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CHAPTER-1 INTRODUCTION TO COST AND MANAGEMENT ACCOUNTING

ILLUSTRATION 1: (Segregation of fixed cost and variable cost)

	Sales value (Rs.)	Total cost (Rs.)
At the Highest volume	1,40,000	72,000
At the Lowest volume	80,000	60,000
	60,000	12,000

Thus, Variable Cost (Rs. 12,000/Rs. 60,000)
= $\frac{1}{5}$ or 20% of sales value = Rs. 28,000 (at highest volume)

Fixed Cost Rs. 72,000 – Rs. 28,000 i.e., (20% of Rs. 1,40,000) = Rs. 44,000.

Alternatively, Rs. 60,000 – Rs. 16,000 (20% of Rs. 80,000) = Rs. 44,000.

ILLUSTRATION 2: (Segregation of fixed cost and variable cost)

Suppose last month the total semi-variable expenses amounted to Rs. 3,000.

If the degree of variability is assumed to be 70%, then variable cost = 70% of Rs. 3,000 = Rs. 2,100.

Fixed cost = Rs. 3,000 – Rs. 2,100 = Rs. 900.

Now in the future months, the fixed cost will remain constant, but the variable cost will vary according to the change in production volume.

Thus, if in the next month production increases by 50%, the total semi-variable expenses will be:

Fixed cost of Rs. 900, plus variable cost viz., Rs. 3,150 i.e., (Rs. 2,100 (V.C.) plus 50% increase of V.C. i.e., Rs. 1,050) =, Rs. 4,050.

ILLUSTRATION 3: (Segregation of fixed cost and variable cost)

	Level of activity	
Capacity %	60%	80%
Volume (Labour hours) or 'x'	150	200
Semi-variable expenses (maintenance of plant) or 'y'	Rs. 1,200	Rs. 1,275

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Substituting the values of 'x' and 'y' in the equation, $y = mx + c$, at both the levels of activity, we get

$$1,200 = 150m + c$$

$$1,275 = 200m + c$$

On solving the above equations, we get the value of 'c'

Fixed cost or 'c' = Rs. 975 and Variable cost or 'm' = Rs. 1.50 per labour hour.

MULTIPLE CHOICE QUESTIONS

1. _____ is anything for which a separate measurement is required.

- (a) Cost unit
- (b) Cost object
- (c) Cost driver
- (d) Cost centre

ANSWER 1-B

2. Which of the following is true about Cost control:

- (a) It is a corrective function
- (b) It challenges the set standards
- (c) It ends when targets achieved
- (d) It is concerned with future

ANSWER 2-C

3. Cost units used in power sector is:

- (a) Kilo meter (K.M)
- (b) Kilowatt-hour (kWh)
- (c) Number of electric points
- (d) Number of hours

ANSWER 3-B

4. Processes Costing method is suitable for

- (a) Transport sector**
- (b) Chemical industries**
- (c) Dam construction**
- (d) Furniture making**

ANSWER 4-B

5. Distinction between direct cost and indirect cost is an example of _____ classification

- (a) By Element**
- (b) By Function**
- (c) By Controllability**
- (d) By Variability**

ANSWER 5-A

6. The advantage of using IT in Cost Accounting does not include:

- (a) Integration of various functions**
- (b) Stock needs to be reconciled with Goods Received Note**
- (c) Reduction in multicity of documents**
- (d) Customised reports can be prepared.**

ANSWER 6-B

7. A taxi provider charges minimum Rs. 80 thereafter Rs. 12 per kilometer of distance travelled, the behaviour of conveyance cost is:

- (a) Fixed Cost**
- (b) Semi-variable Cost**

(c) Variable Cost

(d) Administrative cost.

ANSWER 7-B

8. A Ltd. has three production department, and each department has two machines, which of the following cannot be treated as cost centre for cost allocation:

(a) Machines under the production department

(b) Production departments

(c) Both Production department and machines

(d) A Ltd.

ANSWER 8-D

9. Which of the following is an example of functional classification of cost:

(a) Direct Material Cost

(b) Fixed Cost

(c) Administrative Overheads

(d) Indirect Overheads.

ANSWER 9-C

10. Ticket counter in a Railway Station is an example of

(a) Cost Centre

(b) Revenue Centre

(c) Profit Centre

(d) Investment Centre

ANSWER 10-B



Theoretical Questions

1. DESCRIBE the main objectives of introduction of a Cost and Management Accounting System in a manufacturing organization

ANSWER 1

The main objectives of Cost and Management accounting are explained as below:

(i) Ascertainment of Cost: The main objective of Cost Accounting is accumulation and ascertainment of cost. Costs are **accumulated, assigned and ascertained** for each cost object. This cost object may be a unit, job, operation, process, department or service.

(ii) Determination of Selling Price and Profitability: The cost accounting system helps in determination of selling price and thus profitability of a cost object. Though in a competitive business environment selling prices are determined by external factors but cost accounting system provides a basis for **price fixation and rate negotiation**.

(iii) Cost Control: Maintaining discipline in expenditure is one of the main objectives of a good cost accounting system. It ensures that **expenditures are in consonance with predetermined set standard and any variation from these set standards is noted and reported on continuous basis**. To exercise control over cost, following steps are followed:

- (a) Determination of pre-determined standard or results:
- (b) Measurement of actual performance:
- (c) Comparison of actual performance with set standard or target:
- (d) Analysis of variance and action:

(iv) Cost Reduction: It may be defined "as the achievement of **real and permanent reduction in the unit cost** of goods manufactured or services rendered without impairing their suitability for the use intended or diminution in the quality of the product."

(v) Assisting management in decision making: Cost and Management Accounting by providing relevant information, assist management in planning, implementing, measuring, controlling and evaluating of various activities. A robust cost and management accounting system provides internal and external information to the industry which will be relevant for decision making.

2. Discuss the different cost centres that on organization can have?

ANSWER 2

The cost centres are of two types: (a) Standard Cost Centre and (b) Discretionary Cost Centre

(a) Standard Cost Centre: Cost Centre where output is measurable and input required for the output can be specified. Based on a well-established study, an estimate of standard units of input to produce a unit of output is set. The actual cost for inputs is compared with the standard cost. Any deviation (variance) in cost is measured and analysed into controllable and uncontrollable cost. The manager of the cost centre is expected to comply with the standard and held responsible for adverse cost variances. The input-output ratio for a standard cost centre is clearly identifiable.

(b) Discretionary Cost Centre: The cost centre whose output cannot be measured in financial terms, thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Examples of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and co-related with cost incurred on inputs.

3. DISCUSS cost classification based on variability and controllability.**ANSWER 3****COST CLASSIFICATION BASED ON VARIABILITY**

(a) Fixed costs– These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output. For example, rent, insurance of factory building etc., remain the same for different levels of production.

(b) Variable Costs– These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct material, cost of direct labour, etc.

(c) Semi-variable costs– These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity.

COST CLASSIFICATION BASED ON CONTROLLABILITY

(a) Controllable Costs: - Cost that can be controlled, typically by a cost, profit or investment centre manager is called controllable cost. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the manager heading that responsibility centre. For example, direct costs comprising direct labour, direct material, direct expenses and some of the overheads are generally controllable by the shop floor supervisor or the factory manager.

(b) Uncontrollable Costs - Costs which cannot be influenced by the action of a specified member of an undertaking are known as uncontrollable costs. For example, expenditure incurred by, say, the tool room is controllable by the foreman in-charge of that section but the share of the tool-room expenditure which is apportioned to a machine shop is not controlled by the machine shop foreman.

4. DISCUSS the essential features of a good cost accounting system?**ANSWER 4**

The essential features, which a good cost accounting system should possess, are as follows:

(a) Informative and simple: Cost accounting system should be tailor-made, practical, simple and capable of meeting the requirements of a business concern. The system of costing should not sacrifice the utility by introducing inaccurate and unnecessary details.

(b) Accurate and authentic: The data to be used by the cost accounting system should be accurate and authenticated; otherwise it may distort the output of the system and a wrong decision may be taken.

(c) Uniformity and consistency: There should be uniformity and consistency in classification, treatment and reporting of cost data and related information. This is required for benchmarking and comparability of the results of the system for both horizontal and vertical analysis.

(d) Integrated and inclusive: The cost accounting system should be integrated with other systems like financial accounting, taxation, statistics and operational research etc. to have a complete overview and clarity in results.

(e) Flexible and adaptive: The cost accounting system should be flexible enough to make necessary amendment and modifications in the system to incorporate changes in technological, reporting, regulatory and other requirements.

(f) Trust on the system: Management should have trust on the system and its output. For this, an active role of management is required for the development of such a system that reflects a strong conviction in using information for decision making.

5. DESCRIBE the factors which are to be considered before installing a system of cost accounting.**ANSWER 5**

Before setting up a system of cost accounting the factors mentioned below should be studied:

(a) Objective: The objective of setting up the costing system, for example whether it is being introduced for fixing prices or for establishing a system of cost control.

(b) Nature of Business or Industry: The industry in which the business is operating. Every business or industry has its own uniqueness and objectives. According to its cost information requirement, cost accounting methods are followed. For example, an oil refinery maintains process wise cost accounts to find out the cost incurred on a particular process, say in crude refinement process etc.

(c) Organisational Hierarchy: Costing system should fulfil the information requirements of different levels of management. Top management is concerned with the corporate strategy, strategic level management is concerned with marketing strategy, product diversification, product pricing etc. Operational level management needs the information on standard quantity to be consumed, report on idle time etc.

(d) Knowing the product: Nature of the product determines the type of costing system to be implemented. The product which has by-products requires costing system which accounts for by-products as well. In case of perishable or short self- life products, marginal costing is appropriate to know the contribution and minimum price at which products could be sold.

(e) Knowing the production process: A good costing system can never be established without the complete knowledge of the production process. Cost apportionment can be done on the most appropriate and scientific basis if a cost accountant can identify degree of effort or resources consumed in a particular process. This also includes some basic technical know-how and process peculiarity.

(f) Information synchronisation: Establishment of a department or a system requires substantial amount of organisational resources. While drafting a costing system, information needs of various other departments should be taken into account. For example, in a typical business organisation accounts department needs to submit monthly stock statement to its lender bank, quantity wise stock details at the time of filing returns to tax authorities etc.

(g) Method of maintenance of cost records: The organization must determine beforehand the manner in which Cost and Financial accounts could be inter-locked into a single integral accounting system and how the results of separate sets of accounts i.e. cost and financial, could be reconciled by means of control accounts.

(h) Statutory compliances and audit: Records are to be maintained to comply with statutory requirements and applicable cost accounting standards should be followed.

(i) Information Attributes: Information generated from the Costing system should possess all the attributes of useful information i.e. it should be **complete, accurate, timely, relevant**. to have an effective management information system (MIS).

6. DISCUSS the four different methods of costing along with their applicability to concerned industry.

ANSWER 6

The following table summarises the various methods of costing applied in different industries:

Nature of Output	Method	Cost	Examples of Industries
A Series of Processes	Process costing or Operation Costing	For each process	Sugar
Construction of building	Contract Costing	For each contract	Real estate
Similar units of a Single Product, produced by Single Process	Unit or output or Single Costing	For the entire activity, but averaged for the output	Cold Drinks
Rendering of Services	Operating Costing	For all services	Hospitals
Customer Specifications: single Unit	Job Costing	For each order/ assignment/job	Advertising

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Consisting of multiple varieties of activities and processes	Multiple Costing	Combination of any method	Car Assembly
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7. STATE the method of costing and the suggested unit of cost for the following industries:

- (a) Transport
- (b) Power
- (c) Hotel
- (d) Hospital
- (e) Steel
- (f) Coal
- (g) Bicycles
- (h) Bridge Construction
- (i) Interior Decoration
- (j) Advertising
- (k) Furniture
- (l) Brick-works

ANSWER 7

Nature of industries	method of costing	unit of cost
(a) Transport	Operating Costing	Passenger- kilometer
(b) Power	Operating Costing	Kilo- watt hour (kWh)
(c) Hotel	Operating Costing	Room/meal
(d) Hospital	Operating Costing	Patient day
(e) Steel	Single or Output Costing	Ton
(f) Coal	Single or Output Costing	Tonne/ton
(g) Bicycles	Multiple Costing	Number

(h) Bridge Construction	Contract Costing	Contract, job
(i) Interior Decoration	Job Costing	Chargeable hour, job, contract
(j) Advertising	Job Costing	Chargeable hour, job, contract
(k) Furniture	Job Costing	Chargeable hour, job, contract
(l) Brick-works	Single or Output Costing	1,000 bricks

8. WRITE a note on the following, indicating in which kinds of industries or undertakings, the different methods could be suitably applied:

(a) Single or output costing

(b) Batch Costing

(c) Process costing

(d) Operating Costing

(e) Contract Costing

(f) Multiple Costing

ANSWER 8

Methods	
(a) Single or output costing	Under this method, the cost of a product is ascertained, the product being the only one produced like bricks, coals, etc.
(b) Batch Costing	This method is the extension of job costing. A batch may represent a number of small orders passed through the factory in batch. Each batch here is treated as a unit of cost and thus separately costed. Here cost per unit is determined by dividing the cost of the batch by the number of units produced in the batch.
(c) Process costing	Under this method, the cost of completing each stage of work is ascertained, like cost of making pulp and cost of making paper from pulp. In mechanical operations, the cost of each operation may be ascertained separately; the name given is operation costing.

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(d) Operating Costing	It is used in the case of concerns rendering services like transport, supply of water, retail trade etc.
(e) Contract Costing	Under this method, the cost of each contract is ascertained separately. It is suitable for firms engaged in the construction of bridges, roads, buildings etc.
(f) Multiple Costing	It is a combination of two or more methods of costing outlined above. Suppose a firm manufactures bicycles including its components; the parts will be costed by the system of job or batch costing but the cost of assembling the bicycle will be computed by the Single or output costing method. The whole system of costing is known as multiple costing.



CHAPTER 2: MATERIAL COST**ILLUSTRATION 1**

An invoice in respect of a consignment of chemicals A and B provides the following information:

	(Rs.)
Chemical A: 10,000 kgs. at Rs. 10 per kg.	1,00,000
Chemical B: 8,000 kgs. at Rs. 13 per kg.	1,04,000
Basic custom duty @ 10% (Credit is not allowed)	20,400
Railway freight	3,840
Total cost	2,28,240

A shortage of 500 kgs. in chemical A and 320 kgs. in chemical B is noticed due to normal breakages. You are required to COMPUTE the rate per kg. of each chemical, assuming a provision of 2% for further deterioration.

SOLUTION

Working:

Computation of effective quantity of each chemical available for use

	Chemical A (kg.)	Chemical B (kg.)
Quantity purchased	10,000	8,000
Less: Shortage due to normal breakages	500	320
	9,500	7,680
Less: Provision for deterioration 2%	190	153.6
Quantity available	9,310	7,526.4

Statement showing the computation of rate per kg. of each chemical

	Chemical A (Rs.)	Chemical B (Rs.)
Purchase price 10,000@ Rs.10 per kg, 8,000@Rs.13 per kg	1,00,000	1,04,000
Add: Basic Custom Duty @10%	10,000	10,400
Add: Railway freight (in the ratio of quantity purchased i.e., 5:4)	2,133	1,707
Total cost (A)	1,12,133	1,16,107
Effective Quantity (see working) (B)	9,310 kg.	7,526.4 kg.
Rate per kg. (A ÷ B)	12.04	15.43

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ILLUSTRATION 2 At WHAT price per unit would Part No. A 32 be entered in the Stores Ledger, if the following invoice was received from a supplier:

Invoice	(Rs.)
200 units Part No. A 32 @ Rs. 5	1,000.00
Less: 20% discount	<u>(200.00)</u>
	<u>800.00</u>
Add: IGST @ 12%	<u>96.00</u>
	<u>896.00</u>
Add: Packing charges (5 non-returnable boxes)	<u>50.00</u>
	<u>946.00</u>

(i) A 2 per cent cash discount will be given if payment is made in 30 days. (ii) Documents substantiating payment of IGST are enclosed for claiming Input credit.

SOLUTION

Computation of cost per unit

Net purchase Price	800.00
Add: Packing charges (5 non-returnable boxes)	50.00
	850.00
No. of units purchased	200 units
Cost per unit	4.25

Note: (i) Cash discount is treated as interest and finance charges, hence, it is not considered for valuation of material. (ii) Input credit is available for IGST paid; hence it will not be added to purchase cost.

ILLUSTRATION 3

CALCULATE the Economic Order Quantity from the following information. Also state the number of orders to be placed in a year.

Consumption of materials per annum : 10,000 kg.

Order placing cost per order : Rs. 50

Cost per kg. of raw materials : Rs. 2

Storage costs : 8% on average inventory

SOLUTION

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$$\text{EOQ} = \sqrt{\frac{2 \times A \times O}{C}}$$

A = Units consumed during year = 10,000
 O = Ordering cost per order = 50
 C = Inventory carrying cost per unit per annum. = 8% of ₹ 2

$$\text{EOQ} = \sqrt{\frac{2 \times 10,000 \times 50}{\frac{2 \times 8}{100}}} = \sqrt{\frac{2 \times 10,000 \times 50 \times 25}{4}} = 2,500 \text{ kg}$$

$$\text{No. of orders to be placed in a year} = \frac{\text{Total consumption of materials per annum}}{\text{EOQ}}$$

$$= \frac{10,000 \text{ kg.}}{2,500 \text{ kg.}} = 4 \text{ Orders per year}$$

ILLUSTRATION 4**(i) COMPUTE E.O.Q. and the total variable cost for the following:****Annual Demand = 5,000 units****Unit price = Rs. 20.00****Order cost = Rs. Rs16.00****Storage rate = 2% per annum****Interest rate = 12% per annum****Obsolescence rate = 6% per annum****(ii) DETERMINE the total cost that would result for the items if a new price of Rs. 12.80 is used.****SOLUTION**

(i) Carrying cost (C) = Storage rate = 2%

Interest Rate = 12%

Obsolescence Rate = 6%

Total = 20% per annum

C = 20% of Rs. Rs 20 = Rs. Rs 4 per unit per annum.

$$\text{E.O.Q} = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 5000 \times 16}{4}} = \sqrt{40,000} = 200 \text{ units}$$

Total cost:

Purchase price of 5,000 units @ Rs. 20.00 per unit = Rs. 1,00,000

Ordering cost ==25 orders @ Rs. 16 = Rs. 400 2005000

Carrying cost of average Inventory ==100 units @ Rs. 4 = Rs. 400 2200

Total cost Rs. **1,00,800**

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(ii) If the new price of Rs. 12.80 is used:

$C = 20\%$ of 12.80 = Rs. 2.56 per unit per annum.

$$\text{E.O.Q.} = \sqrt{\frac{2 \times 5,000 \times 16}{2.56}} = 250 \text{ units}$$

Total cost:

Purchase price of 5,000 units @ Rs. 12.80 per unit = Rs. 64,000

Ordering cost == 20 orders @ Rs. Rs 16 = Rs. 320

Carrying cost (of average inventory) = =125 units @ Rs. 2.56= Rs. 320 2502

Total variable cost Rs. **64,640**

ILLUSTRATION 5

Two components, A and B are used as follows:

Normal usage 50 per week each

Maximum usage 75 per week each

Minimum usage 25 per week each

Re-order quantity A: 300; B: 500

Re-order period A: 4 to 6 weeks B: 2 to 4 weeks

CALCULATE for each component

- (a) Re-ordering level,
- (b) Minimum level,
- (c) Maximum level,
- (d) Average stock level.

SOLUTION

(a) Re-ordering level:

Maximum usage per week × Maximum delivery period.

Re-ordering level for component A = 75 units × 6 weeks = **450 units**

Re-ordering level for component B = 75 units × 4 weeks = **300 units**

(b) Minimum level:

Re-order level – (Normal usage × Average period)

Minimum level for component A = 450 units – (50 units × 5 weeks) = 200 units

Minimum level for component B = 300 units – (50 units × 3 weeks) = 150 units

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(c) Maximum level:

Re-order level + Re-order quantity – (Min. usage × Minimum period)

Maximum level for component A = (450 units + 300 units) – (25 units × 4 weeks) = 650 units

Maximum level for component B = (300 units + 500 units) – (25 units × 2 weeks) = 750 units

(d) Average stock level:

$\frac{1}{2}$ (Minimum + Maximum) stock level

Average stock level for component A = $\frac{1}{2}$ (200 units + 650 units) = 425 units.

Average stock level for component B = $\frac{1}{2}$ (150 units + 750 units) = 450 units.

ILLUSTRATION 6

From the details given below, CALCULATE:

(i) Re-ordering level

(ii) Maximum level

(iii) Minimum level

(iv) Danger level.

Re-ordering quantity is to be calculated on the basis of following information:

Cost of placing a purchase order is Rs. 20

Number of units to be purchased during the year is 5,000

Purchase price per unit inclusive of transportation cost is Rs. 50

Annual cost of storage per units is Rs. 5.

Details of lead time : Average- 10 days, Maximum- 15 days, Minimum- 5 days.

For emergency purchases- 4 days.

Rate of consumption : Average: 15 units per day,

Maximum: 20 units per day.

SOLUTION**Basic Data:**

A (Number of units to be purchased annually) = 5,000 units

O (Ordering cost per order) = Rs. 20

C (Annual cost of storage per unit) = Rs. 5

Purchase price per unit inclusive of transportation cost = Rs. 50.

Computations:

(i) Re-ordering level = Maximum usage per period × Maximum lead time

(ROL) = 20 units per day × 15 days = 300 units

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(ii) **Maximum level** = ROL + ROQ – [Min. rate of consumption × Min. (Refer to working notes 1 and 2) lead time]
 = 300 units + 200 units – [10 units per day × 5 days]
 = **450 units**

(iii) **Minimum level** = ROL – Average rate of consumption × Average re-order-period
 = 300 units – (15 units per day × 10 days) = **150 units**

(iv) **Danger level** = Average consumption × Lead time for emergency purchases
 = 15 units per day × 4 days = **60 units**

Working Notes:

1. Minimum rate of consumption per day

$$\text{Av. rate of consumption} = \frac{\text{Minimum rate of consumption} + \text{Maximum rate of consumption}}{2}$$

$$15 \text{ units per day} = \frac{X \text{ units/day} + 20 \text{ units per day}}{2} \quad \text{or} \quad X = 10 \text{ units per day.}$$

2. Re-order Quantity (ROQ) or Economic Order Quantity (EOQ) =

$$\sqrt{\frac{2 \times 5,000 \text{ units} \times ₹ 20}{5}} = 200 \text{ units}$$

ILLUSTRATION 7

M/s Tyrotubes trades in four wheeler tyres and tubes. It stocks sufficient quantity of tyres of almost every vehicle. In year end 2019-20, the report of sales manager revealed that M/s Tyrotubes experienced stock-out of tyres.

The stock-out data is as follows:

Stock-out of Tyres	No. of times of Stock Out
100	2
80	5
50	10
20	20
10	30
0	33

M/s Tyrotubes loses Rs. 150 per unit due to stock-out and spends Rs. 50 per unit on carrying of inventory.

DETERMINE optimum safest stock level.

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SOLUTION**Computation of Stock-out and Inventory carrying cost**

Safety Stock Level (units) (1)	Stock-out (units) (2)	Probability (3)	Stock-out cost (Rs.) (4) = (2) x Rs. 150	Expected stock-out cost (Rs.) (5)=(3)x(4)	Inventory carrying cost (Rs.) (6) =(1)xRs. 50	Total cost (Rs.) (7) = (5)+(6)
100	0	0.00	0	0	5,000	5,000
80	20	0.02	3,000	60	4,000	4,060
50	50	0.02	7,500	150		
	30	0.05	4,500	225		
			12,000	375	2,500	2,875
20	80	0.02	12,000	240		
	60	0.10	9,000	450		
	30	0.05	4,500	450		
			25,500	1,140	1,000	2,140
10	90	0.02	13,500	270		
	70	0.05	10,500	525		
	40	0.10	6,000	600		
	10	0.20	1,500	300		
			31,500	1,695	500	2,195
0	100	0.02	15,000	300		2,700
	80	0.05	12,000	600		
	50	0.10	7,500	750		
	20	0.20	3,000	600		
	10	0.30	1,500	450		
			39,000	2,700	0	2,700

At safety stock level of 20 units, total cost is least i.e. Rs. 2,140.

Working Note:**Computation of Probability of Stock-out**

Stock-out (units)	100	80	50	20	10	0	Total
Nos. of times	2	5	10	20	30	33	100
Probability	0.02	0.05	0.10	0.20	0.30	0.33	1.00

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Safety stock level	Impact
100 units	Any unexpected demand up-to 100 units can be met.
80 units	Stock out will only arise if unexpected demand will be for 100 units. In this case 20 units will remain unsatisfied. The probability of any unexpected demand for 100 units is 0.02.
50 units	Any unexpected demand beyond 50 units will be remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02) 50 units will be unsatisfied. Similarly, if unexpected demand for 80 units arises (probability is 0.05), 30 units will be unsatisfied.
20 units	Any unexpected demand beyond 20 units will be remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02), 80 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 60 units will remain unsatisfied. Similarly, when unexpected demand for 50 units arises (probability is 0.10), 30 units will remain unsatisfied.
10 units	Any unexpected demand beyond 10 units will be remain unsatisfied. If unexpected demand for 100 units arises (probability is 0.02), 90 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 70 units will remain unsatisfied. If unexpected demand for 50 units arises (probability is 0.10), 40 units will remain unsatisfied. Similarly, when unexpected demand for 20 units arises (probability is 0.20), 10 units will remain unsatisfied.
0 unit	When no safety stock level is maintained, any unexpected demand cannot be satisfied. If unexpected demand for 100 units arises (probability is 0.02), 100 units will remain unsatisfied. If unexpected demand for 80 units arises (probability is 0.05), 80 units will remain unsatisfied. If unexpected demand for 50 units arises (probability is 0.10), 50 units will remain unsatisfied. If unexpected demand for 20 units arises (probability is 0.20), 20 units will remain unsatisfied. Similarly, unexpected demand for 10 units (probability is 0.30), 10 units will remain unsatisfied.

ILLUSTRATION 8

From the following details, DRAW a plan of ABC selective control:

Item	Units	Unit cost (Rs.)
1	7000	5.00
2	24000	3.00
3	1500	10.00
4	600	22.00
5	38000	1.50
6	40000	0.50
7	60000	0.20

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8	3000	3.50
9	300	8.00
10	29000	0.40
11	11500	7.10
12	4100	6.20

SOLUTION

Statement of Total Cost and Ranking

Item	Units	% of Total units	Unit cost (Rs.)	Total cost (Rs.)	% of Total cost	Ranking
1	7,000	3.1963	5.00	35,000	9.8378	4
2	24,000	10.9589	3.00	72,000	20.2378	2
3	1,500	0.6849	10.00	15,000	4.2162	7
4	600	0.2740	22.00	13,200	3.7103	8
5	38,000	17.3516	1.50	57,000	16.0216	3
6	40,000	18.2648	0.50	20,000	5.6216	6
7	60,000	27.3973	0.20	12,000	3.3730	9
8	3,000	1.3699	3.50	10,500	2.9513	11
9	300	0.1370	8.00	2,400	0.6746	12
10	29,000	13.2420	0.40	11,600	3.2605	10
11	11,500	5.2512	7.10	81,650	22.9502	1
12	4,100	1.8721	6.20	25,420	7.1451	5
	2,19,000	100		3,55,770	100	

Basis for selective control (Assumed)

Rs. 50,000 & above -- 'A' items

Rs. 15,000 to 50000 -- 'B' items

Below Rs. 15,000 -- 'C' items

On this basis, a plan of A B C selective control is given below:

Ranking	Item Nos.	% of Total units	Cost (Rs.)	% of Total Cost	Category
1	11	5.2512	81,650	22.9502	
2	2	10.9589	72,000	20.2378	
3	5	17.3516	57,000	16.0216	
Total	3	33.5617	2,10,650	59.2096	A
4	1	3.1963	35,000	9.8378	
5	12	1.8721	25,420	7.1451	
6	6	18.2648	20,000	5.6216	
7	3	0.6849	15,000	4.2162	

Total	4	24.0181	95,420	26.8207	B
8	4	0.2740	13,200	3.7103	
9	7	27.3973	12,000	3.3730	
10	10	13.2420	11,600	3.2605	
11	8	1.3699	10,500	2.9513	
12	9	0.1370	2,400	0.6746	
Total	5	42.4202	49,700	13.9697	C
Grand Total	12	100	3,55,770	100	

ILLUSTRATION 9

A factory uses 4,000 varieties of inventory. In terms of inventory holding and inventory usage, the following information is compiled:

No. of varieties of inventory	%	% value of inventory holding (average)	% of inventory usage (in end-product)
3,875	96.875	20	5
110	2.750	30	10
15	0.375	50	85
4,000	100.00	100	100

CLASSIFY the items of inventory as per ABC analysis with reasons.

SOLUTION

Classification of the items of inventory as per ABC analysis

1. 15 number of varieties of inventory items should be classified as 'A' category items because of the following reasons:

- (i) Constitute 0.375% of total number of varieties of inventory handled by stores of factory, which is minimum as per given classification in the table.
- (ii) 50% of total use value of inventory holding (average), which is maximum, according to the given table.
- (iii) Highest in consumption, about 85% of inventory usage (in end-product).

2. 110 number of varieties of inventory items should be classified as 'B' category items because of the following reasons:

- (i) Constitute 2.750% of the total number of varieties of inventory items handled by stores of factory.
- (ii) Requires moderate investment of about 30% of total use value of inventory holding (average).
- (iii) Moderate in consumption, about 10% of inventory usage (in end-product).

3. 3,875 number of varieties of inventory items should be classified as 'C' category items because of the following reasons:

- (i) Constitute 96.875% of total varieties of inventory items handled by stores of factory.
- (ii) Requires about 20% of total use value of inventory holding (average).
- (iii) Minimum inventory consumption, i.e. about 5% of inventory usage (in end-product).

ILLUSTRATION 10

The following data are available in respect of material X for the year ended 31st March, 2020.

	(Rs.)
Opening stock	90,000
Purchases during the year	2,70,000
Closing stock	1,10,000

CALCULATE:

- (i) Inventory turnover ratio, and
- (ii) The number of days for which the average inventory is held.

SOLUTION
Inventory turnover ratio

$$\begin{aligned} \text{(Refer to working note)} &= (\text{Cost of stock of raw material consumed} / \text{Average stock of raw material}) \\ &= (2,50,000 / 1,00,000) = 2.5 \end{aligned}$$

$$\begin{aligned} \text{Average number of days for which the average inventory is held} \\ &= (365 / \text{Inventory Turnover Ratio}) \\ &= (365 \text{ days} / 2.5) \end{aligned}$$

$$= 146 \text{ days}$$

Working Note: (Rs.)

Opening stock of raw material	90,000
Add: Material purchases during the year	2,70,000
Less: Closing stock of raw material	1,10,000
Cost of stock of raw material consumed	2,50,000

ILLUSTRATION 11

From the following data for the year ended 31st March, 2020, CALCULATE the inventory turnover ratio of the two items and put forward your comments on them.

	Material A (Rs.)	Material B (Rs.)
Opening stock 1.04.2019	10,000	9,000
Purchase during the year	52,000	27,000
Closing stock 31.03.2020	6,000	11,000

SOLUTION

First of all, it is necessary to find out the material consumed:

Cost of materials consumed	Material A (Rs.)	Material B (Rs.)
Opening stock	10,000	9,000
Add: Purchases	52,000	27,000
	62,000	36,000
Less: Closing stock	6,000	11,000
Materials consumed	56,000	25,000
Average inventory: (Opening Stock + Closing Stock) ÷ 2	8,000	10,000
Inventory Turnover ratio: (Consumption ÷ Average inventory)	7 times	2.5 times
Inventory Turnover (Number of Days in a year/IT ratio)	52 days	146 days

Comments: Material A is moving faster than Material B.

ILLUSTRATION 12

The following transactions in respect of material Y occurred during the six months ended 30th June, 2020:

Month	Purchase (units)	Price per unit (Rs.)	Issued Units
January	200	25	Nil
February	300	24	250
March	425	26	300
April	475	23	550
May	500	25	800
June	600	20	400

Required:

(a) The Chief Accountant argues that the value of closing stock remains the same no matter which method of pricing of material issues is used. Do you agree? Why or why not? EXPLAIN. Detailed stores ledgers are not required.

(b) STATE when and why would you recommend the LIFO method of pricing material issues?

SOLUTION

(a) Total number of units purchased = 2,500

Total number of units issued = 2,300

The closing stock at the end of six months' period i.e., on 30th June, 2020 will be 200 units

Upto the end of May 2020, total purchases coincide with the total issues i.e., 1,900 units. It means that at the end of May 2020, there was no closing stock. In the month of June 2020, 600 units were purchased out of which 400 units were issued. Since there was only one purchase and one issue in the month of June, 2020 and there was no opening stock on 1st June 2020, the Closing Stock of 200 units is to be valued at Rs. 20 per unit.

In the view of this, the argument of the Chief Accountant appears to be correct. Where there is only one purchase and one issue in a month with no opening stock, the method of pricing of material issues becomes irrelevant. Therefore, in the given case one should agree with the argument of the Chief Accountant that the value of closing stock remains the **same** no matter which method of pricing the issue is used.

It may, however, be noted that the argument of Chief Accountant would not stand if one finds the value of the Closing Stock at the end of each month.

(b) LIFO method has an edge over FIFO or any other method of pricing material issues due to the following advantages:

(i) The cost of the materials issued will be either nearer or will reflect the current market price. Thus, the cost of goods produced will be related to the trend of the market price of materials. Such a trend in price of materials enables the matching of cost of production with current sales revenues.

(ii) The use of the method during the period of rising prices does not reflect undue high profit in the income statement, as it was under the first-in-first-out or average method. In fact, the profit shown here is relatively lower because the cost of production takes into account the rising trend of material prices.

(iii) In the case of falling prices, profit tends to rise due to lower material cost, yet the finished products appear to be more competitive and are at market price.

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(iv) During the period of inflation, LIFO will tend to show the correct profit and thus, avoid paying undue taxes to some extent.

ILLUSTRATION 13

The following information is provided by Sunrise Industries for the fortnight of April, 2020:

Material Exe:

Stock on 1-4-2020 100 units at Rs. 5 per unit.

Purchases

5-4-2020, 300 units at Rs. 6

8-4-2020, 500 units at Rs. 7

12-4-2020, 600 units at Rs. 8

Issues

6-4-2020, 250 units

10-4-2020, 400 units

14-4-2020, 500 units

Required:

(A) CALCULATE using FIFO and LIFO methods of pricing issues:

(a) the value of materials consumed during the period

(b) the value of stock of materials on 15-4-2020.

(B) EXPLAIN why the figures in (a) and (b) in part A of this question are different under the two methods of pricing of material issues used. You need not draw up the Stores Ledgers.

SOLUTION

(A) (a) Value of Material Exe consumed during the period 1-4-2020 to 15-4-2020 by using FIFO method.

Date	Description Units	Qty. (Units)	Rate (Rs.)	Amount (Rs.)
1-4-2020	Opening balance	100	5	500
5-4-2020	Purchased	300	6	1,800
6-4-2020	Issued	100	5	1,400
		150	6	
8-4-2020	Purchased	500	7	3,500
10-4-2020	Issued	150	6	2,650
		250	7	
12-4-2020	Purchased	600	8	4,800
14-4-2020	Issued	250	7	3,750
		250	8	
15-4-2020	Balance	350	8	2,800

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Total value of material Exe consumed during the period under FIFO method comes to (Rs. 1,400 + Rs. 2,650 + Rs. 3,750) Rs. 7,800 and balance on 15-4-2020 is of Rs. 2,800.

Value of material Exe consumed during the period 01-4-2020 to 15-4-2020 by using LIFO method

Date	Description	Qty. (Units)	Rate (Rs.)	Amount (Rs.)
1-4-2020	Opening balance	100	5	500
5-4-2020	Purchased	300	6	1,800
6-4-2020	Issued	250	6	1,500
8-4-2020	Purchased	500	7	3,500
10-4-2020	Issued	400	7	2,800
12-4-2020	Purchased	600	8	4,800
14-4-2020	Issued	500	8	4,000
15-4-2020	Balance	350	—	2,300*

Total value of material Exe issued under LIFO method comes to (Rs. 1,500 + Rs. 2,800 + Rs. 4,000) Rs. 8,300.

*The balance 350 units on 15-4-2020 of Rs. 2,300, relates to opening balance on 1-4-2020 and purchases made on 5-4-2020, 8-4-2020 and 12-4-2020. (100 units @ Rs. 5, 50 units @ Rs. 6, 100 units @ Rs. 7 and 100 units @ Rs. 8).

(b) As shown in (a) above, the value of stock of materials on 15-4-2020:

Under FIFO method Rs. 2,800

Under LIFO method Rs. 2,300

(B) Total value of material Exe issued to production under FIFO and LIFO methods comes to Rs. 7,800 and Rs. 8,300 respectively. The value of closing stock of material Exe on 15-4-2020 under FIFO and LIFO methods comes to Rs. 2,800 and Rs. 2,300 respectively.

The reasons for the difference of Rs. 500 (Rs. 8,300 – Rs. 7,800) as shown by the following table in the value of material Exe, issued to production under FIFO and LIFO is as follows:

Date	Quantity Issued (Units)	Value-FIFO (Rs.)	Total (Rs.)	Value-LIFO (Rs.)	Total (Rs.)
6 - 4 - 2020	250	1400		1500	
10 - 4 - 2020	400	2650		2800	
14-4-2020	500	3750	7800	4000	8300

1. On 6-4-2020, 250 units were issued to production. Under FIFO their value comes to Rs. 1,400 (100 units \times Rs. 5 + 150 units \times Rs. 6) and under LIFO Rs. 1,500 (250 \times Rs. 6). Hence, Rs. 100 more was charged to production under LIFO.

2. On 10-4-2020, 400 units were issued to production. Under FIFO their value comes to Rs. 2,650 (150 \times Rs. 6 + 250 \times Rs. 7) and under LIFO Rs. 2,800 (400 \times Rs. 7). Hence, Rs. 150 more was charged to production under LIFO.

3. On 14-4-2020, 500 units were issued to production. Under FIFO their value comes to Rs. 3,750 (250 \times Rs. 7 + 250 \times Rs. 8) and under LIFO Rs. 4,000 (500 \times Rs. 8). Hence, Rs. 250 more was charged to production under LIFO.

Thus the total excess amount charged to production under LIFO comes to Rs. 500.

The reasons for the difference of Rs. 500 (Rs. 2,800 – Rs. 2,300) in the value of 350 units of Closing Stock of material Exe under FIFO and LIFO are as follows:

1. In the case of FIFO, all the 350 units of the closing stock belongs to the purchase of material made on 12-4-2020, whereas under LIFO these units were from opening balance and purchases made on 5-4-2020, 8-4-2020 and 12-4-2020.

2. Due to different purchase price paid by the concern on different days of purchase, the value of closing stock differed under FIFO and LIFO. Under FIFO 350 units of closing stock were valued @ Rs. 8 p.u. Whereas under LIFO first 100 units were valued @ Rs. 5 p.u., next 50 units @ Rs. 6 p.u., next 100 units @ Rs. 7 p.u. and last 100 units @ Rs. 8 p.u. Thus, under FIFO, the value of closing stock increased by Rs. 500.

(iv) Base Stock Method: Minimum quantity of stock under this method is **always held at a fixed price as reserve in the stock, to meet the state of emergency**, if it arises. This minimum stock is known as base stock and is valued at a price at which the first lot of materials is received and remains unaffected by subsequent price fluctuations. This method of valuing inventory is different from other methods of valuing issues, as the base stock of materials are valued at the original cost, whereas, materials other than the base are valued using other methods like FIFO, LIFO etc. This method is not an independent method as it uses FIFO or LIFO. Advantages and disadvantages of this method depend upon the use of the other method viz., FIFO or LIFO.

ILLUSTRATION 14:

Arnav Electronics manufactures electronic home appliances. It follows weighted average Cost method for inventory valuation. Following are the data of component X:

Date	Particulars	Units	Rate per unit (Rs.)
15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order- 008)	10,000	-
05-01-20	MRN**-003 (against the Purchase Order- 008)	500	-
06-01-20	Material Requisition-011	3,000	-
07-01-20	Purchase Order- 010	10,000	9,750
10-01-20	Material Requisition-012	4,500	-
12-01-20	GRN-009 (against the Purchase Order- 009)	10,000	-
13-01-20	MRN-004 (against the Purchase Order- 009)	400	-
15-01-20	Material Requisition-013	2,200	-
24-01-20	Material Requisition-014	1,500	-
25-01-20	GRN-010 (against the Purchase Order- 010)	10,000	-
28-01-20	Material Requisition-015	4,000	-
31-01-20	Material Requisition-016	3,200	-

*GRN- Goods Received Note; **MRN- Material Returned Note

Based on the above data, you are required to CALCULATE:

- (i) Re-order level
- (ii) Maximum stock level
- (iii) Minimum stock level
- (iv) PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.
- (v) Value of components used during the month of January, 2020.
- (vi) Inventory turnover ratio.

SOLUTION

1. Workings:

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-20)

Minimum component usage = 1,500 units (Material requisition on 24-01-20)

Lead time is calculated from purchase order date to material received date

Maximum lead time = 21 days (15-12-2019 to 05-01-2020)

Minimum lead time = 14 days (30-12-2019 to 13-01-2020)
 2. Reorder quantity (observed) = 10,000 units
 3.

Date	Material Requisition number	Units
06-01-2020	11	3,000
10-01-2020	12	4,500 (Maximum)
15-01-2020	13	2,200
24-01-2020	14	1,500 (Minimum)
28-01-2020	15	4,000
31-01-2020	16	3,200

Calculations:

(i) Re-order level

= Maximum usage × Maximum lead time

= 4,500 units × 21 days = 94,500 units

(ii) Maximum stock level

= Re-order level + Re-order Quantity – (Min. Usage × Min. lead time)

= 94,500 units + 10,000 units – (1,500 units × 14 days)

= 1,04,500 units – 21,000 units = 83,500 units

(iii) Minimum stock level

= Re-order level – (Avg. consumption × Avg. lead time)

= 94,500 units – (3,000 units × 17.5 days)

= 94,500 units – 52,500 units

= 42,000 units

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(iv) Store Ledger for the month of January 2020: (Weighted Average Method)

Date	Receipts				Issue				Balance		
	GR N/ MR N	Units	Rate	Amt. (‘000)	MR N/ MR	Units	Rate	Amt. (‘000)	Units	Rate	Amt. (‘000)
01-01-20	-	-	-	-	-	-	-	-	3500	9810	34335
05-01-20	008	10000	9930	99300	003	500	9930	4965	13000	9898	128670
06-01-20	-	-	-	-	011	3000	9898	29694	10000	9898	98980
10-01-20	-	-	-	-	012	4500	9898	44541	5500	9898	54339
12-01-20	009	10000	9780	97800	004	400	9780	3912	15100	9823	148327
15-01-20	-	-	-	-	013	2200	9823	21611	12900	9823	126716
24-01-20	-	-	-	-	014	1500	9823	14734	11400	9823	111982
25-01-20	010	10000	9750	97500	-	-	-	-	21400	9789	209482
28-01-20	-	-	-	-	015	4000	9789	39156	17400	9789	170326
31-01-20	-	-	-	-	016	3200	9789	31325	14200	9789	139001

[Note: Decimal figures may be rounded-off to the nearest rupee value wherever required]

Value of 14,200 units of stock as on 31-01-2020 (‘000) = Rs.1,39,001

(v) Value of components used during the month of January 2020:

Sum of material requisitions 011 to 016 (‘000)

= Rs. 29,694 + Rs. 44,541 + Rs. 21,611 + Rs. 14,734 + Rs. 39,156 + Rs. 31,325

= Rs. 1,81,061

(vi) Inventory Turnover Ratio

$$= \frac{\text{Value of materials used}}{\text{Average stock value}} = \frac{1,81,061}{(1,39,001 + 34,335) / 2} = \frac{1,81,061}{86,668} = 2.09$$

ILLUSTRATION 15

SKD Company Ltd., not registered under GST, purchased material P from a company which is registered under GST. The following information is available for the one lot of 1,000 units of material purchased:

Listed price of one lot ₹ 50,000

Trade discount @ 10% on Listed price

CGST and SGST (Credit Not available) 12% (6% CGST + 6% SGST)

Cash discount @10%

(Will be given only if payment is made within 30 days.)

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Freight and Insurance ₹ 3,400
Toll Tax paid ₹ 1,000

Demurrage ₹ 1,000
Commission and brokerage on purchases ₹ 2,000

Amount deposited for returnable containers ₹ 6,000
Amount of refund on returning the container ₹ 4,000

Other Expenses @ 2% of total cost
20% of material shortage is due to normal reasons.
The payment to the supplier was made within 20 days of the purchases.

You are required to calculate cost per unit of material purchased to SKD Company Ltd.

SOLUTION
Computation of Total cost of material purchased of SKD Manufacturing Company

	Units	(₹)
Listed Price of Materials	1,000	50,000
Less: Trade discount @ 10% on invoice price		(5,000)
		45,000
Add: CGST @ 6% of ₹ 45,000		2,700
Add: SGST @ 6% of ₹ 45,000		2,700
50,400		
Add: Toll Tax		1,000
Freight and Insurance		3,400
Commission and Brokerage Paid		2,000
Add: Cost of returnable containers: Amount deposited ₹ 6,000 Less: Amount refunded ₹ 4,000		2,000
58,800		
Add: Other Expenses @ 2% of Total Cost (₹ 58,800 × 2 / 98)		1,200
Total cost of material		60,000
Less: Shortage due to Normal Loss @ 20%	200	-
Total cost of material of good units	800	60,000
Cost per unit (₹ 60,000/800 units)		75

Note:

1. GST is payable on net price i.e., listed price less discount.
2. Cash discount is treated as interest and finance charges; hence it is ignored.
3. Demurrage is penalty imposed by the transporter for delay in uploading or off-loading of materials. It is an abnormal cost and not included.
4. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

ILLUSTRATION 16

IPL Limited uses a small casting in one of its finished products. The castings are purchased from a foundry. IPL Limited purchases 54,000 castings per year at a cost of ₹ 800 per casting.

The castings are used evenly throughout the year in the production process on a 360-days-per-year basis. The company estimates that it costs ₹ 9,000 to place a single purchase order and about ₹ 300 to carry one casting in inventory for a year. The high carrying costs result from the need to keep the castings in carefully controlled temperature and humidity conditions, and from the high cost of insurance.

Delivery from the foundry generally takes 6 days, but it can take as much as 10 days. The days of delivery time and percentage of their occurrence are shown in the following tabulation:

Delivery time (days) : 6 7 8 9 10

Percentage of occurrence : 75 10 5 5 5

Required:

(i) Compute the economic order quantity (EOQ).

(ii) Assume the company is willing to assume a 15% risk of being out of stock. What would be the safety stock? The re-order point?

(iii) Assume the company is willing to assume a 5% risk of being out of stock. What would be the safety stock? The re-order point?

(iv) Assume 5% stock-out risk. What would be the total cost of ordering and carrying inventory for one year?

(v) Refer to the original data. Assume that using process re-engineering the company reduces its cost of placing a purchase order to only ₹ 600. In addition, company estimates that when the waste and inefficiency caused by inventories are considered, the true cost of carrying a unit in stock is ₹ 720 per year.

(a) Compute the new EOQ.

(b) How frequently would the company be placing an order, as compared to the old purchasing policy?

ANSWER

(i) Computation of economic order quantity (EOQ)

Annual requirement (A) = 54,000 castings

Cost per casting (C) = ₹ 800

Ordering cost (O) = ₹ 9,000 per order

Carrying cost per casting p.a. (C × i) = ₹ 300

$EOQ = \sqrt{2AO / (C \times i)}$

$= \sqrt{(2 \times 54,000 \text{ units} \times ₹ 9,000) / (₹ 300)}$

$= 1,800 \text{ castings}$

(ii) Safety stock (Assuming a 15% risk of being out of stock)

From the probability table given in the question, we can see that 85% certainty in delivery time is achieved when delivery period is 7 days i.e. at 15% risk level of being out of stock, the maximum delivery period should not exceed 7 days.

Safety stock = (Annual demand / 360 days) × (Max. lead time - Avg. lead time)

$= (54,000 \text{ units} / 360 \text{ days}) \times (7 \text{ days} - 6 \text{ days})$

$= 150 \text{ castings}$

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Re-order point (level) = Safety Stock + Average lead time consumption
 = 150 units + (6 days × 150 units) = 1,050 castings.

(iii) Safety stocks (Assuming a 5% risk of being out of stock)

From the probability table given in the question, we can see that 95% certainty in delivery time is achieved when delivery period is 9 days i.e. at 5% risk level of being out of stock, the maximum delivery period should not exceed 9 days.

Safety stock = (Annual demand / 360 days) × (Max. lead time - Avg. lead time)
 = (54,000 units / 360 days) × (9 days - 6 days)
 = 450 castings

Re-order point (level) = Safety Stock + Average lead time consumption
 = 450 units + (6 days × 150 units) = 1,350 castings.

(iv) At 5% stock-out risk the total cost of ordering and carrying cost is as follows:

Total cost of ordering = (Annual demand / EOQ) × Cost per order
 = (54,000 units / 1,800 units) × ₹ 9,000 = ₹ 2,70,000

Total cost of carrying = (Safety Stock + ½ EOQ) × Carrying cost per unit p.a.
 = (450 units + ½ × 1,800 units) ₹ 300 = ₹ 4,05,000

(v) (a) Computation of new EOQ:

EOQ = $\sqrt{(2 \times 54,000 \text{ units} \times ₹ 600) / ₹ 720} = 300 \text{ castings}$

(b) Total number of orders to be placed in a year are (54,000 units / 300 units) = 180 times

Under new purchasing policy IPL Ltd. has to place order in every 2nd day, however under the old purchasing policy it was every 12th day.

ILLUSTRATION 17

Imbrios India Ltd. is recently incorporated start-up company back in the year 2019. It is engaged in creating Embedded products and Internet of Things (IoT) solutions for the Industrial market. It is focused on innovation, design, research and development of products and services. One of its embedded products is LogMax, a system on module (SoM) Carrier board for industrial use. It is a small, flexible and embedded computer designed as per industry specifications. In the beginning of the month of September 2021, company entered into a job agreement of providing 4800 LogMax to NIT, Mandi. Following details w.r.t. issues, receipts, returns of Store Department handling Micro-controller, a component used in the designated assembling process have been extracted for the month of September, 2021:

Sep. 1	Opening stock of 6,000 units @ ₹ 285 per unit
Sep. 8	Issued 4875 units to mechanical division vide material requisition no. Mech 009/20
Sep. 9	Received 17,500 units @ ₹ 276 per unit vide purchase order no. 159/2020
Sep. 10	Issued 12,000 units to technical division vide material requisition no. Tech 012/20
Sep. 12	Returned to stores 2375 units by technical division against material requisition no. Tech 012/20.
Sep. 15	Received 9,000 units @ ₹ 288 per units vide purchase order no. 160/ 2020
Sep. 17	Returned to supplier 700 units out of quantity received vide purchase order no. 160/2020.
Sep. 20	Issued 9,500 units to technical division vide material requisition no. Tech 165/20

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On 25th September, 2021, the stock manager of the company expressed his need to leave for his hometown due to certain contingency and immediately left the job same day. Later, he also switched his phone off.

As the company has the tendency of stock-taking every end of the month to check and report for the loss due to rusting of the components, the new stock manager, on 30th September, 2021, found that 900 units of Micro-controllers were missing which was apparently misappropriated by the former stock manager. He, further, reported loss of 300 units due to rusting of the components.

From the above information you are REQUIRED to prepare the Stock Ledger account using 'Weighted Average' method of valuing the issues.

SOLUTION
Store Ledger of Imbrios India Ltd. (Weighted Average Method)

Date	Receipts			Issue			Balance		
	Sep	Units (kg)	Rate	Amt. ('000)	Units (kg)	Rate	Amt. ('000)	Units (kg)	Rate
1	-	-	-	-	-	-	6,000	285.00	17,10,000
8	-	-	-	4,875	285.00	13,89,375	1,125	285.00	3,20,625
9	17,500	276.00	48,30,000	-	-	-	18,625	276.54	51,50,625
10	-	-	-	12,000	276.54	33,18,480	6,625	276.54	18,32,145
12	2,375	276.54	6,56,783	-	-	-	9,000	276.54	24,88,928
15	9,000	288.00	25,92,000	-	-	-	18,000	282.27	50,82,928
17	-	-	-	700	288.00	2,01,600	17,300	282.04	48,79,328
20	-	-	-	9,500	282.04	26,79,380	7,800	282.04	2,19,948
30	-	-	-	900*	282.04	2,53,836	6,900	282.04	19,46,112
30	-	-	-	300**	-	-	6,600	294.87	19,46,112

* 900 units is abnormal loss, hence it will be transferred to Costing Profit & Loss A/c. ** 300 units is normal loss, hence it will be absorbed by good units.

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CA INTER COSTING MA COMPILER 4.0**MCQs based Questions**

1. Direct material can be classified as

- (a) Fixed cost**
- (b) Variable cost**
- (c) Semi-variable cost.**
- (d) Prime Cost**

ANSWER 1-B

2. In most of the industries, the most important element of cost is

- (a) Material**
- (b) Labour**
- (c) Overheads**
- (d) Administration Cost**

ANSWER 2-A

3. Which of the following is considered to be the normal loss of materials?

- (a) Loss due to accidents**
- (b) Pilferage**
- (c) Loss due to breaking the bulk**
- (d) Loss due to careless handling of materials.**

ANSWER 3-C

4. In which of following methods of pricing, costs lag behind the current economic values?

- (a) Last-in-first out price**
- (b) First-in-first out price**
- (c) Replacement price**
- (d) Weighted average price**

ANSWER 4-B

5. Continuous stock taking is a part of

- (a) Annual stock taking**
- (b) Perpetual inventory**
- (c) ABC analysis.**
- (d) Bin Cards**

ANSWER 5-B

6. In which of the following methods, issues of materials are priced at pre-determined rate?

- (a) Inflated price method**
- (b) Standard price method**
- (c) Replacement price method**
- (d) Market price method.**

ANSWER 6-B

7. When material prices fluctuate widely, the method of pricing that gives absurd results is

- (a) Simple average price**
- (b) Weighted average price**
- (c) Moving average price**
- (d) Inflated price.**

ANSWER 7-A

8. When prices fluctuate widely, the method that will smooth out the effect of fluctuations is

- (a) Simple average**
- (b) Weighted average**
- (c) FIFO**
- (d) LIFO**

ANSWER 8-B

9. Under the FSN system of inventory control, inventory is classified on the basis of:

- (a) Volume of material consumption**
- (b) Frequency of usage of items of inventory**
- (c) Criticality of the item of inventory for production**
- (d) Value of items of inventory**

ANSWER 9-B

10. Materials are issued to and from one process to another, on the basis of:

- (a) Material Transfer Note**
- (b) Material Requisition Note**
- (c) Bill of Materials**
- (d) Purchase Requisition Note**

ANSWER 10- B

Theoretical Questions

1. STATE how normal and abnormal loss of material arising during storage are treated in Cost Accounts?
ANSWER 1

Loss of materials during handling, storage, process may occur any of the following forms:

(i) Waste: The portion of raw material which is lost during storage or production and discarded. The waste may or may not have any value.

Treatment of Waste Normal- Cost of normal waste is absorbed by good production units.

Abnormal- The cost of abnormal loss is transferred to Costing Profit and loss account.

(ii) Scrap: The materials which are discarded and disposed-off without further treatment. Generally, scrap has either no value or insignificant value. Sometimes, it may be reintroduced into the process as raw material.

Treatment of Scrap Normal- The cost of scrap is borne by good units and income arises on account of realisable value is deducted from the cost.

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Abnormal- The scrap account should be charged with full cost. The credit is given to the job or process concerned. The profit or loss in the scrap account, on realisation, will be transferred to the Costing Profit and Loss Account.

(iii) Spoilage: It is the term used for materials which are badly damaged in manufacturing operations, and they cannot be rectified economically and hence taken out of the process to be disposed off in some manner without further processing.

Treatment of Spoilage Normal- Normal spoilage (i.e., which is inherent in the operation) costs are included in costs, either by charging the loss due to spoilage to the production order or by charging it to the production overhead so that it is spread over all the products.

Any value realised from spoilage is credited to production order or production overhead account, as the case may be.

Abnormal- The cost of abnormal spoilage (i.e., arising out of causes not inherent in manufacturing process) is charged to the Costing Profit and Loss Account. When spoiled work is the result of rigid specification, the cost of spoiled work is absorbed by good production while the cost of disposal is charged to production overhead.

(iv) Defectives: It signifies those units or portions of production which do not meet the quality standards. Defectives arise due to sub-standard materials, bad-supervision, bad-planning, poor workmanship, inadequate-equipment and careless inspection.

The defectives which can be re-made as per the quality standard by using additional materials are known as reworks. Reworks include repairs, reconditioning and refurbishing.

Defectives which cannot be brought up to the quality standards are known as rejects. The rejects may either be disposed- off or re-cycled for production process.

Treatment of Defectives:

Normal- An amount equal to the cost less realisable value on sale of defectives are charged to material cost of good production.

Abnormal- Material Cost of abnormal defectives are not included in material cost but treated as loss after giving credit to the realisable value of such defectives. The material cost of abnormal loss is transferred to costing profit and loss account.

2. DISTINGUISH clearly between Bin cards and Stores Ledger.

ANSWER 2

Difference between Bin Card & Stores Ledger

Bin Card	Stores Ledger
It is maintained by the storekeeper in the store.	It is maintained in cost accounting department.
It contains only quantitative details of material received, issued and returned to stores.	It contains information both in quantity and value.

Entries are made when transaction takes place.	It is always posted after the transaction.
Each transaction is individually posted.	Transactions may be summarized and then posted.
Inter-department transfers do not appear in Bin Card.	Material transfers from one job to another job are recorded for costing purposes.

3. DISCUSS the accounting treatment of defectives in Cost Accounts.

ANSWER 3

Treatment of Defectives:

Normal- An amount equal to the cost less realisable value on sale of defectives are charged to material cost of good production.

Abnormal- Material Cost of abnormal defectives are not included in material cost but treated as loss after giving credit to the realisable value of such defectives. The material cost of abnormal loss is transferred to costing profit and loss account.

4. EXPLAIN the concept of "ABC Analysis" as a technique of inventory control.

ANSWER 4

ABC Analysis: This system exercises discriminating control over different items of inventory on the basis of the investment involved. Usually the items are classified into three categories according to their relative importance, namely, their value and frequency of replenishment during a period.

(i) 'A' Category: This category of items consists of only a small percentage i.e., about 10% of the total items handled by the stores but require heavy investment about 70% of inventory value, because of their **high prices or heavy requirement** or both. Items under this category can be controlled effectively by using a regular system which ensures neither over-stocking nor shortage of materials for production. Such a system plans its total material requirements by making budgets. The stocks of materials are controlled by fixing certain levels like maximum level, minimum level and re-order level.

(ii) 'B' Category: This category of items is relatively less important; they may be 20% of the total items of material handled by stores. The percentage of investment required is about 20% of the total investment in inventories. In the case of these items, as the sum involved is **moderate**, the same degree of control as applied in 'A' category of items is not warranted. The orders for the items, belonging to this category may be placed after reviewing their situation periodically.

(iii) 'C' Category: This category of items does not require much investment; it may be about 10% of total inventory value but they are nearly 70% of the total items handled by store. For these category of items, there is no need of exercising con-stant control. Orders for items in this group may be placed either after six months or once in a year, after ascertaining consumption requirements. In this case the objective is to economies on ordering and handling costs.

5. DISTINGUISH between Re-order level and Re-order quantity.

ANSWER 5

(i) Re-order Stock Level (ROL): This level lies between minimum and the maximum levels in such a way that before the material ordered is received into the stores, there is sufficient quantity in hand to cover both normal and abnormal consumption situations. In other words, it is the level at which fresh order should be placed for replenishment of stock.

It is calculated as:

Maximum Consumption = The maximum rate of material consumption in production activity

Maximum Re-order period = The maximum time to get order from supplier to the stores

This can also be calculated alternatively as below:

Minimum Stock Level = Minimum Stock level that must be maintained all the time.

Average Rate of Consumption = Average rate of material consumption in production activity.

It is also known as normal consumption/ usage

Average Re-order period = Average time to get an order from supplier to the stores. It is also known as normal period.

(Re-order period is also known as Lead time)

(ii) Re-Order Quantity: Re-order quantity is the quantity of materials for which purchase requisition is made by the store department. While setting the quantity to be re-ordered, consideration is given to the maintenance of minimum level of stock, re-order level, minimum delivery time and the most important the cost. Hence, **the quantity should be where, the total of carrying cost and ordering cost is at minimum.** For this purpose, an economic order quantity should be calculated.

6. EXPLAIN how is slow moving and non-moving item of stores detected and what steps are necessary to reduce such stocks?

ANSWER 6

Fast Moving, Slow Moving and Non Moving (FSN) Inventory: It is also known as FNS (Fast, Normal and Slow moving) classification of inventory analysis. Under this system, inventories are controlled by classifying them **on the basis of frequency of usage**. The classification of items into these three categories depends on the nature and managerial discretion. A threshold range on the basis of inventory turnover is decided and classified accordingly.

- (i) **Fast Moving**- This category of items are placed nearer to store issue point and the stock is reviewed frequently for making of fresh orders.
- (ii) **Slow Moving**- This category of items are stored little far and stock is reviewed periodically for any obsolescence. and may be shifted to Non-moving category.
- (iii) **Non Moving**- This category of items are kept for disposal. This category of items is reported to the management and an appropriate provision for loss may be created.

Some of the reasons for slow moving and non-moving inventories are stated below:

- (i) Failure of production management to communicate the updated requirement to the stores management
- (ii) Technological upgradation in terms of new machine requiring new kind of material or existing material becoming obsolete.
- (iii) Lack of periodic review of inventories.

By careful observation, timely identification and adoption of inventory management techniques such as maintenance of minimum level or just in time approach, one can manage slow moving and non-moving inventories. We may calculate inventory turnover ratio and present the reports of comparison of actual and standards with variations, if any to the management.

7. Write short notes on following:

- (i) **Danger Level**
- (ii) **Just in Time Inventory Management**
- (iii) **Maximum stock level and Minimum Stock level**
- (iv) **Obsolescence**

ANSWER 7

(i) **Danger level:** It is the level at which normal issues of the raw material inventory are stopped and emergency issues are only made.

It can be calculated as below:

$\text{Danger Level} = \text{Average Consumption} \times \text{Lead time for emergency purchase}$

*Some time minimum consumption is also used.

(ii) JIT is a system of inventory management with an approach to have a **zero inventories in stores**. According to this approach material should only be purchased when it is actually required for production. JIT is based on two principles

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(i) Produce goods only when it is required and

(ii) the products should be delivered to customers at the time only when they want.

It is also known as 'Demand pull' or 'Pull through' system of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase.

(iii) Minimum Stock Level: It is lowest level of material stock, which must be maintained in hand at all times, so that there is no stoppage of production due to non-availability of inventory.

It is calculated as below:

Minimum Stock Level = Re-order Stock Level -(Average Consumption Rate × Average Re-order Period)

Maximum Stock Level: It is the highest level of quantity for any material which can be held in stock at any time. Any quantity beyond this level cause extra amount of expenditure due to engagement of fund, cost of storage, obsolescence etc.

It can be calculated as below:

Maximum Stock Level = Re-order Level + Re-order Quantity - (Minimum Consumption Rate × Minimum Re-order Period)

Here, Re-order Quantity may be EOQ

(iv) Obsolescence is defined as "the loss in the intrinsic value of an asset due to its supersession". In simple words, obsolescence refers to the loss in the value of an asset due to technological advancements.

Treatment: Materials may become obsolete under any of the following circumstances: (i) where it is a spare part or a component of a machinery that is used in manufacturing and is now obsolete; (ii) where it is used in the manufacturing of a product which has now become obsolete; (iii) where the material itself is replaced by another material due to either improved quality or fall in price. In all the three cases, the value of the obsolete material held in stock is a total loss and immediate steps should be taken to dispose it off at the best available price. The loss arising out of obsolete materials is an abnormal loss and it does not form part of the cost of manufacture.

Practical Problems

1. Anil & Company buys its annual requirement of 36,000 units in 6 instalments. Each unit costs Rs. 1 and the ordering cost is Rs.25. The inventory carrying cost is estimated at 20% of unit value. FIND the total annual cost of the existing inventory policy. CALCULATE, how much money can be saved by Economic Order Quantity?

ANSWER 1

(a) **Total Annual Cost in Existing Inventory Policy (Rs.)**

Ordering cost (6 orders @ Rs. 25)	150
Carrying cost of average inventory (36,000 ÷ 6) = 6,000 units per order	
Average inventory = 3,000 units	
Carrying cost = 20% of Rs. 1 × 3,000 = 3,000 × 0.20	600
Total cost	A 750

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(b) Total Annual Cost in E.O.Q

$$\sqrt{(2 \times 36,000 \times 25) / (1 \times 20\%)} = 3000 \text{ units}$$

No. of orders = $36,000 \div 3,000 \text{ units} = 12 \text{ orders}$

Ordering cost ($12 \times \text{Rs. Rs } 25$) = 300

Carrying cost of average inventory ($3,000 \times 0.20$) $\div 2 =$ 300

Total Cost **B 600**

Savings due to E.O.Q Rs. (750 – 600) (A – B) **150**

2. A Company manufactures a special product which requires a component 'Alpha'. The following particulars are collected for the year 2020:

(i) Annual demand of Alpha 8,000 units

(ii) Cost of placing an order Rs. 200 per order

(iii) Cost per unit of Alpha Rs. 400

(iv) Carrying cost p.a. 20%

The company has been offered a quantity discount of 4 % on the purchase of 'Alpha' provided the order size is 4,000 components at a time.

Required:

(i) COMPUTE the economic order quantity

(ii) STATE whether the quantity discount offer can be accepted.

ANSWER 2

(i) Calculation of Economic Order Quantity

$$\text{EOQ} = \sqrt{2AO/C} = \sqrt{(2 \times 8,000 \text{ units} \times 200) / (400 \times 20/100)} = 200 \text{ units}$$

(ii) Evaluation of Profitability of Different Options of Order Quantity

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(a) When EOQ is ordered

		(Rs.)
Purchase Cost	(8,000 units x Rs. 400)	32,00,000
Ordering Cost	[(8,000 units/200 units) x Rs. 200]	8,000
Carrying Cost	(200 units x Rs.400 x ½ 20/100)	8,000
Total Cost		32,16,000

(b) When Quantity Discount is accepted

		(Rs.)
Purchase Cost	(8,000 units x Rs. 384)	32,00,000
Ordering Cost	[(8,000 units/4000 units) x Rs. 200]	8,000
Carrying Cost	(200 units x Rs.400 x ½ 20/100)	8,000
Total Cost		32,16,000

*Unit Cost Rs.400

Less Quantity Discount @ 4% = 16

Purchase Cost = 400- 16 = Rs.384

Advise – The total cost of inventory is lower if EOQ is adopted. Hence, the company is advised not to accept the quantity discount.

3. The complete Gardener is deciding on the economic order quantity for two brands of lawn fertilizer - Super Grow and Nature's Own. The following information is collected:

	FERTILIZER	
	Super Grow	Nature's Own
Annual demand	2,000 bags	1,280 bags
Relevant ordering cost per purchase order	Rs. 1,200	Rs. 1,400
Annual relevant carrying cost per bag	Rs. 480	Rs. 560

Required:

(i) COMPUTE EOQ for Super Grow and Nature's own.

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(ii) For the EOQ, WHAT is the sum of the total annual relevant ordering costs and total annual relevant carrying costs for Super Grow and Nature's own?

(iii) For the EOQ, COMPUTE the number of deliveries per year for Super Grow and Nature's own.

ANSWER 3

$$EOQ = \sqrt{2AO / C}$$

Where,

A = Annual Demand

O = Ordering cost per order

C = Inventory carrying cost per unit per annum

(i) Calculation of EOQ

Super Grow	Nature's Own
$EOQ = \sqrt{(2 \times 2000 \times 1200) / C}$ $= \sqrt{10,000}$ or 100 bags	$EOQ = \sqrt{(2 \times 1280 \times 1400) / C}$ $= \sqrt{6,400}$ or 80 bags

(ii) Total annual relevant cost = Total annual relevant ordering costs + Total annual relevant carrying cost

	Super Grow	Nature's Own
Number of Orders = Annual Requirement ÷EOQ	= 2,000/100 =20 orders	=1,280/80 =16 orders
Ordering Cost	20 × 1200 = Rs. 24000	16 × 1400 = Rs.22,400
Carrying Cost	$\frac{1}{2} \times 100 \times 480 =$ Rs.24,000	$\frac{1}{2} \times 80 \times 560 =$ Rs.22,400
Total of Ordering and Carrying Cost	=Rs. 24,000+ Rs. 24,000 = Rs. 48,000	Rs. 22,400 + Rs. 22,400 = Rs. 44,800

(iii) Number of deliveries for Super Grow and Nature's own fertilizer per year
 = (Annual demand for fertilizer bags) / EOQ

Super Grow	Nature's Own
= (2000 bags /100 bags) = 20 orders	= (1280 bags /80 bags) = 16 orders

4. A Company uses three raw materials A, B and C for a particular product for which the following data apply:

Raw Material	Usage per unit of Product (Kgs.)	Re-order quantity (Kgs.)	Price per Kg.	Delivery period (in weeks)			Re-order level (Kgs)	Minimum level (Kgs.)
				Minimum	Average	Maximum		
A	1000	10,000	10	1	2	3	8,000	?
B	4	5,000	30	3	4	5	4,750	?
C	6	10,000	15	2	3	4	?	2,000

Weekly production varies from 175 to 225 units, averaging 200 units of the said product. COMPUTE the following quantities:

- (i) Minimum stock of A,
- (ii) Maximum stock of B,
- (iii) Re-order level of C,
- (iv) Average stock level of A.

ANSWER 4

(i) Minimum stock of A

Re-order level – (Average rate of consumption × Average time required to obtain fresh delivery)
 $= 8,000 - (200 \times 10 \times 2) = 4,000$ kgs.

(ii) Maximum stock of B

Re-order level + Re-order quantity – (Minimum consumption × Minimum delivery period)
 $= 4,750 + 5,000 - (175 \times 4 \times 3)$
 $= 9,750 - 2,100 = 7,650$ kgs.

(iii) Re-order level of C

Maximum delivery period × Maximum usage
 $= 4 \times 225 \times 6 = 5,400$ kgs.

OR

Re-order level of C

= Minimum level of C + [Average rate of consumption × Average time required to obtain fresh delivery]
 = 2,000 + [(200 × 6) × 3] kgs = **5,600 kgs.**

(iv) Average stock level of A

= Minimum stock level of A + ½ Re-order quantity of A
 = 4,000 + ½ × 10,000 = 4,000 + 5,000 = **9,000 kgs**

OR

Average Stock level of A

(Minimum stock level of A + Maximum stock level of A) / 2 (Refer to working note)

(4000 + 16250) / 2 = 10,125 kgs

Working note:

Maximum stock of A = ROL + ROQ – (Minimum consumption × Minimum re-order period)
 = 8,000 + 10,000 – [(175 × 10) × 1] = 16,250 kgs

5. (a) EXE Limited has received an offer of quantity discounts on its order of materials as under:

Price per ton (Rs.)	Ton (Nos.)
1,200	Less than 500
1,180	500 and less than 1,000
1,160	1,000 and less than 2,000
1,140	2,000 and less than 3,000
1,120	3,000 and above.

The annual requirement for the material is 5,000 tons. The ordering cost per order is Rs. 1,200 and the stock holding cost is estimated at 20% of material cost per annum. You are required to COMPUTE the most economical purchase level.

(b) WHAT will be your answer to the above question if there are no discounts offered and the price per ton is Rs. 1,500?

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ANSWER 5(a)

Total annual requirement (A)	Order size (Tonne) (q)	No. of orders A/q	Cost of inventory A × Per tonne cost (Rs.)	Ordering cost A/q × Rs. Rs 1200 (Rs.)	Carrying cost p.t. p.a $\frac{1}{2} \times q \times 20\%$ of cost p.t. (Rs.)	Total Cost (4+5+6) (Rs.)
1	2	3	4	5	6	7
5,000 TON	400	12.5 (13)*	60,00,000 (5,000 × Rs.1200)	15,600	48,000 (200 × Rs. 240)	60,63,600
	500	10	59,00,000 (5,000 × Rs. 1180)	12,000	59,000 (250 × Rs. 236)	59,71,000
	1,000	5	58,00,000 (5,000 × Rs. 1160)	6,000	1,16,000 (500 × Rs. 232)	59,22,000
	2,000	2.5 (3)*	57,00,000 (5,000 × Rs. 1140)	3,600	2,28,000 (1,000 × Rs.228)	59,31,600
	3,000	1.666 (2)*	56,00,000 (5,000 × Rs. 1120)	2,400	3,36,000 (1,500 × Rs.224)	59,38,400

* Since number of orders cannot be in decimals, thus 12.5 orders are taken as 13 orders, 2.5 are taken as 3 order and 1.66 orders are taken as 2 orders.

The above table shows that the total cost of 5,000 units including ordering and carrying cost is minimum (Rs. 59,22,000) when the order size is 1,000 units. Hence the most economical purchase level is 1,000 units.

6. From the details given below, CALCULATE:**(i) Re-ordering level****(ii) Maximum level****(iii) Minimum level****(iv) Danger level.**

Re-ordering quantity is to be calculated on the basis of following information:

Cost of placing a purchase order is Rs. 4,000

Number of units to be purchased during the year is 5,00,000

Purchase price per unit, inclusive of transportation cost is Rs. 50

Annual cost of storage per unit is Rs. 10.

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Details of lead time: Average- 10 days, Maximum- 15 days, Minimum- 5 days, for emergency purchases- 4 days.

Rate of consumption: Average: 1,500 units per day, Maximum: 2,000 units per day.

ANSWER 6

Basic Data:

A (Number of units to be purchased annually) = 5,00,000 units

O (Ordering cost per order) = Rs. 4,000

C (Annual cost of storage per unit) = Rs. 10

Purchase price per unit inclusive of transportation cost = Rs. 50

Computations:

(i) Re-ordering level (ROL)

= Maximum usage per period × Maximum lead time
 = 2,000 units per day × 15 days = **30,000 units**

(ii) Maximum level = ROL + ROQ – [Min. rate of consumption × Min. lead time] (Refer to working notes 1 and 2)
 = 30,000 units + 20,000 units – [1,000 units per day × 5 days] = **45,000 units**

(iii) Minimum level = ROL – Average rate of consumption × Average re-order-period
 = 30,000 units – (1,500 units per day × 10 days) = **15,000 units**

(iv) Danger level = Average consumption × Lead time for emergency purchases
 = 1,500 units per day × 4 days = **6,000 units**

Working Notes:

1. Minimum rate of consumption per day

Av. rate of consumption = (Minimum rate of consumption + Maximum rate of consumption) / 2

1,500 units per day = (X units /day + 2000 units per day) / 2 or X = 1,000 units per day.

2. Re-order Quantity (ROQ) = $\sqrt{2 \times 500000 \text{ units} \times 4000} / (10) = 2000 \text{ units}$

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7. G. Ltd. produces a product which has a monthly demand of 4,000 units. The product requires a component X which is purchased at Rs. 20. For every finished product, one unit of component is required. The ordering cost is Rs. 120 per order and the holding cost is 10% p.a.

You are required to CALCULATE:

(i) Economic order quantity.

(ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?

(iii) What is the minimum carrying cost, the company has to incur?

ANSWER 7

(a) (i) Economic order quantity:

A (Annual requirement or Component 'X') = 4,000 units per month × 12 months
 = 48,000 units

C (Purchase cost p.u.) = Rs. 20

O (Ordering cost per order) = Rs. 120

C_i (Holding cost) = 10% per annum

$$\text{E.O.Q.} = \sqrt{\frac{2AO}{C_i}} = \sqrt{\frac{2 \times 48,000 \text{ units} \times ₹120}{10\% \text{ of } ₹20}} = 2,400 \text{ units}$$

(ii) Extra cost incurred by the company:

A. Total cost when order size is equal 4,000 units:

Total cost = Total ordering cost + Total carrying cost

$$\begin{aligned} &= \frac{A}{Q} \times O + \frac{1}{2} Q (C_i) \\ &= \left(\frac{48,000 \text{ units}}{4,000 \text{ units}} \times ₹120 \right) + \left(\frac{1}{2} \times 4,000 \text{ units} \times 10\% \times ₹20 \right) \\ &= ₹1,440 + ₹4,000 = ₹5,440 \end{aligned}$$

B. Total cost when order size is equal EOQ i.e. 2,400 units:

$$\begin{aligned} \text{Total cost} &= \left(\frac{48,000 \text{ units}}{2,400 \text{ units}} \times ₹120 \right) + \left(\frac{1}{2} \times 2,400 \text{ units} \times 10\% \times ₹20 \right) \\ &= ₹2,400 + ₹2,400 = ₹4,800 \end{aligned}$$

Extra cost that the company has to incur = (A) – (B) = Rs. 5,440 – Rs. 4,800 = Rs. 640

(iii) Minimum carrying cost: Carrying cost depends upon the size of the order. It will be minimum on the least order size. (In this part of the question the two order sizes are 2,400 units and 4,000 units. Here 2,400 units is the least of the two order sizes. At this order size carrying cost will be minimum.)

The minimum carrying cost in this case can be computed as under:

Minimum carrying cost = $\frac{1}{2} \times 2,400 \text{ units} \times 10\% \times \text{Rs. } 20 = \text{Rs. } 2,400$

8. 'AT' Ltd. furnishes the following store transactions for September, 2020:

1-9-20 Opening balance 25 units value Rs. 162.50

4-9-20 Issues Req. No. 85 8 units

6-9-20 Receipts from B & Co. GRN No. 26 50 units @ Rs. 5.75 per unit

7-9-20 Issues Req. No. 97 12 units

10-9-20 Return to B & Co. 10 units

12-9-20 Issues Req. No. 108 15 units

13-9-20 Issues Req. No. 110 20 units

15-9-20 Receipts from M & Co. GRN. No. 33 25 units @ Rs. 6.10 per unit

17-9-20 Issues Req. No. 121 10 units

19-9-20 Received replacement from B & Co.

GRN No. 38 10 units

20-9-20 Returned from department, material of

M & Co. MRR No. 4 5 units

22-9-20 Transfer from Job 182 to Job 187 in the dept. MTR 6 5 units

26-9-20 Issues Req. No. 146 10 units

29-9-20 Transfer from Dept. "A" to Dept. "B" MTR 10 5 units

30-9-20 Shortage in stock taking 2 units

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PREPARE the priced stores ledger on FIFO method and STATE how would you treat the shortage in stock taking.

ANSWER 8
Working Notes:

1. The material received as replacement from vendor is treated as fresh supply.
2. In the absence of any information, the price of the material returned from a user department on 20-9-20 has been taken at the price of the latest issue made on 17-9-20. In FIFO method, physical flow of the material is irrelevant, and issue price is based on first in first out.
3. The issue of material on 26-9-20 is made out of the material received from a user department on 20-9-20.
4. The entries for transfer of materials from one job and department to another on 22-9-20 and 29-9-20 respectively, do not affect the store ledger. However, adjustment entries to calculation of cost of respective jobs and departments are made in cost accounts.
5. The material found short as a result of stock taking has been written off at relevant issue price.

Stores Ledger of AT Ltd. for the month of September, 2020 (FIFO Method)

Date	RECEIPT				ISSUE				BALANCE		
	GRN No MRR No.	Qty. Units	Rate (Rs.)	Amount (Rs.)	Requisition No	Qty. Units	Rate (Rs.)	Amount (Rs.)	Qty. Units	Rate (Rs.)	Amount (Rs.)
1	2	3	4	5	6	7	8	9	10	11	12
1-9-20	—	—	—	—	—	—	—	—	25	6.50	162.50
4-9-20	—	—	—	—	85	8	6.50	52	17	6.50	110.50
6-9-20	26	50	5.75	287.50	—	—	—	—	17 50	6.50 5.75	398.00
7-9-20	—	—	—	—	97	12	6.50	78	5 50	6.50 5.75	320.00
10-9-20	—	—	—	—	Return	10	5.75	57.50	5 40	6.50 5.75	262.50
12-9-20	—	—	—	—	108	5 10	6.50 5.75	90	30	5.75	172.50
13-9-20	—	—	—	—	110	20	5.75	115	10	5.75	57.50
15-9-20	33	25	6.10	152.50	—	—	—	—	10 25	5.75 6.10	210.00

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17-9-20	—	—	—	—	121	10	5.75	57.50	25	6.10	152.50
19-9-20	38	10	5.75	57.5	-	-	-	-	25	6.10	210.00
20-9-20	4	5	5.75	28.75	-	-	-	-	5	5.75	238.75
26-9-20	-	-	-	-	146	5	5.75	59.25	20	6.10	179.50
30-9-20	-	-	-	-	shortage	2	6.10	12.20	18	6.10	167.30

9. The following information is extracted from the Stores Ledger:

Material X

Opening Stock Nil

Purchases:

Jan. 1 100 @ Rs. 1 per unit

Jan. 20 100 @ Rs. 2 per unit

Issues:

Jan. 22 60 for Job W 16

Jan. 23 60 for Job W 17

Complete the receipts and issues valuation by adopting the First-In-First-Out, Last-In-First-Out and the Weighted Average Method. TABULATE the values allocated to Job W 16, Job W 17 and the closing stock under the methods aforesaid and discuss from different points of view which method you would prefer.

ANSWER 9

From the point of view of cost of material charged to each job, it is minimum under FIFO and maximum under LIFO (Refer to Tables). During the period of rising prices, the use of FIFO give rise to high profits and that of LIFO low profits. In the case of weighted average, there is no significant adverse or favourable effect on the cost of material as well as on profits.

From the point of view of valuation of closing stock, it is apparent from the above statement, that it is maximum under FIFO, moderate under weighted average and minimum under LIFO. It is clear from the tables that the use of weighted average evens out the fluctuations in the prices. Under this method, the cost of materials issued to the jobs and the cost of material in hands reflects greater uniformity than under FIFO and LIFO. Thus, from different points of view, weighted average method is preferred over LIFO and FIFO.

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Statement of receipts and issues by adopting First-in-First-Out Method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (Rs.)	Value (Rs.)	Units No.	Rate (Rs.)	Value (Rs.)	Units No.	Rate (Rs.)	Value (Rs.)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	100 100	1 2	100 200
Jan. 22	Issue to Job W 16	—	—	—	60	1	60	40 100	1 2	40 200
Jan. 23	Issue to Job W 17	—	—	—	40 20	1 2	40 40	80	2	160

Statement of receipts and issues by adopting Last-In-First-Out method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (Rs.)	Value (Rs.)	Units No.	Rate (Rs.)	Value (Rs.)	Units No.	Rate (Rs.)	Value (Rs.)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	100 100	1 2	100 200
Jan. 22	Issue to Job W 16	—	—	—	60	2	120	100 40	1 2	100 80
Jan. 23	Issue to Job W 17	—	—	—	40 20	2 1	80 20	80	1	80

Statement of Receipt and Issues by adopting Weighted Average method

Date	Particulars	Receipts			Issues			Balance		
		Units No.	Rate (Rs.)	Value (Rs.)	Units No.	Rate (Rs.)	Value (Rs.)	Units No.	Rate (Rs.)	Value (Rs.)
Jan. 1	Purchase	100	1	100	—	—	—	100	1	100
Jan. 20	Purchase	100	2	200	—	—	—	200	1.50	300
Jan. 22	Issue to Job W 16	—	—	—	60	1.50	90	140	1.50	210
Jan. 23	Issue to Job W 17	—	—	—	60	1.50	90	80	1.50	120

Statement of Material Values allocated to Job W 16, Job 17 and Closing Stock, under aforesaid methods

	FIFO (Rs.)	LIFO (Rs.)	Weighted Average (Rs.)
Material for Job W 16	60	120	90
Material for Job W 17	80	100	90
Closing Stock 1	60	80	120
	<u>300</u>	<u>300</u>	<u>300</u>

CHAPTER-3 EMPLOYEE COST

ILLUSTRATION 1

'X' an employee of ABC Co. gets the following emoluments and benefits:

- (a) Basic pay Rs. 10,000 p.m.
 - (b) Dearness allowance Rs. 2,000 p.m.
 - (c) Bonus 20% of salary and D.A.
 - (d) Other allowances Rs. 2,500 p.m.
 - (e) Employer's contribution to P.F. 10% of salary and D.A.
- 'X' works for 2,400 hours per annum, out of which 400 hours are non-productive and treated as normal idle time. You are required to COMPUTE the effective hourly cost of employee 'X'.

SOLUTION

Statement showing computation of effective hourly cost of employee 'X'

	Per month (Rs.)	Per annum (Rs.)
(A) Earning of Employee 'X':		
Basic pay	10,000	1,20,000
Dearness Allowance	2,000	24,000
Bonus	2,400	28,800
Employer's contribution to provident fund	1,200	14,400
Other allowances	2,500	30,000
	18,100	2,17,200
(B) Effective working hours (refer workings)		2,000 hours
(C) Effective hourly cost {(A) ÷ (B)}		Rs.108.60

Workings:

Calculation of effective working hours:

Annual working hours less Normal idle time = 2,400 hours – 400 hours = 2,000 hours.

ILLUSTRATION 2

In a factory working six days in a week and eight hours each day, a worker is paid at the rate of Rs. 100 per day basic plus D.A. @ 120% of basic. He is allowed to take 30 minutes off during his hours shift for meals-break and a 10 minutes recess for rest. During a week, his card showed that his time was chargeable to :

Job X 15 hrs.

Job Y 12 hrs.

Job Z 13 hrs.

The time not booked was wasted while waiting for a job. In Cost Accounting, STATE how would you allocate the wages of the workers for the week?

SOLUTION**Working notes:**

(i) Total effective hours in a week:
 $[(8 \text{ hrs.} - (30 \text{ mts.} + 10 \text{ mts.})) \times 6 \text{ days}] = 44 \text{ hours}$

(ii) Total wages for a week:
 $(\text{Rs. } 100 + 120\% \text{ of Rs. } 100) \times 6 \text{ days} = \text{Rs. } 1,320$

(iii) Wage rate per hour = $1320 \div 44 \text{ hours} = \text{Rs. } 30$

(iv) Time wasted waiting for job (Abnormal idle time):
 $= 44 \text{ hrs.} - (15 \text{ hrs.} + 12 \text{ hrs.} + 13 \text{ hrs.}) = 4 \text{ hrs.}$

Allocation of wages in Cost Accounting

	(Rs.)
Allocated to Job X : 15 hours × Rs. 30	450
Allocated to Job Y : 12 hours × Rs. 30	360
Allocated to Job Z : 13 hours × Rs. 30	390
Charged to Costing Profit & Loss A/c : 4 hours × Rs. 30	120
Total	1,320

ILLUSTRATION 3

CALCULATE the earnings of A and B from the following particulars for a month and allocate the employee cost to each job X, Y and Z:

	A	B
(i) Basic Wages (Rs.)	10,000	16,000
(ii) Dearness Allowance	50%	50%
(iii) Contribution to provident Fund (on basic wages)	8%	8%

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(iv) Contribution to Employee's State Insurance (on basic wages)	2%	2%
(v) Overtime (Hours)	10	--

The normal working hours for the month are 200. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to state Insurance and Provident Fund are at equal rates with employees' contributions. The two workers were employed on jobs X, Y and Z in the following proportions:

Jobs	X	Y	Z
Worker A	40%	30%	30%
Worker B	50%	20%	30%

Overtime was done on job Y.

SOLUTION

Statement showing Earnings of Workers A and B

	A (Rs.)	B (Rs.)
Basic wages	10,000	16,000
Dearness Allowance (50% of Basic Wages)	5,000	8,000
Overtime wages (Refer to Working Note 1)	1,500	--
Gross wages earned	16,500	24,000
Less: Contribution to Provident fund	(800)	(1,280)
Less: Contribution to ESI	(200)	(320)
Net wages earned	15,500	22,400

Statement of Employee Cost

	A (Rs.)	B (Rs.)
Gross Wages (excluding overtime)	15,000	24,000
Add: Employer's contribution to PF	800	1,280
Add: Employer's contribution to ESI	200	320
Gross wages earned	16,000	25,600
Normal working hours	200	200
Ordinary wages rate per hour	80	128

Statement Showing Allocation of Wages to Jobs

	Total Wages (Rs.)	JOBS		
		X (Rs.)	Y (Rs.)	Z (Rs.)
Worker A:				
- Ordinary Wages (4: 3 : 3)	16,000	6,400	4,800	4,800
- Overtime	1,500	--	1,500	--
Worker B:				
- Ordinary Wages (5 : 2 : 3)	25,600	12,800	5,120	7,680
	43,100	19,200	11,420	12,480

Working Notes

1. Normal Wages are considered as basic wages

$$\begin{aligned} \text{Over time} &= \frac{2 \times (\text{Basic wage} + \text{DA}) \times 10 \text{ hours}}{200} \\ &= 2 \times \left(\frac{\text{₹}15,000}{200} \right) \times 10 \text{ hours} = \text{₹}150 \times 10 \text{ hours} = \text{₹}1,500 \end{aligned}$$

ILLUSTRATION 4

It is seen from the job card for repair of the customer's equipment that a total of 154 labour hours have been put in as detailed below:

	Worker 'A' paid at Rs. 200 per day of 8 hours	Worker 'B' paid at Rs. 100 per day of 8 hours	Worker 'C' paid at Rs. 300 per day of 8 hours
Monday (hours)	10.5	8.0	10.5
Tuesday (hours)	8.0	8.0	8.0
Wednesday (hours)	10.5	8.0	10.5
Thursday (hours)	9.5	8.0	9.5
Friday (hours)	10.5	8.0	10.5
Saturday (hours)	--	8.0	8.0
Total (hours)	49.0	48.0	57.0

In terms of an award in employee conciliation, the workers are to be paid dearness allowance on the basis of cost of living index figures relating to each month which works out @ Rs. 968 for the relevant month. The dearness allowance is payable to all workers irrespective of wages rate if they are present or are on leave with wages on all working days.

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Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 4 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 4 hours worked).

Overtime is paid twice of ordinary wage rate if a worker works for more than nine hours in a day or forty eight hours in a week. Excluding holidays, the total number of hours works out to 176 in the relevant month. The company's contribution to Provident Fund and Employees State Insurance Premium are absorbed into overheads.

CALCULATE the wages payable to each worker.

SOLUTION

(1) Calculation of hours to be paid for worker A:

	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	1	1½	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10
Friday	8	1	1½	3	12
Saturday	--	--	--	--	--
Total	40	4	5	10	54

Calculation of hours to be paid for worker B:

	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	---	---	---	8
Tuesday	8	---	---	---	8
Wednesday	8	---	---	---	8
Thursday	8	---	---	---	8
Friday	8	---	---	---	8
Saturday	4	4*	---	---	8
Total	44	4	---	---	48

(*Worker-B has neither worked more than 9 hours in any day nor more than 48 hours in the week)

Calculation of hours to be paid for worker C:

	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
Monday	8	1	1½	3	12
Tuesday	8	---	---	---	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10
Friday	8	1	1½	3	12
Saturday	4	---	4*	8	12
Total	44	4	9	18	66

(*Worker-C has worked more than 48 hours in the week)

Wages payable:

	A	B	C
Basic Wages per hour (Rs.)	25.00	12.50	37.50
Dearness allowance per hour (Rs.)	5.50	5.50	5.50
Hourly rate (Rs.)	30.50	18.00	43.00
Total normal hours	54.00	48.00	66.00
Total Wages payable (Rs.)	1,647.00	864.00	2,838.00

ILLUSTRATION 5

In a factory, the basic wage rate is Rs.100 per hour and overtime rates are as follows:

Before and after normal working hours	175% of basic wage rate
Sundays and holidays	225% of basic wage rate
During the previous year, the following hours were worked	
- Normal time	1,00,000 hours
- Overtime before and after working hours	20,000 hours

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Overtime on Sundays and holidays	5,000 hours
Total	1,25,000 hours

The following hours have been worked on job 'Z'

Normal	1,000 hours
Overtime before and after working hrs.	100 hours.
Sundays and holidays	25 hours.
Total	1,125 hours

You are required to **CALCULATE** the labour cost chargeable to job 'Z' and overhead in each of the following instances:

- Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
- Where overtime is worked irregularly to meet the requirements of production.
- Where overtime is worked at the request of the customer to expedite the job.

SOLUTION

Workings

Basic wage rate : Rs. 100 per hour

Overtime wage rate before and after working hours: Rs. 100 × 175% = Rs. 175 per hour

Overtime wage rate for Sundays and holidays : Rs. 100 × 225% = Rs. 225 per hour

Computation of average inflated wage rate (including overtime premium):

Particulars	Amount (Rs.)
Annual wages for the previous year for normal time (1,00,000 hrs. × Rs.100)	1,00,00,000
Wages for overtime before and after working hours (20,000 hrs. × Rs.175)	35,00,000
Wages for overtime on Sundays and holidays (5,000 hrs. × Rs.225)	11,25,000
Total wages for 1,25,000 hrs.	1,46,25,000

Average inflated wage rate = (Rs.14625000/ 125000 hours) = Rs. 117

(a) Where overtime is worked regularly as a policy due to workers' shortage:

The overtime premium is treated as a part of employee cost and job is charged at an inflated wage rate. Hence, employee cost chargeable to job Z

= Total hours × Inflated wage rate = 1,125 hrs. × Rs. 117 = Rs. **1,31,625**

(b) Where overtime is worked irregularly to meet the requirements of production:

Basic wage rate is charged to the job and overtime premium is charged to factory overheads as under:

Employee cost chargeable to Job Z: 1,125 hours @ Rs.100 per hour = Rs. 1,12,500

Factory overhead: {100 hrs. × Rs. (175 – 100)} + {25 hrs. × Rs. (225 – 100)} = {Rs.7,500 + Rs.3,125} = Rs. **10,625**

(c) Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under:

	(Rs.)
Job Z Employee cost 1,125 hrs. @ Rs. 100 =	1,12,500
Overtime premium 100 hrs. @ Rs. (175 – 100) =	7,500
25 hrs. @ Rs. (225 – 100) =	3,125
Total	1,23,125

ILLUSTRATION 6

CALCULATE the earnings of a worker under Halsey System. The relevant data is as below:

Time Rate (per hour) Rs. 60

Time allowed 8 hours

Time taken 6 hours

Time saved 2 hours

SOLUTION

Calculation of total earnings:

= Time taken × Time rate + 50% (Time Allowed – Time Taken) × Time rate

= 6 hrs. × Rs.60 + 1/2 × (2 hrs. × Rs.60) or Rs.360 + Rs.60 = Rs.420

Of his total earnings, Rs.360 is on account of the time worked and Rs.60 is on account of his share of the premium bonus.

ILLUSTRATION 7

CALCULATE the earnings of a worker under Rowan System. The relevant data is given as below:

Time rate (per Hour) Rs. 60

Time allowed 8 hours.

Time taken 6 hours.

Time saved 2 hours.

SOLUTION

Calculation of total earnings:

= Time taken × Rate per hour + (Time saved / Time Allowed) * Time taken * Rate per hour

= 6 hours × Rs.60 + (2 hours / 8 hours) × 6 hours × Rs. 60 = Rs. 360 + Rs. 90 = Rs. **450**

ILLUSTRATION 8

Two workmen, 'A' and 'B', produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to the Rowan system, while 'B' is paid bonus according to the Halsey system. The time allowed to make the product is 50 hours. 'A' takes 30 hours while 'B' takes 40 hours to complete the product. The factory overhead rate is Rs. 5 per man-hour actually worked.

The factory cost for the product for 'A' is Rs. 3,490 and for 'B' it is Rs. 3,600.

Required:

(a) COMPUTE the normal rate of wages;

(b) COMPUTE the cost of materials cost;

(c) PREPARE a statement comparing the factory cost of the products as made by the two workmen.

SOLUTION

Step 1 : Let X be the cost of material and Y be the normal rate of wages per hour.

Step 2 : Factory Cost of Workman 'A'

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A. Material Cost	X
B. Wages (Rowan Plan)	30 Y
C. Bonus = $(30 / 50) * (50 - 30) * Y$	12 Y
D. Overheads (30 Rs.5) ×	150
E. Factory Cost	3,490

Or, $X + 42 Y = \text{Rs.}3,490$ (Given) – $\text{Rs.}150 = \text{Rs.}3,340$equation (i)

Step 3 : Factory Cost of Workman 'B'

A. Material Cost	X
B. Wages (Halsey Plan)	40 Y
C. Bonus = 50% of (SH - AH) R ×	5 Y
= 50% of (50 - 40) R ×	
D. Overheads (40 Rs.5) ×	200
E. Factory Cost	3,600
Or, $X + 45 Y = \text{Rs.}3,600$ (Given) – $\text{Rs.}200 = \text{Rs.}3,400$equation (ii)	

Step 4 : Subtracting equation (i) from equation (ii)

$$3Y = \text{Rs.}60$$

$$Y = \text{Rs.}60/3 = \text{Rs.}20 \text{ per hour.}$$

(a) The normal rate of wages: Rs.20 per hour

(b) The cost of material: $X + 45 \text{ Rs. } 20 = \text{Rs. } 3,400$ or, $X = \text{Rs. } 3,400 - \text{Rs. } 900 = \text{Rs. } 2,500 \times$

(c) **Comparative Statement of the Factory Cost of the product made by the two workmen.**

	A' (Rs.)	'B' (Rs.)
Material cost	2,500	2,500
Direct Wages	600 (30 × Rs.20)	800 (40 × Rs.20)
Bonus	240 (12 × Rs.20)	100 (5 × Rs.20)
Factory Overhead	150	200
Factory Cost	3,490	3,600

ILLUSTRATION 9

(a) Bonus paid under the Halsey Plan with bonus at 50% for the time saved equals the bonus paid under the Rowan System. When will this statement hold good? (Your answer should contain the proof).

(b) The time allowed for a job is 8 hours. The hourly rate is Rs. 8. PREPARE a statement showing:

i. The bonus earned

ii. The total earnings of employee and

iii. Hourly earnings.

Under the Halsey System with 50% bonus for time saved and Rowan System for each hour saved progressively.

SOLUTION

(a) Bonus under Halsey Plan = $(50/100) \times (SH - AH) \times R$ (i)

Bonus under Rowan Plan : = $(AH/SH) \times (SH - AH) \times R$ (ii)

Bonus under Halsey Plan will be equal to the bonus under Rowan Plan when the following condition holds good:

$$= (50/100) * (SH - AH) * R = (AH/SH) * (SH-AH) * R$$

$$= (50 / 100) = (AH/ SH)$$

Hence, when the actual time taken (AH) is 50% of the time allowed (SH), the bonus under Halsey and Rowan Plans is equal.

(b) Statement of Bonus, total earnings of Employee and hourly earnings under Halsey and Rowan Systems.

SH	AH	Time saved	Basic wages (AH xRs.8) (B x Rs.8)	Bonus under Halsey System (50/100) * C*8	Bonus under Rowan system (B/A) * C*8	Total Earnings under Halsey System D+E	Total Earnings under Rowan System D+F	Hourly Earnings under Halsey System G/B	Hourly Earnings under Rowan System H/B
A Hours	B hours	C = (A-B) hours	D Rs.	E Rs.	F Rs.	G Rs.	H Rs.	I Rs.	J Rs.
8	8	-	64	-	-	64	64	8.00	8.00
8	7	1	56	4	7	60	63	8.57	9.00

8	6	2	48	8	12	56	60	9.33	10.00
8	5	3	40	12	15	52	55	10.40	11.00
8	4	4	32	16	16	48	48	12.00	12.00
8	3	5	24	20	15	44	39	14.67	13.00
8	2	6	16	24	12	40	28	20.00	14.00
8	1	7	8	28	7	36	15	36.00	15.00

ILLUSTRATION 10

A skilled worker in XYZ Ltd. is paid a guaranteed wage rate of Rs. 30 per hour. The standard time per unit for a particular product is 4 hours. Mr. P, a machine man, has been paid wages under the Rowan Incentive Plan and he had earned an effective hourly rate of Rs. 37.50 on the manufacture of that particular product.

STATE what could have been his total earnings and effective hourly rate, had he been put on Halsey Incentive Scheme (50%)?

SOLUTION

Total earnings (under 50% Halsey Scheme) = Hours worked Rate per hour + $\frac{1}{2}$ time saved
 Rate per hour $\times \times$
 = 3 hours \times Rs. 30 + $\frac{1}{2} \times 1$ hour \times Rs.30 = Rs.105

Effective hourly rate = (Total earnings/ Hours taken) = (Rs. 105 / 3 hours) = Rs.35

Working Note:

Let T hours be the total time worked in hours by the skilled workers (machine man P), Rs.30 is the rate per hour; standard time is 4 hours per unit and effective hourly earnings rate is Rs.37.50 then

$$\begin{aligned} \text{Earning (under Rowan plan)} &= \text{Hours worked} \times \text{Rate per hr} + \frac{\text{Time saved}}{\text{Time allowed}} \times \\ &\quad \text{Time taken} \times \text{Rate per hr} \\ \text{₹37.5 T} &= T \times \text{₹30} + \frac{(4 - T)}{4} \times T \times \text{₹30} \end{aligned}$$

(both sides are divided by T)

$$\text{Rs. } 37.5 = \text{Rs. } 30 + (4 - T) \times \text{Rs. } 7.5$$

$$\text{Rs. } 37.5 = \text{Rs. } 30 + \text{Rs. } 30 - 7.5T$$

$$\text{or, Rs. } 7.5 T = \text{Rs. } 60 - \text{Rs. } 37.5$$

$$\text{or, Rs. } 7.5 T = \text{Rs. } 22.5$$

$$\text{or, } T = 3 \text{ hours.}$$

ILLUSTRATION 11

A factory having the latest sophisticated machines wants to introduce an incentive scheme for its workers, keeping in view the following:

- (i) The entire gains of improved production should not go to the workers.**
 - (ii) In the name of speed, quality should not suffer.**
 - (iii) The rate setting department being newly established are liable to commit mistakes.**
- You are required to PREPARE a suitable incentive scheme and DEMONSTRATE by an illustrative numerical example how your scheme answers to all the requirements of the management.**

SOLUTION

Rowan Scheme of premium bonus (variable sharing plan) is a suitable incentive scheme for the workers of the factory. If this scheme is adopted, the entire gains due to time saved by a worker will not pass to him.

Another feature of this scheme is that a worker cannot increase his earnings or bonus by merely increasing its work speed. The reason for this is that the bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.

Lastly, Rowan System provides a safeguard in the case of any loose fixation of the standards by the rate-setting department. It may be observed from the following illustration that in the Rowan Scheme the bonus paid will be low due to any loose fixation of standards. Workers cannot take undue advantage of such a situation. The above three features of Rowan Plan can be discussed with the help of the following illustration:

(i) Time allowed = 4 hours

Time taken = 3 hours

Time saved = 1 hour

Rate = Rs.5 per hour

$$\begin{aligned} \text{Bonus} &= \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate} \\ &= \frac{3 \text{ hours}}{4 \text{ hours}} \times 1 \text{ hour} \times \text{Rs.}5 = \text{Rs.}3.75 \end{aligned}$$

In the above illustration time saved is 1 hour and, therefore, total gain is Rs. 5. Out of Rs.5 according to Rowan Plan only Rs.3.75 is given to the worker in the form of bonus and the remaining Rs. 1.25 remains with the management. In other words, a worker is entitled for 75 percent of the time saved in the form of bonus.

(ii) The figures of bonus in the above illustration when the time taken is 2 hours and 1 hour respectively are as below:

$$\begin{aligned} \text{Bonus} &= \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate} \\ &= \frac{2 \text{ hours}}{4 \text{ hours}} \times 2 \text{ hours} \times \text{₹}5 = \text{₹}5 \\ &= \frac{1 \text{ hours}}{4 \text{ hours}} \times 3 \text{ hours} \times \text{₹}5 = \text{₹}3.75 \end{aligned}$$

The above figures of bonus clearly show that when time taken is half of the time allowed, the bonus is maximum. When the time taken is reduced from 2 to 1 hour, the bonus figure fell by Rs.1.25. Hence, it is quite apparent to workers that it is of no use to increase speed of work. This feature of Rowan Plan thus protects the quality of output.

(iii) If the rate-setting department erroneously sets the time allowed as 10 hours instead of 4 hours, in the above illustration; then the bonus paid will be as follows:

$$\text{Bonus} = (3 \text{ hours} / 10 \text{ hours}) \times 7 \text{ hours} \times \text{Rs.}5 = \text{Rs.}10.50$$

The bonus paid for saving 7 hours thus is Rs.10.50 which is approximately equal to the wages of 2 hours.

In other words, the bonus paid to the workers is low. Hence workers cannot take undue advantage of any mistake committed by the time setting department of the concern.

ILLUSTRATION 12

A worker is paid Rs.10,000 per month and a dearness allowance of Rs.2,000 p.m. Worker contribution to provident fund is @ 10% and employer also contributes the same amount as the employee. The Employees State Insurance Corporation premium is 6.5% of wages of which 1.75% is paid by the employees. It is the firm's practice to pay 2 months' wages as bonus each year.

The number of working days in a year is 300 of 8 hours each. Out of these the worker is entitled to 15 days leave on full pay. CALCULATE the wage rate per hour for costing purposes.

SOLUTION

Wages paid to worker during the year $\{(Rs. 10,000 + 2,000) \times 12\}$	1,44,000
Add: Employer Contribution to:	
Provident Fund @ 10%	14,400
E.S.I. Premium @ 4.75% (6.5 – 1.75)	6,840
Bonus at 2 months' wages (Basic + DA)	24,000
Total	1,89,240

Effective hours per year: 285 days \times 8 hours = 2,280 hours

Wage-rate per hour (for costing purpose): $Rs. 1,89,240 / 2,280$ hours = Rs.83

ILLUSTRATION 13

CALCULATE the Employee hour rate of a worker X from the following data:

Basic pay Rs. 10,000 p.m.

D.A. Rs. 3,000 p.m.

Fringe benefits Rs. 1,000 p.m.

Number of working days in a year 300. 20 days are availed off as holidays on full pay in a year. Assume a day of 8 hours.

SOLUTION

(i) Effective working days in a year	300
Less: Leave days on full pay	20
Effective working days	280 days

Total effective working hours (280 days \times 8 hours) 2,240

(ii) Total wages paid in a year	(Rs.)
Basic pay	1,20,000
D.A.	36,000
Fringe benefits	12,000
	1,68,000

(iii) Hourly rate : $Rs. 1,68,000 / 2,240$ hours Rs.75.00

ILLUSTRATION 14

The Accountant of Y Ltd. has computed employee turnover rates for the quarter ended 31st March, 2020 as 10%, 5% and 3% respectively under 'Flux method', 'Replacement method' and 'Separation method' respectively. If the number of workers replaced during that quarter is 30, FIND OUT the number of workers for the quarter

(i) recruited and joined and (ii) left and discharged and (iii) Equivalent employee turnover rates for the year.

SOLUTION
Working Note:

Average number of workers on roll (for the quarter):

Employee Turnover rate using Replacement method

$$= \frac{\text{No. of replacements}}{\text{Average number of workers on roll}} \times 100$$

$$\text{Or, } \frac{5}{100} = \frac{30}{\text{Average number of workers on roll}}$$

$$\text{Or, Average number of workers on roll} = \frac{30 \times 100}{5} = 600$$

(i) Number of workers recruited and joined:

Employee turnover rate (Flux method)

$$= \frac{\text{No. of Separations}*(S) + \text{No. of Accessions}(A)}{\text{Average number of workers on roll}}$$

$$\text{Or, } \frac{10}{100} = \frac{18^* + A}{600} \quad \text{Or, } A = \left[\frac{6000}{100} - 80 \right] = 42$$

No. of workers recruited and joined 42.

(ii) Number of workers left and discharged:

Employee turnover rate (Separation method)

$$= \frac{\text{No. of Separations}(S)}{\text{Average number of workers on roll}} \times 100 = \frac{3}{100} = \frac{S}{600} \quad \text{Or, } S^* = 18$$

Hence, number of workers left and discharged comes to 18

(iii) Calculation of Equivalent employee turnover rates:

$$= \frac{\text{Employee Turnover rate for the quarter(s)}}{\text{Number of quarter(s)}} \times 4 \text{ quarters}$$

$$\text{Using Flux method} = \frac{10\%}{1} \times 4 = 40\%$$

$$\text{Using Replacement method} = \frac{5\%}{1} \times 4 = 20\%$$

$$\text{Using Separation method} = \frac{3\%}{1} \times 4 = 12\%$$

ILLUSTRATION 15

The management of B.R Ltd. is worried about their increasing employee turnover in the factory and before analyzing the causes and taking remedial steps; it wants to have an idea of the profit foregone as a result of employee turnover in the last year

Last year sales amounted to Rs. 83,03,300 and P/V ratio was 20 per cent. The total number of actual hours worked by the direct employee force was 4.45 lakhs. The actual direct employee hours included 30,000 hours attributable to training new recruits, out of which half of the hours were unproductive.

As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,00,000 potentially productive hours (excluding unproductive training hours) were lost.

The costs incurred consequent on employee turnover revealed, on analysis, the following:

Settlement cost due to leaving Rs. 43,820

Recruitment costs Rs. 26,740

Selection costs Rs. 12,750

Training costs Rs. 30,490

Assuming that the potential production lost as a consequence of employee turnover could have been sold at prevailing prices, **FIND** the profit foregone last year on account of employee turnover.

SOLUTION**Workings:****(i) Computation of productive hours**

Actual hours worked (given)	4,45,000
Less: Unproductive training hours	15,000
Actual productive hours	4,30,000

(ii) Productive hours lost:

Loss of potential productive hours + Unproductive training hours
 = 1,00,000 + 15,000 = 1,15,000 hours

(iii) Loss of contribution due to unproductive hours:

= (Sales Value / Actual productive hours) × Total unproductive hours

= (Rs. 8303300 / 430000 hrs) × 115000 hours = Rs. 2220650

Contribution lost for 1,15,000 hours = (Rs. 22,20,650 / 100) × 20 = Rs.4,44,130

Computation of profit forgone on account of employee turnover

	(Rs.)
Contribution foregone (as calculated above)	4,44,130
Settlement cost due to leaving	43,820
Recruitment cost	26,740
Selection cost	12,750
Training costs	30,490
Profit foregone	5,57,930

MCQs based Questions

1. Idle time is the time under which-

- (a) Full wages are paid to workers
- (b) No productivity is given by the workers
- (c) Both (a) and (b)
- (d) None of the above

ANSWER 1-C

2. Cost of idle time due to non- availability of raw material is-

- (a) Charged to overhead costs
- (b) Charged to respective jobs
- (c) Charged to costing profit and loss account
- (d) None of the above

ANSWER 2-C

3. Time and motion study is conducted by-

- (a) Time keeping department
- (b) Personal department
- (c) Payroll department
- (d) Engineering department

ANSWER 3-D

4. Identify, which one of the following, does not account for increasing labour productivity-

- (a) Job satisfaction**
- (b) Motivating workers**
- (c) High labour turnover**
- (d) Proper supervision and control**

ANSWER 4-C

5. Labour turnover is measured by-

- (a) Number of persons replaced/ average number of workers**
- (b) Numbers of persons separated / number of workers at the beginning of the year**
- (c) (Number of persons replaced + number of persons separated)/(number of persons at the beginning + the number of persons at the end of the year)**
- (d) None of the above**

ANSWER 5-D

6. Labour productivity is measured by comparing-

- (a) Actual time and standard time**
- (b) Total output with total man-hours**
- (c) Added value for the product with total wage cost**
- (d) All of the above**

ANSWER 6- D

7. Employee Cost includes-

- (a) Wages and salaries**
- (b) Allowances and incentives**

(c) Payment for overtime

(d) All of the above

ANSWER 7-D

8. If the time saved is less than 50% of the standard time, then the wages under Rowan and Halsey premium plan on comparison gives-

(a) More wages to workers under Rowan plan than Halsey plan

(b) More wages to workers under Halsey plan than Rowan plan

(c) Equal wages under two plans

(d) None of the above

ANSWER 8- A

9. Standard time of a job is 60 hours and guaranteed time rate is Rs.0.30 per hour. What is the amount of wages under Rowan plan if job is completed in 48 hours?

(a) Rs. 16.20

(b) Rs. 17.28

(c) Rs. 18.00

(d) Rs. 14.40

ANSWER 9- B

10. Important factors for control of employee cost can be-

(a) Time and Motion Study

(b) Control over idle time and overtime

(c) Control over employee turnover

(d) All of the above

ANSWER 10-D

11. Out of the following methods attendance is marked by recognizing an employee based on physical and behavioural traits-

(a) Punch Card Attendance method

- (b) Bio- Metric Attendance system
- (c) Attendance Register method
- (d) Token Method

ANSWER 11- B

12. If overtime is required for meeting urgent orders, the overtime premium should be charged as-

- (a) Respective job
- (b) Overhead cost
- (c) Costing P& L A/c
- (d) None of above

ANSWER 12-A

Theoretical Questions

1. DISCUSS the accounting treatment of Idle time and overtime wages.

ANSWER 1

Treatment of Normal IDLE time	Treatment of Abnormal IDLE time
It is treated as a part of cost of production. Thus, in the case of direct workers an allowance for normal idle time is considered setting of standard hours or standard rate. In case of indirect workers, normal idle time is considered for the computation of overhead rate.	Abnormal idle time cost is not included as a part of production cost and is shown as a separate item in the Costing Profit and Loss Account. The cost of abnormal idle time should be further categorized into controllable and uncontrollable. For each category, the break-up of cost due to various factors should be separately shown. This would help the management in fixing responsibility for controlling idle time. Management should aim at eliminating controllable idle time and on a long-term basis reducing even the normal idle time. This would require a detailed analysis of the causes leading to such idle time.

Treatment of Overtime premium in cost accounting

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Causes	Treatment
(1) The customer may agree to bear the entire charge of overtime because urgency of work.	(1) If overtime is resorted to at the desire of the customer, then overtime premium may be charged to the job directly.
(2) Overtime may be called for to make up any shortfall in production due to some unexpected development.	(2) If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
(3) Overtime work may be necessary to make up a shortfall in production due to some fault of management.	(3) If overtime is worked in a department due to the fault of another department, the overtime premium should be charged to the latter department.
(4) Overtime work may be resorted to, to secure an out-turn in excess of the normal output to take advantage of an expanding market or of rising demand	(4) Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.

2. DISCUSS the effect of overtime payment on productivity.
ANSWER 2

Occasional overtime is a healthy sign as it indicates that the firm has the optimum capacity and that the capacity is being fully utilised. But persistent overtime is rather a bad sign because it may indicate either (a) that the firm needs larger capacity in men and machines, or (b) that men have got into the habit of postponing their ordinary work towards the evening so that they can earn extra money in the form of overtime wages.

3. STATE the circumstances in which time rate system of wage payment can be preferred in a factory.
ANSWER 3

Straight Time Rate System: Under this system, the workers are paid on time basis i.e. hour, day, week, or month. The amount of wages due to a worker are arrived at by multiplying the time worked (including normal idle period) by rate for the time. Time based wages payment is suitable for the employees

- (i) whose services cannot be directly or tangibly measured, e.g., general helpers, supervisory and clerical staff etc.
- (ii) engaged in highly skilled jobs,
- (iii) where the pace of output is independent of the operator, e.g., automatic chemical plants. Wages under time rate system is calculated as under:

$$\text{Wages} = \text{Time Worked (Hours/ Days/ Months)} \times \text{Rate for the time}$$

4. DISCUSS the objectives of time keeping & time booking.**ANSWER 4**

Objectives of Time-keeping: Correct recording of employees' attendance time is of utmost importance where payment is made on the basis of time worked.

Where payment is made by results viz; straight piece work, it would still be necessary to correctly record attendance for the purpose of ensuring that proper discipline and adequate

rate of production are maintained. The objectives of timekeeping are as follows:

- (i) For the preparation of payrolls.
- (ii) For calculating overtime.
- (iii) For ascertaining and controlling employee cost.

- (iv) For ascertaining idle time.
- (v) For disciplinary purposes.
- (vi) For overhead distribution.

Time booking for costing: The time spent on a particular job or activity is used to compute the cost of the job or activity.

Time booking to measure efficiency: The efficiency of the employees is measured by comparing the actual time taken by an employee with the standard time that should have been taken.

Time booking for fixation of responsibility: The time booked data is used to analyse the variance in time taken by an employee on a particular job or process with respect to standard time to see the reasons for the variance. The reasons for variance is further classified as controllable and uncontrollable. The controllable reasons are those which can be avoided by due care and efficiency. On the other hand, uncontrollable reasons cannot be avoided under the normal circumstances. Employees or any other concerned person or departments are made accountable for variance under controllable reasons.

5. DISCUSS the two types of cost associated with labour turnover.**ANSWER 5**

Cost of Employees (Labour) Turnover: Two types of costs which are associated with employee turnover are:

(a) Preventive Costs: The cost incurred to prevent employee turnover or keep it as lowest as possible. Cost incurred for prevention of employee turnover includes the following:

- (i) Cost of medical benefit provided to the employees;
- (ii) Cost incurred on employees' welfare like pension etc.
- (iii) Cost on other benefits with an objective to retain employees.

(b) Replacement Costs: These are the costs which arise due to employee turnover. If employees leave soon after they acquire the necessary training and experience of good work, additional costs will have to be incurred on new workers, i.e., cost of recruitment, training and induction, abnormal breakage and scrap and extra wages and overheads due to the inefficiency of new workers.

It is obvious that a company will incur very high replacement costs if the rate of employee turnover is high. Similarly, only adequate preventive costs can keep Employee turnover at a low level. Each company must, therefore, work out the optimum level of Employee turnover keeping in view its personnel policies and the behaviour of replacement cost and preventive costs at various levels of Employee turnover rates.

6. DESCRIBE briefly, how wages may be calculated under the following systems:

(i) Rowan system

(ii) Halsey system

ANSWER 6

(i) Rowan Premium Plan: According to this system a standard time allowance is fixed for the performance of a job and bonus is paid if time is saved.

Under Rowan System the bonus is that proportion of the time wages as time saved bears to the standard time.

$$\text{Time taken} \times \text{Rate per hour} + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

(ii) Halsey Premium Plan: Under Halsey premium plan a standard time is fixed for each job or process. If there is no saving on this standard time allowance, the worker is paid only his day rate. He gets his time rate even if he exceeds the standard time limit, since his day rate is guaranteed.

If, however, he does the job in less than the standard time, he gets a bonus equal to 50 percent of the wages of time saved; the employer benefits by the other 50 percent. The scheme also is sometimes referred to as the Halsey fifty percent plan. Earnings under Halsey Premium plan is calculated as under:

$$\text{Wages} = \text{Time taken} \times \text{Time rate} + 50\% \text{ of time saved} \times \text{Time rate}$$

Practical Questions

1. Mr. A. is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme - either Halsey Scheme (with 50% bonus) or Rowan Scheme - of wage payment for increasing the Employee productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.

As a result of the assurance, the increase in productivity has been observed as revealed by the following figures for the current month:

Hourly rate of wages (guaranteed)	Rs.40
Average time for producing 1 piece by one worker at the previous performance (This may be taken as time allowed)	2 hours
No. of working days in the month	25
No. of working hours per day for each worker	8
Actual production during the month	1,250 units

(i) CALCULATE effective rate of earnings per hour under Halsey Scheme and Rowan Scheme.

(ii) CALCULATE the savings to Mr. A in terms of direct labour cost per piece under the schemes.

ANSWER 1

Working Notes:

1. Total time wages of 10 workers per month:

= No. of working days in the month × No. of working hours per day of each worker × Hourly rate of wages × No. of workers

= 25 days × 8 hrs. × Rs.40 × 10 workers = Rs.80,000

2. Time saved per month:

Time allowed per piece to a worker 2 hours

No. of units produced during the month by 10 workers 1,250 pieces

Total time allowed to produce 1,250 pieces (1,250 × 2 hours) 2,500 hours

Actual time taken to produce 1,250 pieces 2,000 hours

Time saved (2,500 hours – 2,000 hours) 500 hours

3. Bonus under Halsey scheme to be paid to 10 workers:

Bonus = (50% of time saved) × hourly rate of wages

= 50/100 × 500 hours × Rs.40 = Rs.10,000

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Total wages to be paid to 10 workers are (Rs.80,000 + Rs.10,000) Rs.90,000, if Mr. A considers the introduction of Halsey Incentive Scheme to increase the employee productivity.

4. Bonus under Rowan Scheme to be paid to 10 workers:

Bonus = (Time taken/ Time allowed) × Time saved × hourly rate

= $\frac{2,000}{2,500} \times 500 \text{ hours} \times \text{Rs. } 40 = \text{Rs. } 16,000$

Total wages to be paid to 10 workers are (Rs.80,000 + Rs.16,000) Rs.96,000, if Mr. A considers the introduction of Rowan Incentive Scheme to increase the Employee productivity.

(i) (a) Effective hourly rate of earnings under Halsey scheme:
 (Refer to Working Notes 1, 2 and 3)

= (Total time wages of 10 workers + Total bonus under Halsey scheme) / Total hours worked

= $(80,000 + 10,000) / 2,000 \text{ hours} = \text{Rs. } 45$

(b) Effective hourly rate of earnings under Rowan scheme:
 (Refer to Working Notes 1, 2 and 4)

= Total time wages of 10 workers + Total bonus under Rowan scheme / Total hours worked
 = $(80,000 + 16,000) / 2,000 \text{ hours} = \text{Rs. } 48$

(ii) (a) Saving in terms of direct Employee cost per piece under Halsey scheme:

(Refer to Working Note 3)

Employee cost per piece (under time wage scheme)
 = $2 \text{ hours} \times \text{Rs. } 40 = \text{Rs. } 80$

Employee cost per piece (under Halsey scheme)
 = (Total wages paid under the scheme / Total number of units produced) = $(90,000 / 1,250) = \text{Rs. } 72$

Saving per piece: $(\text{Rs. } 80 - \text{Rs. } 72) = \text{Rs. } 8$

(b) Saving in terms of direct Employee cost per piece under Rowan Scheme:

(Refer to Working Note 4)

Employee cost per piece under Rowan scheme = $\text{Rs. } 96,000 / 1,250 \text{ units} = \text{Rs. } 76.80$

Saving per piece = $\text{Rs. } 80 - \text{Rs. } 76.80 = \text{Rs. } 3.20$

2. Wage negotiations are going on with the recognised employees' union, and the management wants you as an executive of the company to formulate an incentive scheme with a view to increase productivity.

The case of three typical workers A, B and C who produce respectively 180, 120 and 100 units of the company's product in a normal day of 8 hours is taken up for study.

Assuming that day wages would be guaranteed at Rs. 75 per hour and the piece rate would be based on a standard hourly output of 10 units, CALCULATE the earnings of each of the three workers and the employee cost per 100 pieces under (i) Day wages, (ii) Piece rate, (iii) Halsey scheme, and (iv) The Rowan scheme. Also CALCULATE under the above schemes the average cost of labour for the company to produce 100 pieces.

ANSWER 2

Calculation of earnings under different wage schemes:

(i) Day wages

Worker	Day wages (Rs.)	Actual Output (Units)	Labour cost per 100 pieces (Rs.)
A	600	180	333.33
B	600	120	500.00
C	600	100	600.00
Total	1800	400	

Average labour cost to produce 100 pieces:

$$= (\text{Total wages paid} / \text{Total output}) \times 100 = (\text{RS. } 1800 / 400 \text{ units}) \times 100 = \text{Rs. } 450$$

(ii) Piece rate

Worker	Actual Output (Units)	Piece rate (Rs.)	Wages earned (Rs.)	Labour cost per 100 pieces (Rs.)
A	180	7.50	1,350	750.00
B	120	7.50	900	750.00
C	100	7.50	750	750.00
Total	400		3000	

Average cost of labour for the company to produce 100 pieces:

$$= (\text{Rs. } 3,000 / 400 \text{ units}) \times 100 = \text{Rs. } 750$$

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(iii) Halsey Scheme

Worker	Actual Output (Units)	Std. time (Hrs.)	Actual time (Hrs.)	Time saved (Hrs.)	Bonus hours (50% of time saved)	Rate per hour (Rs.)	Total wages (Rs.)	Labour cost per 100 pieces (Rs.)
	A	B	C	D=B-C	E	F	G = F x (C+E)	H=G/A*100
A	180	18	8	10	5	75	975	541.67
B	120	12	8	4	2	75	750	625.00
C	100	10	8	2	1	75	675	675.00

Average cost of labour for the company to produce 100 pieces

$$= (\text{Rs. } 2400 / 400 \text{ units}) \times 100 = \text{Rs. } 600$$

(iv) Rowan Scheme:

Worker	Actual Output (Units)	Std. time (Hrs.)	Actual time (Hrs.)	Time saved (Hrs.)	Bonus hours*	Rate per hour (Rs.)	Total wages including bonus (Rs.)	Labour cost per 100 pieces (Rs.)
	A	B	C	D=B-C	E	F	G=Fx(C+E)	H=G/A*100
A	180	18	8	10	4.44	75	933	518.33
B	120	12	8	4	2.67	75	800	666.67
C	100	10	8	2	1.60	75	720	720.00
Total	400						2453	

$$* \text{ Bonus hours} = \frac{\text{Time Saved}}{\text{Std. Time}} \times \text{Actual time}$$

Average cost of labour for the company to produce 100 pieces

$$= \frac{\text{₹ } 2,453}{400 \text{ units}} \times 100 = \text{₹ } 613.25$$

CHAPTER-4 OVERHEADS – ABSORPTION COSTING METHOD

ILLUSTRATION 1

XL Ltd., has three production departments and four service departments. The expenses for these departments as per Primary Distribution Summary are as follows:

Production Departments:	(Rs.)	(Rs.)
Dept.-A	30,00,000	
Dept.-B	26,00,000	
Dept.-C	24,00,000	80,00,000
Service Departments:	(Rs.)	(Rs.)
Stores	4,00,000	
Time-keeping and Accounts	3,00,000	
Power	1,60,000	
Canteen	1,00,000	9,60,000

The following information is also available in respect of the production departments:

	Dept. A	Dept. B	Dept. C
Horse power of Machine	300	300	200
Number of workers	20	15	15
Value of stores requisition in (Rs.)	2,50,000	1,50,000	1,00,000

PREPARE a statement apportioning the costs of service departments over the production departments using direct re-distribution method.

SOLUTION

Secondary Overhead Distribution Statement

Items of cost (as per primary distribution summary)	Basis of apportionment	Total	Production Departments		
			A (Rs.)	B (Rs.)	C (Rs.)
(Rs.)					
Cost as per primary distribution summary		80,00,000	30,00,000	26,00,000	24,00,000
Stores (5:3:2)	Value of Store requisition	4,00,000	2,00,000	1,20,000	80,000
Time-keeping and Accounts (4:3:3)	No. of workers	3,00,000	1,20,000	90,000	90,000

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Power (3:3:2)	H.P. of Machine	1,60,000	60,000	60,000	40,000
Canteen (4:3:3)	No. of workers	1,00,000	40,000	30,000	30,000
		89,60,000	34,20,000	29,00,000	26,40,000

ILLUSTRATION 2

Suppose the expenses of two production departments A and B and two service departments X and Y are as under:

Department	Amount (Rs.)	Apportionment Basis		
		Y	A	B
Dept.-X	2,00,000	25%	40%	35%
Dept.-Y	1,50,000	—	40%	60%
Dept.-A	3,00,000			
Dept.-B	3,20,000			

PREPARE a statement apportioning the costs of service departments over the production departments using step method.

SOLUTION**Summary of Overhead Distribution**

Departments	X (Rs.)	Y (Rs.)	A (Rs.)	B (Rs.)
Amount as given above	2,00,000	1,50,000	3,00,000	3,20,000
Expenses of service dept.- X is apportioned among other departments- Y, A and B in the ratio (5:8:7)	(2,00,000)	50,000	80,000	70,000
		2,00,000	3,80,000	3,90,000
Expenses of Dept.-Y apportioned between department A and B in the ratio (2:3)	-	(2,00,000)	80,000	1,20,000
Total	Nil	Nil	4,60,000	5,10,000

ILLUSTRATION 3

Service departments' expenses (Rs.)	
Boiler house	3,00,000
Pump room	60,000
Total	3,60,000

The allocation basis is:

	Production Department		Service Department	
	A	B	Boiler House	Pump Room
Boiler House	60%	35%	-	5%
Pump Room	10%	40%	50%	-

SOLUTION

The total expenses of the two service departments will be determined as follows:

Let B stand for Boiler House expenses and P for Pump Room expenses.

Then

$$B = 3,00,000 + 0.50 P$$

$$P = 60,000 + 0.05 B$$

Substituting the value of B,

$$P = 60,000 + 0.05 (3,00,000 + 0.5 P)$$

$$= 60,000 + 15,000 + 0.025 P$$

$$= 75,000 + 0.025 P$$

$$P - 0.025P = 75,000$$

$$P = (75,000 / 9.75)$$

$$P = \text{Rs. } 76,923$$

The total of expenses of the Pump Room is Rs.76,923 and that of the Boiler House is Rs.3,38,462 i.e., Rs.3,00,000 + 0.5 × Rs. 76,923.

The expenses will be allocated to the production departments as under:

	Production Department	
	Dept.-A	Dept.-B
Boiler House (60% and 35% of Rs. 3,38,462)	2,03,077	1,18,462
Pump Room (10% and 40% of Rs. 76,923)	7,692	30,769
Total	2,10,769	1,49,231

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The total of expenses apportioned to A and B is Rs. 3,60,000.

ILLUSTRATION 4

Sanz Ltd., is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2020:

	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Direct material		1,00,000	2,00,000	4,00,000	2,00,000	1,00,000
Direct wages		5,00,000	2,00,000	8,00,000	1,00,000	2,00,000
Factory rent	4,00,000					
Power	2,50,000					
Depreciation	1,00,000					
Other overheads	9,00,000					
Additional information:						
Area (Sq. ft.)		500	250	500	250	500
Capital value of assets (Rs. lakhs)		20	40	20	10	10
Machine hours		1,000	2,000	4,000	1,000	1,000
Horse power of machines		50	40	20	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X' (%)	45	15	30	–	10
Service Dept. 'Y' (%)	60	35	–	5	–

Required:

- (i) PREPARE a statement showing distribution of overheads to various departments.
- (ii) PREPARE a statement showing re-distribution of service departments expenses to production departments using Trial and error method.

SOLUTION

(i) Overhead Distribution Summary

	Basis	Total (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Direct materials	Direct	–	–	–	–	2,00,000	1,00,000
Direct wages	Direct	–	–	–	–	1,00,000	2,00,000
Factory rent (2:1:2:1:2)	Area	4,00,000	1,00,000	50,000	1,00,000	50,000	1,00,000
Power (10:16:16:3:5)*	H.P. × Machine Hrs.	2,50,000	50,000	80,000	80,000	15,000	25,000
Depreciation (2:4:2:1:1)	Capital value	1,00,000	20,000	40,000	20,000	10,000	10,000

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Other overheads (1:2:4:1:1)	Machine hrs.	9,00,000	1,00,000	2,00,000	4,00,000	1,00,000	1,00,000
		16,50,000	2,70,000	3,70,000	6,00,000	4,75,000	5,35,000

*{(1000×50) : (2000×40) : (4000×20) : (1000×15) : (1000×25)}
(50000 : 80000 : 80000 : 15000 : 25000)

(ii) Redistribution of Service Department's expenses:

	Service Departments	
	X (Rs.)	Y (Rs.)
Overheads as per primary distribution	4,75,000	5,35,000
(i) Apportionment of Dept-X expenses to Dept-Y (10% of Rs. 4,75,000)	---	47,500
	---	5,82,500
(ii) Apportionment of Dept-Y expenses to Dept-X [5% of (Rs. 5,35,000 + Rs. 47,500)]	29,125	---
(i) Apportionment of Dept-X expenses to Dept-Y (10% of Rs. 29,125)	---	2,913
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of Rs. 2,913)	146	---
Total	5,04,271	5,85,413

Distribution of Service departments' overheads to Production departments

	Production Departments		
	A (Rs.)	B (Rs.)	C (Rs.)
Overhead as per primary distribution	2,70,000	3,70,000	6,00,000
Dept- X (90% of Rs. 5,04,300)	2,26,900	75,600	1,51,300
Dept- Y (95% of Rs. 5,85,400)	3,51,300	2,04,900	--

ILLUSTRATION 5

Taking all the information from Illustration 4 above, PREPARE a statement showing re-distribution of service departments' expenses to production departments using repeated distribution method. Also CALCULATE machine hour rates of the production departments 'A', 'B' and 'C'.

SOLUTION

Redistribution of Service Department's expenses using 'repeated distribution method':

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	A (Rs.)	B (Rs.)	C (Rs.)	X (Rs.)	Y (Rs.)
Total overheads {Refer (i) of Solution to Illustration 4}	2,70,000	3,70,000	6,00,000	4,75,000	5,35,000
Dept. X overhead apportioned in the ratio (45:15:30: —:10)	2,13,750	71,250	1,42,500	(4,75,000)	47,500
Dept. Y overhead apportioned in the ratio (60:35: —:5: —)	3,49,500	2,03,875	—	29,125	(5,82,500)
Dept. X overhead apportioned in the ratio (45:15:30: —:10)	13,106	4,369	8,738	(29,125)	2,912
Dept. Y overhead apportioned in the ratio (60:35: —:5: —)	1,747	1,019	—	146	(2,912)
Dept. X overhead apportioned in the ratio (45:15:30: —:10)	65	22	44	(146)	15
Dept. Y overhead apportioned in the ratio (60:35: —:5: —)	9	6	—	—	(15)
	8,48,177	6,50,541	7,51,282	—	—

Calculation of machine hour rate:

		A	B	C
A	Total overheads (Rs.)	8,48,177	6,50,541	7,51,282
B	Machine hours	1,000	2,000	4,000
C	Machine hour rate (Rs.) [A ÷ B]	848.18	325.27	187.82

ILLUSTRATION 6

A machine costing Rs. 1,00,00,000 is expected to run for 10 years. At the end of this period its scrap value is likely to be Rs. 9,00,000. Repairs during the whole life of the machine are expected to be Rs. 18,00,000 and the machine is expected to run 4,380 hours per year on the average. Its electricity consumption is 15 units per hour, the rate per unit being Rs. 5. The machine occupies one-fourth of the area of the department and has two points out of a total of ten for lighting.

The foreman has to devote about one sixth of his time to the machine. The monthly rent of the department is Rs. 30,000 and the lighting charges amount to Rs. 8,000 per month. The foreman is paid a monthly salary of Rs. 19,200. FIND OUT the machine hour rate, assuming insurance is @ 1% p.a. and the expenses on oil, etc., are Rs. 900 per month.

SOLUTION

Total number of hours per annum- 4,380

Total number of hours per month- 365

Computation of Machine Hour Rate

	Per month (Rs.)	Per hour (Rs.)
Fixed costs (Standing Charges)		
Depreciation (Refer working note-1)	75,833	
Rent (Rs.30,000 × ¼)	7,500	
Lighting charges {(Rs.8,000 × 2 points) ÷ 10 points}	1,600	
Foreman's salary (Rs.19,200 × 1/6)	3,200	
Sundry expenses (oil etc.)	900	
Insurance {(1% of Rs. 91,00,000) ÷ 12 months}	7,583	
	96,616	264.70
Variable costs:		
Repairs (Refer working note -2)		41.10
Electricity (15 units × Rs. 5)		75.00
Machine Hour rate		380.80

Working Notes:

(1) Depreciation per month = (Cost of Machine-Scrap value) / Life of the machine
 = (1,00,00,000-9,00,000) / (10years×12months)* =Rs. 75,833

*In the question the life of the machine is given as 10 years and it is also mentioned the machine will run for 4,380 hours per annum. The depreciation can be calculated either on the basis of time i.e. 10 years or on the basis of activity of 43,800 hours (4,380 hours p.a.)

(2) Repairs for the whole life is Rs. 18,00,000, which can be linked to activity level of 43,800 hours. Thus, Repairs cost per hour = (Rs.18,00,000 / 43,800hours) = Rs. 41.10

ILLUSTRATION 7

A machine shop cost centre contains three machines of equal capacities. To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid Rs. 20 per hour. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.

The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is Rs.52,000.

Maintenance and repairs per week per machine is Rs.60.

Consumable stores per week per machine are Rs.75.

Power: 20 units per hour per machine at the rate of 80 paise per unit. No power is used during the set-up hours.

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Apportionment to the cost centre: Rent per annum Rs.5,400, Heat and Light per annum Rs.9,720, foreman's salary per annum Rs.12,960 and other miscellaneous expenditure per annum Rs.18,000.

Required:

CALCULATE the cost of running one machine for a four week period.

SOLUTION

Effective Machine hour for four-week period
 = Total working hours – unproductive set-up time
 = {(48 hours × 4 weeks) – {(4 hours × 4 weeks)}

= (192 – 16 hours) =176 hours.

(i) Computation of cost of running one machine for a four week period

	(Rs.)	(Rs.)
(A)	Standing charges (per annum)	
	Rent	5,400
	Heat and light	9,720
	Forman's salary	12,960
	Other miscellaneous expenditure	18,000
	Standing charges (per annum)	46,080
	Total expenses for one machine for four week period ((Rs.46,080) / (3machines × 13four-weekperiod))	1,181.54
	Wages (48 hours × 4 weeks × Rs. 20 × 3 operators)	11,520.00

	Bonus {(176 hours × Rs. 20 × 3 operators) ×10%}	1,056.00
	Total standing charges	13,757.54
(B)	Machine Expenses	
	Depreciation ((Rs.52,000 * 10%) X (1/ 13four-weekperiod))	400.00
	Repairs and maintenance (Rs.60 × 4 weeks)	240.00
	Consumable stores (Rs.75 × 4 weeks)	300.00
	Power (176 hours × 20 units ×Rs. 0.80)	2,816.00
	Total machine expenses	3,756.00
(C)	Total expenses (A) + (B)	17,513.54

(ii) Machine hour rate = (Rs. 17,513.54/ 176hours) = Rs. 99.51

ILLUSTRATION 8

The total overhead expenses of a factory is Rs. 4,46,380. Taking into account the normal working of the factory, overhead was recovered in production at Rs. 1.25 per hour. The actual hours worked were 2,93,104. STATE how would you proceed to close the books of accounts, assuming that besides 7,800 units produced of which 7,000 were sold, there were 200 equivalent units in work-in-progress?

On investigation, it was found that 50% of the unabsorbed overhead was on account of increase in the cost of indirect materials and indirect labour and the remaining 50% was due to factory inefficiency.

SOLUTION

Calculation of under/ over- absorption of overhead

	Amount (Rs.)
Actual factory overhead expenses incurred	4,46,380
Overheads absorbed (2,93,104 hours × Rs. 1.25)	3,66,380
Under-absorption of overhead	80,000

Reasons for unabsorbed overheads

- (i) 50% of the unabsorbed overhead was on account of increase in the cost of indirect material and indirect labour.
- (ii) 50% of the unabsorbed overhead was due to factory inefficiency.

Treatment of unabsorbed overheads in Cost Accounting

1. Unabsorbed overhead amounting to Rs. 40,000, which were due to increase in the cost of indirect material and labour should be charged to units produced by using a supplementary rate.

$$\text{Supplementary rate} = (\text{Rs. } 40,000) / (7,800 + 200) \text{ units} = \text{Rs. } 5 \text{ per unit}$$

The sum of Rs. 40,000 (unabsorbed overhead) should be distributed by using a supplementary rate among cost of sales, finished goods and work-in progress A/cs. The amount to be debited is calculated as below:

	Amount (Rs.)
Stock of finished goods [(7,800-7,000) × Rs. 5]	4,000
Work-in progress (200 units × Rs. 5)	1,000
Cost of sales (7,000 units × Rs. 5)	35,000
Total	40,000

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1. The use of cost of sales figure, would reduce the profit for the period by Rs. 35,000 and will increase the value of stock of finished goods and work-in-progress by Rs. 4,000 and Rs. 1,000 respectively.

2. The balance amount of unabsorbed overheads of Rs. 40,000 due to factory inefficiency should be debited to Costing Profit & Loss Account, as this is an abnormal loss.

ILLUSTRATION 9 (Reverse Calculation of Factory Overhead and Administrative overheads)

In an engineering company, the factory overheads are recovered on a fixed percentage basis on direct wages and the administrative overheads are absorbed on a fixed percentage basis on factory cost.

The company has furnished the following data relating to two jobs undertaken by it in a period:

	Job 101	Job 102
	(Rs.)	(Rs.)
Direct materials	54,000	37,500
Direct wages	42,000	30,000
Selling price	1,66,650	1,28,250
Profit percentage on Total Cost	10%	20%

Required:

(i) COMPUTATION of percentage recovery rates of factory overheads and administrative overheads.

(ii) CALCULATION of the amount of factory overheads, administrative overheads and profit for each of the two jobs.

(iii) Using the above recovery rates DETERMINE the selling price of job 103. The additional data being:

Direct materials Rs. 24,000

Direct wages Rs. 20,000

Profit percentage on selling price 12-½%

SOLUTION

(i) Computation of percentage recovery rates of factory overheads and administrative overheads.

Let the factory overhead recovery rate as percentage of direct wages be F and administrative overheads recovery rate as percentage of factory cost be A.

Factory Cost of Jobs:

Direct materials + Direct wages + Factory overhead

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For Job 101 = Rs. 54,000 + Rs. 42,000 + Rs. 42,000F

For Job 102 = Rs. 37,500 + Rs. 30,000 + Rs. 30,000F

Total Cost of Jobs:
Factory cost + Administrative overhead

For Job 101 = (Rs. 96,000 + Rs. 42,000F) + (Rs. 96,000 + Rs. 42,000F) A = Rs. 1,51,500*

For Job-102 = (Rs. 67,500 + Rs. 30,000F) + (Rs. 67,500 + Rs. 30,000F) A = Rs. 1,06,875**

The value of F & A can be found using following equations

$96,000 + 42,000F + 96,000A + 42,000AF =$	1,51,500eqn (i)
$67,500 + 30,000F + 67,500A + 30,000AF =$	1,06,875eqn (ii)

Working note:

$$\text{Total Cost} = \frac{\text{Selling price}}{(100\% + \text{Percentage of profit})}$$

$$*\text{For Job 101} = \frac{\text{₹}1,66,650}{(100\% + 10\%)} = \text{₹} 1,51,500$$

$$**\text{For Job 102} = \frac{\text{₹}1,28,250}{(100\% + 20\%)} = \text{₹} 1,06,875$$

(ii) Statement of jobs, showing amount of factory overheads, administrative overheads and profit:

	Job 101	Job 102
	(Rs.)	(Rs.)
Direct materials	54,000	37,500
Direct wages	42,000	30,000
Prime cost	96,000	67,500
Factory overheads		
60% of direct wages	25,200	18,000
Factory cost	1,21,200	85,500
Administrative overheads		
25% of factory cost	30,300	21,375
Total cost	1,51,500	1,06,875
Profit (10% & 20% respectively)	15,150	21,375
Selling price	1,66,650	1,28,250

(iii) Selling price of Job 103

	(Rs.)
Direct materials	24,000

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Direct wages	20,000
Prime cost	44,000
Factory overheads (60% of Direct Wages)	12,000
Factory cost	56,000
Administrative overheads (25% of factory cost)	14,000
Total cost	70,000
Profit margin (balancing figure)	10,000
Selling price (Total Cost / 87.5%)	80,000

ILLUSTRATION 10

A company which sells four products, some of these are unprofitable. Company proposes to discontinue to sale one of these products. The following information is available regarding income, costs and activity for the year ended 31st March, 2020.

	Products			
	A	B	C	D
Sales (Rs.)	30,00,000	50,00,000	25,00,000	45,00,000
Cost of goods sold (Rs.)	20,00,000	45,00,000	21,00,000	22,50,000
Area of storage (Sq.ft.)	50,000	40,000	80,000	30,000
Number of parcels sent	1,00,000	1,50,000	75,000	1,75,000
Number of invoices sent	80,000	1,40,000	60,000	1,20,000

Selling and Distribution overheads and the basis of allocation are:

Amount (Rs.)		Basis of allocation to products
Fixed Costs		
Rent & Insurance	3,00,000	Area of storage (Sq.ft.)
Depreciation	1,00,000	No. of Parcels sent
Salesmen's salaries & expenses	6,00,000	Sales Volume
Administrative wages and salaries	5,00,000	No. of invoices sent
Variable Costs:		
Packing wages & materials	Rs. 2 per parcel	
Commission	4% of sales	
Stationery	Rs. 1 per invoice	

You are required to PREPARE Costing Profit & Loss Statement, showing the percentage of profit or loss to sales for each product.

SOLUTION

Statement of Profit or Loss on Various Products during the year ended March 31, 2020.

	TOTAL	Products			
		A	B	C	D
Sales (Rs.)	1,50,00,000	30,00,000	50,00,000	25,00,000	45,00,000
Variable costs:					

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Cost of goods sold	10850000	2000000	4500000	2100000	2250000
Commissions 4% of sales	600000	120000	200000	100000	180000
Packing wages & materials @ Rs. 2 per parcel	1000000	200000	300000	150000	350000
Stationery @ Rs. 1 per invoice	400000	80000	140000	60000	120000
Total variable costs	12850000	2400000	5140000	2410000	2900000
Contribution (Sales – variable cost)	2150000	600000	-140000	90000	1600000
Fixed Costs:					
Rent & Insurance (5:4:8:3)	300000	75000	60000	120000	45000
Depreciation (4:6:3:7)	100000	20000	30000	15000	35000
Salesmen's salaries & expenses (6:10:5:9)	600000	120000	200000	100000	180000
Administrative wages & salaries (4:7:3:6)	500000	100000	175000	75000	150000
Total Fixed costs	1500000	315000	465000	310000	410000
Profit or Loss (Contribution – fixed Costs)	650000	285000	-605000	-220000	1190000
Percentage of profit or Loss on sales (%)	4.33	9.50	-12.10	-8.8	26.4

MCOs based Questions

1. "Fixed overhead costs are not affected in monetary terms during a given period by a change in output". But this statement holds good provided:

- (a) Increase in output is not substantial
- (b) Increase in output is substantial
- (c) Both (a) and (b)
- (d) None of the above

ANSWER 1-A

2. The concept of 'idle capacity of plant' as used in cost accounting is its:

- (a) Best capacity for normal production
- (b) Capacity used for standard setting
- (c) Theoretical maximum capacity
- (d) Capacity below which production should not fall

ANSWER 2-C

3. The allotment of whole items of cost to cost centres or cost units is called:

- (a) Overhead absorption**
- (b) Cost apportionment**
- (c) Cost allocation**
- (d) None of the above**

ANSWER 3- C

4. Primary packing cost is a part of:

- (a) Direct material cost**
- (b) Production Cost**
- (c) Selling overheads**
- (d) Distribution overheads**

ANSWER 4- B

5. Director's remuneration and expenses form part of:

- (a) Production overhead**
- (b) Administration overhead**
- (c) Selling overhead**
- (d) Distribution overhead**

ANSWER 5-B

6. In case, the output of a factory is doubled, the depreciation should be treated as:

- (a) Fixed cost**
- (b) Variable cost**
- (c) Semi- variable cost**
- (d) None of the above**

ANSWER 6- C

7. Bad debt is an example of:

- (a) Distribution overhead**
- (b) Production overhead**
- (c) Selling overhead**
- (d) Administration overhead**

ANSWER 7- C

8. Normal capacity of a plant refers to the difference between:

- (a) Maximum capacity and practical capacity**
- (b) Practical capacity and normal capacity**
- (c) Practical capacity and estimated idle capacity as revealed by long term sales trend.**
- (d) Maximum capacity and actual capacity**

ANSWER 8-C

9. The difference between actual factory overhead and absorbed factory overhead will be usually at the minimum level, provided pre- determined overhead rate is based on:

- (a) Maximum capacity**
- (b) Direct labour hours**
- (c) Machine hours**
- (d) Normal capacity**

ANSWER 9- D

10. Identify among the following a scientific and accurate method of factory overhead absorption:

- (a) Percentage of direct material cost method**
- (b) Percentage of direct labour cost method**
- (c) Percentage of prime cost method**
- (d) Machine hour rate method.**

ANSWER 10-D

Theory Questions

1. STATE what is blanket overhead rate? In which situations, blanket rate is to be used and why?

ANSWER

Blanket Overhead Rate: Blanket overhead rate refers to the **computation of one single overhead rate for the whole factory**. It is to be distinguished from the departmental overhead rate which refers to a separate rate for each individual cost centre or department. The use of blanket rate may be proper in certain factories producing only one major product in a continuous process or where the work performed in every department is fairly uniform or standardised.

This overhead rate is computed as follows:

Blanket Rate = Total overheads for the factory / Total number of units of base for the factory

A blanket rate should be applied in the following cases:

- (1) Where only one major product is being produced.
- (2) Where several products are produced, but
 - (a) All products pass through all departments; and
 - (b) All products are processed for the same length of time in each department.

Where these conditions do not exist, departmental rates should be used.

2. DISCUSS the step method and reciprocal service method of secondary distribution of overheads.

ANSWER

Step Method or Non-reciprocal method: This method gives cognizance to the services rendered by service department to another service department. Therefore, as compared to previous method, this method is more complicated because a sequence of apportionments has to be selected here. **The sequence here begins with the department that renders maximum number of services to the other service department(s)**. In other words, the cost of the service department that serves the largest number of services to the other service department(s) and production department(s) is distributed first. After this, the cost of service department serving the next largest number of departments is apportioned.

This process continues till the cost of last service department is apportioned. The cost of last service department is apportioned among production departments only.

(iii) Reciprocal Service Method: This method recognises the fact that where there are two or more service departments they may render services to each other and, therefore, these **inter-departmental services are to be given due weight** while re-distributing the expenses of the service departments.

The methods available for dealing with reciprocal services are:

- (a) Simultaneous equation method;
- (b) Trial and error method;
- (c) Repeated distribution method.

(a) Simultaneous Equation Method:

According to this method firstly, the costs of service departments are ascertained. These costs are then re-distributed to production departments on the basis of given percentages.

(b) Trial and Error Method:

According to this method the cost of one service cost centre is apportioned to another service cost centre. The cost of another service centre plus the share received from the first cost centre is again apportioned to the first cost centre. This process is repeated till the amount to be apportioned becomes negligible, that means **repeated distribution method is followed to the extent of service departments only.**

All apportioned amounts for each service cost centre are added to get the total apportioned cost. These **total service cost centre costs are redistributed to the production departments.** Trial and error method and Simultaneous equation method gives the same result.

(c) Repeated Distribution Method:

Under this method, **service departments' costs are distributed to other service and production departments on agreed percentages** and this process continues to be repeated, till the figures of service departments are either exhausted or reduced to too small a figure.

3. DISCUSS the problems of controlling the selling and distribution overheads.
ANSWER

Control of selling and distribution expenses is a difficult task. The reasons for this are as follows:

1. The incidence of selling and distribution overheads depends mainly on external factors, such as distance of market, extent and nature of competition, terms of sales, etc. which are beyond the control of management.
2. These overheads are dependent upon the customers, behaviour, their liking and disliking, tastes etc. Therefore, as such control over the overheads may result in loss of customers.
3. These expenses being of the nature of policy costs are not amenable to control. In spite of the above difficulties, the following methods may be used for controlling them.
 - (a) Comparison with past performance - According to this method, selling and distribution overheads are compared with the figures of the previous period. Alternatively, the expenses may be expressed as a percentage of sales, and the percentages may be compared with those of the past period. This method is suitable for small concerns.
 - (b) Budgetary Control - A budget is set up for selling and distribution expenses. The expenses are classified into fixed and variable. If necessary, a flexible budget may be prepared indicating the expenses at different levels of sales. The actual expenses are compared with the budgeted figures and in the case of variances suitable actions are taken.

(c) Standard Costing - Under this method standards are set up in relation to the standard sales volume. Standards may be set up for salesmen, territories, products etc. Once the standards are set up, comparison is made between the actuals and standards: variances are enquired into and suitable action taken.

4. DISTINGUISH between cost allocation and cost absorption.

ANSWER

Cost Allocation: The term 'allocation' refers to the direct assignment of cost to a cost object which can be traced directly. It implies relating overheads directly to the various departments. The estimated amount of various items of manufacturing overheads should be allocated to various cost centres or departments. For example- if a separate power meter has been installed for a department, the entire power cost ascertained from the meter is allocated to that department. The salary of the works manager cannot be directly allocated to any one department since he looks after the whole factory. It is, therefore, obvious that many overhead items will remain unallocated after this step.

Cost Absorption: After completing the distribution as stated above the overheads charged to department are to be recovered from the output produced in respective departments. This process of recovering overheads of a department or any other cost center from its output is called recovery or absorption.

Absorption of manufacturing overheads shall be as follows:

- (i) **Variable Manufacturing overheads:** The variable manufacturing overheads shall be absorbed on the basis of actual production.
- (ii) **Fixed Manufacturing overheads:** The fixed manufacturing overhead shall be absorbed on the basis of normal capacity.

5. EXPLAIN Single and Multiple Overhead Rates.

ANSWER

Blanket overhead rate refers to the **computation of one single overhead rate for the whole factory**. It is to be distinguished from the departmental overhead rate which refers to a separate rate for each individual cost centre or department. The use of blanket rate may be proper in certain factories producing only one major product in a continuous process or where the work performed in every department is fairly uniform or standardised.

Departmental Overhead Rate: It refers to the computation of one single overhead rate for a particular production unit or department. Where the product lines are varied or machinery is used to a varying degree in the different departments, that is, where conditions throughout the factory are not uniform, the use of departmental rates is to be preferred.

6. EXPLAIN how would you treat the idle capacity costs in Cost Accounts?

ANSWER

Treatment of Idle capacity costs: Idle capacity costs can be treated in product costing, in the following ways:

- (a) If the idle capacity cost is due to unavoidable reasons such as repairs, maintenance, changeover of job etc. a supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilised.

- (b) If the idle capacity cost is due to avoidable reasons such as faulty planning, power failure etc.; the cost should be charged to costing profit and loss account.
- (c) If the idle capacity cost is due to seasonal factors, then, the cost should be charged to the cost of production by inflating overhead rates.

7. DISCUSS the difference between allocation and apportionment of overhead.

ANSWER

Difference between Allocation and Apportionment

The difference between the allocation and apportionment is important to understand because the purpose of these two methods is the identification of the items of cost to cost units or centers. However, the main difference between the above methods is given below.

Allocation	Apportionment
Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually.	Apportionment deals with the proportions of an item of cost for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.
Allocation is a direct process of charging expenses to different cost centres	Apportionment is an indirect process because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.

(3) The allocation or apportionment of an expense is not dependent on its nature, but the relationship between the expense and the cost centre decides that whether it is to be allocated or apportioned.

(4) Allocation is a much wider term than apportionment.

8. EXPLAIN what are the methods of re-apportionment of service department expenses over the production departments? Discuss

ANSWER

Methods for Re-apportionment: The re-apportionment of service department expenses over the production departments may be carried out by using any one of the following methods:

- (i) Direct re-distribution method.
- (ii) Step method of secondary distribution or non-reciprocal method.
- (iii) Reciprocal Service method.

i) Direct Re-Distribution Method: Service department costs under this method are apportioned over the production departments only, **ignoring the services rendered by one service department to the other.**

Step Method or Non-reciprocal method: This method gives cognizance to the services rendered by service department to another service department. Therefore, as compared to previous method, this method is more complicated because a sequence of apportionments has to be selected here. **The sequence here begins with the department**

that renders maximum number of services to the other service department(s). In other words, the cost of the service department that serves the largest number of services to the other service department(s) and production department(s) is distributed first.

After this, the cost of service department serving the next largest number of departments is apportioned.

This process continues till the cost of last service department is apportioned. The cost of last service department is apportioned among production departments only.

(iii) Reciprocal Service Method: This method recognises the fact that where there are two or more service departments they may render services to each other and, therefore, these **inter-departmental services are to be given due weight** while re-distributing the expenses of the service departments.

The methods available for dealing with reciprocal services are:

- (a) Simultaneous equation method;
- (b) Trial and error method;
- (c) Repeated distribution method.

(a) Simultaneous Equation Method:

According to this method firstly, the costs of service departments are ascertained. These costs are then re-distributed to production departments on the basis of given percentages.

(b) Trial and Error Method:

According to this method the cost of one service cost centre is apportioned to another service cost centre. The cost of another service centre plus the share received from the first cost centre is again apportioned to the first cost centre. This process is repeated till the amount to be apportioned becomes negligible, that means **repeated distribution method is followed to the extent of service departments only**. All apportioned amounts for each service cost centre are added to get the total apportioned cost. These **total service cost centre costs are redistributed to the production departments**. Trial and error method and Simultaneous equation method gives the same result.

(c) Repeated Distribution Method:

Under this method, **service departments' costs are distributed to other service and production departments on agreed percentages** and this process continues to be repeated, till the figures of service departments are either exhausted or reduced to too small a figure.

Practical Questions

1. The ABC Company has the following account balances and distribution of direct charges on 31st March, 2020.

Indirect labour	14,650	4,000	3,000	2,000	5,650
Maintenance material	5,020	1,800	700	1,020	1,500
Misc. supplies	1,750	400	1,000	150	200
Superintendent's salary	4,000	–	–	4,000	–

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Cost & payroll salary	10,000	–	–	10,000	–
Overheads to be apportioned:					
Power	8,000				
Rent	12,000				
Fuel and heat	6,000				
Insurance	1,000				
Trade License fees	2,000				
Depreciation	1,00,000				
	1,64,420	6,200	4,700	17,170	7,350

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space (Sqft)	Radiator Sections	No. of Employees	Investment (Rs.)	H.P hours
Machine Shop	2,000	45	20	6,40,000	3,500
Packing	800	90	10	2,00,000	500
General Plant	400	30	3	10,000	-
Store & Maintenance	1,600	60	5	1,50,000	1,000
	4,800	225	8	10,00,000	5,000

Expenses charged to the stores and maintenance departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%; General Plant overheads is distributed on the basis of number of employees:

a) PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution including distribution of the service departments' expense to production departments.

(b) DETERMINE the service department distribution by the method of continued distribution (repeated distribution) through 3 cycles. Show all calculations to the nearest rupees.

ANSWER 1

(a) Overhead Distribution Statement

Particulars	Production Department		Service Department	
	Machine	Packing	General Plant	Stores & Maint.
Allocated Expenses:				

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Indirect labour	4,000	3,000	2,000	5,650
Maintenance material	1,800	700	1,020	1,500
Superintendent's salary	-	-	4,000	-
Misc. supplies	400	1,000	150	200
Cost & payroll salaries	-	-	10,000	-
Total Allocated Overheads	6,200	4,700	17,170	7,350
Apportioned expenses (as per schedule below)	77,720	25,800	2,830	22,650
Total overheads	83,920	30,500	20,000	30,000

Schedule of Apportioned Expenses

Item	Basis	Total Amount	Production Depts.		Service Depts.	
			Machine shop	Packing	Gen. Plant	Store & Maint.
(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Power (7:1:-:2)	HP hours	8,000	5,600	800	-	1,600
Rent (5:2:1:4)	Floor Space	12,000	5,000	2,000	1,000	4,000
Fuel and heat (3:6:2:4)	Radiator Secs.	6,000	1,200	2,400	800	1,600
Insurance (64:20:1:15)	Investment	1,000	640	200	10	150
Trade license fees (64:20:1:15)	Investment	2,000	1,280	400	20	300
Depreciation (64:20:1:15)	Investment	1,00,000	64,000	20,000	1,000	15,000
Total		1,29,000	77,720	25,800	2,830	22,650

(b) Distribution of Service Department Expenses

	Production Depts.		Service Depts.	
	Machine shop	Packing	Gen. Plant	Store & Maint.
(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Total Expense [as per (a)]	83,920	30,500	20,000	30,000
Dist. of Store & Maint. (5:2:3)	15,000	6,000	9,000	-30,000
Dist. of General plant (4:2:1)	16,571	8,286	-29,000	4,143
Dist. of Store & Maint. (5:2:3)	2,072	829	1,242	-4,143
Dist. of General plant (4:2:1)	710	355	-1,242	177
Dist. of Store & Maint. (5:2:3)	89	35	53	-177
Dist. of General plant (4:2:1)	35	18	-53	0
Total	1,18,397	46,023		

2. Modern Manufactures Ltd. has three Production Departments P1, P2, P3 and two Service Departments S1 and S2 details pertaining to which are as under:

	P1	P2	P3	S1	S2
Direct wages (Rs.)	3,000	2,000	3,000	1,500	195
Working hours	3,070	4,475	2,419	-	-
Value of machines (Rs.)	60,000	80,000	1,00,000	5,000	5,000
H.P. of machines	60	30	50	10	-
Light points	10	15	20	10	5
Floor space (sq. ft.)	2,000	2,500	3,000	2,000	500

The following figures extracted from the Accounting records are relevant:

	(Rs.)
Rent and Rates	5,000
General Lighting	600
Indirect Wages	1,939
Power	1,500
Depreciation on Machines	10,000
Sundries	9,695

The expenses of the service departments are allocated as under:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

DETERMINE the total cost of product X which is processed for manufacture in Departments P1, P2 and P3 for 4, 5 and 3 hours respectively, given that its Direct Material Cost is Rs. 50 and Direct Labour Cost is Rs. 30.

ANSWER 2

2. Statement Showing Distribution of Overheads of Modern Manufactures Ltd.

Particulars	Basis	Total	Production Departments			Service Departments	
			P1	P2	P3	S1	S2
(Rs.)			(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Direct wages	Actual	1,695	-	-	-	1,500	195
Rent & rates	Area	5,000	1,000	1,250	1,500	1,000	250
General lighting	Light points	600	100	150	200	100	50
Indirect wages	Direct wages	1,939	600	400	600	300	39

Power	H.P.	1,500	600	300	500	100	-
Depreciation of machines	Value of machines	10,000	2,400	3,200	4,000	200	200
Sundries	Direct wages	9,695	3,000	2,000	3,000	1,500	195
		30,429	7,700	7,300	9,800	4,700	929

Redistribution of Service Department's Expenses over Production Departments

	P1	P2	P3	S1	S2
Total overhead distributed as above	7,700	7,300	9,800	4,700	929
Dept. S1 Overheads apportioned (20:30:40:—:10)	940	1,410	1,880	-4,700	470
Dept. S2 overheads apportioned (40:20:30:10:—)	559.6	279.8	419.7	139.9	-1,399
Dept. S1 Overheads apportioned (20:30:40:—:10)	28	42	56	-139.9	13.9
Dept. S2 overheads apportioned (40:20:30:10:—)	6.2	3.1	4.6	-	-13.9
	9,233.8	9,034.9	12,160.3		
Working hours	3070	4475	2419		
Rate per hour	3.00	2.02	5.03		

Determination of total cost of Product 'X'

Direct material cost	50.00
Direct labour cost	30.00
Overhead cost (See working note)	37.19
	117.19

Working Note:

Overhead cost:

(Rs. 3 × 4 hrs.) + (Rs. 2.02 × 5 hrs.) + (Rs. 5.03 × 3 hrs.)

= Rs. 12 + Rs. 10.10 + Rs. 15.09 = Rs. 37.19

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3. Deccan Manufacturing Ltd., have three departments which are regarded as production departments. Service departments' costs are distributed to these production departments using the "Step Ladder Method" of distribution. Estimates of factory overhead costs to be incurred by each department in the forthcoming year are as follows. Data required for distribution is also shown against each department:

Department	Factory overhead (Rs.)	Direct labour hours	No. of employees	Area in sq.m.
Production:				
X	1,93,000	4,000	100	3,000
Y	64,000	3,000	125	1,500
Z	83,000	4,000	85	1,500
Service:				
P	45,000	1,000	10	500
Q	75,000	5,000	50	1,500
R	1,05,000	6,000	40	1,000
S	30,000	3,000	50	1,000

The overhead costs of the four service departments are distributed in the same order, viz., P, Q, R and S respectively on the following basis.

Department	Basis
P	Number of employees
Q	Direct labour hours
R	Area in square metres
S	Direct labour hours

You are required to:

- PREPARE a schedule showing the distribution of overhead costs of the four service departments to the three production departments; and
- CALCULATE the overhead recovery rate per direct labour hour for each of the three production departments.

ANSWER 3

(a) Deccan Manufacturing Limited
Schedule Showing the Distribution of Overhead Costs among Departments

	Production Depts.			Service Depts.			
	X	Y	Z	P	Q	R	S
Overhead cost	1,93,000	64,000	83,000	45,000	75,000	1,05,000	30,000
Distribution of Dept.P (100:125:85:- :50:40:50)	10,000	12,500	8,500	- 45,000	5,000	4,000	5,000
Distribution of Dept.Q 4:3:4:-:-:6:3)	16,000	12,000	16,000	-	- 80,000	24,000	12,000
Distribution of Dept.R (6:3:3:-:-:-:2)	57,000	28,500	28,500	-	-	- 1,33,000	19,000
Distribution of Dept.S (4:3:4:-:-:-:-)	24,000	18,000	24,000	-	-	-	-66,000
Total	3,00,000	1,35,000	1,60,000				

(b) Calculation of overhead recovery rate

	Dept-X	Dept-Y	Dept-Z
Total apportioned overheads	Rs.3,00,000	Rs.1,35,000	Rs.1,60,000
Direct labour hours	4,000	3,000	4,000
Overhead recovery rate per labour hour	Rs.75	Rs.45	Rs.40

4. Gemini Enterprises undertakes three different jobs A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to Rs. 4,20,000 per annum. The expenses regarding the machine are estimated as follows:

Rent for a quarter 17,500
Depreciation per annum 2,00,000
Indirect charges per annum 1,50,000

During the first month of operation the following details were taken from the job register:

	Job		
	A	B	C
Number of hours the machine was used:			
(a) Without the use of the computer	600	900	—
(b) With the use of the computer	400	600	1,000

You are required to **COMPUTE** the machine hour rate:

(a) For the firm as a whole for the month when the computer was used and when the computer was not used.

(b) For the individual jobs A, B and C.

ANSWER 4

Working notes:

(i) Total machine hours used 3,500
(600 + 900 + 400 + 600 + 1,000)

(ii) Total machine hours without the use of computers 1,500
(600 + 900)

(iii) Total machine hours with the use of computer 2,000
(400 + 600 + 1,000)

(iv) Total overheads of the machine per month

Rent (Rs. 17,500 ÷ 3 months) 5,833.33

Depreciation (Rs. 2,00,000 ÷ 12 months) 16,666.67

Indirect Charges (Rs. 1,50,000 ÷ 12 months) 12,500.00

Total 35,000.00

(v) Computer hire charges for a month = Rs. 35,000
(Rs. 4,20,000 ÷ 12 months)

(vi) Overheads for using machines without computer
= (Rs. 35,000 / 3,500 hrs.) × 1,500 hrs. = Rs. 15,000

(a) Computation of Machine hour rate for the firm as a whole for a month.

(1) When the Computer was used: = (Rs.55,000 /2,000 hours) = Rs. 27.50 per hour

(2) When the computer was not used: =(Rs.15,000 / 1,500 hrs.) = Rs.10 per hour

(b) Computation of Machine hour rate for the individual job

Rate per hour	Job						
	A		B		C		
(Rs.)	Hrs.	(Rs.)	Hrs.	(Rs.)	Hrs.	(Rs.)	
Overheads							
Without Computer	10.0	600	6,000	900	9,000	-	-
With computer	27.5	400	11,000	600	16,500	1,000	27,500
Total		1,000	17,000	1,500	25,500	1,000	27,500
Machine hour rate			17		17		27.5

5. A machine shop has 8 identical Drilling machines manned by 6 operators. The machine cannot be worked without an operator wholly engaged on it. The original cost of all these machines works out to Rs. 8 lakhs. These particulars are furnished for a 6 months period:

Normal available hours per month **208**
 Absenteeism (without pay) hours **18**
 Leave (with pay) hours **20**
 Normal idle time unavoidable-hours **10**
 Average rate of wages per worker for 8 hours a day. **Rs.800**

Production bonus estimated **15% on wages**
 Value of power consumed **Rs.80,500**
 Supervision and indirect labour **Rs.33,000**
 Lighting and electricity **Rs.12,000**

These particulars are for a year

Repairs and maintenance including consumables- 3% of value of machines.

Insurance- Rs. 40,000
 Depreciation- 10% of original cost.

Other sundry works expenses- Rs. 12,000

General management expenses allocated- Rs. 54,530.

You are required to COMPUTE a comprehensive machine hour rate for the machine shop.

ANSWER 5**Computation of comprehensive machine hour rate of machine shop**

Particulars	(Rs.)
Operator's wages (Refer to working note 2)	6,84,000
Production bonus (15% on wages)	1,02,600
Power consumed	80,500
Supervision and indirect labour	33,000
Lighting and electricity	12,000
Repairs and maintenance (3%× Rs.8 lakh×½)	12,000
Insurance (Rs.40,000 × ½)	20,000
Depreciation (10%×Rs.8 lakh×½)	40,000
Sundry works expenses (Rs.12,000 × ½)	6,000
General management expenses (Rs.54,530 × ½)	27,265
	10,17,365

Machine hour rate = (Total overheads of machine shop/ Hours of machines operation)

= (Rs. 10,17,365 / 5,760 hours) =(Refer to working note 1)= Rs.176.63

Working notes

1. Computation of hours, for which 6 operators are available for 6 months.

	Per month	For six Month
Normal available hours p.m. per operator.	208	
Less: Absenteeism hours	18	
Less: Leave hours	20	
Less: Idle time hours	10	
Utilisable hours p.m. per operator	160	960

Total utilisable hours for 6 operators and for 6 months are
 = 960 × 6 = 5,760 hours

As machines cannot be worked without an operator wholly engaged on them therefore, hours for which 6 operators are available for 6 months are the hours for which machines can be used. Hence 5,760 hours represent total machine hours.

2. Computation of operator's wages

Average rate of wages: = Rs.100 per hour = (Rs.800/ 8 hours)

Hours per month for which wages are paid to a worker (208 hours – 18 hours)
 = 190 hours.

Total wages paid to 6 operators for 6 months = 190 hours × 6 × 6 × Rs.100 = Rs.6,84,000

6. Job No. 198 was commenced on October 10, 2020 and completed on November 1, 2020. Materials used were Rs. 6,000 and labour charged directly to the job was Rs. 4,000. Other information is as follows:

Machine No. 215 used for 40 hours, the machine hour rate being Rs. 35.

Machine No. 160 used for 30 hours, the machine hour rate being Rs. 40. Six welders worked on the job for five days of 8 hours each: the Direct labour hour per welder is Rs. 20.

General expenses related to production not included for calculating either the machine hour or direct labour hour rate totaled Rs.20,000, total direct wages for the period being Rs.2,00,000. COMPUTE the works costs for job No. 198.

ANSWER 6

Computation for works costs for job No. 198

(Rs.)		(Rs.)
Materials		6,000
Direct labour		4,000
		10,000
Factory overheads:		
Machine No. 215 : 40 hours @ Rs.35		1,400
Machine No. 160 : 30 hours @ Rs.40		1,200
*240 hours of welders @ Rs. 20 per hr.		4,800
**General expenses 10% of wages	400	7,800
Work cost		17,800

* 6 welders × 5 days × 8 hours = 240 hours

** Un- apportioned expenses Rs. 20,000 which works out at 10% of direct wages.

7. In a factory, overheads of a particular department are recovered on the basis of Rs. 5 per machine hour. The total expenses incurred and the actual machine hours for the department for the month of August were Rs. 80,000 and 10,000 hours respectively. Of the amount of Rs. 80,000, Rs. 15,000 became payable due to an award of the Labour Court and Rs. 5,000 was in respect of expenses of the previous year booked in the current month (August). Actual production was 40,000 units, of which 30,000 units were sold. On analysing the reasons, it was found that 60% of the under-absorbed overhead was due to defective planning and the rest was attributed to normal cost increase. SHOW the treatment of over/under-absorbed overhead in the cost accounts?

ANSWER 7

	(Rs.)	(Rs.)
Total expenses incurred in the month of August:		80,000
Less: The amount paid according to labour court award (Assumed to be non-recurring)	15,000	
Expenses of previous year	5000	(20,000)
Net overhead expenses incurred for the month		60,000
Overhead recovered for 10,000 hours @ Rs. 5 per hour		(50,000)
Under-absorbed overheads		10,000

60% of under-absorbed overhead was due to defective planning, it will be charged to costing profit & loss account.

40% of under-absorbed overhead i.e. Rs.4,000 may be distributed over Finished Goods and Cost of Sales using supplementary overhead rate:

Supplementary rate = Under-absorbed OH / Units produced

$$= 4,000 / 40,000 \text{ units Rs.} = \text{Rs.}0.10$$

Amount of under-absorbed overheads charged to finished goods
= 10,000 units × Rs.0.10 = Rs.1,000

Amount of under-absorbed overheads charged to cost of sales
= 30,000 units × Rs.0.10 = Rs.3,000

8. In a manufacturing unit, factory overhead was recovered at a pre-determined rate of Rs. 25 per man-day. The total factory overhead expenses incurred and the man-days actually worked were Rs. 41.50 lakhs and 1.5 lakh man-days respectively. Out of the 40,000 units produced during a period, 30,000 were sold.

On analysing the reasons, it was found that 60% of the unabsorbed overheads were due to defective planning and the rest were attributable to increase in overhead costs.

EXPLAIN how would unabsorbed overheads be treated in Cost Accounts?

ANSWER 8**Computation of unabsorbed overheads**

Man-days worked	1,50,000
	(Rs.)
Overhead actually incurred	41,50,000
Less: Overhead absorbed @ Rs. 25 per man-day (Rs. 25 × 1,50,000)	37,50,000
Unabsorbed overheads	<u>4,00,000</u>
Unabsorbed overheads due to defective planning (i.e. 60% of Rs. 4,00,000)	2,40,000
Balance of unabsorbed overhead	1,60,000

Treatment of unabsorbed overheads in Cost Accounts

(i) The unabsorbed overheads of Rs. 2,40,000 due to defective planning to be treated as abnormal and therefore be charged to Costing Profit and Loss Account.

(ii) The balance unabsorbed overheads of Rs.1,60,000 be charged to production i.e., 40,000 units at the supplementary overhead absorption rate i.e., Rs. 4 per unit (Refer to Working Note)

	(Rs.)
Charge to Costing Profit and Loss Account as part of the cost of unit sold (30,000 units @ Rs. 4 p.u.)	1,20,000
Add: To closing stock of finished goods (10,000 units @ Rs. 4 p.u.)	40,000
Total	1,60,000

Working Note:

Supplementary overhead absorption rate = $\text{Rs.}1,60,000 / 40,000 \text{ units} = \text{Rs. } 4 \text{ p.u.}$

9. A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are given below:

Department	Direct Materials (Rs.)	Direct Wages (Rs.)	Factory Overheads (Rs.)	Direct Labour hours	Machine hours
Budget:					
Machining	6,50,000	80,000	3,60,000	20,000	80,000
Assembly	70,000	3,50,000	1,40,000	1,00,000	10,000
Packing	1,00,000	70,000	1,25,000	50,000	-
Actual:					
Machining	7,80,000	96,000	3,90,000	24,000	96,000
Assembly	1,36,000	2,70,000	84,000	90,000	11,000
Packing	1,20,000	90,000	1,35,000	60,000	-

The details of one of the representative jobs produced during the month are as under:

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Job No. CW 7083 :				
Department	Direct Materials (Rs.)	Direct Wages (Rs.)	Direct Labour hours	Machine hours
Machining	1,200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	-

The factory adds 30% on the factory cost to cover administration and selling overheads and profit.

Required:

(i) COMPUTE the overhead absorption rate as per the current policy of the company and determine the selling price of the Job No. CW 7083.

(ii) Suggest any suitable alternative method(s) of absorption of the factory overheads and CALCULATE the overhead recovery rates based on the method(s) so recommended by you.

(iii) DETERMINE the selling price of Job CW 7083 based on the overhead application rates calculated in (ii) above.

(iv) CALCULATE the department-wise and total under or over recovery of overheads based on the company's current policy and the method(s) recommended by you.

ANSWER 9

(i) Computation of overhead absorption rate
(as per the current policy of the company)

Department	Budgeted factory Overheads (Rs.)	Budgeted direct wages (Rs.)
Machinery	3,60,000	80,000
Assembly	1,40,000	3,50,000
Packing	1,25,000	70,000
Total	6,25,000	5,00,000

Overhead absorption rate = (Budgeted factory overheads / Budgeted direct wages) × 100
 = (6,25,000 / 5,00,000) × 100 = 125% of Direct wages

Selling Price of the Job No. CW-7083

	(Rs.)
Direct materials (Rs. 1,200 + Rs. 600 + Rs. 300)	2,100.00
Direct wages (Rs. 240 + Rs. 360 + Rs. 60)	660.00

Overheads (125% × Rs. 660)	825.00
Total factory cost	3,585.00
Add: Mark-up (30% × Rs. 3,585)	1,075.50
Selling price	4,660.50

(ii) Methods available for absorbing factory overheads and their overhead recovery rates in different departments

1. Machining Department

In the machining department, the use of machine time is the predominant factor of production. Hence machine hour rate should be used to recover overheads in this department. The overhead recovery rate based on machine hours has been calculated as under:

$$\begin{aligned} \text{Machine hour rate} &= (\text{Budgeted factory overheads} / \text{Budgeted machine hours}) \\ &= (3,60,000 / 80,000 \text{ hours}) = \text{Rs. 4.50 per hour} \end{aligned}$$

2. Assembly Department

In this department direct labour hours is the main factor of production. Hence direct labour hour rate method should be used to recover overheads in this department. The overheads recovery rate in this case is:

$$\begin{aligned} \text{Direct labour hour rate} &= (\text{Budgeted factory overheads} / \text{Budgeted direct labour hours}) \\ &= (1,40,000 / 1,00,000 \text{ hours}) = \text{Rs. 1.40 per hour} \end{aligned}$$

3. Packing Department

Labour is the most important factor of production in this department. Hence direct labour hour rate method should be used to recover overheads in this department.

The overhead recovery rate in this case comes to:

$$\begin{aligned} \text{Budgeted factory overhead} \\ \text{Direct labour hour rate} &= \text{Budgeted factory overheads} / \text{Direct labour hours} \\ &= (1,25,000 / 50,000 \text{ hours}) = \text{Rs. 2.50 per hour} \end{aligned}$$

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(iii) Selling Price of Job CW-7083 [based on the overhead application rates calculated in (ii) above]

	(Rs.)
Direct materials	2,100.00
Direct wages	660.00
Overheads (Refer to Working note)	1,078.00
 Factory cost	 3,838.00
Add: Mark up (30% of Rs. 3,838)	1,151.40
Selling price	4,989.40

Working note:

Overhead Summary Statement

Dept. Overheads	Basis	Hours	Rate	
			(Rs.)	(Rs.)
Machining	Machine hour	180	4.50	810
Assembly	Direct labour hour	120	1.40	168
Packing	Direct labour hour	40	2.50	100
			Total	1,078

(iv) Department-wise statement of total under or over recovery of overheads

(a) Under current policy

	Departments			Total (Rs.)
	Machining (Rs.)	Assembly (Rs.)	Packing (Rs.)	
Direct wages (Actual)	96,000	2,70,000	90,000	
Overheads recovered @ 125% of Direct wages: (A)	1,20,000	3,37,500	1,12,500	5,70,000
Actual overheads: (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/Over recovery of overheads : (A—B)	(2,70,000)	2,53,500	(22,500)	(39,000)

(b) As per methods suggested

	Basis of overhead recovery			Total (Rs.)
	Machine hours	Direct labour hours	Direct labour hours	
Hours worked	96,000	90,000	60,000	
Rate/hour (Rs.)	4.50	1.40	2.50	
Overhead recovered (Rs.): (A)	4,32,000	1,26,000	1,50,000	7,08,000
Actual overheads (Rs.): (B)	3,90,000	84,000	1,35,000	6,09,000
(Under)/Over recovery: (A—B)	42,000	42,000	15,000	99,000

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10. A light engineering factory fabricates machine parts for customers. The factory commenced fabrication of 12 nos. machine parts as per customers' specifications, the expenditure incurred on the job for the week ending 21st August, 2020 is as tabulated below:

	(Rs.)	(Rs.)
Direct materials (all items)		780.00
Direct labour (manual) 20 hours @Rs. 15 per hour		300.00
Machine facilities :		
Machine No. I : 4 hours @ Rs. 45	180.00	
Machine No. II : 6 hours @ Rs. 65	390.00	570.00
Total	1,650.00	
Overheads @ Rs. 8 per hour on 20 manual hours	160.00	
Total cost	1,810.00	

The overhead rate of Rs. 8 per hour is based on 3,000 man hours per week; similarly, the machine hour rates are based on the normal working of Machine Nos. I and II for 40 hours out of 45 hours per week.

After the close of each week, the factory levies a supplementary rate for the recovery of full overhead expenses on the basis of actual hours worked during the week. During the week ending 21st August, 2020, the total labour hours worked was 2,400 and Machine Nos. I and II had worked for 30 hours and 32.5 hours respectively.

PREPARE a Cost Sheet for the job for the fabrication of 12 nos. machine parts duly levying the supplementary rates.

ANSWER 10

Fabrication of 12 nos. machine parts (job No.....)

Date of commencement: 16 August, 2020

Date of Completion:

Cost sheet for the week ending, August 21, 2020:

(Rs.)		(Rs.)
Direct materials (all items)		780.00
Direct labour (manual) 20 hours @Rs. 15 per hour		300.00
Machine facilities:		
Machine No. I : 4 hours @ Rs. 45	180.00	
Machine No. II : 6 hours @ Rs. 65	390.00	570.00
Total		1,650.00
Overheads @ Rs. 8 per hour on 20 manual hours		160.00
Total cost		1,810.00
Supplementary Rates		
Overheads 20 hours @ Rs. 2 per hour (Refer WN-1)	40.00	
Machine facilities: (Refer WN-2)		

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Machine No. I - 4 hours @ Rs. 15	60.00	
Machine No. II - 6 hours @ Rs. 15	90.00	190.00
Cost		2,000.00

Working notes (WN):

1. Overheads budgeted: 3,000 man-hours × Rs.8 =Rs.24,000

Actual hours: 2,400 man-hours

Actual rate per hour Rs.24,000 ÷ 2,400 hours = Rs.10

Supplementary charge Rs. 2 (Rs.10 – Rs. 8) per hour

2. Machine facilities:

	Machine No. I	Machine No. II
Budgeted	Rs.1,800 (40 × Rs.45)	Rs.2,600 (40 × Rs.65)
Actual number of hours	30	32.5
Actual rate per hour	Rs.60.00	Rs.80.00
Supplementary rate per hour	Rs. 15.00 (Rs.60.00 – Rs.45.00)	Rs. 15.00 (Rs.80.00 – Rs.65.00)

11. ABC Ltd. manufactures a single product and absorbs the production overheads at a pre-determined rate of Rs. 10 per machine hour.

At the end of financial year 2019-20, it has been found that actual production overheads incurred were Rs. 6,00,000. It included Rs. 45,000 on account of 'written off' obsolete stores and Rs. 30,000 being the wages paid for the strike period under an award.

The production and sales data for the year 2019-20 is as under:

Production :

Finished goods 20,000 units
Work-in-progress 8,000 units
(50% complete in all respects)

Sales :

Finished goods 18,000 units

The actual machine hours worked during the period were 48,000. It has been found that one-third of the under-absorption of production overheads was due to lack of production planning and the rest was attributable to normal increase in costs.

- (i) **CALCULATE** the amount of under-absorption of production overheads during the year 2019-20; and
 (ii) **SHOW** the accounting treatment of under-absorption of production overheads.

ANSWER 11**(i) Amount of under-absorption of production overheads during the year 2019-20**

	(Rs.)	
Total production overheads actually incurred during the year 2019-20		6,00,000
Less : 'Written off' obsolete stores	Rs. 45,000	
Wages paid for strike period	Rs. 30,000	75,000
Net production overheads actually incurred :	(A)	5,25,000
Production overheads absorbed by 48,000 machine hours @ Rs. 10 per hour :	(B)	4,80,000
Amount of under – absorption of production overheads :	[(A) – (B)]	45,000

(ii) Accounting treatment of under absorption of production overheads

It is given in the statement of the question that 20,000 units were completely finished and 8,000 units were 50% complete, one third of the under-absorbed overheads were due to lack of production planning and the rest were attributable to normal increase in costs.

		(Rs.)
1. (33 – 1/3% of Rs. 45,000) i.e., Rs. 15,000 of under-absorbed overheads were due to lack of production planning. This being abnormal, should be debited to the Costing Profit and Loss A/c.		15,000
2. Balance (66–2/3% of Rs. 45,000) i.e., Rs. 30,000 of under-absorbed overheads should be distributed over work-in-progress, finished goods and cost of sales by using supplementary rate.		30,000
Total under-absorbed overheads		45,000

Apportionment of unabsorbed overheads of Rs. 30,000 over, work-in progress, finished goods and cost of sales

	Equivalent Completed Units	(Rs.)
Work-in-Progress (4,000 units × Rs. 1.25) (Refer to working note)	4,000	5,000
Finished goods (2,000 units × Rs. 1.25)	2,000	2,500
Cost of sales (18,000 units × Rs. 1.25)	18,000	22,500
	24,000	30,000

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Working Note

Supplementary rate per unit = (Rs.30,000 / 24,000) = Rs. 1.25

12. A Ltd., manufactures two products A and B. The manufacturing division consists of two production departments P1 and P2 and two service departments S1 and S2. Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P1 is based on direct machine hours, while the rate of Department P2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

(i) Cost of Department S1 to Department P1 and P2 equally, and

(ii) Cost of Department S2 to Department P1 and P2 in the ratio of 2 : 1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

Production Departments		Service Departments	
P1	P2	S1	S2
Rs. 25,50,000	Rs. 21,75,000	Rs. 6,00,000	Rs. 4,50,000

Budgeted output in units:

Product A 50,000; B 30,000.

Budgeted raw-material cost per unit:

Product A Rs. 120; Product B Rs. 150.

Budgeted time required for production per unit:

Department P1 : Product A : 1.5 machine hours
Product B : 1.0 machine hour

Department P2 : Product A : 2 Direct labour hours
Product B : 2.5 Direct labour hours

Average wage rates budgeted in Department P2 are:

Product A - Rs. 72 per hour and Product B – Rs. 75 per hour.

All materials are used in Department P1 only.

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Actual data: (for the month of July, 2020)

Units actually produced: Product A: 4,000 units
Product B: 3,000 units

Actual direct machine hours worked in Department P1:

On product A- 6,100 hours, Product B- 4,150 hours.
Actual direct labour hours worked in Department P2:

on product A- 8,200 hours, Product B- 7,400 hours.

Costs actually incurred:	Product A	Product B
Raw materials	Rs. 4,89,000	Rs. 4,56,000
Wages	Rs. 5,91,900	Rs. 5,52,000
Overheads: Department P1	Rs. 2,31,000	S1 Rs. 60,000
P2	Rs. 2,04,000	S2 Rs. 48,000

You are required to:

- (i) COMPUTE** the pre-determined overhead rate for each production department.
- (ii) PREPARE** a performance report for July, 2020 that will reflect the budgeted costs and actual costs.

ANSWER 12

- (i) Computation of predetermined overhead rate for each production departments from budgeted data**

Particulars	Production Departments		Service Departments	
	P1	P2	S1	S2
(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Budgeted factory overheads for the year in (Rs.)	2550000	2175000	600000	450000
Allocation of service department S1's costs to production departments P1 and P2 equally in (Rs.)	300000	300000	-600000	---
Allocation of service department S2's costs to production departments P1 and P2 in the ratio of 2:1 in (Rs.)	300000	150000	---	-450000
Total	3150000	2625000	---	---

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Budgeted machine hours in department P1 (working note 1)	105000	---		
Budgeted labour hours in department P2 (working note 1)	---	175000		
Budgeted machine/ labour hour rate (Rs.)	30.00	15.00		

(ii) Performance report for July, 2020

(When 4,000 and 3,000 units of products A and B respectively were actually produced)

	Budgeted (Rs.)	Actual (Rs.)
Raw materials used in Dept. P1:		
A : 4,000 units × Rs. 120	4,80,000	4,89,000
B : 3,000 units × Rs. 150	4,50,000	4,56,000
Direct labour cost (on the basis of labour hours worked in department P2)		
A : 4,000 units × 2 hrs. × Rs. 72	5,76,000	5,91,900
B : 3,000 units × 2.5 hrs. × Rs. 75	5,62,500	5,52,000
Overhead absorbed on machine hour basis in Dept. P1:		
A : 4,000 units × 1.5 hrs. × Rs.30	1,80,000	1,74,400*
B : 3,000 units × 1 hr. × Rs.30	90,000	1,18,649*
Overhead absorbed on labour hour basis in Dept. P2:		
A : 4,000 units × 2 hrs. × Rs. 15	1,20,000	1,31,364**
B : 3,000 units × 2.5 hrs. × Rs. 15	1,12,500	1,18,548**
	25,71,000	26,31,861

Working notes:

1.

	Product A	Product B	Total
Budgeted output (in units)	50,000	30,000	
Budgeted machine hours in Dept. P1	75,000 (50,000×1.5 hrs.)	30,000 (30,000×1 hr.)	1,05,000
Budgeted labour hours in Dept. P2	1,00,000 (50,000×2 hrs.)	75,000 (30,000×2.5 hrs.)	1,75,000

2.

	Product A	Product B	Total
Actual output (in units)	4,000	3,000	
Actual machine hours utilized in Dept. P1	6,100	4,150	10,250
Actual labour hours utilised in Dept. P2	8,200	7,400	15,600

3. Computation of actual overhead rates for each production department from actual data

Particulars	Production Departments		Service Departments	
	P1	P2	S1	S2
	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Actual factory overheads for the month of July, 2020 in (Rs.)	2,31,000	2,04,000	60,000	48,000
Allocation of service Dept. S1's costs to production Dept. P1 and P2 equally in (Rs.)	30,000	30,000	(60,000)	–
Allocation of service Dept. S2's costs to production Dept. P1 and P2 in the ratio of 2:1 in (Rs.)	32,000	16,000	–	(48,000)
Total	2,93,000	2,50,000	--	--
Actual machine hours in Dept. P1 (working note 2)	10,250	---		
Actual labour hours in Dept. P2 (working note 2)	---	15,600		
Actual machine/ labour hour rate (Rs.)	28.59	16.02		

4. Actual overheads absorbed (based on machine hours)

A : 6,100 hrs × Rs. 28.59 = Rs. 1,74,400

B : 4,150 hrs × Rs. 28.59 = Rs. 1,18,649

5. Actual overheads absorbed (based on labour hours)

A : 8,200 hrs × Rs. 16.02 = Rs. 1,31,364

B : 7,400 hrs × Rs. 16.02 = Rs. 1,18,548

CHAPTER-5 ACTIVITY BASED COSTING**ILLUSTRATION 1**

ABC Ltd. is a multiproduct company, manufacturing three products A, B and C. The budgeted costs and production for the year ending 31st March, 2020 are as follows:

	A	B	C
Production quantity (Units)	4,000	3,000	1,600
Resources per Unit:			
- Direct Materials (Kg.)	4	6	3
- Direct Labour (Minutes)	30	45	60

The budgeted direct labour rate was Rs. 10 per hour, and the budgeted material cost was Rs. Rs 2 per kg. Production overheads were budgeted at Rs. 99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed the Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

1. Budgeted overheads were analysed into the following:

	(Rs.)
Material handling	29,100
Storage costs	31,200
Electricity	39,150

2. The cost drivers identified were as follows:

Material handling	Weight of material handled
Storage costs	Number of batches of material
Electricity	Number of Machine operations

3. Data on Cost Drivers was as follows:

	A	B	C
For complete production:			
Batches of material	10	5	15
Per unit of production:			
Number of Machine operators	6	3	2

You are requested to:

1. PREPARE a statement for management showing the unit costs and total costs of each product using the absorption costing method.
2. PREPARE a statement for management showing the product costs of each product using the ABC approach.
3. STATE what are the reasons for the different product costs under the two approaches?

SOLUTION

1. Traditional Absorption Costing

	A	B	C	TOTAL
a) Quantity (units)	4,000	3,000	1,600	8,600
(b) Direct labour (minutes)	30	45	60	-
(c) Direct labour hours (a × b)/60 minutes	2,000	2,250	1,600	5,850

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= Rs. 99,450 ÷ 5,850 hours

= Rs. 17 per direct labour hour

Unit Costs:

	A (Rs.)	B (Rs.)	C (Rs.)
Direct Costs:			
- Direct Labour	5.00	7.50	10.00
- Direct Material	8.00	12.00	6.00
Production Overhead:	8.50 (17×30/60)	12.75 (17×45/60)	17.00 (17×60/60)
Total unit costs	21.50	32.25	33.00
Number of units	4,000	3,000	1,600
Total costs	86,000	96,750	52,800

2. Activity Based Costing

	A	B	C	Total
Quantity (units)	4,000	3,000	1,600	-
Material Weight per unit (Kg.)	4	6	3	-
Total material weight	16,000	18,000	4,800	38,800
Machine operations per unit	6	3	2	-
Total operations	24,000	9,000	3,200	36,200
Total batches of Material	10	5	15	30

Material handling rate per kg. = Rs. 29,100 ÷ 38,800 kg. = Rs. 0.75 per kg.

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Electricity rate per machine operations =
 Rs. 39,150 ÷ 36,200 = Rs. 1.081 per machine operations

Storage rate per batch = Rs. 31,200 ÷ 30 batches = Rs. 1,040 per batch

Unit Costs:

	A (₹)	B (₹)	C (₹)
Direct Costs:			
Direct Labour	5.00	7.50	10.00
Direct material	8.00	12.00	6.00
Production Overheads:			
Material Handling	3.00 (₹0.75 × 4)	4.50 (₹0.75 × 6)	2.25 (₹0.75 × 3)
Electricity	6.49 (₹1.081 × 6)	3.24 (₹1.081 × 3)	2.16 (₹1.081 × 2)
Storage	2.60 $\left(₹10 \times \frac{₹1,040}{4,000} \right)$	1.73 $\left(₹5 \times \frac{₹1,040}{3,000} \right)$	9.75 $\left(₹15 \times \frac{₹1,040}{1,600} \right)$
Total unit costs	25.09	28.97	30.16
Number of units	4,000	3,000	1,600
Total costs	₹ 1,00,360	₹ 86,910	₹ 48,256

ILLUSTRATION 2

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost
Power	Kilowatt hours	50,000 kilowatt hours	Rs. 2,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	Rs. 3,00,000

The company makes three products M, S and T. For the year ended March 31, 2020, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

- (i) COMPUTE the costs allocated to each product from each activity.
- (ii) CALCULATE the cost of unused capacity for each activity.

(iii) DISCUSS the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

SOLUTION

(i) Statement of cost allocation to each product from each activity

	Product			
	M(Rs.)	S(Rs.)	T(Rs.)	TOTAL
Power (Refer to working note)	40,000 (10,000 kWh × Rs.4)	80,000 (20,000 kWh × Rs.4)	60,000 (15,000 kWh × Rs.4)	1,80,000
Quality Inspections (Refer to working note)	1,05,000 (3,500 inspections × Rs.30)	75,000 (2,500 inspections × Rs. 30)	90,000 (3,000 inspections × Rs. 30)	2,70,000

Working note

Rate per unit of cost driver:

Power	(Rs. 2,00,000 / 50,000 kWh)	Rs. 4/kWh
Quality Inspection	(Rs. 3,00,000 / 10,000 inspections)	Rs. 30 per inspection

(ii) Computation of cost of unused capacity for each activity:

	(Rs.)
Power (Rs. 2,00,000 – Rs. 1,80,000) or 5,000 x 4	20,000
Quality Inspections (Rs. 3,00,000 – Rs. 2,70,000) or 1,000 x 30	30,000
Total cost of unused capacity	50,000

(iii) Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate:

- Effect on product costing & capacity management
- Effect on pricing decisions.
- Effect on performance evaluation
- Effect on financial statements
- Regulatory requirements.
- Difficulties in forecasting.

ILLUSTRATION 3

ABC Ltd. Manufactures two types of machinery equipment Y and Z and applies/absorbs overheads on the basis of direct-labour hours. The budgeted overheads and direct-labour hours for the month of December, 2020 are Rs. 12,42,500 and 20,000 hours respectively. The information about Company's products is as follows:

	Equipment Y	Equipment Z
Budgeted Production volume	2,500 units	3,125 units
Direct material cost	Rs. 300 per unit	Rs. 450 per unit
Direct labour cost		
Y : 3 hours @ Rs. 150 per hour		
X : 4 hours @ Rs. 150 per hour	Rs. 450	Rs. 600

ABC Ltd.'s overheads of Rs. 12,42,500 can be identified with three major activities:

Order Processing (Rs. 2,10,000), machine processing (Rs. 8,75,000), and product inspection (Rs. 1,57,500). These activities are driven by number of orders processed, machine hours worked, and inspection hours, respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection hours
Y	350	23,000	4,000
Z	250	27,000	11,000
Total	600	50,000	15,000

Required:

(i) Assuming use of direct-labour hours to absorb/apply overheads to production, COMPUTE the unit manufacturing cost of the equipment Y and Z, if the budgeted manufacturing volume is attained.

(ii) Assuming use of activity-based costing, COMPUTE the unit manufacturing costs of the equipment Y and Z, if the budgeted manufacturing volume is achieved.

(iii) ABC Ltd.'s selling prices are based heavily on cost. By using direct-labour hours as an application base, CALCULATE the amount of cost distortion (under-costed or over-costed) for each equipment.

SOLUTION

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(i) Overheads application base: Direct labour hours

	Equipment Y	Equipment Z
Direct material cost	Rs. 300	Rs. 450
Direct labour cost	Rs. 450	Rs. 600
Overheads*	186.38	248.50
	936.38	1298.5

*Pre-determined rate = (Budgeted overheads / Budgeted direct labour hours) =
(12,42,500 / 20000hours) = 62.125

(ii) Estimation of Cost-Driver rate

Activity	Overhead cost (Rs.)	Cost-driver level	Cost driver rate (Rs.)
Order processing	2,10,000	600 Orders processed	350
Machine processing	8,75,000	50,000 Machine hours	17.50
Inspection	1,57,500	15,000 Inspection hours	10.50

	Equipment Y	Equipment Z
Direct material cost	Rs. 300	Rs. 450
Direct labour cost	Rs. 450	Rs. 600
Prime Cost	750	1,050
Overhead Cost		
Order processing 350 : 250 or Rs 350 per order	1,22,500	87,500
Machine processing 23,000 : 27,000 or Rs. 17.5 per hour	4,02,500	4,72,500
Inspection 4,000 : 11,000	42,000	1,15,500
Total overhead cost	5,67,000	6,75,500

Per unit cost		
5,67,000 / 2,500	226.80	Rs.. 216.16
6,75,500 / 3,125		
Unit manufacturing cost (Prime Cost + Overhead per unit)	Rs. 976.80	Rs. 1,266.16

(iii)

	Equipment Y	Equipment Z
Unit manufacturing cost—using direct labour hours as an application base	936.38	1,298.50
Unit manufacturing cost-using activity based costing	976.80	1,266.16
Cost distortion	(-)40.42	+ 32.34

Low volume product Y is under-costed and high volume product Z is over costed using direct labour hours for overhead absorption.

ILLUSTRATION 4

'Humara - Apna' bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.

The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget:

Activity	Present Cost (Rs.)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	4,00,000	All fixed, no change. Fully fixed, no change. Expected to double during budget period.
(b) Rents	2,00,000	
(c) Currency Replenishment	1,00,000	
Cost		
	7,00,000	(This activity is driven by no. of ATM transactions)
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)

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Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)
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The activity drivers and their budgeted quantities are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,50,000	---	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required:

- (i) CALCULATE the budgeted rate for each activity.
- (ii) PREPARE the budgeted cost statement activity wise.
- (iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.

SOLUTION

Statement Showing "Budgeted Cost per unit of the Product"

Activity	Activity Cost (Budgeted) (Rs.)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (Rs.)	Deposits	Loans	Credit Cards
ATM Services	8,00,000	No. of ATM Transaction	2,00,000	4.00	6,00,000	---	2,00,000
Computer Processing	10,00,000	No. of Computer processing Transaction	20,00,000	0.50	7,50,000	1,00,000	1,50,000
Issuing Statements	20,00,000	No. of Statements	5,00,000	4.00	14,00,000	2,00,000	4,00,000

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Customer Inquiries	3,60,000	Telephone Minutes	7,20,000	0.50	1,80,000	90,000	90,000
Budgeted Cost	41,60,000				29,30,000	3,90,000	8,40,000
Units of Product (as estimated in the budget period)					58,600	13,000	14,000
Budgeted Cost per unit of the product					50	30	60

Working Note

Activity	Budgeted Cost (Rs.)	Remark
ATM Services:		
(a) Machine Maintenance	4,00,000	- All fixed, no change.
(b) Rents	2,00,000	- Fully fixed, no change.
(c) Currency Replenishment Cost	2,00,000	- Doubled during budget period.
Total	8,00,000	
Computer Processing	2,50,000	- Rs. 2,50,000 (half of Rs. 5,00,000) is fixed and no change is expected.
	7,50,000	- Rs. 2,50,000 (variable portion) is expected to increase to three times the current level.
Total	10,00,000	
Issuing Statements	18,00,000	- Existing.
	2,00,000	- 2 lakh statements are expected to be increased in budgeted period. For every increase of one lakh statement, one lakh rupees is the budgeted increase.
Total	20,00,000	
Computer Inquiries	3,60,000	- Estimated to increase by 80% during the budget period.
Total	3,60,000	(Rs. 2,00,000 x 180%)

MCOs based Questions

1. A cost driver is:

- (a) An item of production overheads
- (b) A common cost which is shared over cost centres
- (c) Any cost relating to transport
- (d) An activity which generates costs

ANSWER 1-D

2. In activity based costing, costs are accumulated by activity using:

- (a) Cost drivers
- (b) Cost objects
- (c) Cost pools
- (d) Cost benefit analysis

ANSWER 2-C

3. A cost driver:

- (a) Is a force behind the overhead cost
- (b) Is an allocation base
- (c) Is a transaction that is a significant determinant of cost
- (d) All of the above

ANSWER 3-D

4. Which of the following is not a correct match:

Activity	Cost Driver
a) Production Scheduling	Number of Production runs
b) Despatching	Number of dispatch orders
c) Goods receiving	Goods received orders
d) Inspection	Machine hours

ANSWER 4-D

5. Transactions undertaken by support department personnel are the appropriate cost drivers. Find the one which is not appropriate:

(a) The number of purchase, supplies and customers' orders drives the cost associated with new material

inventory, work-in-progress and finished goods inventory

(b) The number of production runs undertaken drives production scheduling, inspection and material handling

(c) The quality of raw material issued drives the cost of receiving department costs

(d) The number of packing orders drives the packing costs

ANSWER 5-C

6. Steps in ABC include:

(a) Identification of activities and their respective costs

(b) Identification of cost driver of each activity and computation of an allocation rate per activity

(c) Allocation of overhead cost to products/ services based on the activities involved

(d) All of the above

ANSWER 6-D

7. Which of the following is not a benefit of ABC?

(a) Accurate cost allocation

(b) Improved decision making

(c) Better control on activity and costs

(d) Reduction of prime cost

ANSWER 7-D

8. The steps involved for installation of ABC in a manufacturing company include the following except:

- (a) Borrowing fund**
- (b) Feasibility study**
- (c) Building up necessary IT infrastructure and training of line employees**
- (d) Strategy and value chain analysis**

ANSWER 8-A

9. Which of the following statements are true: (1) Activity based Management involves activity analysis and performance measurement. (2) Activity based costing serves as a major source of information in ABM.

- (a) (1) True; (2) False**
- (b) (1) True; (2) True**
- (c) (1) False; (2) True**
- (d) (1) False; (2) False**

ANSWER 9-B

10. The key elements of activity based budgeting are:

- (a) Type of activity to be performed**
- (b) Quantity of activity to be performed**
- (c) Cost of activity to be performed**
- (d) All of the above**

ANSWER 10-D

Theoretical Questions:

1. DEFINE the following terms:

(i) Cost driver

(ii) Activity cost pool

ANSWER 1

(i) **Cost Driver**—It is a factor that causes a change in the cost of an activity. There are two categories of cost driver.

- **Resource Cost Driver**— It is a measure of the quantity of resources consumed by an activity. It is used to assign the cost of a resource to an activity or cost pool.
- **Activity Cost Driver**—It is a measure of the frequency and intensity of demand, placed on activities by cost objects. It is used to assign activity costs to cost objects.

(ii) **Activity** – Activity, here, refers to an event that incurs cost

Cost Pool—It represents a group of various individual cost items. It consists of costs that have same cause and effect relationship. Example machine set-up.

2. EXPLAIN in brief the problems of traditional costing where overhead costs are allocated based on volume

ANSWER 2

Overhead, in traditional costing system, overhead costs are grouped together under cost center and then absorbed into product costs on either of the basis such as direct labour hours, machine hours, volume etc. In certain cases, this traditional costing system gives inaccurate cost information. Though, it should not be assumed that all traditional absorption costing systems are not accurate enough to give adequate information for pricing purposes or other long-run management decision purposes. Some traditional systems treat overheads in a detailed way and relate them to service cost centres as well as production cost centres. The service centre overheads are then spread over the production cost centres before absorption rates are calculated. The main cause of inaccuracy is in the calculation of the overhead rate itself, which is usually based on direct labour hours or machine hours. These rates assume that products that take longer to make, generate more overheads and so on. Organisations, who do not wish to know how much it costs to make a product with precise accuracy, may be happy with traditional costing system. Others, however, fix their price on cost basis and need to determine it with reasonable accuracy. The latter organisations have been greatly benefitted from the development of activity based costing (ABC), which is considered as a modern absorption costing method, and was evolved to give more accurate product costs

3. STATE what is Activity based costing? How are product costs determined in ABC?

ANSWER 3

Activity Based Costing is an accounting methodology that assigns costs to activities rather than products or services. This enables resources & overhead costs to be more accurately assigned to products & services that consume them. **ABC is a technique which involves identification of cost with each cost driving activity and making it as the basis for apportionment of costs over different cost objects/ jobs/ products/ customers or services.** ABC assigns cost to activities based on their use of resources. It then assigns cost to cost objects, such as products or customers, based on their use of activities. ABC can track the flow of activities in organization by creating a link between the activity (resource consumption) and the cost object.

Cost Allocation under Traditional and Activity Based Costing System In traditional absorption costing overheads are first related to cost centres (Production & Service Centres) and then to cost objects, i.e., products. In ABC overheads are related to activities or grouped into cost pools. Then they are related to the cost objects, e.g., products. The two processes are, therefore, very similar, but the first stage is different, as ABC uses activities instead of functional departments (cost centres).

The problem with functional departments is that they tend to include a series of different activities, which incur a number of different costs that behave in different ways. Activities also tend to run across functions; for instance, procurement of materials often includes raising a requisition note in a manufacturing department or stores. It is not raised in the purchasing department where most procurement costs are incurred.

Activity costs tend to behave in a similar way to each other i.e., they have the same cost driver. Therefore, ABC gives a more realistic picture of the way in which costs behave.

4. A manufacturing company in India wants to replace its traditional costing system by ABC. It produces a number of products, each having complex production process of different degree. SUGGEST various requirements for installing activity based costing.

ANSWER 4

A number of distinct practical stages are required in the ABC implementation which are given as below:

- (1) Staff Training:** The co-operation of the workforce is critical to the successful implementation of ABC. Staff training should be done to create an awareness on the purpose of ABC.
- (2) Process Specification:** Informal, but structured interviews with key members of personnel will identify the different stages of the production process, the commitment of resources to each, processing times and bottlenecks.

(3) Activity Definition: The activities must be defined clearly in the early stage in order to manage the problems, if any, effectively. There might be overloading of information from the new data, but the same is needed in codification.

(4) Activity Driver Selection: Cost driver for each activity shall be selected.

(5) Assigning Cost: A single representative activity driver can be used to assign costs from the activity pools to the cost objects.

5. DESCRIBE various levels of activities under ABC.

ANSWER 5

Level of Activities	Meaning	Example
1. Unit level activities	These are those activities for which the consumption of resources can be identified with the number of units produced.	<ul style="list-style-type: none"> • The use of indirect materials/consumables tends to increase in proportion to the number of units produced. • The inspection or testing of every item produced, if this was deemed necessary or, perhaps more likely, every 100th item produced.
2. Batch level activities	The activities such as setting up of a machine or processing a purchase order are performed each time a batch of goods is produced. The cost of batch related activities varies with number of batches made, but is common (or fixed) for all units within the batch.	<ul style="list-style-type: none"> • Material ordering—where an order is placed for every batch of production • Machine set-up costs—where machines need resetting between each different batch of production. • Inspection of products where the first item in every batch is inspected rather than every 100th item quoted above.
3. Product level activities	These are the activities which are performed to support different products in product line	<ul style="list-style-type: none"> • Designing the product, • Producing parts specifications • Keeping technical drawings of products up to date.
4. Facilities level activities	These are the activities which cannot be directly attributed to individual products. These activities are necessary to sustain the manufacturing process and are common and joint to all products manufactured	<ul style="list-style-type: none"> • Maintenance of buildings • Plant security

6. STATE what are the benefits of ABC?**ANSWER 6**

The main advantages of using Activity Based Costing are:

- (i) More accurate costing of products/services.
- (ii) Overhead allocation is done on logical basis.
- (iii) It enables better pricing policies by supplying accurate cost information.
- (iv) Utilizes unit cost rather than just total cost
- (v) Help to identify non-value added activities which facilitates cost reduction.
- (vi) It is helpful to the organizations with multiple products. (v) It highlights problem areas which require attention of the management.

7. STATE what are the limitations of ABC?**ANSWER 7**

The main limitations using Activity Based Costing are:

- (i) It is more expensive, particularly in comparison with traditional costing system.
- (ii) It is not helpful to the small organizations.
- (iii) It may not be applied to organizations with limited products.
- (iv) Selection of the most suitable cost driver may not be easy/ may be difficult or complicated.

8. STATE what are the practical applications of ABC?**ANSWER 8****PRACTICAL APPLICATIONS OF ACTIVITY BASED COSTING**

- As a Decision-Making Tool
- As Activity Based Management
- Facilitate Activity Based Budgeting

9. STATE what is Activity based Management? How does ABC help ABM?

ANSWER 9

Meaning of Activity Based Management

The term Activity based management (ABM) is used to describe the cost management application of ABC.

The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM).

ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC.

Various analysis in Activity Based Management

The various types of analysis involved in ABM are as follows:

(1) Cost Driver Analysis: The factors that cause activities to be performed need to be identified in order to manage activity costs. Cost driver analysis identifies the causal factors.

(2) Activity Analysis.

(a) Value-Added Activities (VA): The value-added activities are those activities which are indispensable in order to complete the process. The customers are usually willing to pay (in some way) for these services. For example, polishing furniture by a manufacturer dealing in furniture is a value added activity.

(b) Non-Value-Added Activities (NVA): The NVA activity **represents work that is not valued by the external or internal customer.** NVA activities do not improve the quality or function of a product or service, but they can adversely affect costs and prices. Moving materials and machine set up for a production run are examples of NVA activities.

(3) Performance Analysis: Performance analysis involves the **identification of appropriate measures to report the performance of activity centres** or other organisational units, consistent with each unit's goals and objectives.

Activity Based Management in Business

Activity based management can be used in the following ways

(i) Cost Reduction: ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added.

(ii) Business Process Re-engineering: Business process re-engineering involves examining business processes and making substantial changes to how organisation currently operates. ABM is a powerful tool for measuring business performance, determining the cost of business output and is used as a means of identifying opportunities to improve process efficiency and effectiveness.

(iii) Benchmarking: Benchmarking is a process of comparing of ABC-derived activity costs of one segment of company with those of other segments. It requires uniformity in the definition of activities and measurement of their costs.

10. DEFINE Activity based Budgeting. STATE what are its key elements?

ANSWER 10

Meaning of Activity Based Budgeting (ABB)

Activity based budgeting analyse the resource input or cost for each activity. It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity. Actual results can be compared with budgeted results to highlight both, in financial and non-financial terms, those activities with major discrepancies from budget for potential reduction in supply of resources. It is a planning and control system which seeks to support the objectives of continuous improvement. It means planning and controlling the expected activities of the organization to derive a cost-effective budget that meet forecast workload and agreed strategic goals. ABB is the reversing of the ABC process to produce financial plans and budgets.

Key Elements of ABB

The three key elements of activity based budgeting are as follows:-

- ◆ Type of work to be done
- ◆ Quantity of work to be done
- ◆ Cost of work to be done

Benefits of ABB

Few benefits of activity based budgeting are as follows:-

1. Activity Based Budgeting (ABB) can enhance accuracy of financial forecasts and increasing management understanding.
2. When automated, ABB can rapidly and accurately produce financial plans and models based on varying levels of volume assumptions.
3. ABB eliminates much of the needless rework created by traditional budgeting techniques.

Practical Problems

1. Woolmark Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	P	Q	R
Machine hours per unit	10	18	14
Direct Labour hours per unit	4	12	8
Direct Material per unit (Rs.)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is Rs. 6 per hour. Direct labour hour rate is Rs. 20 per hour.

The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs.....20%
 Machine operation costs.....30%
 Inspection costs.....40%
 Material procurement related costs.....10%

Required

(i) CALCULATE the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) CALCULATE the cost per unit of each product using activity based costing principles.

ANSWER 1

(i) Statement Showing "Cost per unit - Traditional Method"

Particulars of Costs	P	Q	R
	(Rs.)	(Rs.)	(Rs.)
Direct Materials	90	80	120
Direct Labour [(4, 12, 8 hours) × Rs. 20]	80	240	160

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Production Overheads [(10, 18, 14 hours) × Rs. 6]	60	108	84
Cost per unit	230	428	364

(ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	P	Q	R
Production (units)	3,000	5,000	20,000
	(Rs.)	(Rs.)	(Rs.)
Direct Materials (90, 80, 120)	2,70,000	4,00,000	24,00,000
Direct Labour (80, 240, 160)	2,40,000	12,00,000	32,00,000
Machine Related Costs @ Rs. 1.80 per hour (30,000, 90,000, 2,80,000)	54,000	1,62,000	5,04,000

Setup Costs @ Rs. 9,600 per setup (20, 10, 20)	1,92,000	96,000	1,92,000
Inspection Costs @ Rs. 4,800 per inspection (100, 40, 60)	4,80,000	1,92,000	2,88,000
Purchase Related Costs @ Rs. 750 per purchase (60, 100, 160)	45,000	75,000	1,20,000
Total Costs	12,81,000	21,25,000	67,04,000
Cost per unit (Total Cost ÷ Units)	427.00	425.00	335.20

Workings
Number of Batches, Purchase Orders, and Inspections-

	Particulars	P	Q	R	Total
A.	Production (units)	3,000	5,000	20,000	
B.	Batch Size (units)	150	500	1,000	
C.	Number of Batches (A÷B)	20	10	20	50
D.	Number of Purchase Order per batch	3	10	8	
E.	Total Purchase Orders [C × D]	60	100	160	320
F.	Number of Inspections per batch	5	4	3	
G.	Total Inspections [C × F]	100	40	60	200

Total Machine Hours-

	Particulars	P	Q	R
A.	Machine Hours per unit	10	18	14
B.	Production (units)	3,000	5,000	20,000
C.	Total Machine Hours [A × B]	30,000	90,000	2,80,000

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Total Machine Hours = 4,00,000

Total Production Overheads-

= 4,00,000 hrs. × Rs. 6 = Rs. 24,00,000

Cost Driver Rates-

Cost Pool	%	Overheads (Rs.)	Cost Driver Basis	Cost Driver (Units)	Cost Driver Rate (Rs.)
Setup	20%	4,80,000	Number of batches	50	9,600 per Setup
Inspection	40%	9,60,000	Number of inspections	200	4,800 per Inspection
Purchases	10%	2,40,000	Number of purchases	320	750 per Purchase
Machine Hours	30%	7,20,000	Machine Hours	4,00,000	1.80 per Machine Hour

2. RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

(i) General Supermarket Chains

(ii) Drugstore Chains

(iii) Chemist Shops

The following data for the month of April, 2020 in respect of RST Limited has been reported:

	General Supermarket Chains (Rs.)	Drugstore Chains (Rs.)	Chemist Shops (Rs.)
Average revenue per delivery	84,975	28,875	5,445
Average cost of goods sold per delivery	82,500	27,500	4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channels.

The company plans to use activity –based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

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Activity Area	Cost Driver
Customer purchase order processing	Purchase orders by customers
Line-item ordering	Line-items per purchase order
Store delivery	Store deliveries
Cartons dispatched to stores	Cartons dispatched to a store per delivery
Shelf-stocking at customer store	Hours of shelf-stocking

The April, 2020 operating costs (other than cost of goods sold) of RST Limited are Rs. 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area for April, 2020 are as follows:

Activity Area	Total costs in April, 2020 (Rs.)	Total Units of Cost Allocation Base used in April, 2020
Customer purchase order processing	2,20,000	5,500 orders
Line-item ordering	1,75,560	58,520 line items
Store delivery	1,95,250	3,905 store deliveries
Cartons dispatched to store	2,09,000	2,09,000 cartons
Shelf-stocking at customer store	28,160	1,760 hours

Other data for April, 2020 include the following:

	General Supermarket Chains (Rs.)	Drugstore Chains (Rs.)	Chemist Shops (Rs.)
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons shipped per store delivery	300	80	16
Average number of hours of shelf-stocking per store delivery	3	0.6	0.1

Required:

(i) COMPUTE for April, 2020 gross-margin percentage for each of its three distribution channels and compute RST Limited's operating income.

(ii) COMPUTE the April, 2020 rate per unit of the cost-allocation base for each of the five activity areas.

(iii) COMPUTE the operating income of each distribution channel in April, 2020 using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?

(iv) DESCRIBE four challenges one would face in assigning the total April, 2020 operating costs of Rs. 8,27,970 to five activity areas.

ANSWER 2

(i) **RST Limited's**
Statement of operating income and gross margin percentage for each of its three distribution channel

particulars	General Super Market Chains	Drugstore Chains	Chemist Shops	Total
Revenues: (Rs.)	2,80,41,750 (330 × Rs. 84,975)	2,38,21,875 (825 × Rs. 28,875)	1,49,73,750 (2,750 × Rs. 5,445)	6,68,37,375
Less: Cost of goods sold: (Rs.)	2,72,25,000 (330 × Rs. 82,500)	2,26,87,500 (825 × Rs. 27,500)	1,36,12,500 (2,750 × Rs. 4,950)	635,25,000
Gross Margin: (Rs.)	8,16,750	11,34,375	13,61,250	33,12,375
Less: Other operating costs: (Rs.)				8,27,970
Operating income: (Rs.)				24,84,405
Gross Margin	2.91%	4.76%	9.09%	4.96%
Operating income %				3.72

(ii) **Computation of rate per unit of the cost allocation base for each of the five activity areas for April 2020**

	(Rs.)
Customer purchase order processing (Rs. 2,20,000/ 5,500 orders)	40 per order
Line item ordering (Rs. 1,75,560/ 58,520 line items)	3 per line item order
Store delivery	50 per delivery

(Rs. 1,95,250/ 3,905 store deliveries)	
Cartons dispatched (Rs. 2,09,000/ 2,09,000 dispatches)	1 per dispatch
Shelf-stocking at customer store () Rs. (Rs. 28,160/ 1,760 hours)	16 Per hour

(iii) **Operating Income Statement of each distribution channel
in April-2020 (Using the Activity based Costing information)**

	General Super Market Chains	Drugstore Chains	Chemist Shops
Gross margin (Rs.) : (A) (Refer to (i) part of the answer)	8,16,750	11,34,375	13,61,250
Operating cost (Rs.): (B) (Refer to working note)	1,62,910	1,90,410	4,74,650
Operating income (Rs.): (A–B)	6,53,840	9,43,965	8,86,600
Operating income (in %) (Operating income/ Revenue) × 100	2.33	3.96	5.92

Comments and new insights: The activity-based cost information highlights, how the 'Chemist Shops' uses a larger amount of RST Ltd.'s resources per revenue than do the other two distribution channels. Ratio of operating costs to revenues, across these markets is:

General supermarket chains (Rs. 1,62,910/ Rs. 2,80,41,750) × 100	0.58%
Drug store chains (Rs. 1,90,410/ Rs. 2,38,21,875) × 100	0.80%
Chemist shops (Rs. 4,74,650/ Rs. 1,49,73,750) × 100	3.17%

Working note:

Computation of operating cost of each distribution channel:

	General Super Market Chains	Drugstore Chains	Chemist Shops
Customer purchase order processing	15,400 (Rs. 40 × 385 orders)	39,600 (Rs. 40 × 990 orders)	1,65,000 (Rs. 40 × 4125 orders)
Line item ordering	16,170 (Rs. 3 × 14 × 385)	35,640 (Rs. 3 × 12 × 990)	1,23,750 (Rs. 3 × 10 × 4125)
Store delivery	16,500 (Rs. 50 × 330 deliveries)	41,250 (Rs. 50 × 825 deliveries)	1,37,500 (Rs. 50 × 2750 deliveries)

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Cartons dispatched	99,000 (1 × 300 cartons × 300 deliveries) Rs.	66,000 (Rs. 1 × 80 cartons × 825 deliveries)	44,000 (Rs. 1 × 16 cartons × 2,750 deliveries)
Shelf stocking	15,840 (Rs. 16 × 330 deliveries × 3 Av. hrs.)	7,920 (Rs. 16 × 825 deliveries × 0.6 Av. hrs)	4,400 (Rs. 16 × 2,750 deliveries × 0.1 Av. hrs)
Operating cost	1,62,910	1,90,410	4,74,650

(iv) Challenges faced in assigning total operating cost of 8,27,970: Rs.

- Choosing an appropriate cost driver for activity area.
- Developing a reliable data base for the chosen cost driver.
- Deciding, how to handle costs that may be common across several activities.
- Choice of the time period to compute cost rates per cost driver.
- Behavioural factors.

3. Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 2019-20 for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	Rs. 39,67,500	Rs. 1,05,03,000	Rs. 60,49,500
Cost of goods sold	Rs. 30,00,000	Rs. 75,00,000	Rs. 45,00,000
Cost of bottles returned	Rs. 60,000	Rs. 0	Rs. 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 2019-20:

Activity	Description of activity	Total Cost	Cost-allocation base
Bottles returns	Returning of empty bottles	Rs. 60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	Rs. 7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	Rs. 12,60,000	3,150 deliveries

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Shelf stocking	Stocking of goods on store shelves and on-going restocking	Rs. 8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	Rs. 15,36,000	15,36,000 items sold

Required:

(i) Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. **CALCULATE** the operating income and operating income as a % of revenues for each product line.

(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using an activity-based costing system, **CALCULATE** the operating income and operating income as a % of revenues for each product line.

ANSWER 3

(i) **Statement of Operating income and Operating income as a percentage of revenues for each product line**

(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft drinks	Fresh produce	Packaged food	Total (Rs.)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: E = {(A)-(D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (E/A) × 100)	1.70%	7.17%	3.30%	4.97%

Working notes:**1. Total support cost:**

Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{\text{₹ 45,00,000}}{\text{₹ 1,50,00,000}} \times 100 = 30\%$$

3. Cost for each activity cost driver:

Activity (1)	Total cost (Rs.) (2)	Cost allocation base (3)	Cost driver rate (4)=[(2)÷(3)]
Ordering	7,80,000	1,560 purchase orders	Rs. 500 per purchase order
Delivery	12,60,000	3,150 deliveries	Rs. 400 per delivery
Shelf-stocking	8,64,000	8,640 hours	Rs. 100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	Rs. 1 per item sold

(ii) Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines using an activity-based costing system)

	Soft drinks	Fresh produce	Packaged food	Total (Rs.)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5400:2700)	54,000	5,40,000	2,70,000	8,64,000

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Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income C: {(A)-(B)}	4,27,500	63,000	5,29,500	10,20,000
Operating income as a % of revenues	10.78%	0.60%	8.75%	4.97%

* Refer to working note 3

4. Alpha Limited has decided to analyse the profitability of its five new customers. It buys bottled water at Rs. 90 per case and sells to retail customers at a list price of Rs. 108 per case. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Cases sold	4,680	19,688	1,36,800	71,550	8,775
Listed Selling Price	Rs. 108	Rs. 108	Rs. 108	Rs. 108	Rs. 108
Actual Selling Price	Rs. 108	Rs. 106.20	Rs. 99	Rs. 104.40	Rs. 97.20
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	Rs. 750 per purchase order
Customer visits	Rs. 600 per customer visit
Deliveries	Rs. 5.75 per delivery Km travelled
Product handling	Rs. 3.75 per case sold
Expedited deliveries	Rs. 2,250 per expedited delivery

Required:

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(i) COMPUTE the customer-level operating income of each of five retail customers now being examined (A, B, C, D and E). Comment on the results.

(ii) STATE what insights are gained by reporting both the list selling price and the actual selling price for each customer?

ANSWER 4

Working note:

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

	Customers				
	A	B	C	D	E
Cases sold: (a)	4,680	19,688	1,36,800	71,550	8,775
Revenues (at listed price) (Rs.): (b) {(a) × Rs. 108}	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Discount (:): (c) Rs. {(a) × Discount per case}	-	35,438 (19,688 cases × Rs. 1.80)	12,31,200 (1,36,800 cases × Rs. 9)	2,57,580 (71,550 cases × Rs. 3.60)	94,770 (8,775 cases × Rs. 10.80)
Cost of goods sold (Rs.) : (d) {(a) × Rs. 90}	4,21,200	17,71,920	1,23,12,000	64,39,500	7,89,750
Customer level operating activities costs					
Order taking costs (Rs.): (No. of purchase × Rs.750)	11,250	18,750	22,500	18,750	22,500
Customer visits costs (Rs.) (No. of customer visits × Rs. 600)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (Rs.) (Rs. 5.75 per km) (Kms travelled by delivery vehicles × Rs. 5.75 per km.)	1,150 (5.75 × 10 × 20)	1,035 (5.75 × 30 × 6)	1,725 (5.75 × 60 × 5)	2,300 (5.75 × 40 × 10)	3,450 (5.75 × 20 × 30)
Product handling costs (Rs.) {(a) × Rs. 3.75}	17,550	73,830	5,13,000	2,68,313	32,906
Cost of expediting deliveries (Rs.) {No. of expedited deliveries × Rs. 2,250}	-	-	-	-	2,250

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Total cost of customer level operating activities (Rs.)	31,150	95,415	5,40,825	2,90,563	62,906
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(i) Computation of Customer level operating income

	Customers				
	A	B	C	D	E
Revenues (At list price) (Refer to working note)	5,05,440	21,26,304	1,47,74,400	77,27,400	9,47,700
Less: Discount (Refer to working note)	-	35,438	12,31,200	2,57,580	94,770
Revenue (At actual price)	5,05,440	20,90,866	1,35,43,200	74,69,820	8,52,930
Less: Cost of goods sold (Refer to working note)	4,21,200	17,71,920	1,23,12,000	64,39,500	7,89,750
Gross margin	84,240	3,18,946	12,31,200	10,30,320	63,180
Less: Customer level operating activities costs (Refer to working note)	31,150	95,415	5,40,825	2,90,563	62,906
Customer level operating income	53,090	2,23,531	6,90,375	7,39,757	274

Comment on the results:

Customer D is the most profitable customer. D's profits are even higher than C (whose revenue is the highest) despite having only 52.30% of the unit volume of customer C. The main reason is that C receives a discount of 9 per case while customer D receives only a 3.60 discount per case. Rs. Rs.

Customer E is the least profitable. The profits of E is even less than A (whose revenue is least) Customer E received a discount of 10.80 per case, makes Rs. more frequent orders, requires more customer visits and requires more delivery kms. in comparison with customer A.

(ii) Insight gained by reporting both the list selling price and the actual selling price for each customer:

Separate reporting of both-the listed and actual selling prices enables Alpha Ltd. to examine which customer has received what discount per case, whether the discount received has any relationship with the sales volume. The data given below provides us with the following information;

Sales volume	Discount per case (Rs.)
C (1,36,800 cases)	9.00
D (71,550 cases)	3.60
B (19,688 cases)	1.80
E (8,775 cases)	10.80
A (4,680 cases)	0

The above data clearly shows that the discount given to customers per case has a direct relationship with sales volume, except in the case of customer E. The reasons for 10.80 discount per case for customer E should be explored. Rs.

5. BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three ranges of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December, 2020 are as follows:

Production of soaps (Units)	BABYSOFT- Gold		BABYSOFT- Pearl		BABYSOFT- Diamond	
	4000		3000		2000	
Resources per Unit:	Qty	Rate	Qty	Rate	Qty	Rate
- Essential Oils	60 ml	Rs. 200 / 100 ml	55 ml	Rs. 300 / 100 ml	65 ml	Rs. 300 / 100 ml
- Cocoa Butter	20 g	Rs. 200 / 100 g	20 g	Rs. 200 / 100 g	20 g	Rs. 200 / 100 g
- Filtered Water	30 ml	Rs. 15 / 100 ml	30 ml	Rs. 15 / 100 ml	30 ml	Rs. 15 / 100 ml
- Chemicals	10 g	Rs. 30 / 100 g	12 g	Rs. 50 / 100 g	15 g	Rs. 60 / 100 g
- Direct Labour	30 minutes	Rs. 10 / hour	40 minutes	Rs. 10 / hour	60 minutes	Rs. 10 / hour

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Bio-organic Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at Rs. 1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(Rs.)	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operators per unit of production are 5, 5, and 6 for BABYSOFT-Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

- (i) PREPARE a statement showing the unit costs and total costs of each product using the absorption costing method.
- (ii) PREPARE a statement showing the product costs of each product using the ABC approach.
- (iii) STATE what are the reasons for the different product costs under the two approaches?

ANSWER 5

(i) Traditional Absorption Costing

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
(a) Production of soaps (Units)	4,000	3,000	2,000	9,000
(b) Direct labour (minutes)	30	40	60	-
(c) Direct labour hours (a × b)/60 minutes	2,000	2,000	2,000	6,000

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= Rs. 1,98,000 ÷ 6,000 hours

= **Rs. 33 per direct labour hour**

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Unit Costs:

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond
Direct Costs:			
- Direct Labour	5.00 $\left(\frac{10 \times 30}{60}\right)$	6.67 $\left(\frac{10 \times 40}{60}\right)$	10.00 $\left(\frac{10 \times 60}{60}\right)$
- Direct Material (Refer working note1)	167.50	215.50	248.50
Production Overhead:	16.50 $\left(\frac{33 \times 30}{60}\right)$	22.00 $\left(\frac{33 \times 40}{60}\right)$	33.00 $\left(\frac{33 \times 60}{60}\right)$
Total unit costs	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	7,56,000	7,32,510	5,83,000

Working note-1

Calculation of Direct material cost

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond
Essential oils	120.00 $\left(\frac{200 \times 60}{100}\right)$	165.00 $\left(\frac{300 \times 55}{100}\right)$	195.00 $\left(\frac{300 \times 65}{100}\right)$
Cocoa Butter	40.00 $\left(\frac{200 \times 20}{100}\right)$	40.00 $\left(\frac{200 \times 20}{100}\right)$	40.00 $\left(\frac{200 \times 20}{100}\right)$
Filtered water	4.50 $\left(\frac{15 \times 30}{100}\right)$	4.50 $\left(\frac{15 \times 30}{100}\right)$	4.50 $\left(\frac{15 \times 30}{100}\right)$
Chemicals	3.00	6.00	9.00

	$\left(\frac{30 \times 10}{100}\right)$	$\left(\frac{50 \times 12}{100}\right)$	$\left(\frac{60 \times 15}{100}\right)$
Total costs	167.50	215.50	248.50

(ii) Activity Based Costing

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	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
Quantity (units)	4,000	3,000	2,000	-
Weight per unit (grams)	108 {(60×0.8)+20+30+10}	106 {(55×0.8)+20+30+12}	117 {(65×0.8)+20+30+15}	-
Total weight (grams)	4,32,000	3,18,000	2,34,000	9,84,000
Direct labour (minutes)	30	40	60	-
Direct labour hours	2,000 (4,000×30 /60)	2,000 (3,000×40 /60)	2,000 (2,000×60 / 60)	6,000
Machine operations per unit	5	5	6	-
Total operations	20,000	15,000	12,000	47,000

Forklifting rate per gram = Rs. 58,000 ÷ 9,84,000 grams = Rs. 0.06 per gram

Supervising rate per direct = Rs. 60,000 ÷ 6,000 hours labour hour = Rs. 10 per labour hour

Utilities rate per machine = Rs. 80,000 ÷ 47,000 machine operations operations
= Rs. 1.70 per machine operations

Unit Costs under ABC:

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond
Direct Costs:			
- Direct Labour	5.00	6.67	10.00
- Direct material	167.50	215.50	248.50
Production Overheads:			
Forklifting cost	6.48 (0.06 × 108)	6.36 (0.06 × 106)	7.02 (0.06 × 117)
Supervising cost	5.00 (10×30/60)	6.67 (10×40 /60)	10.00 (10×60/60)

Utilities	8.50 (1.70 × 5)	8.50 (1.70 × 5)	10.20 (1.70 × 6)
Total unit costs	192.48	243.70	285.72
Number of units S	4,000	3,000	2,000
Total costs	7,69,920	7,31,100	5,71,440

(iii) Comments: The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more accurate

CHAPTER-6 COST SHEET**ILLUSTRATION 1**

The following data relates to the manufacture of a standard product during the month of April, 2020:

Particulars	(Amount)
Raw materials	Rs. 1,80,000
Direct wages	Rs. 90,000
Machine hours worked (hours)	10,000
Machine hour rate (per hour)	Rs. 8
Administration overheads (general)	Rs. 35,000
Selling overheads (per unit)	Rs. 5
Units produced	4,000
Units sold	3,600
Selling price per unit	Rs. 125

You are required to PREPARE a cost sheet in respect of the above showing:

- (i) Cost per unit
- (ii) Profit for the month

SOLUTION

(i) Cost Sheet

Output: 4,000 units

Particulars	Total Cost (Rs.)	Cost per (unit) (Rs.)
Raw materials	1,80,000	45.00
Direct wages	90,000	22.50
Prime cost	2,70,000	67.50
Add: Factory overheads (10,000 hrs × Rs. 8 per hour)	80,000	20.00
Cost of Production	3,50,000	87.50
Less: Closing Stock of finished goods (4,000 – 3,600 units)	(35,000)	--

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Cost of Goods Sold	3,15,000	87.50
Add: Administration overheads (general)	35,000	9.72
Add: Selling Overheads (3,600 units × Rs. 5 unit)	18,000	5.00
Cost of sales (total Cost)	3,68,000	102.22

(ii) Statement of Profit

Particulars	Total Cost (Rs.)
Sales revenue (3,600 units @ Rs. 125)	4,50,000
Less: Cost of sales	3,68,000
Profit	82,000

ILLUSTRATION 2

The following information has been obtained from the records of ABC Corporation for the period from June 1 to June 30, 2020.

	On June 1, 2020 (Rs.)	On June 30, 2020 (Rs.)
Cost of raw materials	60,000	50,000
Cost of work-in-process	12,000	15,000
Cost of stock of finished goods	90,000	1,10,000
Purchase of raw materials during June 2020		4,80,000
Wages paid		2,40,000
Factory overheads		1,00,000
Administration overheads (related to production)		50,000
Selling & distribution overheads		25,000
Sales		10,00,000

PREPARE a statement giving the following information:

- Raw materials consumed;
- Prime cost;
- Factory cost;
- Cost of goods sold; and
- Net profit.

SOLUTION
Statement of Cost & Profit
(for the month of June 2020)

	Amount (Rs.)
Opening stock of raw materials	60,000
Add: Purchase of raw materials during June' 2020	4,80,000
Less: Closing stock of raw materials	(50,000)
(a) Raw materials consumed	4,90,000
Add: Direct wages	2,40,000
(b) Prime cost	7,30,000
Add: Factory overheads	1,00,000
Works cost	8,30,000
Add: Opening work-in-process	12,000
Less: Closing work-in-process	(15,000)
(c) Factory cost	8,27,000
Add: Administration overheads	50,000
Cost of production	8,77,000
Add: Opening stock of finished goods	90,000
Less: Closing stock of finished goods	(1,10,000)
(d) Cost of goods sold	8,57,000
Add: Selling & distribution overheads	25,000
Cost of sales	8,82,000
(e) Net Profit	1,18,000
Sales	10,00,000

ILLUSTRATION 3

Arnav Inspat Udyog Ltd. has the following expenditures for the year ended 31st March, 2020:

Sl. No.		Amount (Rs.)	Amount (Rs.)
(i)	Raw materials purchased	10,00,00,000	
(ii)	GST paid on the above purchases @18% (eligible for input tax credit)	1,80,00,000	
(iii)	Freight inwards	11,20,600	
(iv)	Wages paid to factory workers	29,20,000	
(v)	Contribution made towards employees' PF & ESIS	3,60,000	
(vi)	Production bonus paid to factory workers	2,90,000	
(vii)	Royalty paid for production	1,72,600	

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(viii)	Amount paid for power & fuel	4,62,000	
(ix)	Amount paid for purchase of moulds and patterns (life is equivalent to two years production)	8,96,000	
(x)	Job charges paid to job workers	8,12,000	
(xi)	Stores and spares consumed	1,12,000	
(xii)	Depreciation on:		
	Factory building	84,000	
	Office building	56,000	
	Plant & Machinery	1,26,000	
	Delivery vehicles	86,000	3,52,000
(xiii)	Salary paid to supervisors		1,26,000
(xiv)	Repairs & Maintenance paid for:	48,000	
	Plant & Machinery		
	Sales office building	18,000	
	Vehicles used by directors	19,600	85,600
(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	18,100	
	Stock of raw materials & WIP	36,000	85,300
(xvi)	Expenses paid for quality control check activities		19,600
(xvii)	Salary paid to quality control staffs		96,200
(xviii)	Research & development cost paid for improvement in production process		18,200
(xix)	Expenses paid for pollution control and engineering & maintenance		26,600

(xx) Expenses paid for administration of factory work		1,18,600
(xxi) Salary paid to functional mangers:		
Production control	9,60,000	
Finance & Accounts	9,18,000	
Sales & Marketing	10,12,000	28,90,000
(xxii) Salary paid to General Manager		12,56,000
(xxiii) Packing cost paid for:		
Primary packing necessary to maintain quality	96,000	
For re-distribution of finished goods	1,12,000	2,08,000
(xxiv) Interest and finance charges paid (for usage of non- equity fund)		7,20,000
(xxv) Fee paid to auditors		1,80,000

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(xxvi) Fee paid to legal advisors		1,20,000
(xxvii) Fee paid to independent directors		2,20,000
(xxviii) Performance bonus paid to sales staffs		1,80,000
(xxix) Value of stock as on 1st April, 2019:		
Raw materials	18,00,000	
Work-in-process	9,20,000	
Finished goods	11,00,000	38,20,000
(xxx) Value of stock as on 31st March, 2020:		
Raw materials	9,60,000	
Work-in-process	8,70,000	
Finished goods	18,00,000	36,30,000

Amount realized by selling of scrap and waste generated during manufacturing process – Rs. 86,000/-

From the above data you are required to PREPARE Statement of cost for Arnav Ispat Udyog Ltd. for the year ended 31st March, 2020, showing

(i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

SOLUTION

Statement of Cost of Arnav Ispat Udyog Ltd. for the year ended 31st March, 2020:

Sl. No.	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Material Consumed:		
	Raw materials purchased	10,00,00,000	
	Freight inwards	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	29,20,000	
	Contribution made towards employees' PF & ESIS	3,60,000	
	Production bonus paid to factory workers	2,90,000	35,70,000
(iii)	Direct expenses:		
	Royalty paid for production	1,72,600	
	Amount paid for power & fuel	4,62,000	
	Amortised cost of moulds and patterns	4,48,000	
	Job charges paid to job workers	8,12,000	18,94,600
	Prime Cost		10,74,25,200
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,12,000	
	Depreciation on factory building	84,000	
	Depreciation on plant & machinery	1,26,000	
	Repairs & Maintenance paid for plant & machinery	48,000	
	Insurance premium paid for plant & machinery	31,200	

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	Insurance premium paid for factory building	18,100	
	Insurance premium paid for stock of raw materials & WIP	36,000	
	Salary paid to supervisors	1,26,000	
	Expenses paid for pollution control and engineering & maintenance	26,600	6,07,900
	Gross factory cost		10,80,33,100
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		10,80,83,100
(v)	Quality control cost:		
	Expenses paid for quality control check activities	19,600	
	Salary paid to quality control staffs	96,200	1,15,800
(vi)	Research & development cost paid for improvement in production process		18,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,18,600	
	-Salary paid to Production control manager	9,60,000	10,78,600
(viii)	Less: Realisable value on sale of scrap and waste	(86,000)	
(ix)	Add: Primary packing cost	96,000	
	Cost of Production		10,93,05,700
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,00,000)
	Cost of Goods Sold		10,86,05,700
(x)	Administrative overheads:		
	Depreciation on office building	56,000	
	Repairs & Maintenance paid for vehicles used by directors	19,600	
	Salary paid to Manager- Finance & Accounts	9,18,000	
	Salary paid to General Manager	12,56,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,20,000	
(xi)	Selling overheads:		
	Repairs & Maintenance paid for sales office building	18,000	
	Salary paid to Manager- Sales & Marketing	10,12,000	
	Performance bonus paid to sales staffs	1,80,000	12,10,000
(xii)	Distribution overheads	:	
	Depreciation on delivery vehicles	86,000	
(xiii)	Packing cost paid for re-distribution of finished goods	1,12,000	1,98,000
(xiv)	Interest and finance charges paid		7,20,000
	Cost of Sales		11,35,03,300

Note:

GST paid on purchase of raw materials would not be part of cost of materials as it is eligible for input tax credit.

MCQs based Questions

1. Generally, for the purpose of cost sheet preparation, costs are classified on the basis of:

- (a) Functions**
- (b) Variability**
- (c) Relevance**
- (d) Nature**

ANSWER 1-A

2. Which of the following does not form part of prime cost:

- (a) Cost of packing**
- (b) Cost of transportation paid to bring materials to factory**
- (c) GST paid on raw materials (input credit cannot be claimed)**
- (d) Overtime premium paid to workers.**

ANSWER 2-A

3. A Ltd. received an order, for which it purchased a special frame for manufacturing, it is a part of:

- (a) Direct Materials**
- (b) Direct expenses**
- (c) Factory Overheads**
- (d) Administration Overheads**

ANSWER 3-B

4. Salary paid to plant supervisor is a part of

- (a) Direct expenses**
- (b) Factory overheads**
- (c) Quality control cost**
- (d) Administration cost**

ANSWER 4-B

5. Depreciation of director's laptop is treated as a part of:

- (a) Administration Overheads**
- (b) Factory Overheads**
- (c) Direct Expenses**
- (d) Research & Development cost.**

ANSWER 5-A

6. A manufacture has set-up a lab for testing of products for compliance with standards, salary of this lab staffs are part of:

- (a) Works overheads**
- (b) Quality Control Cost**
- (c) Direct Expenses**
- (d) Research & Development Cost.**

ANSWER 6-B

7. Audit fees paid to auditors is part of:

- (a) Administration Cost**
- (b) Production cost**
- (c) Selling & Distribution cost**
- (d) Not shown in cost sheet.**

ANSWER 7-A

8. Salary paid to factory store staff is part of:

- (a) Factory overheads**
- (b) Production Cost**
- (c) Direct Employee cost**
- (d) Direct Material Cost.**

ANSWER 8-A

9. Canteen expenses for factory workers are part of:

- (a) Factory overhead**
- (b) Administration Cost**
- (c) Marketing cost**
- (d) None of the above.**

ANSWER 9-A

10. A company pays royalty to State Government on the basis of production, it is treated as:

- (a) Direct Material Cost**
- (b) Factory Overheads**
- (c) Direct Expenses**
- (d) Administration cost.**

ANSWER 10-C

Theoretical Questions

1. DESCRIBE how costs are classified on the basis of function?**ANSWER 1**

The following are the classification of costs based on functions:

- (i) Direct Material Cost

- (ii) Direct Employee (labour) Cost
- (iii) Direct Expenses
- (iv) Production/ Manufacturing Overheads
- (v) Administration Overheads
- (vi) Selling Overheads
- (vii) Distribution Overheads
- (viii) Research and Development costs etc.

2. EXPLAIN the treatment of administration overheads.

ANSWER 2

Administrative Overheads:

It is the **cost related with general administration** of the entity. It includes the followings:

- (a) Depreciation and maintenance of, building, furniture etc. of corporate or general management.
- (b) Salary of administrative employees, accountants, directors, secretaries etc.
- (c) Rent, rates & taxes, insurance, lighting, office expenses etc.
- (d) Indirect materials- printing and stationery, office supplies etc.
- (e) Legal charges, audit fees, corporate office expenses like directors' sitting fees, remuneration and commission, meeting expenses etc.

3. STATE the advantages of a cost sheet

ANSWER 3

The main advantages of a Cost Sheet are as follows:

- (i) It provides the total cost figure as well as cost per unit of production.
- (ii) It helps in cost comparison.
- (iii) It facilitates the preparation of cost estimates required for submitting tenders.
- (iv) It provides sufficient help in arriving at the figure of selling price.
- (v) It facilitates cost control by disclosing operational efficiency.

Practical Questions

1. The books of Adarsh Manufacturing Company present the following data for the month of April, 2020:

Direct labour cost Rs. 17,500 being 175% of works overheads

Cost of goods sold excluding administrative expenses Rs. 56,000.

Inventory accounts showed the following opening and closing balances:

	April 1 (Rs.)	April 30 (Rs.)
Raw materials	8,000	10,600
Work-in-progress	10,500	14,500
Finished goods	17,600	19,000

Other data are:

Selling expenses	3,500
General and administration expenses	2,500
Sales for the month	75,000

You are required to:

- (i) FIND out the value of materials purchased.
- (ii) PREPARE a cost statement showing the various elements of cost and also the profit earned.

ANSWER 1

(i) Computation of the value of materials purchased

To find out the value of materials purchased, reverse calculations from the given data can be presented as below:

Particulars	(Rs.)
Cost of goods sold	56,000
Add: Closing stock of finished goods	19,000
Less: Opening stock of finished goods	(17,600)
Cost of production	57,400
Add: Closing stock of work-in-progress	14,500
Less: Opening stock of work-in-progress	(10,500)
Works cost	61,400
Less: Factory overheads: [] × 17,500 / 100 = 175Rs.	(10,000)

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Prime cost	51,400
Less: Direct labour	(17,500)
Raw material consumed	33,900
Add: Closing stock of raw materials	10,600
Raw materials available	44,500
Less: Opening stock of raw materials	(8,000)
Value of materials purchased	36,500

(ii) Cost statement

Raw material consumed [Refer to statement (i) above]	33,900
Add: Direct labour cost	17,500
Prime cost	51,400
Add: Factory overheads	10,000
Works cost	61,400
Add: Opening work-in-progress	10,500
Less: Closing work-in-progress	(14,500)
Cost of production	57,400
Add: Opening stock of finished goods	17,600
Less: Closing stock of finished goods	(19,000)
Cost of goods sold	56,000
Add: General and administration expenses	2,500
Add: Selling expenses	3,500
Cost of sales	62,000
Profit (Balance figure Rs. 75,000 – Rs. 62,000)	13,000
Sales	75,000

2. From the following particulars, you are required to PREPARE monthly cost sheet of Aditya Industries:

	Amount (Rs.)
Opening Inventories:	
- Raw materials	12,00,000
- Work-in-process	18,00,000
- Finished goods (10,000 units)	9,60,000
Closing Inventories:	

- Raw materials	14,00,000
- Work-in-process	16,04,000
- Finished goods	?

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Raw materials purchased	1,44,00,000
GST paid on raw materials purchased (ITC available)	7,20,000
Wages paid to production workers	36,64,000
Expenses paid for utilities	1,45,600
Office and administration expenses paid	26,52,000
Travelling allowance paid to office staffs	1,21,000
Selling expenses	6,46,000

Machine hours worked- 21,600 hours

Machine hour rate- Rs. 8.00 per hour

Units sold- 1,60,000

Units produced- 1,94,000

Desired profit- 15% on sales

ANSWER 2

Cost sheet of Aditya Industries for month of.....

Units produced- 1,94,000

Units sold- 1,60,000

Particulars	Amount (Rs.)	Cost per unit (Rs.)
Raw materials purchased		1,44,00,000
Add: Opening value of raw materials		12,00,000
Less: Closing value of raw materials		(14,00,000)
Materials consumed	1,42,00,000	73.19
Wages paid to production workers	36,64,000	18.89
Expenses paid for utilities	1,45,600	0.75
Prime Cost	1,80,09,600	92.83
Factory overheads (Rs. 8 × 21,600 hours)		1,72,800
Add: Opening value of W-I-P		18,00,000
Less: Closing value of W-I-P		(16,04,000)
Cost of Production	1,83,78,400	94.73
Add: Value of opening finished stock		9,60,000
Less: Value of closing finished stock (Rs. 94.73 × 44,000)		(41,68,120)
Cost of Goods Sold	1,51,70,280	94.81
Office and administration expenses paid	26,52,000	16.58
Travelling allowance paid to office staffs	1,21,000	0.75
Selling expenses	6,46,000	4.04

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Cost of Sales	1,85,89,280	116.18
Add: Profit	32,80,461	20.50
2,18,69,741		136.68

3. A Ltd. Co. has capacity to produce 1,00,000 units of a product every month. Its works cost at varying levels of production is as under:

Level	Works cost per unit (Rs.)
10%	400
20%	390
30%	380
40%	370
50%	360
60%	350
70%	340
80%	330
90%	320
100%	310

Its fixed administration expenses amount to Rs.1,50,000 and fixed marketing expenses amount to Rs.2,50,000 per month respectively. The variable distribution cost amounts to Rs. 30 per unit.

It can sell 100% of its output at Rs.500 per unit provided it incurs the following further expenditure:

- (a) it gives gift items costing Rs. 30 per unit of sale;
- (b) it has lucky draws every month giving the first prize of Rs. 50,000; 2nd prize of Rs. 25,000, 3rd prize of Rs. 10,000 and three consolation prizes of Rs. 5,000 each to customers buying the product.
- (c) it spends Rs.1,00,000 on refreshments served every month to its customers;
- (d) it sponsors a television programme every week at a cost of Rs. 20,00,000 per month. It can market 30% of its output at Rs.550 per unit without incurring any of the expenses referred to in (a) to (d) above.

PREPARE a cost sheet for the month showing total cost and profit at 30% and 100% capacity level.

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ANSWER 3**(a) Cost Sheet (For the month)**

Level of Capacity	30%		100%	
	30,000 units		100,000 units	
	Per unit (Rs.)	Total (Rs.)	Per unit (Rs.)	Total (Rs.)
Works Cost	380.00	1,14,00,000	310.00	3,10,00,000
Add: Fixed administration expenses	5.00	1,50,000	1.50	1,50,000
Add: Fixed marketing expenses	8.33	2,50,000	2.50	2,50,000
Add: Variable distribution cost	30.00	9,00,000	30.00	30,00,000
Add: Special Costs:				
- Gift items costs	-	-	30.00	30,00,000
- Customers' prizes*	-	-	1.00	1,00,000
- Refreshments	-	-	1.00	1,00,000
- Television programme sponsorship cost	-	-	20.00	20,00,000
Cost of sales	423.33	1,27,00,000	396.00	3,96,00,000
Profit (Balancing figure)	126.67	38,00,000	104.00	1,04,00,000
Sales revenue	550.00	1,65,00,000	500.00	5,00,00,000

***Customers' prize cost:**

	Amount (Rs.)
1st Prize	50,000
2nd Prize	25,000
3rd Prize	10,000
Consolation Prizes (3 × Rs.5,000)	15,000
Total	1,00,000

CHAPTER-7 COST ACCOUNTING SYSTEMS

ILLUSTRATION 1

As on 31st March, 2020, the following balances existed in a firm's Cost Ledger:

	Dr.	Cr.
	(Rs.)	(Rs.)
Stores Ledger Control A/c	3,01,435	
Work-in-Process Control A/c	1,22,365	
Finished Stock Ledger Control A/c	2,51,945	
Manufacturing Overhead Control A/c		10,525
Cost Ledger Control A/c		6,65,220
	6,75,745	6,75,745

During the next three months the following items arose:

	(Rs.)
Finished product (at cost)	2,10,835
Manufacturing overhead incurred	91,510
Raw materials purchased	1,23,000
Factory Wages	50,530
Indirect Labour	21,665
Cost of Sales	1,85,890
Material issued to production	1,27,315
Sales returned at Cost	5,380
Material returned to suppliers	2,900
Manufacturing overhead charged to production	77,200

You are required to PASS the Journal Entries; write up the accounts and schedule the balances, stating what each balance represents.

SOLUTION

Journal entries are as follows:

1.	Finished stock ledger Control A/c To Work-in-Process Control A/c	Dr.	2,10,835	2,10,835
2.	Manufacturing Overhead Control A/c To Cost Ledger Control A/c	Dr.	91,510	91,510

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3.	Stores Ledger Control A/c To Cost Ledger Control A/c	Dr.	1,23,000	1,23,000
4.	(i) Wage Control A/c To Cost Ledger Control A/c	Dr.	72,195	72,195
(ii)	Work-in-Process Control A/c To Wages Control A/c	Dr.	50,530	50,530
(iii)	Manufacturing Overhead Control A/c To Wages Control A/c	Dr.	21,665	21,665
5.	Cost of Sales A/c To Finished Stock Ledger A/c	Dr.	1,85,890	1,85,890
6.	Work-in-Process Control A/c To Stores Ledger Control A/c	Dr.	1,27,315	1,27,315
7.	Finished Stock Ledger Control A/c To Cost of Sales A/c	Dr.	5,380	5,380
8.	Cost Ledger Control A/c To Stores Ledger Control A/c	Dr.	2,900	2,900
9.	Work-in-Process Control A/c To Manufacturing Overhead Control A/c	Dr.	77,200	77,200

COST LEDGERS**Cost Ledger Control Account**

Particulars	(Rs.)	Particulars	(Rs.)
To Stores Ledger Control A/c (return)	2,900	By Balance b/d	6,65,220
"	9,49,025	" Manufacturing OH Control A/c	91,510
Balance c/d		" Stores Ledger Control A/c	1,23,000
		" Wages Control A/c	72,195
	9,51,925		9,51,925

Stores Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	3,01,435	By Work in Process Control A/c	1,27,315
" Cost Ledger Control A/c	1,23,000	" Cost Ledger Control A/c	2,900
		" Balance c/d	2,94,220
	4,24,435		4,24,435

Wages Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	72,195	By Work in Process Control A/c	50,530
		" Manufacturing OH Control A/c	21,665
	72,195		72,195

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Manufacturing Overhead Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	91,510	By Balance b/d	10,525
" Wages Control A/c	21,665	" Work in Process Control A/c	77,200
		"Balance c/d	25,450
	1,13,175		1,13,175

Work-in-Process Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	1,22,365	By Finished Stock Ledger Control A/c	2,10,835
" Wages Control A/c	50,530	" Balance c/d	1,66,575
"Stores Ledger Control A/c	1,27,315		
"Manufacturing OH Control A/c	77,200		
	3,77,410		3,77,410

Finished Stock Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	2,51,945	By Cost of Sales Control A/c	1,85,890
" Work in Process Control A/c	2,10,835	" Balance c/d	2,82,270
"Cost of Sales Control A/c (Return at cost)	5,380		
	4,68,160		4,68,160

Cost of Sales Account

Particulars	(Rs.)	Particulars	(Rs.)
To Finished Stock Ledger Control	1,85,890	By Finished Stock Ledger Control (Return)	5,380
		"Balance c/d	1,80,510
	1,85,890		1,85,890

Trial Balance

Particulars	Dr.	Cr.
	(Rs.)	(Rs.)

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Stores Ledger Control A/c	2,94,220	
Work-in-Process Control A/c	1,66,575	
Finished Stock Ledger Control A/c	2,82,270	
Manufacturing Overhead Control A/c	25,450	
Cost of Sales A/c	1,80,510	
Cost Ledger Control A/c		9,49,025
	9,49,025	9,49,025

ILLUSTRATION 2

Acme Manufacturing Co. Ltd. opens the costing records, with the balances as on 1st July, 2020 as follows:

	(Rs.)	(Rs.)
Material Control A/c	1,24,000	
Work-in-Process Control A/c	62,500	
Finished Goods Control A/c	1,24,000	
Production Overhead Control A/c	8,400	
Administrative Overhead Control A/c		12,000
Selling & Distribution Overhead Control A/c	6,250	
Cost Ledger Control A/c		3,13,150
	3,25,150	3,25,150

The following are the transactions for the quarter ended 30th September 2020:

	(Rs.)
Materials purchased	4,80,100
Materials issued to jobs	4,77,400
Materials to works maintenance	41,200
Materials to administrative office	3,400
Materials to sales department	7,200
Wages direct	1,49,300
Wages indirect	65,000
Transportation for indirect materials	8,400
Production overheads incurred	2,42,250
Absorbed production overheads	3,59,100
Administrative overheads incurred	74,000
Administrative overheads allocated to production	52,900
Administrative overheads allocated to sales department	14,800
Selling & Distribution overheads incurred	64,200
Selling & Distribution overheads absorbed	82,000
Finished goods produced	9,58,400
Finished goods sold	9,77,300
Sales	14,43,000

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Make up the various accounts as you envisage in the Cost Ledger and PREPARE a Trial Balance as at 30th September, 2020.

SOLUTION
Cost Ledgers Material Control A/c*

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	1,24,000	By Work-in-process Control A/c	4,77,400
" Cost Ledger Control A/c (purchase)	4,80,100	" Production OH Control A/c	41,200
		Admn. OH Control A/c	3,400
		S&D OH Control A/c	7,200
		Balance c/d	74,900
	6,04,100		6,04,100

*Material Control A/c may also be written as Stores Ledger Control A/c

Wages Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	2,14,300	By Work-in-process Control A/c	1,49,300
		" Production OH Control A/c	65,000
	2,14,300		2,14,300

Production Overhead Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	8,400	By Work-in-process Control A/c	3,59,100
Cost Ledger Control A/c:			
- Transportation	8,400		
	2,42,250		
- Production OH			
Wages Control A/c	65,000		
" Material Control A/c	41,200	" Balance c/d	6,150
	3,65,250		3,65,250

Administrative Overhead Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	74,000	By Balance b/d	12,000
" Material Control A/c:	3,400	" Finished Goods Control A/c	52,900
" Balance c/d	2,300	" Cost of sales A/c	14,800
	79,700		79,700

Work-in-Process Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	62,500	By Finished goods Control A/c	9,58,400
" Material Control A/c	4,77,400		
" Wages Control A/c	1,49,300		
" Production OH Control A/c	3,59,100		
		" Balance c/d	89,900
	10,48,300		10,48,300

Finished Goods Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To " Balance b/d	1,24,000	By Cost of Sales A/c	9,77,300
Administrative Overhead Control A/c	52,900		
" Work-in-process Control A/c	9,58,400	" Balance c/d	1,58,000
	11,35,300		11,35,300

Selling and Distribution Overhead Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	6,250	By Cost of Sales A/c	82,000
		Cost Ledger Control A/c:	64,200
		Material Control A/c	7,200
		Balance c/d	4,350
	82,000		82,000

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Cost of Sales A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Finished Goods Control A/c	9,77,300	By Costing P&L A/c	10,74,100
Admn. OH Control A/c	14,800		
S&D OH Control A/c	82,000		
	10,74,100		10,74,100

Cost Ledger Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Costing P&L A/c (Sales)	14,43,000	By Balance b/d	3,13,150
		Material Control A/c	4,80,100
		Wages Control A/c (Rs.1,49,300+Rs.65,000)	2,14,300
		Production OH Control A/c (Rs.8,400+Rs.2,42,250)	2,50,650
		Administrative OH A/c	74,000
		S&D OH Control A/c	64,200
Balance c/d	3,22,300	" Costing P&L A/c	3,68,900
	17,65,300		17,65,300

Costing Profit & Loss A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Cost of sales A/c	10,74,100	By Cost Ledger Control A/c (sales)	14,43,000
" Cost Ledger Control A/c (profit) (balancing figure)	3,68,900		
	14,43,000		14,43,000

Trial Balance as at 30th September, 2020

	Dr. (₹)	Cr. (₹)
Material Control A/c	74,900	
Production OH Control A/c	6,150	
Administrative OH Control A/c		2,300
Selling & Distribution OH Control A/c		4,350
Work-in-process Control A/c	89,900	
Finished Goods Control A/c	1,58,000	
Cost Ledger Control A/c		3,22,300
	3,28,950	3,28,950

ILLUSTRATION 3

JOURNALISE the following transactions assuming that cost and financial transactions are integrated:

	(Rs.)
Raw materials purchased	2,00,000
Direct materials issued to production	1,50,000
Wages paid (30% indirect)	1,20,000
Wages charged to production	84,000
Manufacturing expenses incurred	84,000
Manufacturing overhead charged to production	92,000
Selling and distribution costs	20,000
Finished products (at cost)	2,00,000
Sales	2,90,000
Closing stock	Nil
Receipts from debtors	69,000
Payments to creditors	1,10,000

SOLUTION

Journal entries are as follows:

		DR. (Rs.)	CR. (Rs.)
Stores Ledger Control A/c..... To Payables (Creditors)/ Bank A/c (Materials purchased)	Dr.	2,00,000	2,00,000
Work-in-Process Control A/c..... To Stores Ledger Control A/c (Materials issued to production)	Dr.	1,50,000	1,50,000
Wages Control A/c..... To Bank A/c (Wages paid)	Dr.	1,20,000	1,20,000
Factory Overhead Control A/c..... To Wages Control A/c (30% of wages paid being indirect charged to overhead)	Dr.	36,000	36,000
Work-in-Process Control A/c..... To Wages Control A/c (Direct wages charged to production)	Dr.	84,000	84,000
Factory Overhead Control A/c..... To Bank A/c (Manufacturing overhead incurred)	Dr.	84,000	84,000
Work-in-Process Control A/c..... To Factory Overhead Control A/c (Manufacturing overhead charged to production)	Dr.	92,000	92,000

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Selling & Distribution Overhead Control A/c..... To Bank A/c (Selling and distribution costs incurred)	Dr.	20,000	20,000
Finished Goods Control A/c..... To Work-in-Process Control A/c (Cost of finished goods)	Dr.	2,00,000	2,00,000
Cost of Sales A/c..... To Finished Goods Control A/c To Selling and Distribution Control A/c (Costs of sales)	Dr.	2,20,000	2,00,000 20,000
Receivables (Debtors)/ Bank A/c..... To Sales A/c (Finished goods sold)	Dr.	2,90,000	2,90,000
Bank A/c..... To Receivables (Debtors) A/c (Receipts from receivables)	Dr.	69,000	69,000
Payables (Creditors) A/c..... To Bank A/c (Payment made to payables)	Dr.	1,10,000	1,10,000

ILLUSTRATION 4

In the absence of the Chief Accountant, you have been asked to prepare a month's cost accounts for a company which operates a batch costing system fully integrated with the financial accounts. The following relevant information is provided to you:

(Rs.)		(Rs.)
Balances at the beginning of the month:		
Stores Ledger Control Account		25,000
Work-in-Process Control Account		20,000
Finished Goods Control Account		35,000
Prepaid Production Overheads brought forward from previous month		3,000
Transactions during the month:		
Materials Purchased		75,000
Materials Issued:		
To production	30,000	
To factory maintenance	4,000	34,000
Materials transferred between batches		5,000
Total wages paid:		
To direct workers	25,000	

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To indirect workers	5,000	30,000
Direct wages charged to batches	20,000	
Recorded non-productive time of direct workers	5,000	
Selling and Distribution Overheads Incurred	6,000	
Other Production Overheads Incurred	12,000	
Sales	1,00,000	
Cost of Finished Goods Sold	80,000	
Cost of Goods completed and transferred into finished goods during the month	65,000	
Physical value of work-in-Process at the end of the month	40,000	

The production overhead absorption rate is 150% of direct wages charged to work-in-Process.

Required:

PREPARE the following accounts for the month:

(a) Stores Ledger Control Account.

(b) Work-in-Process Control Account.

(c) Finished Goods Control Account.

(d) Production Overhead Control Account.

(e) Costing Profit and Loss Account.

SOLUTION

(a) Stores Ledger Control Account

	(Rs.)		(Rs.)
To Balance b/d	25,000	By Work in Process Control A/c	30,000
" Creditors/ Bank A/c	75,000	" Production OH Control A/c	4,000
" Balance c/d			66,000
	1,00,000		1,00,000

(b) Wages Control Account

	(Rs.)		(Rs.)
To Bank A/c (Paid to direct workers)	25,000	By Work in Process Control A/c (Charged to batches)	20,000

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" Bank A/c (Paid to indirect workers)	5,000	„ Production OH Control A/c	5,000
		Production OH Control A/c (Non-productive wages)	5,000
	30,000		30,000

(c) Production Overhead Control Account

(Rs.)		(Rs.)	
To Balance b/d (Prepaid amount)	3,000	By Work-in-Process Control A/c (150% of direct wages)	30,000
Stores Ledger Control A/c			4,000
Wages Control A/c (Rs.5,000 + Rs.5,000)			10,000
Bank A/c			12,000
(Over-absorption, balancing figure)			1,000
	30,000		30,000

* Alternatively the over absorbed overhead may be carried forward.

(d) Work-in-Process Control Account

(Rs.)		(Rs.)	
To Balance b/d	20,000	By Finished Goods Control A/c	65,000
" Store Ledger Control A/c	30,000	" Balance c/d (Physical value)	40,000
Wages Control A/c	20,000		
Production OH Control A/c (150% of direct wages)	30,000		
Costing P&L A/c (Stock Gains)	5,000		
	1,05,000		1,05,000

(e) Finished Goods Control Account

(Rs.)		(Rs.)	
To Balance b/d	35,000	By Cost of Goods Sold* A/c	80,000
" Work-in-Process Control A/c	65,000	" Balance c/d	20,000
	1,00,000		1,00,000

* Alternatively, Costing Profit & Loss Account

(f) Costing Profit & Loss Account

(Rs.)		(Rs.)	
To Finished goods control A/c or Cost of Goods Sold A/c	80,000	By Sales A/c	1,00,000
" Selling & distribution OH A/c	6,000	" Production OH Control A/c	1,000
" Balance c/d	20,000	" Work-in-Process Control A/c (Stock gain)	5,000
	1,06,000		1,06,000

Notes:

- (1) Materials transferred between batches will not affect the Control Accounts.
- (2) Non-production time of direct workers is a production overhead and therefore will not be charged to work-in-Process control A/c.
- (3) Production overheads absorbed in work-in-Process Control A/c equals to Rs. 30,000 (150% of Rs. 20,000).
- (4) In the work-in-Process Control A/c the excess physical value of stock is taken resulting in stock gain. Stock gain is transferred to Profit & Loss A/c.

ILLUSTRATION 5

A fire destroyed some accounting records of a company. You have been able to collect the following from the spoilt papers/records and as a result of consultation with accounting staff for the period of January, 2020:

(i) Incomplete Ledger Entries:
Materials Control A/c

	(Rs.)		(Rs.)
To Balance b/d	32,000		

Work-in-Process Control A/c

	(Rs.)		(Rs.)
To Balance b/d	9,200	By Finished Goods Control A/c	1,51,000

Payables (Creditors) A/c

	(Rs.)		(Rs.)
		By Balance b/d	16,400
To Balance c/d	19,200		

Manufacturing Overheads Control A/c

	(Rs.)		(Rs.)
To Bank A/c (Amount spent)	29,600		

Finished Goods Control A/c

	(Rs.)		(Rs.)
To Balance b/d	24,000		
		By Balance c/d	30,000

(ii) Additional Information:

(1) The bank-book showed that Rs. 89,200 have been paid to creditors for raw-material.

(2) Ending inventory of work-in-process included materials of Rs. 5,000 on which 300 direct labour hours have been booked against wages and overheads.

(3) The job card showed that workers have worked for 7,000 hours. The wage rate is Rs. 10 per labour hour.

(4) Overhead recovery rate was Rs. 4 per direct labour hour.

You are required to COMPLETE the above accounts in the cost ledger of the company.

SOLUTION**Materials Control A/c**

	(Rs.)		(Rs.)
To Balance b/d	32,000	By Work-in-process control A/c	53,000
Cost Ledger Control A/c			
To Payables (Creditors) A/c	92,000	By Balance c/d	71,000

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(Purchases)			
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Manufacturing Overheads Control A/c

	(Rs.)		(Rs.)
To Bank A/c (Amount spent)	29,600	By Work-in-process control A/c (Rs.4 × 7,000 hours)	28,000
		By Costing P/L A/c (Under-absorbed OH)	1,600
	29,600		29,600

Work-in-Process Control A/c

	(Rs.)		(Rs.)
To Balance b/d	9,200	By Finished Goods Control A/c	1,51,000
To Wages Control A/c (Rs.10 × 7,000 hours)	70,000	By Balance c/d: -Material	5,000
To Overheads Control A/c (Rs.4 × 7,000 hours)	28,000	-Wages	3,000
To Materials Control A/c (Balancing figure)	53,000	Overheads	1,200
	1,60,200	(Rs.4 × 300 hours)	9,200
			1,60,200

Finished Goods Control A/c

	(Rs.)		(Rs.)
To Balance b/d	24,000	By Cost of sales A/c (Bal fig.)	1,45,000
To Work-in-process Control A/c (as above)	1,51,000	By Balance c/d	30,000
	1,75,000		1,75,000

Payables (Creditors) A/c

	(Rs.)		(Rs.)
To Bank A/c	89,200	By Balance b/d	16,400
To Balance c/d	19,200	By Material Control A/c (Purchases) (Balancing fig.)	92,000
	1,08,400		1,08,400

ILLUSTRATION 6

The following figures are available from the financial records of ABC Manufacturing Co. Ltd. for the year ended 31-03-2020.

Sales (20,000 units)	25,00,000
Materials	10,00,000
Wages	5,00,000
Factory Overheads	4,50,000
Administrative Overhead (production related)	2,60,000
Selling and distribution Overheads	1,80,000
Finished goods (1,230 units)	1,50,000

	(Rs.)	(Rs.)
Work-in-Process:		
Materials	30,000	
Labour	20,000	
Factory overheads	20,000	70,000
Goodwill written off		2,00,000
Interest on loan taken		20,000

In the Costing records, factory overhead is charged at 100% of wages, administrative overhead 10% of factory cost and selling and distribution overhead at the rate of Rs. 10 per unit sold.

PREPARE a statement reconciling the profit as per cost records with the profit as per financial records.

SOLUTION

Profit & Loss Account of ABC Manufacturing Co. Ltd. (for the year ended 31-3-2020)

(Rs.)		(Rs.)	
To Opening Stock	-	By Sales (20,000 units)	25,00,000
To Materials	10,00,000	By Closing Stock:	
To Wages	5,00,000	Finished goods (1,230 units)	1,50,000
To Factory Overheads	4,50,000	Work-in-Process	70,000
To Admn. Overheads	2,60,000		
To S&D Overheads	1,80,000		
To Goodwill written off	2,00,000		
To Interest on loan	20,000		
To Net Profit	1,10,000		
	27,20,000		27,20,000

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Cost Sheet

Materials	10,00,000
Wages	5,00,000
Direct Expenses	Nil
Prime Cost	15,00,000
Add: Factory overhead @ 100% of wages	5,00,000
Gross Factory Cost	20,00,000
Less: Closing WIP	(70,000)
Factory Cost of (20,000 + 1,230) units	19,30,000
Add: Admn. Overhead @ 10% of Factory cost	1,93,000
	21,23,000
Less: Closing Stock of finished goods (1,230 units)	(1,23,000)*
Cost of Goods sold (20,000 units)	20,00,000
Add: Selling & Dist. Overhead @ Rs. 10 per unit	2,00,000
Cost of sales (20,000 units)	22,00,000
Sales of 20,000 units	25,00,000
Profit	3,00,000

* (Rs.21,23,000 × 1,230 units/ 21,230 units)

Reconciliation Statement

(Rs.)		(Rs.)
Profit as per Cost Accounts		3,00,000
Add: Factory overheads over-absorbed (Rs. 5,00,000 – Rs. 4,50,000)	50,000	
Selling & Dist. Overhead over-absorbed (Rs. 2,00,000 – Rs. 1,80,000)	20,000	
Difference in the valuation of closing stock of finished goods (Rs. 1,50,000 – Rs. 1,23,000)	27,000	97,000
		3,97,000
Less: Admn. overhead under-absorbed (Rs. 2,60,000 – Rs. 1,93,000)		67,000
Goodwill written off		2,00,000
Interest on loan	20,000	2,87,000
Profit as per financial accounts		1,10,000

ILLUSTRATION 7

Following are the figures extracted from the Cost Ledger of a manufacturing unit.

Stores:	
Opening balance	15,000
Purchases	80,000
Transfer from WIP	40,000

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Issue to WIP	80,000
Issue to repairs and maintenance	10,000
Sold as a special case at cost	5,000
Shortage in the year	3,000
Work-in-Process:	
Opening inventory	30,000
Direct labour cost charged	30,000
Overhead cost charged	1,20,000
Closing Balance	20,000
Finished Products:	
Entire output is sold at 10% profit on actual cost from work-in-process.	
Others:	
Wages for the period	35,000
Overhead Expenses	1,25,000

ASCERTAIN the profit or loss as per financial account and cost accounts and reconcile them.

SOLUTION**Stores Ledger Control A/c**

To Balance b/d	15,000	By Work-in-process Control A/c (Issued to WIP)	80,000
To Cost Ledger Control A/c (Purchases)	80,000	By Overhead Control A/c (Issued for repairs)	10,000
To Work-in-process Control A/c (Return from WIP)	40,000	By Cost Ledger Control A/c (Sold at cost)	5,000
		By Overheads Control A/c* (Shortages)	3,000
		By Balance c/d	37,000
	1,35,000		1,35,000

* Assumed normal

Wages Control A/c

	(Rs.)		(Rs.)
To Cost Ledger Control A/c	35,000	By Work-in-process Control A/c	30,000
		By Overhead Control A/c	5,000
	35,000		35,000

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Overhead Control A/c

	(Rs.)		(Rs.)
To Stores Ledger Control A/c	10,000	By Work-in-process	1,20,000
To Stores Ledger Control A/c	3,000		
To Cost Ledger Control A/c	1,25,000		
To Wages Control A/c	5,000	By Balance c/d	23,000
	1,43,000		1,43,000

WIP Control A/c

(Rs.)		(Rs.)	
To Balance b/d	30,000	By Stores Ledger Control A/c	40,000
To Stores Ledger Control A/c	80,000	By Finished goods Control A/c	2,00,000*
To Wages Control A/c	30,000		
To Overheads Control A/c	1,20,000	By Balance c/d	20,000
	2,60,000		2,60,000

* Finished output at cost	2,00,000
Profit at 10% on actual cost from WIP Sales	20,000
	2,20,000

Statement of Profit as per Costing Records

Direct material Cost (Rs.80,000 – Rs.40,000)	40,000
Direct wages	30,000
Prime Cost	70,000
Production Overheads	1,20,000
Works Cost	1,90,000
Add: Opening WIP	30,000
2,20,000	
Less: Closing WIP	(20,000)
Cost of finished goods	2,00,000
Profit (10% of cost)	20,000
Sales	2,20,000

Profit & Loss A/c

(Rs.)		(Rs.)	
To Material (Op. bal. + Purchases - Sale)	90,000	By Sales A/c	2,20,000
To Opening WIP	30,000	By Closing WIP	20,000
To Wages for the period	35,000	By Closing Finished goods	37,000
To Overheads expenses	1,25,000	By Net loss	3,000
	2,80,000		2,80,000

Reconciliation Statement

Profit (loss) as per Financial Accounts	(3,000)
Add: Overheads over absorbed (refer Overhead control A/c)	23,000
Net Profit as per Cost Accounts	20,000

ILLUSTRATION 8

The following figures have been extracted from the Financial Accounts of a manufacturing firm for the first year of its operation:

Direct Material Consumption	50,00,000
Direct Wages	30,00,000
Factory Overheads	16,00,000
General administrative overheads	7,00,000
Selling and Distribution Overheads	9,60,000
Bad debts	80,000
Preliminary expenses written off	40,000
Legal charges	10,000
Dividends received	1,00,000
Interest received on deposits	20,000
Sales (1,20,000 units)	1,20,00,000
Closing stock:	
Finished goods (4,000 units)	3,20,000
Work-in-Process	2,40,000

The cost accounts for the same period reveal that the direct material consumption was Rs. 56,00,000. Factory overhead is recovered at 20% on prime cost. Administration overhead is recovered at Rs. 6 per unit of production. Selling and distribution overheads are recovered at Rs. 8 per unit sold.

PREPARE the Profit and Loss Accounts both as per financial records and as per cost records. **RECONCILE** the profits as per the two records.

SOLUTION
Profit and Loss Account
 (As per financial records)

(Rs.)		(Rs.)	
To Direct Material	50,00,000	By Sales (1,20,000 units)	1,20,00,000
To Direct Wages	30,00,000	By Closing Stock	
To Factory Overheads	16,00,000	Work-in-process	2,40,000
To Gross Profit c/d	29,60,000	Finished Goods (4,000 units)	3,20,000
	1,25,60,000		1,25,60,000
To General Administrative Overheads	7,00,000	By Gross Profit b/d	29,60,000
To Selling and Dist. OH	9,60,000	By Dividend received	1,00,000
To Bad debts	80,000	By Interest received	20,000
To Preliminary Expenses written off	40,000		
To Legal Charges	10,000		
To Net Profit	12,90,000		
	30,80,000		30,80,000

Statement of Cost and Profit
 (As per Cost Records)

Direct Material	56,00,000
Direct Wages	30,00,000
Prime Cost	86,00,000
Factory Overhead (20% of Rs.86,00,000)	17,20,000
1,03,20,000	
Less:	(2,40,000)
Closing Stock (WIP)	
Works Cost or Cost of production (1,24,000 units)	1,00,80,000
Less:	(3,25,160)
Finished Goods (4,000 units @ Rs.81.29)	
Cost of goods sold (1,20,000 units)	97,54,840
Administrative overhead (1,24,000 units @ Rs. 6 p.u.)	7,44,000

Selling and Distribution Overhead (1,20,000 @ Rs. 8 p.u.)	9,60,000
Cost of Sales	1,14,58,840
Net profit (Balancing figure)	5,41,160
Sales Revenue	1,20,00,000

Statement of Reconciliation of profit as obtained under Cost and Financial Accounts

(Rs.)		Total (Rs.)
Profit as per Cost Records		5,41,160
Add: Excess of Material Consumption	6,00,000	
Factory Overhead	120000	
Administrative Overhead	44000	

Dividend Received	100000	
Interest Received	20000	884000
		1425160
Less: Bad debts	80000	
Preliminary expenses written off	40000	
Legal Charges	10000	
Over- valuation of stock in cost book (325160-320000)	5160	-135160
Profit as per Financial Records		1290000

MCQS BASED QUESTIONS

1. Under the Non-integrated accounting system

- (a) Same ledger is maintained for cost and financial accounts by accountants
- (b) Separate ledgers are maintained for cost and financial accounts
- (c) (a) and (b) both
- (d) None of the above

ANSWER 1-B

2. Notional costs

- (a) May be included in Integrated accounts
- (b) May be included in Non- integrated accounts
- (c) Cannot be included in Non-integrated accounts
- (d) None of the above

ANSWER 2-C

3. Under Non-integrated accounting system, the account made to complete double entry is

- (a) Stores ledger control account
- (b) Work in progress control account
- (c) Finished goods control account
- (d) General ledger adjustment account

ANSWER 3-D

4. Integrated systems of accounts are maintained

- (a) In separate books of accounts for costing and financial accounting purposes
- (b) In same books of accounts
- (c) Both (a) & (b)
- (d) None of the above

ANSWER 4-B

5. Under Non-integrated system of accounting, purchase of raw material is debited to which account

- (a) Material control account / stores ledger control account
- (b) General ledger adjustment account
- (c) Purchase account
- (d) None of the above

ANSWER 5-A

6. Under Non-integrated accounts, if materials worth Rs. 1,500 are purchased for a special job, then which account will be debited:

- (a) Special job account / work in process account**
- (b) Material control account**
- (c) Cost control account**
- (d) None of the above**

ANSWER 6-A

7. Which account is to be debited if materials worth Rs. 500 are returned to vendor under Non-integrated accounts:

- (a) Cost ledger control account**
- (b) Finished goods control account**
- (c) WIP control account**
- (d) None of the above**

ANSWER 7-A

8. Which of the following items is included in cost accounts?

- (a) Notional rent**
- (b) Donations**
- (c.) Transfer to general reserve**
- (d) Rent receivable**

ANSWER 8-A

9. When costing loss is Rs. 5,600, administrative overhead under-absorbed being Rs. 600, the loss as per financial accounts should be

- (a) Rs. 5,600
- (b) Rs. 6,200
- (c) Rs. 5,000
- (d) None of the above

ANSWER 9-B

10. Which of the following items should be added to costing profit to arrive at financial profit?

- (a) Over-absorption of works overhead
- (b) Interest paid on debentures
- (c) Income tax paid
- (d) All of the above

ANSWER 10-A

Theoretical Questions

1. EXPLAIN what are the essential pre-requisites of Integrated accounting system?

ANSWER 1

The essential pre-requisites for integrated accounts include the following steps:

1. The management's decision about the extent of integration of the two sets of books. Some concerns find it useful to integrate up to the stage of prime cost or factory cost while other prefers full integration of the entire accounting records.

2. A suitable coding system must be made available so as to serve the accounting purposes of financial and cost accounts.
3. An agreed routine, with regard to the treatment of provision for accruals, prepaid expenses, other adjustment necessary for preparation of interim accounts.
4. Perfect coordination should exist between the staff responsible for the financial and cost aspects of the accounts and an efficient processing of accounting documents should be ensured.

2. STATE what are the advantages of Integrated accounting?

ANSWER 2

The main advantages of Integrated Accounts are as follows:

- (a) **No need for Reconciliation**- The question of reconciling costing profit and financial profit does not arise, as there is only one figure of profit.
- (b) **Less efforts**- Due to use of one set of books, there is a significant saving in efforts made.
- (c) **Less time consuming**- No delay is caused in obtaining information as it is provided from books of original entry.
- (d) **Economical process**- It is economical also as it is based on the concept of "Centralisation of Accounting function".

3. EXPLAIN why is it necessary to reconcile the Profits between the Cost Accounts and Financial Accounts?

ANSWER 3

When the cost and financial accounts are kept separately, it is imperative that these should be reconciled to make the cost accounts reliable. It is necessary for reconciliation of the two sets of accounts that sufficient details are available to locate the differences and the reasons for the same. It is, therefore, important that in the financial accounts, the expenses should be analysed in the same way as in the cost accounts. The General Ledger Adjustment Account in the Cost Ledger may be studied to know the items which are included here and how differently these are presented in the financial accounts.

The reconciliation of the balances of two sets of accounts is possible by preparing a Memorandum Reconciliation Account. In this account, the items charged in one set of accounts but not in the other or those charged in excess as compared to the other are identified and collected. These items of differences are either added or subtracted from the profit as shown by one of the accounts. Finally the profits from two sets of accounts

are reconciled. The procedure is similar to those which are followed for reconciling bank balance as per bank ledger with the balance as shown in bank statement.

4. STATE what are the reasons for disagreement of profits as per cost accounts and financial accounts? Discuss.

ANSWER 4

Causes of differences in Financial and Cost Accounts:

1. Items included in Financial Accounts only-

(a) Purely Financial Expenses:

- (i) Interest on loans or bank mortgages.
 - (ii) Expenses and discounts on issue of shares, debentures etc.
 - (iii) Other capital losses i.e., loss by fire not covered by insurance etc.
 - (iv) Losses on the sales of fixed assets and investments
 - (v) Goodwill written off
 - (vi) Preliminary expenses written off
 - (vii) Income tax, donations, subscriptions
 - (viii) Expenses of the company's share transfer office, if any.
- (b) Purely Financial Income
- (i) Interest received on bank deposits, loans and investments
 - (ii) Dividends received
 - (iii) Profits on the sale of fixed assets and investments
 - (iv) Transfer fee received.
 - (v) Rent receivables

2. Item included in Cost Accounts only (notional expenses):

- (i) Charges in lieu of rent where premises are owned
- (ii) Interest on capital at notional figure though not incurred
- (iii) Salary for the proprietor at notional figure though not incurred
- (iv) Notional Depreciation on the assets fully depreciated for which book value is nil.

3. Items whose treatment is different in the two sets of accounts: The objective of cost accounting is to provide information to management for decision making and control purposes while financial accounting conforms to external reporting requirements. Hence there are chances that certain items are treated differently in the two sets of accounts. For example, LIFO method is not allowed for inventory valuation in India as per the Accounting Standard 2 issued by the Council of the ICAI. However, this method may be adopted for cost accounts as it is more suitable for arriving at costs which may be used as a base for deciding selling prices. Similarly cost accounting may use a different method of depreciation than what is allowed under financial accounting.

4. Varying basis of valuation: It is another factor which sometimes is responsible for the difference. It is well known that in financial accounts stock are valued either at cost or market price, whichever is lower. But in Cost Accounts, stocks are only valued at cost.

5. LIST the Financial expenses which are not included in cost.**ANSWER 5****Item included in Cost Accounts only (notional expenses):**

- (i) Charges in lieu of rent where premises are owned
- (ii) Interest on capital at notional figure though not incurred
- (iii) Salary for the proprietor at notional figure though not incurred
- (iv) Notional Depreciation on the assets fully depreciated for which book value is nil.

6. STATE when is the reconciliation statement of Cost and Financial accounts not required?**ANSWER 6**

Circumstances where reconciliation statement can be avoided: When the Cost and Financial Accounts are integrated - there is no need to have a separate reconciliation statement between the two sets of accounts. Integration means that the same set of accounts fulfil the requirement of both i.e., Cost and Financial Accounts.

Practical Problems

1. The following incomplete accounts are furnished to you for the month ended 31st October, 2020.

Stores Ledger Control Account
1.10.2020 To Balance Rs. 54,000

Work in Process Control Account
1.10. 2020 To Balance Rs. 6,000

Finished Goods Control Account
1.10. 2020 To Balance Rs. 75,000

Factory Overheads Control Account
Total debits for October, 2020 Rs. 45,000

Factory Overheads Applied Account

Cost of Goods Sold Account

Creditors for Purchases Account
1.10. 2020 By Balance Rs. 30,000

Additional information:

(i) The factory overheads are applied by using a budgeted rate based on direct labour hours. The budget for overheads for 2020 is Rs. 6,75,000 and the budget of direct labour hours is 4,50,000.

(ii) The balance in the account of creditors for purchases on 31.10.2020 is Rs. 15,000 and the payments made to creditors in October, 2020 amount to Rs. 1,05,000.

(iii) The finished goods inventory as on 31st October, 2020 is Rs. 66,000.

(iv) The cost of goods sold during the month was Rs. 1,95,000.

(v) On 31st October, 2020 there was only one unfinished job in the factory. The cost records show that Rs. 3,000 (1,200 direct labour hours) of direct labour cost and Rs. 6,000 of direct material cost had been charged.

(vi) A total of 28,200 direct labour hours were worked in October, 2020. All factory workers earn same rate of pay.

(vii) All actual factory overheads incurred in October, 2020 have been posted.

You are required to FIND:

- (a) Materials purchased during October, 2020.
- (b) Cost of goods completed in October, 2020.
- (c) Overheads applied to production in October, 2020.
- (d) Balance of Work-in-process Control A/c on 31st October, 2020.
- (e) Direct materials consumed during October, 2020.
- (f) Balance of Stores Ledger Control Account on 31st October, 2020.
- (g) Over absorbed or under absorbed overheads for October, 2020.

ANSWER 1

Working Notes:

(i) Overhead recovery rate per direct labour hour:

Budgeted factory overheads : Rs. 6,75,000

Budgeted direct labour hours : 4,50,000

Overhead recovery rate : = (Budgeted factory overheads / Budgeted direct labour hours)

= 6,75,000 / 4,50,000 hoursRs.

= Rs. 1.50 per direct labour

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(ii) Direct wage rate per hour:

Direct labour cost of WIP : Rs. 3,000
(on 31st October 2020)

Direct labour hours of WIP : 1,200 hours

Direct wage rate per hour : = (Direct labour cost on WIP / Direct labour hours on WIP)
= (3,000 / 1,200 hours) = Rs.2.50

(iii) Total direct wages charged to production:

Total direct labour hours spent on production × Direct wage rate per hour
= 28,200 hours × Rs. 2.50 = Rs. **70,500**

(a) Material purchased during October, 2020

Payment made to creditors	1,05,000
Add: Closing balance in the account of creditors for purchase	15,000
Less: Opening balance	(30,000)
Material Purchased	90,000

(b) Cost of finished goods in October, 2020

Cost of goods sold during the month	1,95,000
Add: Closing finished goods inventory	66,000
Less: Opening finished goods inventory	(75,000)
Cost of goods completed during the month	1,86,000

(c) Overhead applied to production in October, 2020

= 28,200 hours × Rs. 1.50 = Rs. **42,300**

(d) Balance of Work-in-Process on 31st October, 2020

Direct material cost	6,000
Direct labour cost	3,000
Overheads (Rs. 1.50 × 1,200 hours)	1,800
	10800

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(e) Direct material consumed during October, 2020 = Rs.78,000
 (Refer to following Accounts)

Work in Process Control A/c

	(Rs.)		(Rs.)
To Balance b/d	6,000	By Finished goods control A/c [Refer (b) above]	1,86,000
To Wages Control A/c [Refer working note (iii)]	70,500	By Balance c/d [Refer (d) above]	10,800
To Factory OH Control A/c [Refer (c) above]			42,300
To Material consumed (Balancing fig.)			78,000
	1,96,800		1,96,800

(f) Balance of Stores Control Account on 31st October, 2020 = Rs. 66,000
 (Refer to following Account)

Stores Ledger Control Account

	(Rs.)		(Rs.)
To Balance b/d	54,000	By Work-in-process Control A/c [Refer (e) above]	78,000
To Payables(Creditors) A/c [Refer (a) above]	90,000	By Balance c/d (Balancing fig.)	66,000
	1,44,000		1,44,000

(g) Over-absorbed or under-absorbed overheads for October, 202: Balance in Factory Overhead Account below showing that Rs. 2,700 is under-absorbed.

Factory Overhead Account

	(Rs.)		(Rs.)
To Bank A/c	45,000	By Work-in-process Control A/c (Factory OH applied)	42,300
By Costing P/L A/c (Under-absorbed)			2,700
	45,000		45,000

2. A company operates on historic job cost accounting system, which is not integrated with the financial accounts. At the beginning of a month, the opening balances in cost ledger were:

Stores Ledger Control Account	80
Work-in-Process Control Account	20
Finished Goods Control Account	430
Building Construction Account	10
Cost Ledger Control Account	540

During the month, the following transactions took place:
(Amounts in lakh)

Materials – Purchased	40
Issued to production	50
Issued to factory maintenance	6
Issued to building construction	4
Wages – Gross wages paid	150
Indirect wages	40
For building construction	10
Works Overheads– Actual amount incurred (excluding items shown above)	160
Absorbed in building construction	20
Under absorbed	8
Royalty paid (related to production)	5
Selling, distribution and administration overheads	25
Sales	450

At the end of the month, the stock of raw material and work-in-Process was Rs. 55 lakhs and Rs. 25 lakhs respectively. The loss arising in the raw material accounts is treated as factory overheads. The building under construction was completed during the month.

Company's gross profit margin is 20% on sales.

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

ANSWER 2

Amount (Rs. in lakhs)

Cost Ledger Control A/c

	(Rs.)		(Rs.)
To Costing P&L A/c	450	By Balance b/d	540
To Building Construction A/c	44	By Stores Ledger Control A/c	40
To Balance c/d	483	By Wages Control A/c	150
		By Works OH Control A/c	160
		By Royalty A/c	5
		By Admn. OH and S&D OH A/c	25
		By Costing P&L A/c	57
	977		977

Stores Ledger Control A/c

	(Rs.)		(Rs.)
To Balance b/d	80	By Work-in-process A/c	50
To Cost Ledger Control A/c	40	By Works OH Control A/c	6
		By Building Const. A/c	4
		By Works OH Control A/c (Bal. fig.) (loss)	5
By Balance c/d			55
	120		120

Wages Control A/c

	(Rs.)		(Rs.)
To Cost Ledger Control A/c	150	By Works OH Control A/c	40
		By Building Const. A/c	10
		By Work-in-process Control A/c (Balancing figure)	100
	150		150

Works Overhead Control A/c

	(Rs.)		(Rs.)
To Stores Ledger Control A/c	6	By Building Const. A/c	20

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To Wages Control A/c	40	By Work-in-process Control A/c (Balancing figure)	183
To Cost Ledger Control A/c	160	By Costing P&L A/c (under-absorption)	8
To Store Ledger Control A/c (loss)			5
	211		211

Royalty A/c

(Rs.)		(Rs.)	
To Cost Ledger Control A/c	5	By Work-in-process Control A/c	5
	5		5

Work-in-Process Control A/c

	(Rs.)		(Rs.)
To Balance b/d	20	By Finished Goods Control A/c (Balancing figure)	333
To Stores Ledger Control A/c	50		
To Wages Control A/c	100		
To Works OH Control A/c	183		
To Royalty A/c	5	By Balance c/d	25
	358		358

Finished Goods Control A/c

	(Rs.)		(Rs.)
To Balance b/d	430	By Cost of Goods Sold A/c (80% of Rs. 450)	360
To Work-in-process Control A/c	333	By Balance c/d	403
	763		763

Cost of Goods Sold A/c

	(Rs.)		(Rs.)
To Finished Goods Control A/c	360	By Cost of sales A/c	360
	360		360

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Selling, Distribution and Administration Overhead A/c

	(Rs.)		(Rs.)
To Cost Ledger Control A/c	25	By Cost of sales A/c	25
	25		25

Cost of Sales A/c

	(Rs.)		(Rs.)
To Cost of Goods Sold	360	By Costing P&L A/c	385
To Admn. OH and S&D OH A/c	25		
	385		385

Costing P & L A/c

	(Rs.)		(Rs.)
To Cost of Sales A/c	385	By Cost Ledger Control A/c (Sales)	450
To Works Overhead Control A/c	8		
To Cost Ledger Control A/c (Profit) (Balancing figure)	57		
	450		450

Building Construction A/c

	(Rs.)		(Rs.)
To Balance b/d	10	By Cost Ledger Control A/c	44
To Stores Ledger Control A/c			4
To Wages Control A/c			10
To Works OH Control A/c			20
	44		44

Trial Balance (Rs. in lakhs)

	DR. (Rs.)	CR. (Rs.)
Stores control A/c	55	
Work-in-Process A/c	25	
Finished goods A/c	403	

Cost Ledger Adjustment A/c		483
	483	483

3. Dutta Enterprises operates an Integral system of accounting. You are required to PASS the Journal Entries for the following transactions that took place for the year ended 30th June, 2020.

(Narrations are not required.)

Raw materials purchased (50% on Credit)	6,00,000
Materials issued to production	4,00,000
Wages paid (50% Direct)	2,00,000
Wages charged to production	1,00,000
Factory overheads incurred	80,000
Factory overheads charged to production	1,00,000
Selling and distribution overheads incurred	40,000
Finished goods at cost	5,00,000
Sales (50% Credit)	7,50,000
Closing stock	Nil
Receipts from debtors	2,00,000
Payments to creditors	2,00,000

ANSWER 3

Journal entries are as follows:

Stores Ledger Control A/c.....	Dr.	6,00,000	
To Payables (Creditors) A/c			3,00,000
To Cash or Bank			3,00,000
Work-in-Process Control A/c.....	Dr.	4,00,000	
To Stores Ledger Control A/c			4,00,000
Wages Control A/c.....	Dr.	2,00,000	
To Bank A/c			2,00,000
Factory Overhead Control A/c.....	Dr.	1,00,000	
To Wages Control A/c			1,00,000
Work-in-Process Control A/c.....	Dr.	1,00,000	
To Wages Control A/c			1,00,000
Factory Overhead Control A/c.....	Dr.	80,000	
To Bank A/c			80,000
Work-in-Process Control A/c.....	Dr.	1,00,000	
To Factory Overhead Control A/c			1,00,000
Selling and Dist. Overhead Control A/c	Dr.	40,000	
To Bank A/c			40,000

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Finished Goods Control A/c..... To Work-in-Process Control A/c	Dr.	5,00,000	5,00,000
Cost of Sales A/c..... To Finished Goods Control A/c To Selling and Distribution Control A/c	Dr.	5,40,000	5,00,000 40,000
Receivables (Debtors) A/c..... Bank or Cash A/c..... To Sales A/c	Dr. Dr.	3,75,000 3,75,000	7,50,000
Bank A/c..... To Receivables (Debtors) A/c	Dr.	2,00,000	2,00,000
Payables (Creditors) A/c..... To Bank A/c	Dr.	2,00,000	2,00,000

4. The following figures are extracted from the Trial Balance of Go-getter Co. on 30th September, 2020:

	Dr.	Cr.
	(Rs.)	(Rs.)
Inventories:		
Finished Stock	80,000	
Raw Materials	1,40,000	
Work-in-Process	2,00,000	
Office Appliances	17,400	
Plant & Machinery	4,60,500	
Building	2,00,000	
Sales		7,68,000
Sales Return and Rebates	14,000	
Materials Purchased	3,20,000	
Freight incurred on Materials	16,000	
Purchase Returns		4,800
Direct employee cost	1,60,000	
Indirect employee cost	18,000	
Factory Supervision	10,000	
Repairs and factory up-keeping expenses	14,000	
Heat, Light and Power	65,000	
Rates and Taxes	6,300	
Miscellaneous Factory Expenses	18,700	
Sales Commission	33,600	
Sales Travelling	11,000	
Sales Promotion	22,500	
Distribution Deptt.—Salaries and Expenses	18,000	

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Office Salaries and Expenses	8,600	
Interest on Borrowed Funds	2,000	

Further details are available as follows:

(i) Closing Inventories:	
Finished Goods	1,15,000
Raw Materials	1,80,000
Work-in-Process	1,92,000
(ii) Outstanding expenses on:	
Direct employee cost	8,000
Indirect employee cost	1,200
Interest on Borrowed Funds	2,000
(iii) Depreciation to be provided on:	
Office Appliances	5%
Plant and Machinery	10%
Buildings	4%
(iv) Distribution of the following costs:	
Heat, Light and Power to Factory, Office and Distribution in the ratio 8 : 1 : 1.	
Rates and Taxes two-thirds to Factory and one-third to Office.	
Depreciation on Buildings to Factory, Office and Selling in the ratio 8 : 1 : 1.	

With the help of the above information, you are required to PREPARE a condensed Profit and Loss Statement of Go-getter Co. for the year ended 30th September, 2020 along with supporting schedules of:

- (i) Cost of Sales.
- (ii) Selling and Distribution Expenses.
- (iii) Administration Expenses.

ANSWER 4

Profit and Loss Statement of Go-getter Company
for the year ended 30th September, 2020

	(Rs.)	(Rs.)
Gross Sales	7,68,000	
Less: Returns and rebates	(14,000)	7,54,000
Less: Cost of Sales [Refer to Schedule (i)]		(7,14,020)
Net Operating Profit		39,980
Less: Interest on borrowed funds (2,000+2,000)		(4,000)
Net Profit		35,980

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(i) Schedule of Cost of Sales

	(Rs.)	(Rs.)
Raw Material (Inventory opening balance)		1,40,000
Add: Material Purchased	3,20,000	
Add: Freight on Material	16,000	
Less: Purchase Returns	(4,800)	3,31,200
		4,71,200
Less: Closing Raw Material Inventory		(1,80,000)
Materials consumed in Production		2,91,200
Direct employee cost (Rs.1,60,000 + Rs.8,000)		1,68,000
Prime Cost		4,59,200
Factory Overheads:		
Indirect employee cost (Rs.18,000 + Rs.1,200)	19,200	
Factory Supervision	10,000	
Repairs and factory up-keeping expenses	14,000	
Heat, Light and Power (Rs.65,000 × 8/10)	52,000	
Rates and Taxes (Rs.6,300 × 2/3rd)	4,200	
Miscellaneous Factory Expenses	18,700	

Depreciation of Plant (10% of Rs.4,60,500)	46,050	
Depreciation of Buildings (4% of Rs.2,00,000 × 8/10)	6,400	1,70,550
Gross Works Cost		6,29,750
Add: Opening Work-in-Process inventory		2,00,000
Less: Closing Work-in-Process inventory		(1,92,000)
Cost of production		6,37,750
Add: Opening Finished Goods inventory		80,000
Less: Closing Finished Goods inventory		(1,15,000)
Cost of Goods Sold		6,02,750
Add: Administration Expenses [See Schedule (iii)]		18,870
Add: Selling and Distribution Expenses [See Schedule (ii)]		92,400
Cost of Sales		7,14,020

(ii) Schedule of Selling and Distribution Expenses

Sales Commission	33,600
Sales Travelling	11,000
Sales Promotion	22,500
Distribution Deptt.—Salaries and Expenses	18,000

Heat, Light and Power	6,500
Depreciation of Buildings	800
	92400

(iii) Schedule of Administration Expenses

Office Salaries and Expenses	8,600
Depreciation of Office Appliances	870
Depreciation of Buildings	800
Heat, Light and Power	6,500
Rates and Taxes	2,100
	18870

5. The following information is available from the financial books of a company having a normal production capacity of 60,000 units for the year ended 31st March, 2020:

- (i) Sales Rs. 10,00,000 (50,000 units).
- (ii) There was no opening and closing stock of finished units.
- (iii) Direct material and direct wages cost were Rs. 5,00,000 and Rs. 2,50,000 respectively.
- (iv) Actual factory expenses were Rs. 1,50,000 of which 60% are fixed.
- (v) Actual administrative expenses related with production activities were Rs. 45,000 which are completely fixed.
- (vi) Actual selling and distribution expenses were Rs. 30,000 of which 40% are fixed.
- (vii) Interest and dividends received Rs. 15,000.

You are required to:

- (a) FIND OUT profit as per financial books for the year ended 31st March, 2020;
- (b) PREPARE the cost sheet and ascertain the profit as per cost accounts for the year ended 31st March, 2020 assuming that the indirect expenses are absorbed on the basis of normal production capacity; and
- (c) PREPARE a statement reconciling profits shown by financial and cost books.

ANSWER 5

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(a)

Profit & Loss Account
(for the year ended 31st March, 2020)

(Rs.)		(Rs.)	
To Direct Material	5,00,000	By Sales (50,000 units)	10,00,000
To Direct Wages	2,50,000	By Interest and dividends	15,000
To Factory expenses	1,50,000		
To Administrative expenses	45,000		
To Selling & Dist. Expenses	30,000		
To Net profit	40000		
	1015000		1015000

(b)

Cost Sheet
(for the year ended 31st March, 2020)

(Rs.)		(Rs.)
Direct material		5,00,000
Direct wages		2,50,000
Prime cost		7,50,000
Factory expenses:		
Variable (40% of Rs. 1,50,000)		60,000
Fixed (Rs. 90,000 × 50,000/60,000)	75,000	1,35,000
Works cost		8,85,000
Administrative expenses: (Rs. 45,000 × 50,000/60,000)		37,500
Cost of production		9,22,500
Selling & distribution expenses:		
Variable (60% of Rs. 30,000)		18,000
Fixed* (Rs. 12,000 × 50,000/60,000)	10,000	28,000
Cost of Sales		9,50,500
Profit (Balancing figure)		49,500
Sales revenue		10,00,000

*It is assumed that the company sells what it generally produces i.e. normal production.

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(c) Statement of Reconciliation
(Reconciling profit shown by Financial and Cost Accounts)

Profit as per Cost Account		49,500
Add : Income from interest and dividends		15,000
		64,500
Less: Factory expenses under-charged in Cost Accounts (Rs. 1,50,000 – Rs. 1,35,000)	15,000	
Administrative expenses under-charged in Cost Accounts (Rs. 45,000 – Rs. 37,500)	7,500	
Selling & distribution expenses under—charged in Cost Accounts (Rs. 30,000 – Rs. 28,000)	2,000	(24,500)
Profit as per Financial Accounts	40,000	

6. M/s. H.K. Piano Company showed a net loss of Rs. 4,16,000 as per their financial accounts for the year ended 31st March, 2020. The cost accounts, however, disclosed a net loss of Rs. 3,28,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of books:

(i) Factory overheads under-recovered	6,000
(ii) Administration overheads over-recovered	4,000
(iii) Depreciation charged in financial accounts	1,20,000
(iv) Depreciation recovered in costs	1,30,000
(v) Interest on investment not included in costs	20,000
(vi) Income-tax provided	1,20,000
(vii) Transfer fees (credit in financial books)	2,000
(viii) Stores adjustment (credit in financial books)	2,000

PREPARE a Memorandum reconciliation account.

ANSWER 6
Memorandum Reconciliation Account

(Rs.)		(Rs.)	
To Net loss as per costing books	3,28,000	By Administration overhead-over-recovered in costs	4,000
To Factory overheads under-recovered in costs	6,000	By Depreciation overcharged in costs	10,000
To Income-tax not provided in costs	1,20,000	By Interest on investments not included in costs	20,000
		By Transfer fees in financial books	2,000
		By Stores adjustment	2,000
		By Net loss as per financial books	4,16,000
	4,54,000		4,54,000

CHAPTER 8 UNIT & BATCH COSTING

ILLUSTRATION 1

The following data relate to the manufacture of a standard product during the 4-week ended 28th February 2020:

Raw Materials Consumed	Rs. 4,00,000
Direct Wages	Rs. 2,40,000
Machine Hours Worked	3,200 hours
Machine Hour Rate	Rs. 40
Office Overheads	10% of works cost
Selling Overheads	Rs. 20 per unit
Units produced and sold	10,000 at Rs. 120 each

You are required to FIND OUT the cost per unit and profit for the 4-week ended 28th February 2020.

SOLUTION

Statement of Cost per Unit
units

No. of units produced: 10,000

Particulars	Cost per unit (Rs.)	Amount (Rs.)
Raw Materials Consumed	40.00	4,00,000
Direct Wages	24.00	2,40,000
Prime cost	64.00	6,40,000
Add: Manufacturing Overheads (3,200 hours × Rs. 40)	12.80	1,28,000
Works cost	76.80	7,68,000
Add: Office Overheads (10% of Works Cost)	7.68	76,800
Cost of goods sold	84.48	8,44,800
Add: Selling Overheads (10,000 units × Rs. 20)	20.00	2,00,000
Cost of sales / Total cost	104.48	10,44,800
Add: Profit (Bal Figure)	15.52	1,55,200
Sales	120.00	12,00,000

ILLUSTRATION 2

Atharva Pharmacare Limited produced a uniform type of product and has a manufacturing capacity of 3,000 units per week of 48 hours. From the records of the company, the following data are available relating to output and cost of 3 consecutive weeks

Week Number	Units Manufactured	Direct Material (Rs.)	Direct Wages (Rs.)	Factory Overheads (Rs.)
1	1,200	9,000	3,600	31,000
2	1,600	12,000	4,800	33,000
3	1,800	13,500	5,400	34,000

Assuming that the company charges a profit of 20% on selling price, **FIND OUT** the selling price per unit when the weekly output is 2,000 units

SOLUTION

Statement of Cost and Selling price for 2,000 units of output

Particulars	Cost per unit (Rs.)	Total Cost (Rs.)
Direct Materials	7.50	15,000
Direct Labour	3.00	6,000
Prime cost	10.50	21,000
Add: Factory Overheads (Refer working note-2)	17.50	35,000
Total cost	28.00	56,000
Add: Profit (20% of Sales is equivalent to 25% of Cost)	7.00	14,000
Sales	35.00	70,000

Working Notes:

(1) Direct Material and Direct Labour cost is varying directly in proportion to units produced and shall remain same per unit of output. Thus, direct material cost is equal to Rs. $9000 \div 1200$ units = Rs. 7.50 per unit and labour cost is equal to Rs. $3600 \div 1200$ units = Rs. 3 per unit.

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(2) Calculation of Factory Overheads- An observation of cost related to different output levels for factory overheads shall reveal 2 things

a. Total cost increases from Rs.31,000 to Rs.34,000 along with increase in output from 1,200 units to 1,800 units but cost per unit is not constant. Thus it is not a variable cost. Cost per unit is reducing along with increase in output from Rs. 25.83 (Rs. 31,000 ÷ 1,200 units) to Rs. 18.89 (Rs.34,000 ÷ 1,800 units)

b. Since the cost is varying with the output, it is also not a fixed cost. Hence, we can see that the cost is a semi- variable cost and has to be calculated for 2,000 units by analysing its fixed and variable components

Week Number	Units Manufactured	Factory Overheads
1	1,200	31,000
2	1,600	33,000
Difference	400	2,000

Therefore, Variable Cost per unit = Change in Factory Overheads ÷ Change in output

$$= \text{Rs.}2,000 \div 400$$

$$= \text{Rs.}5 \text{ Now total factory overheads for week 2}$$

$$= \text{Rs.}33,000 \text{ Out of this, Variable Overheads}$$

$$= 1,600 \text{ units} \times \text{Rs.}5 = \text{Rs. } 8,000$$

$$\text{Thus, fixed component} = \text{Rs. } 33,000 - \text{Rs. } 8,000 = \text{Rs. } 25,000$$

$$\text{Therefore, Variable Cost for 2,000 units} = 2,000 \text{ units} \times \text{Rs.}5 = \text{Rs. } 10,000$$

$$\text{Fixed Cost will not change and hence will be} = \text{Rs.}25,000$$

Therefore,

$$\text{Total Factory Cost} = \text{Variable Overheads} + \text{Fixed Overheads for 2,000 units} = \text{Rs.}10,000 + \text{Rs.}25,000 = \text{Rs. } 35,000$$

ILLUSTRATION 3

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake at most 50 units of any item at a time. A customer has given an order for 600 muffins. To process a batch of 50 muffins, the following cost would be incurred:

Direct materials- Rs. 500

Direct wages- Rs. 50

Oven set- up cost Rs. 150

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads. AC requires a profit margin of 25% of sales value.

DETERMINE the selling price for 600 muffins

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SOLUTION**Statement of cost per batch and per order**

No. of batch = 600 units ÷ 50 units = 12 batches

Particulars	Cost per batch (Rs.)	Total Cost (Rs.)
Direct Material Cost	500.00	6,000
Direct Wages	50.00	600
Oven set-up cost	150.00	1,800
Add: Production Overheads (20% of Direct wages)	10.00	120
Total Production cost	710.00	8,520
Add: S&D and Administration overheads (10% of Total production cost)	71.00	852
Total Cost	781.00	9,372
Add: Profit (1/3rd of total cost)	260.33	3,124
Selling price	1,041.33	12,496
Selling Price per unit = 1041.33 ÷ 50 = Rs. 20.83		

ILLUSTRATION 4

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate equal to per labour hour. The selling price contracted for is Rs. 8 per piece. From the following data **CALCULATE** the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

Month	Batch Output	Material cost (Rs.)	Direct wages (Rs.)	Direct labour hours
January	210	650	120	240
February	200	640	140	280
March	220	680	150	280
April	180	630	140	270
May	200	700	150	300
June	220	720	160	320

The other details are:

Month	Chargeable expenses (Rs.)	Direct labour hours
January	12,000	4,800

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February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

SOLUTION

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	210	200	220	180	200	220	1,230
Sale value (Rs.)	1,680	1,600	1,760	1,440	1,600	1,760	9,840
Material cost (Rs.)	650	640	680	630	700	720	4,020
Direct wages (Rs.)	120	140	150	140	150	160	860
Chargeable expenses* (Rs.)	600	672	672	621	780	800	4,145
Total cost (Rs.)	1,370	1,452	1,502	1,391	1,630	1,680	9,025
Profit per batch (Rs.)	310	148	258	49	(30)	80	815
Total cost per unit (Rs.)	6.52	7.26	6.83	7.73	8.15	7.64	7.34
Profit per unit (Rs.)	1.48	0.74	1.17	0.27	(0.15)	0.36	0.66

Overall position of the order for 1,200 units

Sales value of 1,200 units @ Rs. 8 per unit	Rs. 9,600
Total cost of 1,200 units @ Rs. 7.34 per unit	Rs. 8,808
Profit	Rs. 792

*Chargeable expenses × Direct labour hours for batch / Direct labour for the month

ILLUSTRATION 5

Monthly demand for a product

500 units

Setting-up cost per batch

Rs. 60

Cost of manufacturing per unit

Rs. 20

Rate of interest

10% p.a.

DETERMINE economic batch quantity.

SOLUTION

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 500 \times 12 \times 60}{0.1 \times 20}} = 600 \text{ units.}$$

ILLUSTRATION 6

M/s. KBC Bearings Ltd. is committed to supply 48,000 bearings per annum to M/s. KMR Fans on a steady daily basis. It is estimated that it costs Rs. 1 as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 3,200

- (i) DETERMINE the optimum run size of bearing manufacture?
- (ii) STATE what would be the interval between two consecutive optimum runs?
- (iii) FIND OUT the minimum inventory cost?

SOLUTION

(i) Optimum batch size or Economic Batch Quantity (EBQ):

$$\text{EBQ} = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48,000 \times 3,200}{12}} = 5,060 \text{ units.}$$

(ii) Number of Optimum runs = $48,000 \div 5,060 = 9.49$ or 10 run
 Interval between 2 runs (in days) = $365 \text{ days} \div 10 = 36.5 \text{ days}$

(iii) Minimum Inventory Cost = Average Inventory \times Inventory Carrying Cost per unit per annum

Average Inventory = $5,060 \text{ units} \div 2 = 2,530 \text{ units}$

Carrying Cost per unit per annum = $\text{Rs.}1 \times 12 \text{ months} = \text{Rs.} 12$

Minimum Inventory Holding Costs = $2,530 \text{ units} \times \text{Rs.} 12 = \text{Rs.} 30,360$

ILLUSTRATION 7

A Company has an annual demand from a single customer for 50,000 litres of a paint product. The total demand can be made up of a range of colour to be produced in a continuous production run after which a set-up of the machinery will be required to accommodate the colour change. The total output of each colour will be stored and then delivered to the customer as single load immediately before production of the next colour commences.

The Set up costs are Rs. 100 per set up. The Service is supplied by an outside company as required.

The Holding costs are incurred on rented storage space which costs Rs. 50 per sq. meter per annum. Each square meter can hold 250 Litres suitably stacked.

You are required to:

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(i) CALCULATE the total cost per year where batches may range from 4,000 to 10,000 litres in multiples of 1,000 litres and hence choose the production batch size which will minimize the cost.

(ii) Use the economic batch size formula to CALCULATE the batch size which will minimise total cost.

SOLUTION

(i)

Production Batch Size (Lt.)	Set-up costs per annum (Rs.)	Holding Costs per annum (Rs.)	Total Costs per annum (Rs.)
4,000	1,250	400	1,650
5,000	1,000	500	1,500
6,000	833	600	1,433
7,000	714	700	1,414
8,000	625	800	1,425
9,000	556	900	1,456
10,000	500	1000	1,500

As the total cost is minimum at 7,000 ltr. i.e. Rs. 1,414, thus economic production lot would be 7,000 Litres

(ii) Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the product = 50,000 Litres

S = Setting up cost per batch = ₹100 per set-up

C = Carrying cost per unit of production

= ₹ 50 / 250 litres = 0.20 per litre per annum

$$= \sqrt{\frac{2 \times 50,000 \times 100}{0.2 \times 1}} = 7,071 \text{ Litres}$$

Working Note:

1. For Production batch size of 7,000 litres

Number of set ups per year = 50,000 ÷ 7,000 = 7.14 or 8 set-ups

Hence, annual set up cost per year = 8 × Rs.100 = Rs.800

Average Quantity = 7,000 ÷ 2 = 3,500 litres

Holding Costs = 3,500 ltr. ÷ 250 × 50 = Rs. 700

2. It can be seen that EBQ determined with mathematical formula (7,071 litres) slightly varies from the one determined by trial and error method (7,000 Litres)

MCQs based Questions

1. Different businesses in order to determine cost of their product or service offering follow:

- (a) Different methods of Costing
- (b) Uniform Costing
- (c) Different techniques of costing
- (d) None of the above

ANSWER 1-A

2. In order to determine cost of the product or service, following are used:

- (a) Techniques of costing like Marginal, Standard etc.
- (b) Methods of Costing
- (c) Comparatives
- (d) All of the above

ANSWER 2-B

3. Unit Costing is applicable where:

- (a) Product produced are unique and no 2 products are same
- (b) Dissimilar articles are produced as per customer specification
- (c) homogeneous articles are produced on large scale
- (d) Products made require different raw materials

ANSWER 3-C

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4. In case product produced or jobs undertaken are of diverse nature, the system of costing to be used should be:

- (a) Process costing
- (b) Operating costing
- (c) Job costing
- (d) None of the above

ANSWER 4-C

5. Job Costing is:

- (a) Applicable to all industries regardless of the products or services provided
- (b) Technique of costing
- (c) Suitable where similar products are produced on mass scale
- (d) Method of costing used for non- standard and non- repetitive products.

ANSWER 5-D

6. The production planning department prepares a list of materials and stores required for the completion of a specific job order, this list is known as:

- (a) Bin card
- (b) Bill of material
- (c) Material requisition slip
- (d) None of the above

ANSWER 6-B

7. Batch costing is a type of:

- (a) Process costing
- (b) Job Costing

(c) Differential costing

(d) Direct costing

ANSWER 7-B

8. Batch costing is similar to that under job costing except with the difference that a:

(a) Job becomes a cost unit.

(b) Batch becomes the cost unit instead of a job

(c) Process becomes a cost unit

(d) None of the above

ANSWER 8-B

9. The main points of distinction between job and contract costing includes:

(a) Length of time to complete.

(b) Big jobs

(c) Activities to be done outside the factory area

(d) All of the above

ANSWER 9-D

10. Economic batch quantity is that size of the batch of production where:

(a) Average cost is minimum

(b) Set-up cost of machine is minimum

(c) Carrying cost is minimum

(d) Both (b) and (c)

ANSWER 10-D

Theoretical Questions

1. DESCRIBE Unit Costing and Batch Costing giving example of industries where these are used?

ANSWER 1

Unit costing is that method of costing where the output produced is identical and each unit of output requires identical cost. Unit costing is synonymously known as single or output costing, but these are sub-division of unit costing method. This method of costing is followed by industries which produce single output or few variants of a single output. Under this method costs, are collected and analysed element wise and then total cost per unit is ascertained by dividing the total cost with the number of units produced.

Batch Costing is a type of specific order costing where articles are manufactured in predetermined lots, known as batch. Under this costing method, the cost object for cost determination is a batch for production rather output as seen in unit costing method. A batch consists of certain number of units which are processed simultaneously to be for manufacturing operation. Under this method of manufacturing, the inputs are accumulated in the assembly line till it reaches minimum batch size. Soon after a batch size is reached, all inputs in a batch is processed for further operations.

2. DISTINGUISH between Job Costing & Batch Costing?

ANSWER 2

S.NO	Job Costing	Batch Costing
1	Method of costing used for non- standard and non-repetitive products produced as per customer specifications and against specific orders	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality

3. In Batch Costing, STATE how is Economic Batch Quantity determined?

ANSWER 3

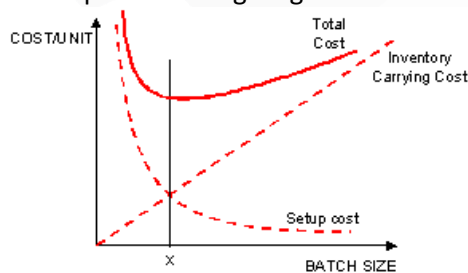
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The economic batch size or Economic Batch Quantity may be determined by calculating the total cost for a series of possible batch sizes and checking which batch size gives the minimum cost. Alternatively, a formula can be derived which is similar to determination of Economic Order Quantity (EOQ). The objective here being to determine the production lot (Batch size) that optimizes on both set up and inventory holding costs formula.

4. Z Ltd. produces product ZZ in batches, management of the Z Ltd. wants to know the number of batches of product ZZ to be produced where the cost incurred on batch setup and carrying cost of production is at optimum level. How will they DETERMINE the optimum batch number.

ANSWER

As the product is produced in batches or lots, the lot size chosen will be critical in achieving least cost of operation. Primarily, the total production cost under batch production comprises of two main costs, namely, 1. Machine Set Up Costs and 2. Inventory holding costs. If the size is higher, the set up cost may decline due to lesser number of set ups required; but units in inventory will go up leading to higher holding costs. If the lot size is lower, lower inventory holding costs are accomplished but only with higher set up costs. **Economic batch quantity is the size of a batch where total cost of set-up and holding costs are at minimum.** This relationship is explained with the help of following diagram



As can be seen in the above diagram, costs are shown on the Y axis and Batch size or batch quantity is shown on the X axis. With the higher batch size, holding cost shows a tendency to increase whereas set-up costs show a declining trend. The point where both the cost lines intersect each other represents the lowest cost combination. The economic batch size or Economic Batch Quantity may be determined by calculating the total cost for a series of possible batch sizes and checking which batch size gives the minimum cost. Alternatively, a formula can be derived which is similar to determination of Economic Order Quantity (EOQ). The objective here being to determine the production lot (Batch size) that optimizes on both set up and inventory holding costs formula. The mathematical formula usually used for its determination is as follows:

$$EBQ = \sqrt{2DS / C}$$

Where, D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production

Practical Questions

1. Wonder Ltd. has a capacity of 120,000 units per annum as its optimum capacity. The production costs are as under:

Direct Material – Rs. 90 per unit

Direct Labour- Rs. 60 per unit

Overheads:

Fixed: Rs. 30,00,000 per annum

Variable: Rs. 100 per unit

Semi Variable: Rs. 20,00,000 per annum up to 50% capacity and an extra amount of Rs. 4,00,000 for every 25% increase in capacity or part thereof

The production is made to order and not for stocks.

If the production programme of the factory is as indicated below and the management desires a profit of Rs.20,00,000 for the year DETERMINE the average selling price at which each unit should be quoted.

First 3 months: 50% capacity

Remaining 9 months: 80% capacity

Ignore Administration, Selling and Distribution overheads.

ANSWER 1

Statement of Cost and Total Sales Amount (Rs.)

Particulars	First 3 months	Next 9 months	Total
Capacity Utilisation (No of units)	120,000x3/12x50% =15,000	120,000x9/12x50 %=72,000	87,000
Direct Material	13,50,000	64,80,000	78,30,000
Direct Labour	9,00,000	43,20,000	52,20,000
Add: Overheads:			
- Fixed (1:3)	7,50,000	22,50,000	30,00,000
- Variable	15,00,000	72,00,000	87,00,000

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Semi Variable	5,00,000 (For first 3 months at the rate of Rs. 20,00,000)	21,00,000 (at the rate of Rs. 28,00,000 for 9 months)	26,00,000
Total cost	50,00,000	2,23,50,000	2,73,50,000
Add: Profit			20,00,000
Sales			2,93,50,000

Average Selling Price = Rs.2,93,50,000 ÷ 87,000 units = Rs. 337.356

2. Rio Limited undertakes to supply 1000 units of a component per month for the months of January, February and March 2020. Every month a batch order is opened against which materials and labour cost are booked at actual. Overheads are levied at a rate per labour hour. The selling price is contracted at Rs. 15 per unit. From the following data, CALCULATE the profit per unit of each batch order and the overall position of the order for the 3,000 units.

Month	Batch Output (Numbers)	Material Cost (Rs.)	Labour Cost (Rs.)
January 2020	1,250	6,250	2,500
February 2020	1,500	9,000	3,000
March 2020	1,000	5,000	2,000

Labour is paid at the rate of Rs. 2 per hour. The other details are:

Month	Overheads (Rs.)	Total Labour Hours
January 2020	12,000	4,000
February 2020	9,000	4,500
March 2020	15,000	5,000

ANSWER 2
Statement of Cost and Profit per unit of each batch

	Jan. 2020	Feb. 2020	March. 2020	Total
a) Batch Output (Nos.)	1,250	1,500	1,000	3,750
b) Sales Value (@ Rs. 15 per unit)	(Rs.) 18,750	(Rs.) 22,500	(Rs.) 15,000	(Rs.) 56,250
Cost				
Material	6,250	9,000	5,000	20,250
Wages	2,500	3,000	2,000	7,500
Overheads	3,750	3,000	3,000	9,750
c) Total	12,500	15,000	10,000	37,500

d) Profit per batch (b) – (c)	6,250	7,500	5,000	18,750
e) Cost per unit (c) ÷ (a)	10	10	10	
f) Profit per unit (d) ÷ (a)	5	5	5	

Overall Position of the Order for 3,000 Units

Sales value (3,000 units × Rs. 15)	Rs.45,000
Less: Total cost (3,000 units × Rs. 10)	30,000
Profit	15,000

	Jan. 2020	Feb. 2020	March 2020
i. Labour hours:			
= $\frac{\text{Labour cost}}{\text{Labour rates per hour}}$	$\frac{₹2,500}{2} = 1,250$	$\frac{₹3,000}{2} = 1,500$	$\frac{₹2,000}{2} = 1,000$
ii. Overhead per hour:			
= $\frac{\text{Total Overheads}}{\text{Total labour hour}}$	$\frac{₹12,000}{4,000} = ₹ 3$	$\frac{₹9,000}{4,500} = ₹ 2$	$\frac{₹15,000}{5,000} = ₹ 3$
iii. Overhead for batch (i) × (ii)	₹ 3,750	₹ 3,000	₹ 3,000

3. X Ltd. is committed to supply 24,000 bearings per annum to Y Ltd. on steady basis. It is estimated that it costs 10 paise as inventory holding cost per bearing per month and that the set-up cost per run of bearing manufacture is Rs. 324.

(a) COMPUTE what would be the optimum run size for bearing manufacture?

(b) Assuming that the company has a policy of manufacturing 6,000 bearings per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (a) above?

(c) CALCULATE the holding cost at optimum inventory level?

ANSWER 3

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(a) Optimum production run size (Q) = $\sqrt{\frac{2DS}{C}}$

where,

D = No. of units to be produced within one year.

S = Set-up cost per production run

C = Carrying cost per unit per annum.

$$= \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 24,000 \times ₹324}{0.10 \times 12}} = 3,600 \text{ bearings.}$$

- (b) Total Cost (of maintaining the inventories) when production run size (Q) are 3,600 and 6,000 bearings respectively

Total cost = Total set-up cost + Total carrying cost.

	When run size is 3,600 bearings	When run size is 6,000 bearings
Total set up cost	= 3,600 / 24,000 × Rs. 324 = Rs. 2,160 Or, No. of setups = 6.67 (7 setups) = 7 × 324 = Rs. 2,268	= 24000/6000 X 324 = 1296
Total Carrying cost	$\frac{1}{2} \times 3,600 \times 0.10P \times 12$ = Rs. 2,160	$\frac{1}{2} \times 6,000 \times 0.10P \times 12$ = Rs. 3,600
Total Cost	Rs. 4,320/ Rs. 4,428	Rs. 4,896

Rs. 576/ Rs 468 is the excess cost borne by the firm due to run size not being economic batch quantity.

(c) Inventory holding cost at EBQ = $\frac{1}{2} Q \times C$

(when Q = 3,600 bearings) = $\frac{1}{2} \times 3,600 \text{ bearings} \times 0.10P \times 12$

= Rs. 2,160

4. A customer has been ordering 90,000 special design metal columns at the rate of 18,000 columns per order during the past years. The production cost comprises Rs.2,120 for material, Rs.60 for labour and Rs.20 for fixed overheads. It costs Rs.1,500 to set up for one run of 18,000 column and inventory carrying cost is 5%.

(i) FIND the most economic production run.

(ii) CALCULATE the extra cost that company incur due to processing of 18,000 columns in a batch.

ANSWER 4

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(i) Total Cost of production = Rs. 2,120 + 60 + 20 = Rs. 2,200

Calculation of Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2 \times 90,000 \times ₹1,500}{5\% \text{ of } ₹2,200}} = \sqrt{\frac{27,00,00,000}{₹110}} = 1,567 \text{ columns.}$$

(ii) Calculation of Extra Cost due to processing of 18,000 columns in a batch

	When run size is 1,567 columns	When run size is 18,000 columns
Total set up cost	No. of setups = 90,000/1567 = 57.43(58 setups) = 90,000 / 1,567 X Rs. 1,500 = Rs. 87,000	= 90000/18000 X '1500 = '7500
Total Carrying cost	$\frac{1}{2} \times 1,567 \times \text{Rs. } 110$ = Rs. 86,185	$\frac{1}{2} \times 18,000 \times \text{Rs. } 110 =$ Rs. 9,90,000
Total Cost	Rs. 1,73,185	Rs. 9,97,500

Thus, extra cost = Rs. 9,97,500 – Rs. 1,73,185 = Rs. 8,24,315

CHAPTER-9 JOB AND CONTRACT COSTING

ILLUSTRATION 1:

The manufacturing cost of a work order is Rs. 1,00,000; 8% of the production against that order spoiled and the rejection is estimated to have a realisable value of Rs. 2,000 only. The normal rate of spoilage is 2%. RECORD this in the costing journal.

SOLUTION

Actual loss due to spoilage = 8% of Rs. 1,00,000 = Rs.8,000 and Normal loss = 2% of Rs. 1,00,000 = Rs.2,000, therefore abnormal loss = Rs.6,000.

The rejection has a realisable value of Rs. 2,000, which is to be apportioned between normal loss and abnormal loss in the ratio of 2 : 6.

The accounting entries necessary for recording the above facts would be:

		Rs.)	(Rs.)
Material Control Account	Dr.	2,000	
Overhead Control Account	Dr.	1,500	
Costing Profit and Loss Control Account	Dr.	4,500	
To Work-in-Progress Control Account			8,000

In the case of defectives being inherent in the manufacturing process, the rectification cost may be charged to the specific jobs in which they have arisen. In case defectives cannot be identified with jobs, the cost of rectification may be treated as factory overheads. Abnormal defectives should be written off to the Costing Profit and Loss Account.

ILLUSTRATION 2

A shop floor supervisor of a small factory presented the following cost for Job No. 303, to determine the selling price.

	Per unit (Rs.)
Materials	70
Direct wages 18 hours @ Rs. 2.50 (Deptt. X 8 hours; Deptt. Y 6 hours; Deptt. Z 4 hours)	45
Chargeable expenses	5
	120
Add : 33-1/3 % for expenses cost	40
	160

**Analysis of the Profit/Loss Account
(for the year 2020)**

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	(Rs.)		(Rs.)
Materials used	150000	Sales less returns	250000
Direct wages:			
Deptt. X 10000			
Deptt. Y 12000			
Deptt. Z 8000	30000		
Special stores items	4000		
Overheads:			
Deptt. X 5000			
Deptt. Y 9000			
Deptt. Z 2000	16000		
Works cost	200000		
Gross profit c/d	50000		
	250000		250000
Selling expenses	20000	Gross profit b/d	50000
Net profit	30000		
	50000		50000

It is also noted that average hourly rates for the three Departments X, Y and Z are similar.

You are required to:

- (i) PREPARE a job cost sheet.
- (ii) CALCULATE the entire revised cost using 2020 actual figures as basis.
- (iii) Add 20% to total cost to DETERMINE selling price.

SOLUTION
Job Cost Sheet

Customer Details ———

Job

No. _____

Date of commencement ———

Date of completion

Particulars

Amount

(Rs.)

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Direct materials		70
Direct wages:		
Deptt. X ₹ 2.50 × 8 hrs. = ₹ 20.00		
Deptt. Y ₹ 2.50 × 6 hrs. = ₹ 15.00		
Deptt. Z ₹ 2.50 × 4 hrs. = ₹ 10.00		45
Chargeable expenses		<u>5</u>
Prime cost		120
Overheads:		
Deptt. X = $\frac{₹5,000}{₹10,000} \times 100 = 50\%$ of ₹ 20 = ₹ 10.00		
Deptt. Y = $\frac{₹9,000}{₹12,000} \times 100 = 75\%$ of ₹ 15 = ₹ 11.25		
Deptt. Z = $\frac{₹2,000}{₹8,000} \times 100 = 25\%$ of ₹ 10 = ₹ 2.50		<u>23.75</u>
Works cost		143.75
Selling expenses = $\frac{₹20,000}{₹2,00,000} \times 100 = 10\%$ of work cost		<u>14.38</u>
Total cost		158.13
Profit (20% of total cost)		<u>31.63</u>
Selling price		189.76

ILLUSTRATION 3:

COMPUTE estimated profit on a contract (which has been 90% complete) from the following particulars

Total expenditure to date	22,50,000
Estimated further expenditure to complete the contract (including contingencies)	2,50,000
Contract price	32,50,000
Work certified	27,50,000
Work uncertified	1,75,000
Cash received	21,25,000

SOLUTION**Calculation of Estimated Profit:**

Total expenditure to date	22,50,000
Estimated further expenditure to complete the contract (including contingencies)	2,50,000
	25,00,000

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Estimated profit on contract (Balancing figure)
7,50,000
Contract price
32,50,000

ILLUSTRATION 4

The following expenses were incurred on a contract:	(Rs.)
Materials purchased	6,00,000
Material drawn from stores	1,00,000
Wages	2,25,000
Plant issued	75,000
Chargeable expenses	75,000
Apportioned indirect expenses	25,000

The contract was for Rs. 20,00,000 and it commenced on January 1, 2020. The value of the work completed and certified upto 30th November, 2020 was Rs. 13,00,000

of which Rs. 10,40,000 was received in cash, the balance being held back as retention money by the contractee. The value of work completed subsequent to the architect's certificate but before 31st December, 2020 was Rs. 60,000. There were also lying on the site materials of the value of Rs. 40,000. It was estimated that the value of plant as at 31st December, 2020 was Rs. 30,000.

You are required to COMPUTE value of work certified, cost of work not certified and notional profit on the contract till the year ended 31st December, 2020.

SOLUTION
Contract Account

Particulars	(Rs.)	Particulars	(Rs.)
To Material purchased	6,00,000	By Work-in-progress:	
" Stores issued	1,00,000	Value of work certified	13,00,000
" Wages	2,25,000	Cost of work uncertified	60,000
" Plant	75,000	" Material unused	40,000
" Chargeable expenses	75,000	" Plant less depreciation	30,000
" Indirect expenses	25,000		
" Costing P&L A/c (Notional profit) (bal. figure)	3,30,000		
14,30,000			14,30,000

ILLUSTRATION 5

A contractor prepares his accounts for the year ending 31st December each year. He commenced a contract on 1st April, 2020.

The following information relates to the contract as on 31st December, 2020:

	(Rs.)
Material issued	2,51,000
Wages	5,65,600
Salary to Foreman	81,300

A machine costing Rs. 2,60,000 has been on the site for 146 days, its working life is estimated at 7 years and its final scrap value at Rs. 15,000.

A supervisor, who is paid Rs. 8,000 p.m. has devoted one-half of his time to this contract.

All other expenses and administration charges amount to Rs. 1,36,500.

Material in hand at site costs Rs. 35,400 on 31st December, 2020.

The contract price is Rs. 20,00,000. On 31st December, 2020 two-third of the contract was completed. The architect issued certificates covering 50% of the contract price, and the contractor had been paid Rs. 7,50,000 on account.

PREPARE Contract A/c and show the notional profit or loss as on 31st December, 2020.

SOLUTION**Contract Account**

Particulars	(Rs.)	Particulars	(Rs.)
To		By Machine (Working note 1)	2,46,000
Material issued	2,51,000	" Material (in hand)	35,400
" Wages	5,65,600	" Works cost (balancing figure)	10,49,000
" Foreman's salary	81,300		
" Machine	2,60,000		
" Supervisor's salary (Rs. 8,000 × 9)/2	36,000		
" Administrative charges	1,36,500		
	13,30,400		13,30,400
" Works cost	10,49,000	" Value of work certified	10,00,000
" Costing P&L A/c (Notional profit)	2,13,250	" Cost of work uncertified (Working Note 2)	2,62,250
	12,62,250		12,62,250

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Working notes:

1. Written down value of Machine:

$$= \frac{\text{₹}2,60,000 - \text{₹}15,000}{7 \text{ years}} \times \frac{146 \text{ days}}{365 \text{ days}} = \text{₹} 14,000$$

Hence the value of machine after the period of 146 days = Rs. 2,60,000 – Rs. 14,000 = Rs. 2,46,000

2. The cost of 2/3rd of the contract is Rs. 10,49,000

∴ Cost of 100% " " " " = Rs. 10,49,000 × 3 / 2 = Rs. 15,73,500

∴ Cost of 50% of the contract which has been certified by the architect is Rs. 7,86,750. Also the cost of 1/3rd of the contract, which has been completed but not certified by the architect is Rs. 2,62,250.

ILLUSTRATION 6

M/s. Bansals Construction Company Ltd. took a contract for Rs. 60,00,000 expected to be completed in three years. The following particulars relating to the contract are available:

	2018 (Rs.)	2019 (Rs.)	2020 (Rs.)
Materials	6,75,000	10,50,000	9,00,000
Wages	6,20,000	9,00,000	7,50,000
Transportation cost	30,000	90,000	75,000
Other expenses	30,000	75,000	24,000
Cumulative work certified	13,50,000	45,00,000	60,00,000
Cumulative work uncertified	15,000	75,000	—

Plant costing Rs. 3,00,000 was bought at the commencement of the contract. Depreciation was to be charged at 25% per annum, on the written down value method. The contractee pays 75% of the value of work certified as and when certified, and makes the final payment on completion of the contract. You are required to PREPARE a contract account for three years and total estimated profit/ loss from the contract.

SOLUTION

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Contract Account (For the year ended 2018)

Particulars	(Rs.)	Particulars	(Rs.)
To Materials	6,75,000	By Plant at site c/d (75% of Rs.3,00,000)	2,25,000
" Wages	6,20,000	" Work-in-progress c/d:	
" Transportation cost	30,000	- Work certified	13,50,000
" Other expenses	30,000	- Work uncertified	15,000
" Plant	3,00,000	" Costing P&L A/c (Loss for the year)	65,000
	16,55,000		16,55,000

Costing Profit & Loss A/c for the year ended 2018

Particulars	(Rs.)	Particulars	(Rs.)
To Contract A/c (Notional Loss on contract)	65,000	By Balance c/d (Loss)	65,000
	65,000		65,000

Contract Account (For the year ended 2019)

Particulars	(Rs.)	Particulars	(Rs.)
To Plant at site b/d	2,25,000	By Plant at site c/d (75% of Rs.2,25,000)	1,68,750
" Work-in-progress b/d:		" Work-in-progress c/d:	
- Work certified 13,50,000		- Work certified 45,00,000	
-Work uncertified 15,000	13,65,000	- Work uncertified 75,000	45,75,000
" Materials	10,50,000		
" Wages	9,00,000		
" Transportation cost	90,000		
" Other expenses	75,000		
" Costing P&L A/c (Notional Profit for the year)	10,38,750		
	47,43,750		47,43,750

Costing Profit & Loss A/c for the year ended 2019

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	65,000	By Contract A/c (Notional profit on contract)	10,38,750
To Balance c/d (Profit)			9,73,750
	10,38,750		10,38,750

Contract Account (For the year ended 2020)

Particulars	(Rs.)	Particulars	(Rs.)
To Plant at site b/d	168750	By Plant at site c/d (75% of Rs.168750)	126563
" Work-in-progress b/d:		" Contractee A/c	600000
- Work certified 4500000			
- Work uncertified 75000	4575000	Costing P&L A/c (Notional Loss for the year)	366187
" Materials	900000		
" Wages	750000		
" Transportation cost	75000		
" Other expenses	24000		
" Costing P&L A/c (Notional Profit for the year)			
	6492750		6492750

Costing Profit & Loss A/c for the year ended 2020

Particulars	(Rs.)	Particulars	(Rs.)
To Contract A/c (Notional loss on contract)	3,66,187	By Balance b/d	9,73,750
To Estimated profit on Contract	6,07,563		
	9,73,750		9,73,750

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ILLUSTRATION 7:

A contractor has entered into a long term contract at an agreed price of Rs. 17,50,000 subject to an escalation clause for materials and wages as spelt out in the contract and corresponding actual are as follows:

	Standard		Actual	
	Qty (tons)	Rate (Rs.)	Qty (tons)	Rate (Rs.)
A	5,000	50.00	5,050	48.00
B	3,500	80.00	3,450	79.00
C	2,500	60.00	2,600	66.00

Wages	Hours	Hourly Rate (Rs.)	Hours	Hourly Rate (Rs.)
	X	2,000	70.00	2,100
Y	2,500	75.00	2,450	75.00
Z	3,000	65.00	3,100	66.00

Reckoning the full actual consumption of material and wages, the company has claimed a final price of Rs. 17,73,600. Give your ANALYSIS of admissible escalation claim and indicate the final price payable.

SOLUTION**Statement showing final claim**

	Standard Qty/Hrs.	Standard Rate (Rs.)	Actual Rate (Rs.)	Variation in Rate (Rs.)	Escalation Claim (Rs.)
	(a)	(b)	(c)	(d) = (c) - (b)	(e) = (a) × (d)
Materials					
A	5,000	50.00	48.00	(-) 2.00	(-) 10,000
B	3,500	80.00	79.00	(-) 1.00	(-) 3,500
C	2,500	60.00	66.00	(+) 6.00	15,000
Materials escalation claim: (A)			1,500		
Wages					
X	2,000	70.00	72.00	(+) 2.00	4,000
Y	2,500	75.00	75.00	-	-
Z	3,000	65.00	66.00	(+) 1.00	3,000
			Wages escalation claim: (B)		7,000
			Final claim: (A + B)		8,500

Statement showing final price payable

Agreed price		Rs. 17,50,000
Agreed escalation:		
Material cost	Rs. 1,500	
Labour cost	Rs. 7,000	Rs. 8,500
Final price payable		Rs. 17,58,500

The claim of Rs. 17,73,600 is based on the total increase in cost. This can be verified as shown below:

Statement showing total increase in cost

	Standard Cost			Actual Cost			Increase/ (Decrease)
	Qty/hrs	Rate (Rs.)	Amount (Rs.)	Qty/hrs	Rate (Rs.)	Amount (Rs.)	Amount (Rs.)
	(a)	(b)	(c) = (a)×(b)	(d)	(e)	(f) = (d) × (e)	g = (f) – (c)
I. Materials							
A	5,000	50.00	2,50,000	5,050	48.00	2,42,400	(7,600)
B	3,500	80.00	2,80,000	3,450	79.00	2,72,550	(7,450)
C	2,500	60.00	1,50,000	2,600	66.00	1,71,600	21,600
			6,80,000			6,86,550	6,550
II. Wages							
X	2,000	70.00	1,40,000	2,100	72.00	1,51,200	
Y	2,500	75.00	1,87,500	2,450	75.00	1,83,750	
Z	3,000	65.00	1,95,000	3,100	66.00	2,04,600	
			5,22,500			5,39,550	17,050
							23,600

Contract price	Rs. 17,50,000
Add: Increase in cost	Rs. 23,600
The final price claimed by the company	Rs. 17,73,600

This claim is not admissible because escalation clause covers only that part of increase in cost, which has been caused by inflation.

Note: It is fundamental principle that the contractee would compensate the contractor for the increase in costs which are caused by factors beyond the control of contractor and not for increase in costs which are caused due to inefficiency or wrong estimation.

MCQs based Questions

1. In case product produced or jobs undertaken are of diverse nature, the system of costing to be used should be:

- (a) Process costing
- (b) Operating costing
- (c) Job costing
- (d) None of the above

ANSWER 1-C

2. The production planning department prepares a list of materials and stores required for the completion of a specific job order, this list is known as:

- (a) Bin card
- (b) Bill of material
- (c) Material requisition slip
- (d) None of the above

ANSWER 2-B

3. Job costing is similar to that under Batch costing except with the difference that a:

- (a) Job becomes a cost unit.
- (b) Batch becomes the cost unit instead of a job
- (c) Process becomes a cost unit
- (d) None of the above.

ANSWER 3-A

4. The main points of distinction between job and contract costing includes:

- (a) Length of time to complete
- (b) Big jobs
- (c) Activities to be done outside the factory area
- (d) All of the above

ANSWER 4-D

5. In job costing which of the following documents are used to record the issue of direct material to a job':

- (a) Goods received note
- (b) Material requisition
- (c) Purchase order
- (d) Purchase requisition

ANSWER 5-B

6. Which of the following would best describe the characteristics of contract costing:

- (i) homogeneous products;
 - (ii) customer driven production;
 - (iii) short period of time between the commencement and completion of the cost unit
- (a) (i) and (ii) only
 - (b) (ii) and (iii) only
 - (c) (i) and (iii) only
 - (d) (ii) only

ANSWER 6-D

7. The most suitable cost system where the products differ in type of materials and work performed is :

- (a) Job Costing
- (b) Process Costing
- (c) Operating Costing
- (d) None of these.

ANSWER 7-A

8. Which of the following statements is true:

- (a) Job cost sheet may be used for estimating profit of jobs.
- (b) Job costing cannot be used in conjunction with marginal costing.
- (c) In cost plus contracts, the contractor runs a risk of incurring a loss.
- (d) None of these.

ANSWER 8-A

9. Which of the following statements is true:

- (a) In job costing method, a cost sheet is prepared for each job.
- (b) A production order is an order received from a customer for particular jobs.
- (c) In contract costing, the contract which is complete up to one fourth of the total contract, one-fourth of the profit should be transferred to Profit & Loss Account.
- (d) In contract costing profit of each contract is computed when the contract is completed.

ANSWER 9-A

10. Which of the following statements is true:

- (a) Job cost sheet may be prepared for facilitating routing and scheduling of the job
- (b) Job costing can be suitably used for concerns producing uniformly any specific product
- (c) Job costing cannot be used in companies using standard costing
- (d) Neither (a) nor (b) nor (c)

ANSWER 10-D

Theoretical Questions

1. DESCRIBE job Costing giving example of industries where it is used?

ANSWER 1

CIMA London defines Job Costing as “**the category of basic costing methods which is applicable where the work consists of separate contracts, jobs or batches, each of which is authorised by specific order or contract.**” According to this method, costs are collected and accumulated according to jobs, contracts, products or work orders.

Each job or unit of production is treated as a separate entity for the purpose of costing. Job costing is carried out for the purpose of ascertaining cost of each job and takes into account the cost of materials, employees and overhead etc. For example, printing; furniture; hardware; ship-building; heavy machinery; interior decoration, repairs and other similar work.

2. DISTINGUISH between Job Costing & Process Costing?

ANSWER 2

Job Costing	Process Costing
(i) A Job is carried out or a product is produced by specific orders.	The process of producing the product has a continuous flow and the product produced is homogeneous.
(ii) Costs are determined for each job.	Costs are compiled on time basis i.e., for production of a given accounting period for each process or department.
(iii) Each job is separate and independent of other jobs.	Products lose their individual identity as they are manufactured in a continuous flow.
(iv) Each job or order has a number and costs are collected against the same job number.	The unit cost of process is an average cost for the period.

(v) Costs are computed when a job is completed. The cost of a job may be determined by adding all costs against the job	Costs are calculated at the end of the cost period. The unit cost of a process may be computed by dividing the total cost for the period by the output of the process during that period.
(vi) As production is not continuous and each job may be different, so more managerial attention is required for effective control.	Process of production is usually standardized and is therefore, quite stable. Hence control here is comparatively easier.

3. WRITE a note on cost-plus-contracts.

ANSWER 3

Cost- plus contract is a contract where **the value of the contract is determined by adding an agreed percentage of profit to the total cost.** These types of contracts are entered into when it is not possible to estimate the contract cost with reasonable accuracy due to unstable condition of factors that affect the cost of material, employees, etc. **Cost plus contracts have the following advantages and disadvantages:** Advantages: (i) The **Contractor is assured of a fixed percentage of profit.**

There is no risk of incurring any loss on the contract. (ii) It is useful specially **when the work to be done is not definitely fixed** at the time of making the estimate. (iii) Contractee can ensure himself about 'the cost of the contract', as he is empowered to examine the books and documents of the contractor to ascertain the veracity of the cost of the contract. Disadvantages - The contractor may not have any inducement to avoid wastages and effect economy in production to reduce cost.

4. WRITE a note on Escalation Clause.

ANSWER 4

Escalation clause in a contract empowers a contractor to revise the price of the contract in case of increase in the prices of inputs due to some macro-economic or other agreed reasons. A contract takes longer period to complete and the factors based on which price negotiation is done at the time of entering into the contract may change till the contract completes. This protect the contractor from adverse financial impacts and empowers the contractor to recover the increased prices. **As per this clause, the contractor increases the contract price if the cost of materials, employees and other expenses increase beyond a certain limit.** Inclusion of such a clause in a contract deed is called an "Escalation Clause".

5. EXPLAIN Retention money in Contract costing

ANSWER 5

Retention Money: In a contract, a contractee generally keeps some amount payable to contractor with himself as security deposit. In a contract, a contractor undertakes to completed a job work on the basis of pre- determined terms and conditions and work

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specifications. To ensure that the work carried out by the contractor is as per the plan and specifications, it is monitored periodically by the contractee.

To have a cushion against any defect or undesirable work, the contractee upholds some money payable to contractor. This security money upheld by the contractee is known as retention money. In some contracts the contractor has to deposit some security money before starting of the contract as a term of contract. This is known as Earnest money.

If any deficiency or defect is noticed in the work, it is to be rectified by the contractor before the release of the retention money. Retention money provides a safeguard against the risk of loss due to faulty workmanship.

Retention Money = Value of work certified – Payment actually made/ cash paid

Practical Questions

1. RST Construction Ltd. commenced a contract on April 1, 2019. The total contract was for Rs. 49,21,875. Actual expenditure for the period April 1, 2019 to March 31, 2020 and estimated expenditure for April 1, 2020 to September 30, 2020 are given below:

	April 1, 2019 to March 31, 2020 (Actual)(Rs.)	April 1, 2020 to Sept. 30, 2020 (Estimated) (Rs.)
Materials issued	7,76,250	12,99,375
Wages: Paid	5,17,500	6,18,750
Prepaid	37,500	-
Outstanding	12,500	5,750
Plant purchased	4,00,000	-
Expenses: Paid	2,25,000	3,75,000
Outstanding	25,000	10,000
Prepaid	15,000	-
Plant returns to store (historical cost)	1,00,000 (on September 30, 2019)	3,00,000 (on September 30, 2020)
Work certified	22,50,000	Full
Work uncertified	25,000	-
Cash received	18,75,000	-
Materials at site	82,500	42,500

The plant is subject to annual depreciation @ 25% on written down value method. The contract is likely to be completed on September 30, 2020.

Required:

PREPARE the Contract A/c for the year ended 31st March, 2020 and determine the estimated profit on the contract.

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ANSWER 1**Contract A/c (1-4-2019 to 31-3-2020)**

Particulars		(Rs.)	Particulars		(Rs.)
To Materials issued		7,76,250	By Plant returned to Store on 30-9-2019		
			1,00,000		
To Wages 5,17,500			Less: Depreciation (1/2)	(12,500)	87,500
Less: Prepaid (37,500)					
Add: Outstanding	12,500	4,92,500	By Plant at site on 31.3.20		
			3,00,000		
To Plant purchased		4,00,000	Less: Depreciation	(75,000)	2,25,000
To Expenses 2,25,000			By Materials at site c/d		82,500
Less: Prepaid (15,000)			By Work-in-progress c/d		
Add: Outstanding	25,000	2,35,000	Work certified		22,50,000
To Notional Profit		766250	Work uncertified		25,000
		2670000			2670000

Computation of Estimated Profit**Contract A/c (1-4-2019 to 30-9-2020)**

Particulars		(Rs.)	Particulars		(Rs.)
To Materials issued (7,76,250 +12,99,375)		20,75,625	By Materials at site		42,500
To Wages (5,17,500 - 37,500 + 12,500 + 6,18,750+37,500 -12,500 + 5,750)		11,42,000	By Plant returned to store on 30.9.2019 (1,00,000 – 12,500)		87,500
To Plant purchased		4,00,000	By Plant returned to store on 30.9.20 (4,00,000 – 1,00,000 – 1,03,125)		1,96,875
To Expenses (2,25,000+25,000 -15,000+ 3,75,000 - 25,000 + 15,000 + 10,000)		6,10,000	By Contractee A/c		49,21,875
To Estimated Profit		1021125			
		5248750			5248750

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Workings:
Calculation of written down value of plant as on 30-9-2020 (Rs.)

Plant purchased on 1-4-2019	4,00,000
Less: Plant returned to store on 30-9-2019	1,00,000
(Depreciation on it Rs. 1,00,000x 25/100x 6/12 = Rs. 12,500)	
	3,00,000
Less: Depreciation on Balance plant (3,00,000 x25/100) ×	75,000
WDV of Plant on 1-4-2020	2,25,000
Less: Depreciation (2,25,000 x25/100x 6/12)	28,125
WDV of plant returned to store on 30-9-2020	1,96,875

2. In a factory following the Job Costing Method, an abstract from the work-in-progress as on 30th September was prepared as under.

Job No.	Materials (₹)	Direct hrs.	Labour (₹)	Factory Overheads applied (₹)
115	1325	400 hrs.	800	640
118	810	250 hrs.	500	400
120	765	300 hrs.	475	380
	2,900		1,775	1,420

Materials used in October were as follows:

Materials Requisition No.	Job No.	Cost (₹)
54	118	300
55	118	425
56	118	515
57	120	665
58	121	910
59	124	720
		3,535

A summary for labour hours deployed during October is as under:

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Job No.	Number of Hours	
	Shop A	Shop B
115	25	25
118	90	30
120	75	10
121	65	--
124	25	10
	275	75
Indirect Labour:		
Waiting of material	20	10
Machine breakdown	10	5
Idle time	5	6
Overtime premium	6	5
	316	101

A shop credit slip was issued in October, that material issued under Requisition No. 54 was returned back to stores as being not suitable. A material transfer note issued in October indicated that material issued under Requisition No. 55 for Job 118 was directed to Job 124.

The hourly rate in shop A per labour hour is ₹ 3 per hour while at shop B, it is ₹ 2 per hour. The factory overhead is applied at the same rate as in September. Job 115, 118 and 120 were completed in October.

You are asked to COMPUTE the factory cost of the completed jobs. It is the practice of the management to put a 10% on the factory cost to cover administration and selling overheads and invoice the job to the customer on a total cost plus 20% basis.

DETERMINE the invoice price of these three jobs?

ANSWER
Factory Cost Statement of Completed Job.

Month	Job No.	Materials	Direct labour	Factory overheads (80% of direct labour cost)	Factory cost
	(₹)	(₹)	(₹)	(₹)	(₹)
September	115	1,325	800	640	2765
October	115	--	125	100	225
Total		1,325	925	740	2,990

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September	118	810	500	400	1,710
October	118	515	330	264	1,109
Total		1,325	830	664	2,819

September	120	765	475	380	1,620
October	120	665	245	196	1,106
Total		1,430	720	576	2,726

Invoice Price of Complete Job

Job No.	115 (₹)	118 (₹)	120 (₹)
Factory cost	2,990.00	2,819.00	2,726.00
Administration and selling overheads @ 10% of factory cost	299.00	281.90	272.60
Total cost	3,289.00	3,100.90	2,998.60
Profit (20% of total cost)	657.80	620.18	599.72
Invoice Price	3,946.80	3,721.08	3,598.32

Assumption: - Indirect labour costs have been included in the factory overhead which has been recovered as 80% of the labour cost.

3. COMPUTE Notional profit and estimated profit on a contract (which has been 90% complete) from the following particulars.

Total expenditure to date 4,50,000

Estimated further expenditure to complete the contract (including contingencies) 25,000

Contract price 6,12,000

Work certified 5,50,800

Work uncertified 34,000

Cash received 4,40,640

ANSWER

Computation of Notional Profit (₹)

Value of work certified 5,50,800

Less: Cost of work certified

(₹ 4,50,000 – ₹ 34,000) 4,16,000

Notional profit 1,34,800

Computation of Estimated Profit (₹)

Contract price 6,12,000

Less: Cost of work to date 4,50,000

Estimated further expenditure to complete the contract 25,000

Estimated total cost 4,75,000

Estimated profit 1,37,000

4. AKP Builders Ltd. commenced a contract on April 1, 2020. The total contract was for ₹ 5,00,000. Actual expenditure for the period April 1, 2020 to March 31, 2021 and estimated expenditure for April 1, 2021 to December 31, 2021 are given below:

Particulars	2020-21 (actual)	2021-22 (9 months) (estimated)
Materials issued	90,000	85,750
Wages: Paid	75,000	87,325
Outstanding at the end	6,250	8,300
Plant	25,000	-
Sundry expenses: Paid	7,250	6,875
Prepaid at the end	625	-
Establishment charges	14625	-

A part of the material was unsuitable and was sold for ₹ 18,125 (cost being ₹15,000) and a part of plant was scrapped and disposed-off for ₹ 2,875. The value of plant at site on 31 March, 2021 was ₹ 7,750 and the value of material at site was ₹ 4,250. Cash received on account to date was ₹ 1,75,000, representing 80% of the work certified. The cost of work uncertified was valued at ₹ 27,375.

The contractor estimated further expenditure that would be incurred in completion of the contract:

- ☑ The contract would be completed by 31st December, 2021.
- ☑ A further sum of ₹ 31,250 would have to be spent on the plant and the residual value of the plant on the completion of the contract would be ₹ 3,750.
- ☑ Establishment charges would cost the same amount per month as in the previous year.
- ☑ ₹ 10,800 would be sufficient to provide for contingencies.

Required:

PREPARE a Contract Account for the year ended 31st March, 2021, and **CALCULATE** estimated total profit on this contract.

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ANSWER**Contract Account (2020-21)**

Particulars	(₹)	Particulars	(₹)
To Materials issued	90,000	By Material sold	18,125
To Wages paid 75,000		By Plant sold	2,875
Add: Outstanding <u>6,250</u>	81,250	By Plant at site c/d	7,750
To Plant	25,000	By Material at site c/d	4,250
To Sundry Expenses 7,250		By Work-in-progress c/d	
Less: Prepaid <u>625</u>	6,625	Work certified 2,18,750 (₹1,75,000 ÷ 80%)	
To Establishment charges	14,625	Work uncertified <u>27,375</u>	2,46,125
To Costing P & L A/c (₹18,125 – ₹15,000)	3,125		
To Notional profit (Profit for the year)	58,500		
	2,79,125		2,79,125

Calculation of Estimated Profit

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		(₹)	(₹)
(1)	Material consumed (90,000 + 3,125 - 18,125)	75,000	
	Add: Further consumption	85,750	1,60,750
(2)	Wages:	81,250	
	Add: Further cost (87,325 - 6,250)	81,075	
	Add: Outstanding	8,300	1,70,625
(3)	Plant used (25,000 - 2,875)	22,125	
	Add: Further plant introduced	31,250	
	Less: Closing balance of plant	(3,750)	49,625
(4)	Establishment charges	14,625	
	Add: Further charges for nine months (14,625 × 9/12)	10,969	25,594
(5)	Sundry expenses	7,250	
	Add: Further expenses	6,875	14,125
(6)	Reserve for contingencies		10,800
	Estimated profit (balancing figure)		68,481
	Contract price		5,00,000

CHAPTER-10 Process & Operation Costing

ILLUSTRATION 1

From the following data, PREPARE process accounts indicating the cost of each process and the total cost. The total units that pass through each process were 240 for the period.

	Process I (Rs.)	Process II (Rs.)	Process III (Rs.)
Materials	1,50,000	50,000	20,000
Labour	80,000	2,00,000	60,000
Other expenses	26,000	72,000	25,000

Indirect expenses amounting to Rs. 85,000 may be apportioned on the basis of wages. There was no opening or closing stock.

SOLUTION

Dr.	Process- I Account	Cr.
-----	---------------------------	-----

Particulars	Per unit (Rs.)	Total (Rs.)	Particulars	Per unit (Rs.)	Total (Rs.)
To Material	625	1,50,000	By Process -II A/c	1,150	2,76,000
" Labour	334	80,000	(Transfer to Process-II)		
" Other expenses	108	26,000			
" Indirect expenses*	83	20,000			
	1,150	2,76,000		1,150	2,76,000

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Dr.		Process- I Account				Cr.
Particulars	Per unit (₹)	Total (₹)	Particulars	Per unit (₹)	Total (₹)	
To Process-I A/c	1,150	2,76,000	By Process-III A/c	2,700	6,48,000	
" Material	208	50,000	(Transfer to Process-III)			
" Labour	834	2,00,000				
" Other expenses	300	72,000				
" Indirect expenses*	208	50,000				
	2,700	6,48,000		2,700	6,48,000	

Dr.		Process- I Account				Cr.
Particulars	Per unit (₹)	Total (₹)	Particulars	Per unit (₹)	Total (₹)	
To Process-II A/c	2,700	6,48,000	By Finished Stock A/c	3,200	7,68,000	
" Material	83	20,000	(Transferred)			
" Labour	250	60,000				
" Other expenses	104	25,000				
" Indirect expenses*	63	15,000				
	3,200	7,68,000		3,200	7,68,000	

* Apportionment of Indirect expenses among Process-I, Process-II and Process-III
 Total Wages to processes (I + II + III) = Rs. 80,000 + Rs. 2,00,000 + Rs. 60,000 = Rs. 3,40,000

Apportionment to:

$$\text{Process- I} = \frac{₹85,000}{₹3,40,000} \times ₹80,000 = ₹20,000;$$

$$\text{Process- II} = \frac{₹85,000}{₹3,40,000} \times ₹2,00,000 = ₹50,000 \text{ and}$$

$$\text{Process- III} = \frac{₹85,000}{₹3,40,000} \times ₹60,000 = ₹15,000$$

ILLUSTRATION 2

A product passes through three processes. The output of each process is treated as the raw material of the next process to which it is transferred and output of the third process is transferred to finished stock.

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	Process-I (Rs.)	Process-II (Rs.)	Process-III (Rs.)
Materials issued	40,000	20,000	10,000
Labour	6,000	4,000	1,000
Manufacturing overhead	10,000	10,000	15,000

10,000 units have been issued to the Process-I and after processing, the output of each process is as under:

Process	Output	Normal Loss
Process-I	9,750 units	2%
Process-II	9,400 units	5%
Process-III	8,000 units	10%

No stock of materials or of work-in-process was left at the end. CALCULATE the cost of the finished articles.

SOLUTION

Dr.	Process- I Account	Cr.
-----	---------------------------	-----

Particulars	Units	Total (Rs.)	Particulars	Units	Total (Rs.)
To Material	10,000	40,000	By Normal Loss A/c (2% of 10,000 units)	200	--
" Labour	--	6,000	" Abnormal Loss A/c (Rs. 5.7142 × 50 units)	50	286
" Manufacturing OH	--	10,000	" Process-II A/c (Rs. 5.7142 × 9,750 units)	9,750	55,714
	10000	56000		10000	56000

Cost per unit of completed units and abnormal loss:

$$\frac{\text{Total Cost}}{\text{Inputs-Normal loss}} = \frac{\text{₹ 56,000}}{10,000\text{units}-200\text{units}} = \text{₹ 5.7142}$$

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Dr.	Process- I Account	Cr.
-----	---------------------------	-----

Particulars	Units	Total (Rs.)	Particulars	Units	Total (Rs.)
To Process-I A/c	9,750	55,714	By Normal Loss A/c (5% of 9,750 units)	488	--
" Material	--	20,000	" Process-III A/c (Rs. 9.6862 × 9,400 units)	9,400	91,051
" Labour	--	4,000			
" Manufacturing OH	--	10,000			
" Abnormal Gain A/c (Rs. 9.6862 × 138 units)	138	1,337			
	9,888	91,051		9,888	91,051

Cost per unit of completed units and abnormal gain:

$$\frac{\text{Total Cost}}{\text{Inputs-Normal loss}} = \frac{\text{₹89,714}}{9,750\text{units}-488\text{units}} = \text{₹ 9.6862}$$

Dr.	Process- I Account	Cr.
-----	---------------------------	-----

Particulars	Units	Total (Rs.)	Particulars	Units	Total (Rs.)
To Process-II A/c	9,400	91,051	By Normal Loss A/c (10% of 9,400 units)	940	--
" Material	--	10,000	" Abnormal Loss A/c (Rs.13.8358 × 460 units)	460	6,364
" Labour	--	1,000	" Finished Stock A/c (Rs.13.8358 × 8,000 units)	8,000	1,10,687
" Manufacturing OH	--	15,000			
	9,400	1,17,051		9,400	1,17,051

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Cost per unit of completed units and abnormal loss:

$$\frac{\text{Total Cost}}{\text{Inputs-Normal loss}} = \frac{\text{₹1,17,051}}{9,400\text{units}-940\text{units}} = \text{₹13.8358}$$

ILLUSTRATION 3

RST Limited processes Product Z through two distinct processes – Process- I and Process- II. On completion, it is transferred to finished stock. From the following information for the year 2019-20, PREPARE Process- I, Process- II and Finished Stock A/c:

Particulars	Process- I	Process- II
Raw materials used	7,500 units	--
Raw materials cost per unit	Rs. 60	--
Transfer to next process/finished stock	7,050 units	6,525 units
Normal loss (on inputs)	5%	10%
Direct wages	Rs. 1,35,750	Rs. 1,29,250
Direct Expenses	60% of Direct wages	65% of Direct wages
Manufacturing overheads	20% of Direct wages	15% of Direct wages
Realisable value of scrap per unit	Rs. 12.50	Rs. 37.50

6,000 units of finished goods were sold at a profit of 15% on cost. Assume that there was no opening or closing stock of work-in-process.

SOLUTION
Process- I A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Raw material used (Rs.60 × 7,500 units)	7,500	4,50,000	By Normal loss (5% of 7,500 units) × Rs.12.5	375	4,688
To Direct wages	--	1,35,750	By Process- II A/c (Rs.96.7947 × 7,050 units)	7,050	6,82,403
To Direct expenses	--	81,450	By Abnormal loss (Rs.96.7947 × 75 units)	75	7,259
To Manufacturing overhead		27150			
	7500	694350		7500	694350

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Cost per unit of completed units and abnormal loss:

$$\frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs units} - \text{Normal loss units}}$$

$$= \frac{\text{₹6,94,350} - \text{₹4,688}}{7,500 \text{ units} - 375 \text{ units}} = \frac{\text{₹6,89,662}}{7,125 \text{ units}} = \text{₹96.7947}$$

Process- II A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process- I A/c	7,050	6,82,403	By Normal loss (10% of 7,050 units) × Rs. 37.5	705	26,438
To Direct wages	--	1,29,250	By Finished Stock A/c (Rs. 140.0496 × 6,525 units)	6,525	9,13,824
To Direct expenses	--	84,013			

To Manufacturing overhead	--	19,387			
To Abnormal gain (Rs. 140.0496 × 180 units)	180	25,209			
	7,230	9,40,262		7,230	9,40,262

Cost per unit of completed units and abnormal loss:

$$\frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs units} - \text{Normal loss units}}$$

$$= \frac{\text{₹9,15,053} - \text{₹26,438}}{7,050 \text{ units} - 705 \text{ units}} = \frac{\text{₹8,88,615}}{6,345 \text{ units}} = \text{₹140.0496}$$

Finished Goods Stock A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process II A/c	6,525	9,13,824	By Cost of Sales (Rs.140.0496 × 6,000 units)	6,000	8,40,298

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			By Balance c/d	525	73526
	6525	913824		6525	913824

Income Statement

Particulars	(Rs.)	Particulars	(Rs.)
To Cost of sales (Rs.140.0496 × 6,000 units)	840298	By Abnormal gain {180 units × (Rs.140.0496 – Rs.37.50)}	18459
To Abnormal loss {75 units × (Rs.96.7947 – Rs.12.50)}	6322	By Sales (840298*115%)	966343
To Net Profit	131812		
	984802		984802

ILLUSTRATION 4

Opening work-in-process 1,000 units (60% complete); Cost Rs. 1,10,000. Units introduced during the period 10,000 units; Cost Rs. 19,30,000. Transferred to next process - 9,000 units.

Closing work-in-process - 800 units (75% complete). Normal loss is estimated at 10% of total input including units in process at the beginning. Scraps realise Rs. 10 per unit. Scraps are 100% complete.

Using FIFO method, COMPUTE equivalent production and cost per equivalent unit. Also evaluate the output.

SOLUTION
Statement of Equivalent Production Units (Under FIFO Method)

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P	1,000	From opening W-I-P	1,000	40	400
Units introduced	10,000	From fresh inputs	8,000	100	8,000
Units completed		(Transferred to next process)	9,000		

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		Normal Loss {10% (1,000 + 10,000 units)}	1,100	--	--
		Closing W-I-P	800	75	600
		Abnormal loss (Balancing figure)	100	100	100
	11,000		11,000		9,100

Computation of cost per equivalent production unit:

Cost of the Process (for the period)	Rs.19,30,000
Less: Scrap value of normal loss (Rs. 10 × 1,100 units)	(Rs.11,000)
Total process cost	Rs. 19,19,000

Cost per equivalent unit = (Rs.1919000/9100 units) = 210.88

Statement of Evaluation

Particulars	Equivalent Units (EU)	Cost per EU (Rs.)	Amount (Rs.)
(i) Opening W-I-P completed during the period	400	210.88	84,352
Add: Cost of W-I-P at beginning	--	--	1,10,000
Complete cost of 1,000 units of opening W-I-P	1,000	194.35	1,94,352
(ii) Completely processed units	8,000	210.88	16,87,040
(iii) Abnormal Loss	100	210.88	21,088
(iv) Closing W-I-P	600	210.88	1,26,528

(The difference in total amount may arise due to rounding off error)

Process Explained:

- (i) Total Units completed and Transferred is 9,000 units. Out of these 9,000 units, 1,000 units has been taken from opening WIP and the rest is from the fresh units introduced.
- (ii) The opening WIP is 60% complete in respect of costs, hence, 40% more work is to be done during the period.
- (iii) Total cost for cost elements for the period (current period only) is accumulated.
- (iv) The realisable value of scrap (i.e. normal loss) is deducted from the total cost as accumulated above.

- (v) Total cost less realisable value is divided by equivalent units to get cost per equivalent unit.
- (vi) The equivalent cost as calculated above is multiplied by the equivalent units of completely processed goods, abnormal loss and closing WIP to get the value.
- (vii) Cost of units completed and transferred is calculated separately for Opening WIP and fresh inputs.

ILLUSTRATION 5

Refer to information provided in Illustration 4 above and solve this by Weighted Average Method:

SOLUTION

Statement of Equivalent Units (Under Weighted Average Method)

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P	1000	From opening W-I-P	9000	100	9100
Units introduced	10000	From fresh inputs			
Units completed		(Transferred to next process)			
		Normal Loss {10% (1,000 + 10,000 units)}	1100	---	---
		Closing W-I-P	800	75	600
		Abnormal loss (Balancing figure)	100	100	100
	11000		11000		9700

Computation of cost per equivalent production unit :

Cost of Opening WIP	110000
Cost of the Process (for the period)	1930000
Less: Scrap value of normal loss (Rs. 1 × 1,100 units)	-11000
Total process cost	2029000

Cost per equivalent unit = (Rs. 2029000 / 9700 units) = Rs. 209.18

Statement of Evaluation

Particulars	Equivalent Units (EU)	Cost per EU (Rs.)	Amount (Rs.)
(i) Units Completed and transferred to next process	9000	209.18	1882620
(iii) Abnormal Loss	100	209.18	20918
(iv) Closing W-I-P	600	209.18	125508

(The difference in total amount may arise due to rounding off error)

Process Explained:

(i) Total Units completed and Transferred is 9,000 units. All the 9,000 units has been considered as equally complete in respected of cost.

(ii) Total cost for cost elements for the period and opening WIP is accumulated.

(iii) The realisable value of scrap (i.e. normal loss) is deducted from the total cost as accumulated above.

(iv) Total cost less realisable value is divided by equivalent units to get cost per equivalent unit.

(v) The equivalent cost as calculated above is multiplied by the equivalent units of completely processed goods, abnormal loss and closing WIP to get the value.

ILLUSTRATION 6

A Ltd. produces product 'AXE' which passes through two processes before it is completed and transferred to finished stock. The following data relate to October 2020:

	Process- I (Rs.)	Process- II (Rs.)	Finished Stock (Rs.)
Opening stock	7,500	9,000	22,500
Direct materials	15,000	15,750	--
Direct wages	11,200	11,250	--
Factory overheads	10,500	4,500	--
Closing stock	3,700	4,500	11,250
Inter-process profit included in opening stock	--	1,500	8,250

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Output of Process- I is transferred to Process- II at 25% profit on the transfer price.
 Output of Process- II is transferred to finished stock at 20% profit on the transfer price.
 Stock in processes is valued at prime cost. Finished stock is valued at the price at which it is received from process II. Sales during the period are Rs. 1,40,000.

PREPARE Process cost accounts and finished goods account showing the profit element at each stage.

SOLUTION
Process- I Account

Particulars	Total (Rs.)	Cost (Rs.)	Profit (Rs.)	Particulars	Total (Rs.)	Cost (Rs.)	Profit (Rs.)
Opening stock	7,500	7,500	--	Process- II A/c*	54,000	40,500	13,500
Direct materials	15,000	15,000	--	Closing Stock	3,700	3,700	--
Direct wages	11,200	11,200	--				
Prime Cost	33,700	33,700					
Overheads	10,500	10,500	--				
Total Cost	44,200	44,200					
Profit**	13,500	--	13,500				
	57,700	44,200	13,500		57,700	44,200	13,500

$$\text{*Transfer price} = \frac{\text{Total cost} - \text{Closing stock}}{75\%} = \frac{44,200 - 3,700}{75\%} = ₹54,000$$

$$\text{**Profit on transfer} = 54,000 \times 25\% = ₹13,500$$

Process- II Account

Particulars	Total (Rs.)	Cost (Rs.)	Profit (Rs.)	Particulars	Total (Rs.)	Cost (Rs.)	Profit (Rs.)
Opening stock	9000	7500	1500	Finished Stock A/c**	112500	75750	36750
Transferred from Process- I	54000	40500	13500	Closing Stock	4500	3750	750

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Direct materials	15750	15750	---				
Direct wages	11250	11250	---				
Prime Cost	90000	75000	15000				
Overheads	4500	4500	---				
Total Cost	94500	79500	15000				
Profit**	22500	---	22500				
	117000	79500	37500		117000	79500	37500

$$* \text{ Cost of Closing Stock} = \frac{\text{₹75,000}}{\text{₹90,000}} \times \text{₹4,500} = \text{₹3,750}$$

$$** \text{ Transfer price} = \frac{\text{Total cost} - \text{Closing stock}}{80\%} = \frac{94,500 - 4,500}{80\%} = \text{₹1,12,500}$$

$$*** \text{ Profit on transfer} = 1,12,500 \times 20\% = \text{₹22,500}$$

Finished Stock Account

Particulars	Total (Rs.)	Cost (Rs.)	Profit (Rs.)	Particulars	Total (Rs.)	Cost (Rs.)	Profit (Rs.)
Opening stock	22500	14250	8250	Costing P&L A/c	140000	82425	57575
Process- II	112500	75750	36750	Closing Stock *	11250	7575	3675
Profit	16250	---	16250				
	151250	90000	61250		151250	90000	61250

$$* \text{ Cost of Closing Stock} = \frac{\text{Cost of transfer from Process-II}}{\text{Transfer price from Process-II}} \times \text{Value of closing stock}$$

(As per instruction given in the question)

$$= \frac{\text{₹75,750}}{\text{₹1,12,500}} \times \text{₹11,250} = \text{₹7,575}$$

MCQs based Questions

1. The type of process loss that should not be allowed to affect the cost of good units is:

(a) Abnormal loss

(b) Normal loss

(c) Seasonal loss

(d) Standard loss

ANSWER 1-A

2. 200 units were introduced in a process in which 20 units is the normal loss. If the actual output is 150 units, then there is:

(a) No abnormal loss

(b) No abnormal gain

(c) Abnormal loss of 30 units

(d) Abnormal gain of 30 units

ANSWER 2-C

3. 100 units are processed at a total cost of Rs. 160, normal loss is 10%, & scrap units are sold @ Rs. 0.25 each. If the output is 80 units, then the value of abnormal loss is:

(a) Rs. 2.50

(b) Rs. 16

(c) Rs. 17.50

(d) Rs. 17.75

ANSWER 3-C

4. When average method is used in process costing, the opening inventory costs are:

(a) Subtracted from the new costs

(b) Added to the new costs

(c) Kept separate from the costs of the new period

(d) Averaged with other costs to arrive at total cost

ANSWER 4-B

5. Spoilage that occurs under inefficient operating conditions and is ordinarily controllable is called:

- (a) Normal spoilage
- (b) Abnormal spoilage
- (c) Normal defectives
- (d) None of the above

ANSWER 5-B

6. An abnormal gain in a process occurs in which of the following situations?

- (a) When the actual output is greater than the planned output.
- (b) When actual loss is more than the expected.
- (c) When actual loss is less than the expected loss

(d) When normal loss is equal to actual loss.

ANSWER 6-C

7. The value of abnormal loss is equal to:

- (a) Total cost of materials
- (b) Total process cost less realizable value of normal loss
- (c) Total process cost less cost of scrap
- (d) Total process cost less realizable value of normal loss less value of transferred out goods.

ANSWER 7-D

8. Inter-process profit is calculated, because:

- (a) a process is a cost centres
- (b) each process has to report profit

(c) the efficiency of the process is measured

(d) the wages of employees are linked to the process profitability.

ANSWER 8-C

9. The concept of process costing cannot be applied to:

(a) batch production

(b) a contract

(c) transport services

(d) a job order

ANSWER 9-C

10. A process account is debited by abnormal gain, the value is determined as:

(a) Equal to the value of normal loss

(b) Cost of good units less realizable value of normal loss

(c) Cost of good units less realizable value of actual loss

(d) Equal to the value of good units less closing stock

ANSWER 10-B

11. Lean Labs develops 55mm film using a four-step process that moves progressively through four departments. The company specializes in overnight service and has the largest drug store chain as its primary customer. Currently, direct labor, direct materials, and overhead are accumulated by departments.

The cost accumulation system that best describes the system Lean Labs is using is:

(a) Operation costing.

(b) Activity-based costing.

(c) Job-order costing.

(d) Process costing.

ANSWER 11-D

12. When compared with normal spoilage, abnormal spoilage:

- (a) Arises more frequently from factors that are inherent in the manufacturing process.
- (b) Is given the same accounting treatment as normal spoilage.
- (c) Is generally thought to be more controllable by purchase department than production department.
- (d) Is not typically influenced by the "tightness" of production standards.

ANSWER 12-D

13. Assume 550 units were worked on during a period in which a total of 500 good units were completed. Normal spoilage consisted of 30 units; abnormal spoilage, 20 units. Total production costs were Rs. 2,200. The company accounts for abnormal spoilage separately on the income statement as loss due to abnormal spoilage. Normal spoilage is not accounted for separately. What is the cost of the good units produced?

- (a) Rs. 2,080
- (b) Rs. 2,115
- (c) Rs. 2,200
- (d) Rs. 2,332

ANSWER 13-B

14. IC Limited uses process costing systems and inspects its goods post manufacturing. An engineer noticed on May 30 the following:

Good units completed	15,000
Normal spoilage (units)	300
Abnormal spoilage (units)	100

Unit costs were: Material Rs. 2.50 and conversion costs (Labour & overheads) Rs. 6.00. The number of units that company would transfer to its finished goods stock and the related cost of these units are:

- (a) 15,000 units transferred at a cost of Rs. 127,500
- (b) 15,000 units transferred at a cost of Rs. 130,050
- (c) 15,000 units transferred at a cost of Rs. 135,000

(d) 15,300 units transferred at a cost of Rs. 130,050

ANSWER 14-B

Theoretical Questions

1. EXPLAIN briefly the procedure for the valuation of Work-in-process.

ANSWER 1-

In the case of process type of industries, it is possible to determine the average cost per unit by dividing the total cost incurred during a given period of time by the total number of units produced during the same period. But this is hardly the case in most of the process type industries where manufacturing is a continuous activity. The reason is that the cost incurred in such industries represents the cost of work carried on opening work-in-process, closing work-in-process and completed units. Thus to ascertain the cost of each completed unit, it is necessary to ascertain the cost of work-in-process in the beginning and at the end of the process. The valuation of work-in-process presents a good deal of difficulty because it has units under different stages of completion from those in which work has just begun to those which are only a step short of completion. Work-in-process can be valued on actual basis, i.e., materials used on the unfinished units and the actual amount of labour expenses involved. However, the degree of accuracy in such a case cannot be satisfactory. An alternative method is based on converting partly finished units into equivalent finished units.

2. EXPLAIN equivalent units.

ANSWER 2

Equivalent units or equivalent production units, means converting the incomplete production units into their equivalent completed units. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, labour and overheads. It is important that the estimate of percentage of completion should be as accurate as possible. The formula for computing equivalent completed units is:

Equivalent completed units = (Actual number of units in × the process of manufacture) × (Percentage of Work completed)

For instance, if 25% of work has been done on the average of units still under process, then 200 such units will be equal to 50 completed units and the cost of work-in-process will be equal to the cost of 50 finished units.

3. "Operation costing is defined as refinement of Process costing." EXPLAIN it.**ANSWER 3**

This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. Which means conversion activities are similar for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batch wise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

For example, a company is manufacturing two grades of products, Product- Deluxe and Product- Regular. Both the products pass through a similar production process but require different quality and quantities of raw materials. The cost of raw material is accumulated on the basis of job or batches or units of two variants of products. But the costs for the conversion activities need not to be identified with the product variants as both the Products requires similar activities for conversion. Hence, conversion activity costs are accumulated on the basis of departments or processes only. Example of industries are ready made garments, Shoe making, jewelry etc.

4. What is inter-process profit? STATE its advantages and disadvantages.**ANSWER 4**

To control cost and to measure performance, different processes within an organization are designated as separate profit centres. In this type of organizational structure, the output of one process is transferred to the next process not at cost but at market value or cost plus a percentage of profit. The difference between cost and the transfer price is known as inter-process profits.

The advantages and disadvantages of using inter-process profit, in the case of process type industries are as follows:

Advantages:

1. Comparison between the cost of output and its market price at the stage of completion is facilitated.
2. Each process is made to stand by itself as to the profitability.

Disadvantages:

1. The use of inter-process profits involves complication.
2. The system shows profits which are not realised because of stock not sold out

Practical Questions

1. An English willow company who manufactures cricket bat buys wood as its direct material. The Forming department processes the cricket bats and the cricket bats are then transferred to the Finishing department where stickers are applied. The Forming department began manufacturing 10,000 initial bats during the month of December for the first time and their cost is as follows:

Direct material: Rs. 33,000

Conversion costs: Rs. 17,000

Total Rs. 50,000

A total of 8,000 cricket bats were completed and transferred to the Finishing department, the rest 2,000 were still in the Forming process at the end of the month. All of the forming departments direct material were placed, but, on average, only 25% of the conversion costs was applied to the ending work in progress inventory.

CALCULATE:

- (i) Equivalent units of production for each cost.
- (ii) The Conversion cost per Equivalent units.
- (iii) Cost of closing work in process (WIP) and finished products.

ANSWER 1

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(i) Calculation of equivalent units of production:

Input Details	Units	Output Particulars	Units	Equivalent Units			
				Material		Conversion cost	
				%	Units	%	Units
Unit Introduced	10,000	Finished output	8,000	100	8,000	100	8,000
		Closing W-I-P	2,000	100	2,000	25	500
Total	10,000	Total	10,000		10,000		8,500

(ii) Calculation of cost per equivalent unit

	Direct Material	Conversion costs
Total cost (₹)	33,000	17,000
Equivalent units	10,000	8,500
Cost per equivalent unit (₹)	3.30	2.00

(iii) The cost of closing work in process (WIP):

Costs	Equivalent units	Rate (₹)	Total Cost (₹)
Direct Material	2,000	3.30	6,600
Conversion costs	500	2.00	1,000
Total			7,600

The cost of finished products:

Costs	Equivalent units	Rate (₹)	Total Cost (₹)
Direct Material	8,000	3.30	26,400
Conversion costs	8,000	2.00	16,000
Total			42,400

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2. Hill manufacturing Ltd uses process costing to manufacture Water density sensors for hydro sector. The following information pertains to operations for the month of May.

Particulars	Units
Beginning WIP, May 1	16,000
Started in production during May	1,00,000
Completed production during May	92,000
Ending work in progress, May 31	24,000

The beginning work in progress was 60% complete for materials and 20% complete for conversion costs. The ending inventory was 90% complete for material and 40% complete for conversion costs.

Costs pertaining to the month of May are as follows:

Beginning inventory costs are material Rs.27,670, direct labour Rs.30,120 and factory overhead Rs. 12,720

Cost incurred during May are material used, Rs. 4,79,000, direct labour Rs.1,82,880, factory overheads Rs. 3,91,160.

CALCULATE:

(i) Using the FIFO method, the equivalent units of production for material.

(ii) Cost per equivalent unit for conversion cost.

ANSWER 2

(i) Calculation of equivalent units of production:

Input Details	Units	Output Particulars	Units	Equivalent Units			
				Material		Conversion cost	
				%	Units	%	Units
Beginning WIP	16,000	From beginning WIP	16,000	40	6,400	80	12,800
Unit Introduced	1,00,000	Completed output	76,000	100	76,000	100	76,000
		Closing W-I-P	24,000	90	21,600	40	9,600
Total	1,16,000	Total	1,16,000		1,04,000		98,400

(ii) Calculation of cost per equivalent unit for conversion costs

Particulars	Amount (₹)
Direct labour	1,82,880
Factory overheads	3,91,160
	5,74,040
Equivalent units	98,400
Cost per equivalent unit (₹)	5.83

3. Following information is available regarding Process-I for the month of February, 2020:

Production Record:	
Units in process as on 1.2.2020 (All materials used, 25% complete for labour and overhead)	4,000
New units introduced	16,000
Units completed	14,000
Units in process as on 28.2.2020 (All materials used, 33-1/3% complete for labour and overhead)	6,000
Cost Records:	
Work-in-process as on 1.2.2020	(Rs.)
Materials	6,000
Labour	1,000
Overhead	1,000
	8,000
Cost during the month:	
Materials	25,600
Labour	15,000
Overhead	15,000
	55,600

Presuming that average method of inventory is used, PREPARE:

- (i) Statement of equivalent production.
- (ii) Statement showing cost for each element.
- (iii) Statement of apportionment of cost.
- (iv) Process cost account for Process-I.

ANSWER 3

(i) **Statement of equivalent production (Average cost method)**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	4,000	Completed and transferred	14,000	100	14,000	100	14,000
Units introduced	16,000	Closing WIP	6,000	100	6,000	33-1/3	2,000
	20,000		20,000		20,000		16,000

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(ii) Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	6,000	1,000	1,000	8,000
Cost incurred during the month	25,600	15,000	15,000	55,600
Total cost: (A)	31,600	16,000	16,000	63,600
Equivalent units: (B)	20,000	16,000	16,000	
Cost per equivalent unit: (C) = (A ÷ B)	1.58	1	1	3.58

(iii) Statement of apportionment of cost

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (14,000 units × ₹ 3.58)		50,120
2. Value of Closing W-I-P:		
- Materials (6,000 units × ₹ 1.58)	9,480	
- Labour (2,000 units × ₹ 1)	2,000	
- Overheads (2,000 units × ₹ 1)	2,000	13,480

(iv) Process-I Cost Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W-I-P	4,000	8,000	By Completed units	14,000	50,120
To Materials	16,000	25,600	By Closing W-I-P	6,000	13,480
To Labour	--	15,000			
To Overhead	--	15,000			
	20,000	63,600		20,000	63,600

4. Following details are related to the work done in Process-I by XYZ Company during the month of March, 2020:

Opening work-in process	(2,000 units)
Materials	80,000
Labour	15,000
Overheads	45,000
Materials introduced in Process-I (38,000 units)	14,80,000

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Direct Labour	3,59,000
Overheads	10,77,000

Units scrapped: 3,000 units

Degree of completion:

Materials 100%

Labour and overheads 80%

Closing work-in process: 2,000 units

Degree of completion:

Materials 100%

Labour and overheads 80%

Units finished and transferred to Process-II: 35,000 units

Normal Loss:

5% of total input including opening work-in-process.

Scrapped units fetch Rs. 20 per piece.

You are required to PREPARE using average method:

(i) Statement of equivalent production

(ii) Statement of cost

(iii) Statement of distribution cost, and

(iv) Process-I Account, Normal Loss Account and Abnormal Loss Account.

ANSWER 4

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(i) **Statement of Equivalent Production**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	2,000	Completed and transferred to Process-II	35,000	100	35,000	100	35,000
Units introduced	38,000	Normal Loss (5% of 40,000)	2,000	--	--	--	--
		Abnormal loss (Balancing figure)	1,000	100	1,000	80	800
		Closing WIP	2,000	100	2,000	80	1,600
	40,000		40,000		38,000		37,400

(ii) **Statement showing cost for each element**

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	80,000	15,000	45,000	1,40,000
Cost incurred during the month	14,80,000	3,59,000	10,77,000	29,16,000
Less: Realisable Value of normal scrap (₹ 20 × 2,000 units)	(40,000)	--	--	(40,000)
Equivalent units: (B)	38,000	37,400	37,400	
Cost per equivalent unit: (C) = (A ÷ B)	40.00	10.00	30.00	80.00

(iii) **Statement of Distribution of cost**

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (35,000 units × ₹ 80)		28,00,000
2. Value of Abnormal Loss:		

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- Materials (1,000 units × ₹ 40)	40,000	
- Labour (800 units × ₹ 10)	8,000	
- Overheads (800 units × ₹ 30)	24,000	72,000
3. Value of Closing W-I-P:		
- Materials (2,000 units × ₹ 40)	80,000	
- Labour (1,600 units × ₹ 10)	16,000	
- Overheads (1,600 units × ₹ 30)	48,000	1,44,000

(iv) **Process-I A/c**

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:			By Normal Loss (₹20 × 2,000 units)	2,000	40,000
- Materials	2,000	80,000	By Abnormal loss	1,000	72,000
- Labour	--	15,000	By Process-I A/c	35,000	28,00,000
- Overheads	--	45,000	By Closing WIP	2,000	1,44,000
To Materials introduced	38,000	14,80,000			
To Direct Labour		3,59,000			
To Overheads		10,77,000			
	40,000	30,56,000		40,000	30,56,000

Normal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	2,000	40,000	By Cost Ledger Control A/c	2,000	40,000
	2,000	40,000		2,000	40,000

Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	1,000	72,000	By Cost Ledger Control A/c	1,000	20,000
			By Costing Profit & Loss A/c		52,000
	1,000	72,000		1,000	72,000

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5. A company produces a component, which passes through two processes. During the month of April, 2020, materials for 40,000 components were put into Process I of which 30,000 were completed and transferred to Process II. Those not transferred to Process II were 100% complete as to materials cost and 50% complete as to labour and overheads cost. The Process I costs incurred were as follows:

Direct material Rs.15,000

Direct wages Rs.18,000

Factory overheads Rs.12,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

No further process material costs occur after introduction at the first process until the end of the second process, when protective packing is applied to the completed components. The process and packing costs incurred at the end of the Process II were:

Packing materials Rs.4,000

Direct wages Rs.3,500

Factory overheads Rs.4,500

Required:

- (i) PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.
- (ii) PREPARE Statement of Equivalent Production, Cost per unit and Process II A/c.

ANSWER 5

- (i) Process I – Statement of Equivalent Production

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Particulars	Completed Units	Closing stock of WIP			Equivalent Production units
		Units	% of Completion	Equivalent Units	
	(1)			(2)	(1) + (2)
Material	30,000	10,000	100%	10,000	40,000
Wages	30,000	10,000	50%	5,000	35,000
Overhead	30,000	10,000	50%	5,000	35,000

Process I

Particulars	Process Cost (₹)	Equivalent Production (units)	Process Cost p.u. (2)/(3)	WIP stock Equivalent units	Cost of WIP Stock (₹) (4) x (5)	Transfer to Process II (2)-(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Material	15,000	40,000	0.375	10,000	3,750	11,250
Wages	18,000	35,000	0.514	5,000	2,570	15,430
Overhead	12,000	35,000	0.343	5,000	1,715	10,285
	45,000				8,035	36,965

Process I A/c

Particulars	Unit	(₹)	Particulars	Units	(₹)
To Direct material	40,000	15,000	By Process II A/c	30,000	36,965
To Direct wages	--	18,000	By Closing W-I-P	10,000	8,035
To Factory overhead	--	12,000		--	--
	40,000	45,000		40,000	45,000

(ii) **Process II – Statement of Equivalent Production**

Particulars	Completed Units	Closing stock of WIP			Equivalent Production units
		Units	% of Completion	Equivalent Units	
	(1)			(2)	(1) + (2)
Material	28,000	1,800	100%	1,800	29,800
Wages	28,000	1,800	25%	450	28,450
Overhead	28,000	1,800	25%	450	28,450

Process II

Particulars	Process Cost (₹)	Equivalent Production (units)	Process Cost p.u. (2)/(3)	WIP stock Equivalent units	Cost of WIP Stock (₹) (4) x (5)	Transfer to Finished Stock (2)-(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Material	36,965	29,800	1.240	1,800	2,232	34,733
Wages	3,500	28,450	0.123	450	55	3,445
Overhead	4,500	28,450	0.158	450	71	4,429
	44,965				2,358	42,607
Add: Packing Material Cost						4,000
Cost of Finished Stock						46,607

Process II A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process I	30,000	36,965	By Finished Stock	28,000	46,607
To Direct wages	--	3,500	By Normal loss	200	--
To Factory overhead	--	4,500	By WIP stock	1,800	2,358
To Packing charges	--	4,000			
	30,000	48,965		30,000	48,965

6. 'Healthy Sweets' is engaged in the manufacturing of jaggery. Its process involve sugarcane crushing for juice extraction, then filtration and boiling of juice along with some chemicals and then letting it cool to cut solidified jaggery blocks.

The main process of juice extraction (Process – I) is done in conventional crusher, which is then filtered and boiled (Process – II) in iron pots. The solidified jaggery blocks are then cut, packed and dispatched. For manufacturing 10 kg of jaggery, 100 kg of sugarcane is required, which extracts only 45 litre of juice.

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Following information regarding Process – I has been obtained from the manufacturing department of Healthy Sweets for the month of January, 2020:

Opening work-in process	(4,500 litre)
Sugarcane	50,000
Labour	15,000
Overheads	45,000
Sugarcane introduced for juice extraction (1,00,000 kg)	5,00,000
Direct Labour	2,00,000
Overheads	6,00,000

Abnormal Loss: 1,000 kg

Degree of completion:

Sugarcane 100%

Labour and overheads 80%

Closing work-in process: 9,000 litre

Degree of completion:

Sugarcane 100%

Labour and overheads 80%

Extracted juice transferred for filtering and boiling: 39,500 litre
 (Consider mass of 1 litre of juice equivalent to 1 kg)

You are required to PREPARE using average method:

- (i) Statement of equivalent production,
- (ii) Statement of cost,
- (iii) Statement of distribution cost, and
- (iv) Process-I Account.

ANSWER 6

(i) Statement of Equivalent Production

Particulars	Input units	Particulars	Output units	Equivalent Production			
				(%)	Equivalent units	(%)	Equivalent units
Opening W-I-P	4500	Completed and transferred to Process - II	39500	100	39500	100	39500
Units introduced	100000	Normal Loss (55%* of 1,00,000)	55000	---	---	---	---
		Closing W-I-P	1000	100	1000	80	800
		Abnormal loss	9000	100	9000	80	7200
	104500		104500		49500		47500

* 100 kg of sugarcane extracts only 45 litre of juice.

Thus, normal loss = $100 - 45 = 55\%$

(ii) Statement showing cost for each element

Particulars	Sugarcane (Rs.)	Labour (Rs.)	Overhead (Rs.)	Total (Rs.)
Cost of opening work-in-process	50,000	15,000	45,000	1,10,000
Cost incurred during the month	5,00,000	2,00,000	6,00,000	13,00,000
Total cost: (A)	5,50,000	2,15,000	6,45,000	14,10,000
Equivalent units: (B)	49,500	47,500	47,500	
Cost per equivalent unit: (C) = $(A \div B)$	11.111	4.526	13.579	29.216

(iii) Statement of Distribution of cost

Amount (Rs.)		Amount (Rs.)
1. Value of units completed and transferred (39,500 units × Rs. 29.216)		11,54,032
Value of Abnormal Loss:		
- Sugarcane (1,000 units × Rs. 11.111)	11,111	
- Labour (800 units × Rs. 4.526)	3,621	
- Overheads (800 units × Rs. 13.579)	10,863	25,595
3. Value of Closing W-I-P		
- Sugarcane (9,000 units × Rs. 11.111)	99,999	
- Labour (7,200 units × Rs. 4.526)	32,587	
- Overheads (7,200 units × Rs. 13.579)	97,769	2,30,355

(iv) Process-I A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Opening W.I.P:			By Normal Loss	55,000	--
- Sugarcane	4,500	50,000	By Abnormal loss [Rs. 25,595 + Rs. 18 (difference due to approximation)]	1,000	25,613
- Labour	--	15,000	By Process-II A/c	39,500	11,54,032
- Overheads	--	45,000	By Closing WIP	9,000	2,30,355
o Sugarcane introduced	100,000	5,00,000			
To Direct Labour		2,00,000			
To Overheads		6,00,000			
	104,500	14,10,000		104,500	14,10,000

CHAPTER-11 JOINT PRODUCTS AND BY PRODUCTS

ILLUSTRATION 1

A coke manufacturing company produces the following products by using 5,000 tons of coal @ Rs.1,100 per ton into a common process.

Coke	3,500 tons
Tar	1,200 tons
Sulphate of ammonia	52 tons
Benzol	48 tons

PREPARE a statement apportioning the joint cost amongst the products on the basis of the physical unit method.

SOLUTION

	Products					Total
	Coke	Tar	Sulphate of ammonia	Benzole	Wastage	
Output (in ton)	3,500	1,200	52	48	200	5,000
Wastage (in ton) (Refer Note-1)	146		50	2	2	(200)
Input (in ton)	3,646	1,250	54	50	-	5,000
Share of Joint Cost @ Rs.1,100 per ton (in Rs.)	40,10,600	13,75,000	59,400	55,000	-	55,00,000

Note-1: Apportionment of wastage of 200 tons over the four products on the basis of physical weights (3,500:1,200:52:48) is as follows:

$$\text{Coke: } \frac{200}{4,800} \times 3,500 \text{ tons} = 146 \text{ tons}$$

$$\text{Tar: } \frac{200}{4,800} \times 1,200 \text{ tons} = 50 \text{ tons}$$

$$\text{Sulphate of ammonia: } \frac{200}{4,800} \times 52 \text{ tons} = 2 \text{ tons}$$

$$\text{Benzole: } \frac{200}{4,800} \times 48 \text{ tons} = 2 \text{ tons}$$

ILLUSTRATION 2

FIND OUT the cost of joint products A, B and C using average unit cost method from the following data:

(a) Pre-separation Joint Cost Rs. 60,000

(b) Production data:

Products Units produced

A	500
B	200
C	300
	1,000

$$\text{Average cost per unit} = \frac{\text{Total joint costs}}{\text{Units produced}} = \frac{\text{₹ 60,000}}{1,000 \text{ units}} = \text{₹ 60}$$

The joint costs apportioned @ Rs. 60 are as follows:

Products	Units	Cost per unit (Rs.)	Value (Rs.)
A	500	60	30,000
B	200	60	12,000
C	300	60	18,000
			60,000

ILLUSTRATION 3

FIND OUT the cost of joint products A and B using contribution margin method from the following data :

Sales

A : 100 kg @ Rs. 60 per kg.

B : 120 kg @ Rs. 30 per kg.

Joint costs

Marginal cost Rs. 4,400

Fixed cost Rs. 3,900

SOLUTION

The marginal cost (variable cost) of Rs. 4,400 is apportioned over the joint products A and B in the ratio of their physical quantity i.e 100 : 120

Marginal cost for Product A : (Rs. 4,400 × 100 / 220) = Rs. 2,000

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Marginal cost for Product B : $(Rs. 4,400 \times 120 / 220) = Rs. 2,400$

The fixed cost of Rs. 3,900 is apportioned over the joint products A and B in the ratio of their contribution margin i.e. 40 : 12

(Refer to working note)

Product A : $Rs. 3,900 \times 40/52 = Rs. 3,000$

Product B : $Rs. 3,900 \times 12/52 = Rs. 900$

Working Note:

Computation of contribution margin ratio

Products	Sales revenue (Rs.)	Marginal cost (Rs.)	Contribution (Rs.)
A	6,000	2,000	4,000
B	3,600	2,400 (Refer to above)	1,200

Contribution ratio is 40 : 12

ILLUSTRATION 4

Inorganic Chemicals purchases salt and processes it into more refined products such as Caustic Soda, Chlorine and PVC. In the month of July, Inorganic Chemicals purchased Salt for Rs. 40,000. Conversion cost of Rs. 60,000 were incurred upto the split off point, at which time two sealable products were produced. Chlorine can be further processed into PVC.

The July production and sales information is as follows:

	Production (in ton)	Sales Quantity (in ton)	Selling price per ton (Rs.)
Caustic Soda	1,200	1,200	50
Chlorine	800	—	—
PVC	500	500	200

All 800 tons of Chlorine were further processed, at an incremental cost of Rs. 20,000 to yield 500 tons of PVC. There was no beginning or ending inventories of Caustic Soda, Chlorine or PVC in July.

There is active market for Chlorine. Inorganic Chemicals could have sold all its July production of Chlorine at Rs. 75 per ton.

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Required :

(1) SHOW how joint cost of Rs.1,00,000 would be apportioned between Caustic Soda and Chlorine under each of following methods:

- (a) sales value at split- off point ;
- (b) physical unit method, and
- (c) estimated net realisable value.

(2) Lifetime Swimming Pool Products offers to purchase 800 tonnes of Chlorine in August at Rs. 75 per tonne. This sale of Chlorine would mean that no PVC would be produced in August. EXPLAIN how the acceptance of this offer for the month of August would affect operating income?

SOLUTION:

1. (a) Sales value at split- off point method

Products	Sales (in Ton)	Selling Price per Ton (Rs.)	Sales Revenue (Rs.)	Joint Cost Apportioned (Rs.)
Caustic Soda	1,200	50	60,000	50,000
Chlorine	800	75	60,000	50,000
			1,20,000	1,00,000

Apportionment of joint cost

= Total joint cost × Sale revenue of each product / Total sale value

Joint cost apportioned to Caustic Soda = Rs.1,00,000 / Rs.1,20,000 × Rs. 60,000
= Rs.50,000

Joint cost apportioned to Chlorine = Rs.1,00,000 / Rs.1,20,000 × Rs. 60,000
= Rs.50,000

(b) Physical measure method

Products	Sales (in Ton)	Joint Cost Apportioned (Rs.)
Caustic Soda	1,200	60,000
Chlorine	800	40,000
		100,000

Apportionment of joint cost

= Total joint cost × Physical units of each product / Total physical value

Joint cost apportioned to Caustic Soda

$$= \frac{₹ 1,00,000}{2,000 \text{ tonnes}} \times 1,200 \text{ tonnes}$$

$$= ₹60,000$$

Joint cost apportioned to chlorine = $\frac{₹ 1,00,000}{2,000 \text{ tonnes}} \times 800 \text{ tonnes}$

$$= ₹40,000$$

(c) Estimated net realisable value method:

	Caustic Soda Amount (Rs.)	Chlorine Amount (Rs.)
Sales Value	60,000 (Rs.50 × 1,200 tons)	1,00,000 (Rs.200 × 500 tons)
Less: Post split-off cost (Further processing cost)	-	(20,000)
Net Realisable Value	60,000	80,000
Apportionment of Joint Cost of ₹1,00,000 in ratio of 3:4	42,857	57,143

2. Incremental revenue from further processing of Chlorine into PVC

3.

(500 tons × Rs.200 – 800 tons × Rs.75) Rs.40,000

Less : Incremental cost of further processing of Chlorine into PVC Rs.20,000

Incremental operating income from further processing Rs.20,000

The operating income of Inorganic Chemicals will be reduced by Rs.20,000 in August if it sells 800 tons of Chlorine to Lifetime Swimming Pool Products, instead of further processing of Chlorine into PVC for sale.

MCQs based Questions

1. In sugar manufacturing industries molasses is also produced along with sugar. Molasses may be of smaller value as compared with the value of sugar and is known as:

(a) Common product

(b) By- product

- (c) Joint product
- (d) None of them

ANSWER 1-B

2. Method of apportioning joint costs on the basis of output of each joint product at the point of split off is:

- (a) Sales value method
- (b) Physical unit method
- (c) Average cost method
- (d) Marginal cost and contribution method

ANSWER 2-B

3. In the Net realisable value method, for apportioning joint costs over the joint products, the basis of apportionment makes use of:

- (a) Selling price per unit of each of the joint products
- (b) Selling price multiplied by units sold of each of the joint products
- (c) Sales value of each joint product less further processing costs of individual products
- (d) Both (b) and (c)

ANSWER 3-D

4. The main purpose of accounting of joint products and by-products is to:

- (a) Determine the opportunity cost
- (b) Determine the replacement cost
- (c) Determine profit or loss on each product line
- (d) None of the above

ANSWER 4-C

5. Under net realizable value method of apportioning joint costs to joint products, the selling & distribution cost is:

- (a) Added to joint cost
- (b) Deducted from further processing cost
- (c) Deducted from sales value
- (d) Ignored

ANSWER 5-C

6. Which of the following is a co-product:

- (a) Diesel and Petrol in an oil refinery
- (b) Edible oils and oil cakes
- (c) Curd and butter in a dairy
- (d) Mustard oil and Sunflower oil in an oil processing company.

ANSWER 6-D

7. Which of the following is an example of by-product

- (a) Diesel and Petrol in an oil refinery
- (b) Edible oils and oil cakes
- (c) Curd and butter in a dairy
- (d) Mustard seeds and mustard oil.

ANSWER 7-B

8. Which of following method can be used when the joint products are of unequal quantity and used for captive consumption:

- (a) Technical estimates, using market value of similar goods
- (b) Net Realisable value method
- (c) Physical Units method
- (d) Market value at split-off method.

ANSWER 8-A

9. Which of the following statement is not correct in relation to Co-products:

- (a) Co-products may also have joint products
- (b) Costing for co-products are done according to process costing method
- (c) Co-products do not have any by-products
- (d) Co-products are treated as a separate cost object for costing purpose.

ANSWER 9-C

10. When a by-product does not have any realisable value, the cost of by-product is:

- (a) Transferred to Costing Profit & Loss A/c
- (b) By-product cost is borne by the good units
- (c) By-product cost is ignored
- (d) By-product cost is determined taking value of similar goods

ANSWER 10-B

11. SG Ltd manufactures two products from a joint milling process. The two products developed are Mine support (MS) and Commercial building (CB). A standard production run incurs joint costs of Rs. 1,00,000 and results in 60,000 units of MS and 90,000 units of CB. Each MS sells for Rs. 200 per unit, and each CB sells for Rs. 450 per unit. Assuming no further processing work is done after the split-off point, the amount of joint cost allocated to Commercial building (CB) on a physical quantity allocation basis would be:

- (a) Rs. 60,000.

(b) Rs. 180,000.

(c) Rs. 225,000.

(d) Rs. 120,000.

ANSWER 11-A

12. Kay Company manufactures two hair care lotions, Livi and Sili, out of a joint process. The joint (common) costs incurred are Rs. 6,30,000 for a standard production run that generates 1,80,000 gallons of Livi and 1,20,000 gallons of Sili. Livi sells for Rs. 240 per gallon, and Sili sells for Rs. 390 per gallon.

If additional processing costs beyond the split-off point are Rs. 140 per gallon for Livi and Rs. 90 per gallon for Sili, the amount of joint cost of each production run allocated to Livi on a physical-quantity basis is:

(a) Rs. 340,000.

(b) Rs. 378,000.

(c) Rs. 232,000.

(d) Rs. 580,000.

ANSWER 12-B

13. For the purpose of allocating joint costs to joint products, the sales price at point of sale, reduced by cost to complete after split-off, is assumed to be equal to the:

(a) Joint costs

(b) Sales price less a normal profit margin at point of sale

(c) Net sales value at split off

(d) Total costs.

ANSWER 13-C

Theoretical Questions

1. DISTINGUISH between Joint products and By-products

ANSWER 1

- (i) **Joint Products** - Joint products represent "two or more products separated in the course of the same processing operation usually requiring further

processing, each product being in such proportion that no single product can be designated as a major product”.

- (ii) **By-Products** - These are defined as “**products recovered from material discarded in a main process**, or from the production of some major products, where the material value is to be considered at the time of severance from the main product.” Thus by-products emerge as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short a by-product is a secondary or subsidiary product which emanates as a result of manufacture of the main product.

Distinction between Joint-Product and By-Product - The main points of distinction as apparent from the definitions of Joint Products and By-Products are: (a) Joint products are of equal importance whereas by-products are of small economic value. (b) Joint products are produced simultaneously but the by-products are produced incidentally in addition to the main products.

2.DISCUSS the treatment of by-product cost in Cost Accounting.

ANSWER 2

By-product cost can be dealt in cost accounting in the following ways:

(a) When they are of small total value: When the by-products are of small total value, the amount realised from their sale **may be dealt in any one the following two ways:**

1. The sales value of the by-products may be **credited to the Costing Profit and Loss Account** and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
2. The sale proceeds of the by-product may be **treated as deductions from the total costs**. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

(b) When the by-products are of considerable total value: Where by-products are of considerable total value, **they may be regarded as joint products rather than as by-products**.

To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

(c) Where they require further processing: In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products. If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (a). In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (b).

3. How apportionment of joint costs upto the point of separation amongst the joint products using net realizable value method is done? DISCUSS.

ANSWER 3

Net Realisable Value at Split-off Point Method: In this method of joint cost apportionment the followings are deducted from the sales value of joint products at final stage i.e. after processing:

- (i) Estimated profit margins,
- (ii) Selling and distribution expenses, if any, and
- (iii) Post split-off costs.

The resultant figure so obtained is known as net realisable value of joint products. Joint costs are apportioned in the ratio of net realisable value.

	Product- A Amount (Rs.)	Product- B Amount (Rs.)	Product- C Amount (Rs.)
Sales Value (Units after processing × Selling Price)	xxx	xxx	xxx
Less: Profit Margin	(xxx)	(xxx)	(xxx)
Less: Selling & Distribution costs	(xxx)	(xxx)	(xxx)
Less: Post split-off cost	(xxx)	(xxx)	(xxx)
Net Realisable Value	xxx	xxx	xxx

4. DESCRIBE briefly, how joint costs upto the point of separation may be apportioned amongst the joint products under the following methods:

- (i) Average unit cost method
- (ii) Contribution margin method
- (iii) Market value at the point of separation
- (iv) Market value after further processing

ANSWER 4

(i) Average Unit Cost Method: Under this method, total process cost (upto the point of separation) is divided by total units of joint products produced. On division average cost per unit of production is obtained.

Average unit cost = Total process cost (upto the point of separation) ÷ Total units of joint product produced.

This is a simple method. The effect of application of this method is that **all joint products will have uniform cost per unit**. If this method is used as the basis for price fixation, then all the products may have more or less the same price. Under this method customers of high quality items are benefitted as they have to pay less price on their purchase.

(ii) **Contribution Margin Method:** According to this method, joint costs are segregated into two parts - variable and fixed. The variable costs are apportioned over the joint products on the basis of units produced (average method) or physical quantities. In case the products are further processed after the point of separation, then all variable cost incurred be added to the variable costs determined earlier. In this way total variable cost is arrived which is deducted from their respective sales values to ascertain their contribution. The fixed costs are then apportioned over the joint products on the basis of the contribution ratios.

(iii) **Market value at the point of separation:** This method is used for the apportionment of joint costs to joint products upto the split off point. It is difficult to apply this method if the market value of the products at the point of separation is not available. **It is a useful method where further processing costs are incurred disproportionately.**

To determine the apportionment of joint costs over joint products, a factor known as multiplying factor is determined. This multiplying factor on multiplication with the sales values of each joint product gives rise to the proportion of joint cost.

$$\text{Multiplying factor} = \frac{\text{Joint Cost} \times \text{Total Sales Revenue}}{\text{Sales Value of Joint Product}} \times 100$$

(iv) **Market value after further processing:** Here the basis of apportionment of joint cost is the total sales value of finished products and involves the same principle as discussed above. **The use of this method is unfair where further processing costs after the point of separation are disproportionate or when all the joint products are not subjected to further processing.** The net realisable value method which is discussed as above overcomes the shortcoming of this method.

Practical Question

1. Smile company produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. Details of company's operation are given in the table below. During the month, company incurred joint production costs of Rs. 10,00,000/- The main products are not marketable at the split off point and thus have to be processed further.

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Particulars	Product-A	Product-B	By product
Monthly output in kg.	60,000	1,20,000	50,000
Selling price per kg.	Rs. 50	Rs. 30	Rs. 5
Process costs		Rs. 2,00,000	Rs. 3,00,000

FIND OUT the amount of joint product cost that Smile company would allocate to the product-B by using the physical volume method to allocate joint production costs?

ANSWER 1

Calculation of Net joint costs to be allocated:

Particulars	Amount (Rs.)
Joint Costs	10,00,000
Less: Net Realizable value of by-product (50,000×5)	2,50,000
Net joint costs to be allocated	7,50,000

Therefore, amount of joint product cost that Smile company would allocate to the product-B by using the physical volume method to allocate joint production costs:

$$= \frac{\text{Physical quantity of Product-B}}{\text{Total Quantity}} \times \text{Net joint costs to be allocated}$$

$$= \frac{1,20,000 \text{ units}}{1,80,000 \text{ units}} \times ₹7,50,000 = ₹5,00,000$$

2. Sun-moon Ltd. produces and sells the following products:

Products	Units	Selling price at split-off point (Rs.)	Selling price after further processing (Rs.)
A	2,00,000	17	25
B	30,000	13	17
C	25,000	8	12
D	20,000	10	-
E	75,000	14	20

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Raw material costs Rs.35,90,000 and other manufacturing expenses cost Rs. 5,47,000 in the manufacturing process which are absorbed on the products on the basis of their 'Net realisable value'. The further processing costs of A, B, C and E are Rs. 12,50,000; Rs. 1,50,000; Rs. 50,000 and Rs. 1,50,000 respectively. Fixed costs are Rs. 4,73,000.

You are required to PREPARE the following in respect of the coming year:

(a) Statement showing income forecast of the company assuming that none of its products are to be further processed.

(b) Statement showing income forecast of the company assuming that products A, B, C and E are to be processed further.

Can you suggest any other production plan whereby the company can maximise its profits? If yes, then submit a statement showing income forecast arising out of adoption of that plan.

ANSWER 2
Working Note:

Apportionment of joint costs on the basis of Net Realisable Value method

Products	Sales Value (Rs.)	Post separation Cost (Rs.)	Net Realisable Value (Rs.)	Apportioned Cost (Rs.)
A	50,00,000 (2,00,000 units × Rs. 25)	12,50,000	37,50,000	26,25,000
B	5,10,000 (30,000 units × Rs. 17)	1,50,000	3,60,000	2,52,000
C	3,00,000 (25,000 units × Rs. 12)	50,000	2,50,000	1,75,000
D	2,00,000 (20,000 units × Rs. 10)	—	2,00,000	1,40,000
E	15,00,000 (75,000 units × Rs. 20)	1,50,000	13,50,000	9,45,000
			59,10,000	41,37,000

Total joint cost = Raw material costs + Manufacturing expenses
 = Rs. 35,90,000 + Rs. 5,47,000 = Rs. 41,37,000

Apportioned joint cost

$$= \frac{\text{Total joint cost}}{\text{Total net realisable value}} \times \text{Net realisable value of each product}$$

Apportioned joint cost for Product A

$$= \frac{₹41,37,000}{₹59,10,000} \times ₹37,50,000 = ₹26,25,000$$

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Similarly, the apportioned joint cost for products B, C, D and E are Rs. 2,52,000, Rs. 1,75,000, Rs. 1,40,000 and Rs. 9,45,000 respectively.

(a) Statement showing income forecast of the company assuming that none of its products are further processed

Products						
	A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)	E (Rs.)	Total (Rs.)
Sales revenue	34,00,000 (Rs.17 × 2,00,000)	3,90,000 (Rs.13 × 30,000)	2,00,000 (Rs.8 × 25,000)	2,00,000 (Rs.10 × 20,000)	10,50,000 (Rs.14 × 75,000)	52,40,000
Less: Apportioned Costs (Refer Working note)	26,25,000	2,52,000	1,75,000	1,40,000	9,45,000	41,37,000
	775000	138000	25000	60000	105000	1103000
Less: Fixed Cost						473000
Profit						630000

(b) Statement showing income forecast of the company: assuming that products A, B, C and E are further processed (Refer to working note)

Products						
	A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)	E (Rs.)	Total (Rs.)
A. Sales revenue	5000000	510000	300000	200000	1500000	7510000
B. Apportioned Costs	2625000	252000	175000	140000	945000	4137000
C. Further processing cost	1250000	150000	50000	-	150000	1600000
D. Total processing cost (B+ C)	3875000	402000	225000	140000	1095000	5737000
E. Excess of sales revenue (A-D)	1125000	108000	75000	60000	405000	1773000

F. Fixed Cost						473000
G. Profit (E - F)						1300000

Suggested production plan for maximising profits:

On comparing the figures of excess of revenue over cost of manufacturing in the above statements one observes that the concern is earning more after further processing of A, C and E products but is losing a sum of Rs. 30,000 in the case of product B (if it is processed further). Hence the best production plan will be to sell A, C and E after further processing and B and D at the point of split off. The profit statement based on this suggested production plan is as below :

Profit statement based on suggested production plan

	Products					Total (Rs.)
	A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)	E (Rs.)	
A. Sales revenue	5000000	390000	300000	200000	1500000	7390000
B. Appor-tioned Costs	2625000	252000	175000	140000	945000	4137000
C. Further processing cost	1250000	-	50000	-	150000	1450000
D. Total processing cost (B+ C)	3875000	252000	225000	140000	1095000	5587000
E. Excess of sales revenue (A-D)	1125000	138000	75000	60000	405000	1803000
F. Fixed Cost						473000
G. Profit (E - F)						1330000

Hence the profit of the company has increased by Rs. 30,000

3. 'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 2020, 'Buttery Butter' purchased 50 Kilolitre processed cream @ Rs. 100 per 1000 ml. Conversion cost of Rs. 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee. The January, 2020 production and sales information is as follows:

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Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilolitre/tonne)	Selling price per Litre/Kg (Rs.)
Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of Rs. 1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in January, 2020.

Required:

(i) SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realisable Value method.

(ii) 'Healthy Bones' offers to purchase 20 tonne of butter in February at Rs. 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself?

ANSWER 3

(i) Estimated Net Realisable Value Method:

	Buttermilk Amount (Rs.)	Butter Amount (Rs.)
Sales Value	8,40,000 (Rs. 30 × 28 × 1000)	76,80,000 (Rs. 480 × 16 × 1000)
Less: Post split-off cost (Further processing cost)	-	(1,20,000)
Net Realisable Value	8,40,000	75,60,000
Apportionment of Joint Cost of Rs. 51,00,000* in ratio of 1:9	5,10,000	45,90,000

* [(Rs. 100 × 50 × 1000) + Rs. 1,00,000] = Rs. 51,00,000

(ii) Incremental revenue from further processing of Butter into Ghee

(Rs. 480 × 16 × 1000 - Rs. 360 × 20 × 1000) Rs. 4,80,000

Less: Incremental cost of further processing of Butter into Ghee	Rs. 1,20,000
Incremental operating income from further processing	Rs. 3,60,000

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The operating income of 'Buttery Butter' will be reduced by Rs. 3,60,000 in February if it sells 20 tonne of Butter to 'Healthy Bones', instead of further processing of Butter into Ghee for sale. Thus, 'Buttery Butter' is advised not to accept the offer and further process butter to make Ghee itself.

4. NN Manufacturing company uses joint production process that produces three products at the split off point. Joint productions costs during September were Rs. 8,40,000. Product information for September was as follows:

Particulars	Product A	Product B	Product C
Units produced	1,500	3,000	4,500
Units sold	2,000	6,000	7,500
Sales prices:			
At the split-off		Rs. 100	
After further processing	Rs. 150	Rs. 175	Rs. 50
Costs to process after split-off	Rs. 1,50,000	Rs. 1,50,000	Rs. 1,50,000

Assume that product C is treated as a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Assume also that Product B & C must be processed further before they can be sold. **FIND OUT** the total cost of Product A in September if joint cost allocation is based on net realizable values?

ANSWER 4

Product A can be sold at the split-off point, because the question says that "Products B and C must be processed further before they can be sold." Since product A is not included in that, we know that Product A can be sold at the split-off point. Furthermore, the cost to process Product A after the split-off point is Rs. 1,50,000, whereas the additional revenue to be earned by processing it further is only Rs. 75,000 (Rs. 50 increase in selling price per unit multiplied by the 1,500 units produced during September). Therefore, Product A will not be processed further, and we use the sales value at split-off for A for allocating the joint costs. The sales value at the split-off for A is Rs. 100 × 1,500 units, or Rs. 1,50,000.

Since Product B must be processed further, we use its net realizable value for the joint cost allocation. The net realizable value of Product B is Rs. 5,25,000 (Rs. 175 selling price after further processing × 3,000 units produced) – Rs. 1,50,000 in further processing costs = Rs. 3,75,000.

Product C, the by-product, must also be processed further to be sold. The net realizable value of Product C is Rs. 75,000 (Rs. 50 sales price after further processing × 4,500 units produced – Rs. 1,50,000 in further processing costs = Rs. 75,000).

Joint production costs total Rs. 8,40,000. Since the by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated are Rs. 7,65,000 (Rs. 8,40,000 minus the Rs. 75,000 NRV of Product C), to be allocated between Product A (sales value Rs. 1,50,000) and Product B (net realizable value Rs. 3,75,000). So, the total on which the allocation of the joint costs is based is Rs. 1,50,000 + 3,75,000 = Rs. 5,25,000. Product A represents 28.571% of the total (Rs. 1,50,000 ÷ Rs. 5,25,000).

Since Product A has no further processing costs, the total cost of Product A is equal to its allocated joint costs, which are 28.571% of the net joint costs of Rs. 7,65,000, or Rs. 2,18,568.

CHAPTER-12 SERVICE COSTING**ILLUSTRATION 1**

A Lorry starts with a load of 20 MT of Goods from Station 'A'. It unloads 8 MT in Station 'B' and balance goods in Station 'C'. On return trip, it reaches Station 'A' with a load of 16 MT, loaded at Station 'C'. The distance between A to B, B to C and C to A are 80 Kms, 120 Kms and 160 Kms, respectively. COMPUTE "Absolute MT-Kilometer" and "Commercial MT – Kilometer".

(MT = Metric Ton or Ton).

SOLUTION:**Weighted Average or Absolute basis – MT – Kilometer:**

$$= (20 \text{ MT} \times 80 \text{ Kms}) + (12 \text{ MT} \times 120 \text{ Kms}) + (16 \text{ MT} \times 160 \text{ Kms})$$

$$= 1,600 + 1,440 + 2,560 = 5,600 \text{ MT - Kilometer}$$

Simple Average or Commercial basis – MT – Kilometer:

$$= \left\{ \frac{(20+12+16)}{3} \text{ MT} \times \{(80+120+160) \text{ Kms}\} \right.$$

$$= 16 \text{ MT} \times 360 \text{ Kms} = 5,760 \text{ MT – Kilometer}$$

ILLUSTRATION 2

AXA Passenger Transport Company is running 5 buses between two towns, which are 40 kms apart. Seating capacity of each bus is 40 passengers. Following details are available from their books, for the month of April 2020:

Particulars	Amount (Rs.)
Salary of Drivers, Cleaners and Conductors	24,000
Salary to Supervisor	10,000
Diesel and other Oil	40,000
Repairs and Maintenance	8,000
Tax and Insurance	16,000
Depreciation	26,000
Interest	20,000
	1,44,000

Actual passengers carried were 75% of the seating capacity. All the five buses run on all days for the month. Each bus made one round trip per day. CALCULATE cost per passenger – Kilometer.

SOLUTION:

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Working Note:

Total Passenger Kilometres =

Number of Buses × Distance × Seating Capacity × Used Capacity × Number of days in the month × Number of trips

= 5 Buses × 40 kms. × 40 Seats × 75% × 30 Days × 2 Single trips (1 Round Trip)

= 3,60,000 Passenger-Kms.

Cost per Passenger-Km = Total costs ÷ Total Passenger Kilometers

Statement of Cost per Passenger – Km

Particulars	Cost Per Month	Cost per Passenger – Km
A. Standing Charges:		
Wages of Drivers, Cleaners and Conductors	24,000	
Salary to Supervisor	10,000	
Tax and Insurance	16,000	
Depreciation	26,000	
Interest	20,000	
Total Standing Charges	96,000	0.267
B. Running Charges		
Diesel and other Oil	40,000	0.111
C. Maintenance Charges		
Repairs and Maintenance	8,000	0.022
Total	1,44,000	0.400

Cost per Passenger-Km = Rs. 0.40

ILLUSTRATION 3

ABC Transport Company has given a route 40 kilometers long to run bus.

- The bus costs the company a sum of Rs. 10,00,000
- It has been insured at 3% p.a. and
- The annual tax will amount to Rs. 20,000
- Garage rent is Rs. 20,000 per month.
- Annual repairs will be Rs. 2,04,000
- The bus is likely to last for 2.5 years
- The driver's salary will be Rs.30,000 per month and the conductor's salary will be Rs.25,000 per month in addition to 10% of takings as commission [To be shared by the driver and conductor equally].
- Cost of stationery will be Rs.1,000 per month.
- Manager-cum-accountant's salary is Rs.17,000 per month.
- Petrol and oil will be Rs.500 per 100 kilometers.

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(k) The bus will make 3 up and down trips carrying on an average 40 passengers on each trip.

(l) The bus will run on an average 25 days in a month.

Assuming 15% profit on takings, CALCULATE the bus fare to be charged from each passenger.

SOLUTION:
Working Note:
(1) Total Kilometres run per annum:

= Number of Buses × Distance × Number of days in the Month × Number of trips × 12 months

= 1 Bus × 40 kms × 25 Days × 6 Single trips (3 Round Trips) × 12 months = 72,000 kms.

(2) Total Passenger Kilometres per annum:

Total Kilometres run per annum × Seating Capacity

= 72,000 Kms × 40 Seats = 28,80,000 Passenger-Kms.

(3) Petrol & oil Consumption per annum:

Total Kilometres run per annum × Petrol Consumption per KM

= 72,000 Kms × (Rs.500 / 100 Kms) = Rs. 3,60,000

Statement of Cost per Passenger – Km

Particulars	Per Annum	Per Passenger - Kilometer
A. Standing Charges:		
Insurance @ 3% on Rs.10,00,000	30,000	
Annual Tax	20,000	
Garage rent (Rs.20,000 × 12)	2,40,000	
Depreciation	4,00,000	
Salary of Driver (fixed part)	3,60,000	
Salary of Conductor (fixed part)	3,00,000	
Stationary	12,000	
Manager-cum-accountant's salary	2,04,000	
Total Standing Charges	15,66,000	0.5438
B. Running Charges:		
Diesel and other Oil (WN-3)	3,60,000	
Commission to Driver* (10%×Rs.28,40,000×1/2)	1,42,000	
Commission to Conductor*	1,42,000	

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(10%×Rs.28,40,000×1/2)		
Total Running Charges	6,44,000	0.2236
C. Maintenance Charges:		
Repairs	2,04,000	0.0708
Grand Total (A+B+C)	24,14,000	0.8382
Profit (15%×Rs.28,40,000)	4,26,000	0.1479
Fare per Passenger Kilometer		0.9861

*Total takings = Standing Charges + (Running cost + Commission on takings) + Maintenance cost + Profit

Let Takings = X

Or, $X = 15,66,000 + (3,60,000 + 0.1X) + 2,04,000 + 0.15X$

Or, $X - 0.25X = 21,30,000$

Or, $X = 28,40,000$

ILLUSTRATION 4

SMC is a public school having five buses each plying in different directions for the transport of its school students. In view of a larger number of students availing of the bus service the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The work-load of the students has been so arranged that in the morning the first trip picks up senior students and the second trip plying an hour later picks up the junior students. Similarly, in the afternoon the first trip takes the junior students and an hour later the second trip takes the senior students home. The distance travelled by each bus one way is 8 km. The school works 25 days in a month and remains closed for vacation in May, June and December. Bus fee, however, is payable by the students for all 12 months in a year.

The details of expenses for a year are as under:

Driver's salary	Rs. 4,500 per month per driver
Cleaner's salary	Rs. 3,500 per month
(Salary payable for all 12 months)	
(one cleaner employed for all the five buses)	
Licence fee, taxes, etc.	Rs. 8,600 per bus per annum
Insurance	Rs. 10,000 per bus per annum
Repairs & maintenance	Rs. 35,000 per bus per annum
Purchase price of the bus	Rs. 15,00,000 each
Life of each bus	12 years
Scrap value of buses at the end of life	Rs. 3,00,000
Diesel cost	Rs. 45.00 per litre

Each bus gives an average mileage of 4 km. per litre of diesel.

Seating capacity of each bus is 50 students.

The seating capacity is fully occupied during the whole year.

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Students picked up and dropped within a range up to 4 km. of distance from the school are charged half fare and fifty per cent of the students travelling in each trip are in this category. Ignore interest. Since the charges are to be based on average cost you are required to:

(i) PREPARE a statement showing the expenses of operating a single bus and the fleet of five buses for a year.

(ii) WORK OUT the average cost per student per month in respect of –

(A) students coming from a distance of upto 4 km. from the school and

(B) students coming from a distance beyond 4 km. from the school.

SOLUTION:

(i) Statement of Expenses of operating bus/ buses for a year

Particulars	Rate (Rs.)	Per Bus per annum (Rs.)	Fleet of 5 buses p.a. (Rs.)
(i) Standing Charges:			
Driver's salary	4,500 p.m	54,000	2,70,000
Cleaner's salary	3,500 p.m	8,400	42,000
Licence fee, taxes etc.	8,600 p.a.	8,600	43,000
Insurance	10,000 p.a.	10,000	50,000
Depreciation (15,00,000 – 3,00,000) ÷ 12 yrs	1,00,000 p.a.	1,00,000	5,00,000
(ii) Maintenance Charges:			
Repairs & maintenance	35,000 p.a.	35,000	1,75,000
(iii) Operating Charges:			
Diesel (Working Note 1)		1,62,000	8,10,000
Total Cost [(i) + (ii) + (iii)]		3,78,000	18,90,000
Cost per month		31,500	1,57,500
Total no. of equivalent students		150	750
Total Cost per half fare equivalent student		Rs. 210	Rs. 210

(ii) Average cost per student per month:

A. Students coming from distance of upto 4 km. from school

= Total cost per month / Total no.of equivalent students = 31,500 / 150students Rs. = Rs. 210

B. Students coming from a distance beyond 4 km. from school

= Cost of per half fare student × 2 = Rs. 210 × 2 = Rs. 420

Working Notes:**1. Calculation of Diesel cost per bus :**

Distance travelled in a year: (8 round trip × 8 km. × 25 days × 9 months)

Distance travelled p.a.: 14,400 km.

Cost of diesel (per bus p.a.): (14,400 km / 4kmpl) × Rs. 45 = Rs. 162000

2. Calculation of equivalent number of students per bus :

Seating capacity of a bus	50 students
Half fare students (50% of 50 students)	25 students
Full fare students (50% of 50 students)	25 students
Total number of students equivalent to half fare students	
Full fare students (25 students × 2)	50 students
Add: Half fare students	25 students
Total Equivalent number of students in a trip	75 students
Total number of equivalent students in two trips (Senior + Junior)	150 students

ILLUSTRATION 5

GTC has a lorry of 6-ton carrying capacity. It operates lorry service from city A to city B. It charges Rs. 2,400 per ton from city 'A' to city 'B' and Rs. 2,200 per ton for the return journey from city 'B' to city 'A'. Goods are also delivered to an intermediate city 'C' but no concession or reduction in rates is given. Distance between the city 'A' to 'B' is 300 km and distance from city 'A' to 'C' is 140 km.

In January 2020, the truck made 12 outward journeys for city 'B'. The details of journeys are as follows:

Outward journey	No. of journeys	Load (in ton)
'A' to 'B'	10	6
'A' to 'C'	2	6
'C' to 'B'	2	4
Return journey	No. of journeys	Load (in ton)
'B' to 'A'	5	8
'B' to 'A'	6	6
'B' to 'C'	1	6
'C' to 'A'	1	0

Annual fixed costs and maintenance charges are Rs. 6,00,000 and Rs. 1,20,000 respectively. Running charges spent during January 2020 are Rs. 2,94,400 (includes Rs. 12,400 paid as penalty for overloading).

You are required to:

- (i) CALCULATE the cost as per (a) Commercial ton-kilometre. (b) Absolute ton-kilometre
- (ii) CALCULATE Net Profit/ loss for the month of January, 2020.

SOLUTION:

(i) Calculation of total monthly cost for running truck:

Particulars		Amount per annum (Rs.)	Amount per month (Rs.)
(i)	Standing Charges:		
	Annual fixed costs	6,00,000	50,000
(ii)	Maintenance Charges:	1,20,000	10,000
(iii)	Running Cost:		
	Running charges 2,94,400		
	Less: Penalty paid for overloading (12,400)		2,82,000
	Total monthly cost		3,42,000

(a) Cost per commercial ton-km. = Rs.3,42,000 / 44,856ton-km. = Rs. 7.62

(Refer to working note-1)

(b) Cost per absolute ton-km. = Rs.3,42,000 / 44,720ton-km. = Rs. 7.65

(Refer to working note-2)

(ii) Calculation of Net Profit/Loss for the month of January 2020:

Particulars	(Rs.)	(Rs.)
Truck hire charges received during the month:		
From Outward journey (12 trips × 6 ton × Rs. 2,400)	1,72,800	
From return journey {(5 trips × 8 ton × Rs. 2,200) + (7 trips × 6 ton × Rs. 2,200)}	1,80,400	3,53,200
Less: Monthly running cost {as per (i) above}		(3,42,000)
Operating profit		11,200
Less: Penalty paid for overloading		(12,400)
Net Loss for the month		(1,200)

Working Notes:

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1. Calculation of Commercial Ton-km:

Particulars	Ton-km.
A. Total Distance travelled	
To and fro (300 km × 2 × 12 trips) (in km)	7,200
B. Average weight carried:	
Outward (12 journeys × 6 ton + 2 journeys × 4 ton)	80
Return (5 journeys × 8 ton + 6 journeys × 6 ton + 1 journey × 6 ton)	82
Total weight	162
No. of journeys	26
Average weight (in ton) (162 ÷ 26)	6.23
Total Commercial Ton-km (A × B)	44,856

2. Calculation of Absolute Ton-km:

Particulars	Ton-km.	Ton-km.
Outward journeys:		
From city A to city B (10 journey × 300 km. × 6 ton)	18,000	
From city A to city C (2 journeys × 140 km. × 6 ton)	1,680	
From city C to city B (2 journeys × 160 km. × 4 ton)	1,280	20,960
Return journeys:		
From city B to city A (5 journeys × 300 km. × 8 ton) + (6 journeys × 300 km. × 6 ton)	22,800	
From city B to city C (1 journey × 160 km. × 6 ton)	960	23,760
Total Absolute Ton-km		44,720

ILLUSTRATION 6 A company runs a holiday home. For this purpose, it has hired a building at a rent of Rs. 10,000 per month along with 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms. Following information is given:

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite. The other expenses for the year 2020 are as follows:

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	₹
Staff salaries	14,25,000
Room attendants' wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000

Provide profit @ 20% on total taking and assume 360 days in a year.
 You are required to CALCULATE the rent to be charged for each type of suite.

SOLUTION:
Working Notes:
(i) Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms × 360 days × 100%)	36,000 (36,000 × 1)
Double rooms suites	14,400 (50 rooms × 360 days × 80%)	36,000 (14,400 × 2.5)

Triple rooms suites	6,480 (30 rooms × 360 days × 60%)	32,400 (6,480 × 5)
---------------------	--------------------------------------	-----------------------

(ii) Statement of total cost:

	₹
Staff salaries	14,25,000
Room attendant's wages	4,50,000
Lighting, heating and power	2,15,000
Repairs and renovation	1,23,500
Laundry charges	80,500
Interior decoration	74,000
Sundries	1,53,000
	25,21,000
Building rent {(₹10,000 × 12 months) + 5% on total taking}	1,20,000 + 5% on total takings
Total cost	26,41,000 + 5% on total takings

Profit is 20% of total takings

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∴ Total takings = Rs.26,41,000 + 25% (5% +20%) of total takings

Let R be rent for single room suite

Then $1,04,400 R = 26,41,000 + (0.25 \times 1,04,400 R)$

Or, $1,04,400 R = 26,41,000 + 26,100 R$

Or, $78,300 R = 26,41,000$

Or, $R = \text{Rs.}33.73$

Alternatively

Let total takings be x

∴ $X = 26,41,000 + .25X (5\% + 20\%)$

∴ $X = 35,21,333$

Let the rent of single room be R

Then $1,04,400 R = 35,21,333$

Or, $R = \text{Rs.}33.73$

Rent to be charged:

Rent to be charged for single room suite = Rs.33.73

Rent for double rooms suites Rs. $33.73 \times 2.5 = \text{Rs.}84.33$

Rent for triple rooms suites Rs. $33.73 \times 5 = \text{Rs.}168.65$

ILLUSTRATION 7

A lodging home is being run in a small hill station with 100 single rooms. The home offers concessional rates during six off- season months in a year when numbers of visitor are limited. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending on 31st March 2020. [Assume a month to be of 30 days].

(i) Occupancy during the season is 80% while in the off- season it is 40% only.

(ii) Total investment in the home is Rs. 200 lakhs of which 80% relate to buildings and balance for furniture and equipment.

(iii) Expenses:

o Staff salary [Excluding room attendants] : Rs. 5,50,000

o Repairs to building : Rs. 2,61,000

o Laundry charges : Rs. 80, 000

o Interior : Rs. 1,75,000

o Miscellaneous expenses : Rs. 1,90,800

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(iv) Annual depreciation is to be provided for buildings @ 5% and on furniture and equipment @ 15% on straight-line basis.

(v) Room attendants are paid Rs. 10 per room day on the basis of occupancy of the rooms in a month.

(vi) Monthly lighting charges are Rs. 120 per room, except in four months in winter when it is Rs. 30 per room.

You are required to **WORK OUT** the room rent chargeable per day both during the season and the off-season months on the basis of the foregoing information.

SOLUTION:

Working Notes:

(i) **Total Room days in a year**

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	100 Rooms × 80% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 100% = 14,400
Off-season – 40% Occupancy	100 Rooms × 40% × 6 months × 30 days in a month = 7,200 Room Days	7,200 Room Days × 50% = 3,600
Total Room Days	14,400 + 7,200 = 21,600 Room Days	18,000 Full Room days

(ii) **Lighting Charges:**

It is given in the question that lighting charges for 8 months is Rs.120 per month and during winter season of 4 months it is Rs.30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	Occupancy (Room-days)
Season & Non-winter – 80% Occupancy	100 Rooms × 80% × 6 months × Rs.120 per month = Rs. 57,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	100 Rooms × 40% × 2 months × Rs.120 per month = Rs. 9,600
Off- season & -winter – 40% Occupancy months)	100 Rooms × 40% × 4 months × Rs. 30 per month = Rs. 4,800
Total Lighting charges	Rs. 57,600+ 9,600 + 4,800 = Rs. 72,000

Statement of total cost:

	(Rs.)
Staff salary	5,50,000
Repairs to building	2,61,000
Laundry & Linen	80,000
Interior	1,75,000
Sundries Expenses	1,90,800
Depreciation on Building (Rs. 200 Lakhs × 80% × 5%)	8,00,000
Depreciation on Furniture & Equipment (Rs. 200 Lakhs × 20% × 15%)	6,00,000
Room attendant's wages (Rs. 10 per Room Day for 21,600 Room Days)	2,16,000
Lighting charges	72,000
Total cost	29,44,800
Add: Profit Margin (20% on Room rent or 25% on Cost)	7,36,200
Total Rent to be charged	36,81,000

Calculation of Room Rent per day:

Total Cost / Equivalent Full Room days = Rs. 36,81,000 / 18,000 = Rs.204.50

Room Rent during Season – Rs.204.50

Room Rent during Off season = Rs.204.50 × 50% = Rs. 102.25

ILLUSTRATION 8

ABC Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, if required.

Rent per month - Rs. 75,000

Supervisors – 2 persons – Rs. 25,000 Per month

– each Nurses – 4 persons – Rs. 20,000 per month – each

Ward Boys – 4 persons – Rs. 5,000 per month – each

Doctors paid Rs. 2,50,000 per month – paid on the basis of number of patients attended and the time spent by them

Other expenses for the year are as follows:

Repairs (Fixed) – Rs. 81,000

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Food to Patients (Variable) – Rs. 8,80,000

Other services to patients (Variable) – Rs. 3,00,000

Laundry charges (Variable) – Rs. 6,00,000

Medicines (Variable) – Rs. 7,50,000

Other fixed expenses – Rs. 10,80,000

Administration expenses allocated – Rs. 10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied.

The hospital hired 750 beds at a charge of Rs. 100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required to –

(a) CALCULATE profit per Patient day, if the hospital recovers on an average Rs. 2,000 per day from each patient

(c) FIND OUT Breakeven point for the hospital

SOLUTION:
Working Notes:

(1) Calculation of number of Patient days

35 Beds × 150 days = 5,250

25 Beds × 80 days = 2,000

Extra beds = 750

Total = 8,000

Statement of Profitability

Particulars	Amount	Amount
Income for the year (Rs. 2,000 per patient per day × 8,000 patient days)		1,60,00,000
Variable Costs:		
Doctor Fees (Rs. 2,50,000 per month × 12)	30,00,000	
Food to Patients (Variable)	8,80,000	
Other services to patients (Variable)	3,00,000	
Laundry charges (Variable) – (Rs.)	6,00,000	
Medicines (Variable) – (Rs.)	7,50,000	
Bed Hire Charges (Rs.100 × 750 Beds)	75,000	
Total Variable costs		56,05,000

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Contribution		1,03,95,000
Fixed Costs:		
Rent (Rs. 75,000 per month × 12)	9,00,000	
Supervisor (2 persons × Rs.25,000 × 12)	6,00,000	
Nurses (4 persons × Rs. 20,000 × 12)	9,60,000	
Ward Boys (4 persons × Rs. 5,000 × 12)	2,40,000	
Repairs (Fixed)	81,000	
Other fixed expenses – (Rs.)	10,80,000	
Administration expenses allocated – (Rs.)	10,00,000	
Total Fixed Costs		48,61,000
Profit		55,34,000

(1) Calculation of Contribution per Patient day

Total Contribution – Rs. 1,03,95,000

Total Patient days – 8,000

Contribution per Patient day – Rs. 1,03,95,000 / 8,000 = Rs. 1,299.375

(2) Breakeven Point = Fixed Cost / Contribution per Patient day

= Rs. 48,61,000 / Rs.1,299.375

= 3,741 patient days

ILLUSTRATION 9

Following are the data pertaining to Infotech Pvt. Ltd, for the year 2019-20:

Amount (Rs.)	
Salary to Software Engineers (5 persons)	15,00,000
Salary to Project Leaders (2 persons)	9,00,000
Salary to Project Manager	6,00,000
Repairs & maintenance	3,00,000
Administration overheads	12,00,000

The company executes a Project XYZ, the details of the same as are as follows:

Project duration – 6 months

One Project Leader and three Software Engineers were involved for the entire duration of the project, whereas

Project Manager spends 2 months' efforts, during the execution of the project.

Travel expenses incurred for the project – Rs. 1,87,500

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Two Laptops were purchased at a cost of Rs. 50,000 each, for use in the project and the life of the same is estimated to be 2 years

PREPARE Project cost sheet.

SOLUTION

Working Notes:

(1) Calculation of Cost per month and Overhead absorption rate

Particulars	Total Per Annum	Per Person Per Annum	Per Person Per Month
Salary to Software Engineer (5 Persons)	Rs.15,00,000	Rs. 3,00,000	Rs.25,000
Salary to Project Leaders (2 persons)	Rs. 9,00,000	Rs. 4,50,000	Rs. 37,500
Salary to Project Manager	Rs. 6,00,000	Rs. 6,00,000	Rs. 50,000
Total	Rs. 30,00,000		Rs.1,12,5000

(2) **Total Overhead** = Repairs & maintenance + Administration overheads = Rs. 3,00,000 + Rs.12,00,000 = Rs.15,00,000

(3) **Calculation of Overhead absorption rate** = Total Overhead / Total Salary = Rs.15,00,000 / Rs.30,00,000 = 50%

Project Cost Sheet

	₹
Salary Cost:	
Salary of Software Engineers (3 × ₹ 25,000 × 6 months)	4,50,000
Salary of Project Leader (₹ 37,500 × 6 months)	2,25,000
Salary of Project Manager (₹ 50,000 × 2 months)	1,00,000
Total Salary	7,75,000
Overheads (50% of Salary)	3,87,500
Travel Expenses	1,87,500
Depreciation on Laptops (₹1,00,000 / 2 years × 6 months)	25,000
Total Project Cost	13,75,000

ILLUSTRATION 10

BHG Toll Plaza Ltd built a 60 km. long highway and now operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that a total of 12 crore vehicles (only single type of vehicle) will be using the highway during the 10 years toll collection tenure.

Toll Operating and Maintenance cost for the month of April 2020 are as follows:

(i) Salary to –

Collection Personnel (3 Shifts and 4 persons per shift) - Rs. 550 per day per person

Supervisor (2 Shifts and 1 person per shift) - Rs. 750 per day per person

Security Personnel (3 Shifts and 6 persons per shift) - Rs.450 per day per person

Toll Booth Manager (2 Shifts and 1 person per shift) - Rs.900 per day per person

(ii) Electricity – Rs. 8,00,000

(iii) Telephone – Rs. 1,40,000

(iv) Maintenance cost – Rs. 30 Lakh

Monthly depreciation and amortisation expenses will be Rs. 1.50 crore. Further, the company needs 25% profit over total cost to cover interest and other costs.

Required:

(i) CALCULATE cost per kilometer per month.

(ii) CALCULATE the toll rate per vehicle.

SOLUTION:

Calculation of cost for the month of April 2020

Particulars	(Rs.)
Salary to Collection Personnel (3 Shifts × 4 persons per shift × 30 days × Rs.550 per day)	1,98,000
Salary to Supervisor (2 Shifts × 1 persons per shift × 30 days × Rs.750 per day)	45,000
Salary to Security Personnel (3 Shifts × 6 persons per shift × 30 days × Rs.450 per day)	2,43,000
Salary to Toll Booth Manager	54,000

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(2 Shifts × 1 persons per shift × 30 days × Rs.900 per day)	
Electricity	8,00,000
Telephone	1,40,000
Maintenance cost	30,00,000
Total operating cost (A)	44,80,000
Depreciation and amortisation expenses (B)	1,50,00,000
Total Cost (A + B)	1,94,80,000

(i) **Calculation of cost per kilometer per month:**

$$= \frac{\text{Total Cost}}{\text{Total km.}} = \frac{\text{₹ } 1,94,80,000}{60 \text{ km.}} = \text{₹ } 3,24,666.67$$

(ii) **Calculation of toll rate per vehicle:**

$$= \frac{\text{Total Cost} + 25\% \text{ profit}}{\text{Vehicles per month}} = \frac{\text{₹ } 1,94,80,000 + \text{₹ } 48,70,000}{10,00,000 \text{ vehicles}} = \text{₹ } 24.35$$

Working:

No. of vehicles using the highway per month

$$\frac{\text{Total estimated vehicles}}{10 \text{ years}} \times \frac{1 \text{ month}}{12 \text{ months}} = \frac{12 \text{ crore}}{10 \text{ years}} \times \frac{1 \text{ month}}{12 \text{ months}} = 10 \text{ lakhs}$$

ILLUSTRATION 11

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes, but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

Teachers' salary (25 teachers × Rs. 35,000 × 12 months)	1,05,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × Rs. 15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × Rs. 10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	10

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participates in annual functions and sports activities.

Required:

(a) CALCULATE cost per student per annum for all three streams.

(b) If the management decides to take uniform fee of Rs. 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.

(c) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

SOLUTION:

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Calculation of Cost per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
Re-apportionment of Economics & Mathematics teachers' salary (W.N- 2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N-8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(i) Calculation of cost per student per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(ii) Calculation of profitability

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

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(iii) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:
(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (Rs.) (Rs. 35,000 x 12)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091
	$\left(\frac{₹4,20,000}{1,040} \times 208 \right)$		$\left(\frac{₹4,20,000}{1,100} \times 160 \right)$	

(3) Principal's salary has been apportioned on the basis of time spent by him for administration of classes.

(4) Lab attendants' salary has been apportioned on the basis of lab classes attended by the students.

(5) Salary of library staffs are apportioned on the basis of time spent by the students in library.

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(6) Salary of Peons are apportioned on the basis of number of students. The peons' salary allocable to higher secondary classes is calculated as below:

	Amount (₹)
Peon dedicated for higher secondary (1 peon × ₹10,000 × 12 months)	1,20,000
Add: 15% of other peons' salary {15% of (3 peons × ₹10,000 × 12 months)}	54,000
	1,74,000

(7) Salary to other staffs, office & administration cost, Annual day expenses and sports expenses are apportioned on the basis of number of students.

(8) Examination expenditure has been apportioned taking number of students into account (It may also be apportioned on the basis of number of examinations).

ILLUSTRATION 12

Sanziet Lifecare Ltd. operates in life insurance business. Last year it launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy:

Policy development cost	11,25,000
Cost of marketing of the policy	45,20,000
Sales support expenses	11,45,000
Policy issuance cost	10,05,900

Policy servicing cost	35,20,700
Claims management cost	1,25,600
IT cost	74,32,000
Postage and logistics	10,25,000
Facilities cost	15,24,000
Employees cost	5,60,000
Office administration cost	16,20,400

Number of policy sold- 528

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Total insured value of policies- Rs.1,320 crore

Required:

(i) CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions.

(ii) CALCULATE cost per policy.

(iii) CALCULATE cost per rupee of insured value.

SOLUTION:

(i) Calculation of total cost for 'Professionals Protection Plus' policy

	Particulars	Amount (₹)	Amount (₹)
1.	Marketing and Sales support:		
	- Policy development cost	11,25,000	
	- Cost of marketing	45,20,000	
	- Sales support expenses	11,45,000	67,90,000
2.	Operations:		
	- Policy issuance cost	10,05,900	
	- Policy servicing cost	35,20,700	
	- Claims management cost	1,25,600	46,52,200
3.	IT Cost		74,32,000
4.	Support functions		
	- Postage and logistics	10,25,000	
	- Facilities cost	15,24,000	
	- Employees cost	5,60,000	
	- Office administration cost	16,20,400	47,29,400
	Total Cost		2,36,03,600

$$(ii) \text{ Calculation of cost per policy} = \frac{\text{Total cost}}{\text{No. of policies}} = \frac{₹2,36,03,600}{528}$$

$$= ₹ 44,703.79$$

$$(iii) \text{ Cost per rupee of insured value} = \frac{\text{Total cost}}{\text{Total insured value}} = \frac{₹ 2.36 \text{ crore}}{₹ 1,320 \text{ crore}}$$

$$= ₹ 0.0018$$

ILLUSTRATION 13

The loan department of a bank performs several functions in addition to home loan application processing task. It is estimated that 25% of the overhead costs of loan department are applicable to the processing of home-loan application. The following information is given concerning the processing of a loan application:

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Direct professional labor:

Loan processor monthly salary:	2,40,000
(4 employees @ Rs. 60,000 each)	
Loan department overhead costs (monthly)	
Chief loan officer's salary	75,000
Telephone expenses	7,500
Depreciation Building	28,000

Legal advice	24,000
Advertising	40,000
Miscellaneous	6,500
Total overhead costs	1,81,000

You are required to COMPUTE the cost of processing home loan application on the assumption that five hundred home loan applications are processed each month.

SOLUTION:

Statement showing computation of the cost of processing a typical home loan application

Direct professional labour cost	2,40,000
(4 employees @ Rs. 60,000 each)	
Service overhead cost (25% of Rs. 1,81,000)	45,250
Total processing cost per month	2,85,250
No. of applications processed per month	500
Total processing cost per home loan application	570.5

ILLUSTRATION 14

PREPARE the cost statement of Ignus Thermal Power Station showing the cost of electricity generated per kWh, from the data provided below pertaining to the year 2019-20.

Total units generated 20,00,000 kWh

Operating labour	30,00,000
Repairs & maintenance	10,00,000
Lubricants, spares and stores	8,00,000
Plant supervision	6,00,000
Administration overheads	40,00,000

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5 kWh. of electricity generated per kg of coal consumed @ Rs.4.25 per kg. Depreciation charges @ 5% on capital cost of Rs. 5,00,00,000.

SOLUTION:

Cost Statement of Ignus Thermal Power Station		20,00,000 kwh.	
Total units generated			
		Per annum (Rs.)	Per kWh (Rs.)
Fixed costs:			
Plant supervision		6,00,000	
Administration overheads		40,00,000	
Depreciation (5% of Rs. 5,00,00,000 p.a.)		25,00,000	
Total fixed cost: (A)		71,00,000	3.55
Variable costs:			
Operating labour		30,00,000	
Lubricants, spares and stores		8,00,000	
Repairs & maintenance		10,00,000	
Coal cost (Refer to working note)		17,00,000	
Total variable cost: (B)		65,00,000	3.25
Total cost [(A) + (B)]		1,36,00,000	6.80

Working Note:

Coal cost (20,00,000 kwh. ÷ 5 kwh) × Rs. 4.25 per kg. = Rs. 17,00,000

MCQs based Questions

1. Composite cost unit for a hospital is:

- (a) Per patient
- (b) Per patient-day
- (c) Per day
- (d) Per bed

ANSWER 1-B

2. Cost of diesel and lubricant is an example of:

- (a) Operating cost
- (b) Fixed charges
- (c) Semi-variable cost
- (d) None of the above

ANSWER 2-A

3. Cost units used in power sector is:

- (a) Kilo meter (K.M)
- (b) Kilowatt-hour (kWh)
- (c) Number of electric points
- (d) Number of hours

ANSWER 3-B

4. Absolute Tonne-km. is an example of:

- (a) Composite units in power sector
- (b) Composite unit of transport sector
- (c) Composite unit for bus operation
- (d) Composite unit for oil and natural gas

ANSWER 4-B

5. Depreciation is treated as fixed cost if it is related to:

- (a) Activity level
- (b) Related with machine hours
- (c) Efflux of time
- (d) None of the above

ANSWER 5-C

6. Jobs undertaken by IT & ITES organizations are considered as:

- (a) Project
- (b) Batch work
- (c) Contract
- (d) All the above

ANSWER 6-A

7. In Toll Road costing, the repetitive costs includes:

- (a) Maintenance cost
- (b) Annual operating costs
- (c) None of the above
- (d) Both (a) and (b)

ANSWER 7-A

8. BOT approach means:

- (a) Build, Operate and Transfer
- (b) Buy, Operate and Transfer
- (c) Build, Operate and Trash
- (d) Build, Own and Trash

ANSWER 8-A

9. Pre-product development activities in insurance companies, include:

- (a) Processing of Claim
- (b) Selling of policy
- (c) Provision of conditions
- (d) Policy application processing

ANSWER 9-C

10. Which of the following costing method is not appropriate for costing of educational institutes:

- (a) Batch Costing
- (b) Activity Based Costing
- (c) Absorption Costing
- (d) Process Costing

ANSWER 10 -D

Theoretical Questions

1. EXPLAIN briefly, what do you understand by Service Costing.

ANSWER 1

Service sector, being a fastest growing sector and having a significant contribution towards the GDP in India, is a very important sector where the role of the cost and management accounting is inevitable. The competitiveness of a service entity is very much dependent on a robust cost and management accounting system for competitive pricing and identification of value adding activities. Providers of services like transportation, hotels, financial services & banking, insurance, electricity generation, transmission and distribution etc. are very much cost conscious and thrive to provide services in a cost-effective manner. Irrespective of regulatory requirements to maintain cost records and get the records audited, service costing becomes integral and inseparable part of each service entity. In this chapter we will be discussing how costing is done in service sectors like Transportation, Toll roads, Electricity generation, transmission and distribution, Hospitals, Canteen & Restaurants, Hotels & Lodges, Educational institutes, Financial institutions, Insurance, Information Technology (IT) & Information Technology Enabled Services (ITES) etc.

Service costing is also known as operating costing.

2. STATE how are composite units is computed?

ANSWER 2

Composite unit may be computed in two ways.

- (i) Absolute (Weighted Average) basis.
- (ii) Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

(i) Weighted Average or Absolute basis –It is summation of the products of qualitative and quantitative factors. For example, to calculate absolute Ton-Km for a goods transport is calculated as follows.:

$$\Sigma(\text{Weight Carried} \times \text{Distance})_1 + (\text{Weight Carried} \times \text{Distance})_2 + \dots + (\text{Weight Carried} \times \text{Distance})_n$$

Similarly, in case of Cinema theatres, price for various classes of seats are fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second Class seat – to ensure proper cost per composite unit.

(ii) Simple Average or Commercial basis – It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Ton-Km is arrived at by multiplying total distance km., by average load quantity.

$$\Sigma(\text{Distance}_1 + \text{Distance}_2 + \dots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \dots + W_n}{n} \right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor. To understand the concept of absolute ton-km., and commercial ton-km., the following illustration may be referred.

3. STATE the features of service costing?

ANSWER 3

Internal: The service costing is required for in-house services provided by a service cost centre to other responsibility centres as support services. Examples of support services are Canteen and hospital for staff, Boiler house for supplying steam to production departments, Captive Power generation unit, operation of fleet of vehicles for transport of raw material to factory or distribution of finished goods to the market outlets, IT department services used by other departments, research & development, quality assurance, laboratory etc.

External: When services are offered to outside customers as a profit centre in consonance with organisational objectives as an output like goods or passenger transport service provided by a transporter, hospitality services provided by a hotel, provision of services by financial institutions, insurance and IT companies etc.

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In both the situation, all costs incurred are collected, accumulated for a certain period or volume, recorded in the cost accounting system and then expressed in terms of a cost unit of service.

Practical Questions

1. From the following data pertaining to the year 2019-20 PREPARE a cost statement showing the cost of electricity generated per kwh by Chambal Thermal Power Station.

Total units generated	10,00,000 kWh
	(Rs.)
Operating labour	15,00,000
Repairs & maintenance	5,00,000
Lubricants, spares and stores	4,00,000
Plant supervision	3,00,000
Administration overheads	20,00,000

5 kWh. of electricity generated per kg. of coal consumed @ Rs. 4.25 per kg. Depreciation charges @ 5% on capital cost of Rs. 2,00,00,000.

ANSWER 1

Cost Statement of Chambal Thermal Power Station

Total units generated	10,00,000 kWh
-----------------------	---------------

	Per annum (Rs.)	Per kWh. (Rs.)
Fixed costs:		
Plant supervision	3,00,000	
Administration overheads	20,00,000	
Depreciation (5% of Rs. 2,00,00,000 p.a.)	10,00,000	
Total fixed cost: (A)	33,00,000	3.30
Variable costs:		
Operating labour	15,00,000	
Lubricants, spares and stores	4,00,000	
Repairs & maintenance	5,00,000	
Coal cost (Refer to working note)	8,50,000	
Total variable cost: (B)	32,50,000	3.25
Total cost [(A) + (B)]	65,50,000	6.55

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Working Note:

Coal cost (10,00,000 kWh. ÷ 5 kWh) × Rs. 4.25 per kg. = Rs. 8,50,000

2. SLS Infrastructure built and operates 110 k.m. highway on the basis of Built-Operate-Transfer (BOT) for a period of 25 years. A traffic assessment carried out to estimate the traffic flow per day shows the following figures:

Sl. No.	Type of vehicle	Daily traffic volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450
3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Sl. No.	Activities	Amount (₹ in lakh)
1	Site clearance	170.70
2	Land development and filling work	9,080.35
3	Sub base and base courses	10,260.70
4	Bituminous work	35,070.80
5	Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	29,055.60
6	Drainage and protection work	9,040.50
7	Traffic sign, marking and road appurtenance	8,405.00
8	Maintenance, repairing and rehabilitation	12,429.60
9	Environmental management	982.00
	Total Project cost	114,495.25

An estimated cost of ₹ 1,120 lakh has to be incurred on administration and toll plaza operation.

On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles:

Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

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Required:

- (i) CALCULATE the total project cost per day of concession period.
 (ii) COMPUTE toll fee to be charged for per vehicle of each type, if the company wants to earn a profit of 15% on total cost.

[Note: Concession period is a period for which an infrastructure is allowed to operate and recovers its investment]

ANSWER

(i) Calculation of total project cost per day of concession period:

Activities	Amount (₹ in lakh)
Site clearance	170.70
Land development and filling work	9,080.35
Sub base and base courses	10,260.70
Bituminous work	35,070.80
Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc.	29,055.60
Drainage and protection work	9,040.50
Traffic sign, marking and road appurtenance	8,405.00
Maintenance, repairing and rehabilitation	12,429.60
Environmental management	982.00
Total Project cost	114,495.25
Administration and toll plaza operation cost	1,120.00
Total Cost	115,615.25
Concession period in days (25 years × 365 days)	9,125
Cost per day of concession period (₹ in lakh)	12.67

(ii) Computation of toll fee:

Cost to be recovered per day = Cost per day of concession period + 15% profit on cost
 = ₹12,67,000 + ₹1,90,050 = ₹14,57,050

Cost per equivalent vehicle = ₹14,57,050 / 76,444 units (Refer working note)
 = ₹19.06 per equivalent vehicle

Vehicle type-wise toll fee:

Sl. No.	Type of vehicle	Equivalent cost [A]	Weight [B]	Toll fee per vehicle [A×B]
1.	Two wheelers	₹ 19.06	1	19.06
2.	Car and SUVs	₹ 19.06	4	76.24
3.	Bus and LCV	₹ 19.06	6	114.36
4.	Heavy commercial vehicles	₹ 19.06	9	171.54

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Working Note:

The cost per day has to be recovered from the daily traffic. The each type of vehicle is to be converted into equivalent unit. Let's convert all vehicle types equivalent to Two-wheelers..

Sl. No.	Type of vehicle	Daily traffic volume [A]	Weight	Ratio [B]	Equivalent Two-wheeler [A×B]
1.	Two wheelers	44,500	0.05	1	44,500
2.	Car and SUVs	3,450	0.20	4	13,800
3.	Bus and LCV	1,800	0.30	6	10,800
4.	Heavy commercial vehicles	816	0.45	9	7,344
	Total				76,444

3. Mr. X owns a bus which runs according to the following schedule:

(i) Delhi to Chandigarh and back, the same day.	
Distance covered:	250 km. one way.
Number of days run each month :	8
Seating capacity occupied	90%.
(ii) Delhi to Agra and back, the same day.	
Distance covered:	210 km. one way
Number of days run each month :	10
Seating capacity occupied	85%
(iii) Delhi to Jaipur and back, the same day.	
Distance covered:	270 km. one way
Number of days run each month :	6
Seating capacity occupied	100%
(iv) Following are the other details:	
Cost of the bus	₹ 12,00,000

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Salary of the Driver	₹ 24,000 p.m.
Salary of the Conductor	₹ 21,000 p.m.
Salary of the part-time Accountant	₹ 5,000 p.m.
Insurance of the bus	₹ 4,800 p.a.
Diesel consumption 4 km. per litre at	₹ 56 per litre
Road tax	₹ 15,915 p.a.
Lubricant oil	₹ 10 per 100 km.
Permit fee	₹ 315 p.m.
Repairs and maintenance	₹ 1,000 p.m.
Depreciation of the bus	@ 20% p.a.
Seating capacity of the bus	50 persons.

Passenger tax is 20% of the total takings. CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings. The fares are to be indicated per passenger for the journeys:

(i) Delhi to Chandigarh (ii) Delhi to Agra and (iii) Delhi to Jaipur

ANSWER

Working Notes:

Total Distance (in km.) covered per month

Bus route	Km. per trip	Trips per day	Days per month	Km. per month
Delhi to Chandigarh	250	2	8	4,000
Delhi to Agra	210	2	10	4,200
Delhi to Jaipur	270	2	6	3,240
				11,440

Passenger- km. per month

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	Total seats available per month (at 100% capacity)	Capacity utilised		Km. per trip	Passenger-Km. per month
		(%)	Seats		
Delhi to Chandigarh & Back	800 (50 seats × 2 trips × 8 days)	90	720	250	1,80,000 (720 seats × 250 km.)
Delhi to Agra & Back	1,000 (50 seats × 2 trips × 10 days)	85	850	210	1,78,500 (850 seats × 210 km.)
Delhi to Jaipur & Back	600 (50 seats × 2 trips × 6 days)	100	600	270	1,62,000 (600 seats × 270 km.)
Total					5,20,500

Monthly Operating Cost Statement

	(₹)	(₹)
(i) Running Costs		
Diesel $\{(11,440 \text{ km} \div 4 \text{ km}) \times ₹ 56\}$	1,60,160	
Lubricant oil $\{(11,440 \text{ km} \div 100) \times ₹ 10\}$	1,144	1,61,304
(ii) Maintenance Costs		
Repairs & Maintenance		1,000
(iii) Standing charges		
Salary to driver	24,000	
Salary to conductor	21,000	
Salary of part-time accountant	5,000	
Insurance (₹ 4,800 ÷ 12)	400	
Road tax (₹ 15,915 ÷ 12)	1,326.25	
Permit fee	315	
Depreciation $\{(₹ 12,00,000 \times 20\%) \div 12\}$	20,000	72,041.25
Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,34,345.25
Passenger Tax*		93,738.10
Total Cost		3,28,083.35
Add: Profit*		1,40,607.15
Total takings per month		4,68,690.50

*Let, total takings be X then

$X = \text{Total costs per month before passenger tax} + 0.2 X (\text{passenger tax}) + 0.3 X (\text{profit})$

$X = ₹ 2,34,345.25 + 0.2 X + 0.3 X$

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$0.5 X = ₹ 2,34,345.25$ or, $X = ₹ 4,68,690.50$
 Passenger Tax = 20% of ₹ 4,68,690.50 = ₹ 93,738.10
 Profit = 30% of ₹ 4,68,690.50 = ₹ 1,40,607.15

Calculation of Rate per passenger km. and fares to be charged for different routes

Rate per Passenger-Km. = Totaltakingspermonth / TotalPassenger-Km.permonth
 = (4,68,690 / .505,20,500 Passenger-Km.₹) = ₹ 0.90

Bus fare to be charged per passenger.

Delhi to Chandigarh	=	₹ 0.90 × 250 km	=	₹ 225.00
Delhi to Agra	=	₹ 0.90 × 210 km	=	₹ 189.00
Delhi to Jaipur	=	₹ 0.90 × 270 km	=	₹ 243.00

4. A company is considering three alternative proposals for conveyance facilities for its sales personnel who has to do considerable traveling, approximately 20,000 kilometres every year. The proposals are as follows:

- (i) Purchase and maintain its own fleet of cars. The average cost of a car is ₹ 6,00,000.
- (ii) Allow the Executive use his own car and reimburse expenses at the rate of ₹ 10 per kilometer and also bear insurance costs.
- (iii) Hire cars from an agency at ₹ 1,80,000 per year per car. The company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

Petrol ₹ 6 per km.	Repairs and maintenance ₹ 0.20 per km.
Tyre ₹ 0.12 per km.	Insurance ₹ 1,200 per car per annum
Taxes ₹ 800 per car per annum	Life of the car: 5 years with annual mileage of 20,000 km.

Resale value: ₹ 80,000 at the end of the fifth year.

WORK OUT the relative costs of three proposals and rank them.

ANSWER

Calculation of relative costs of three proposals and their ranking

		I Use of company's car	II Use of own car	III Use of hired car
	per annum (₹)	per km. (₹)	per km. (₹)	per km. (₹)
Reimbursement		--	10.00	9.00*
Fixed cost:				
Insurance	1,200	0.06	0.06	--
Taxes	800	0.04	--	0.04
Depreciation (₹ 6,00,000 - ₹80,000) ÷ 5 year	1,04,000	5.20	--	--
Running and Maintenance Cost:				
Petrol	--	6.00	--	6.00
Repairs and Maintenance	--	0.20	--	--
Tyre	--	0.12	--	0.12
Total cost per km.	--	11.62	10.06	15.16
Cost for 20,000 km.		2,32,400	2,01,200	3,03,200
Ranking of proposals		II	I	III

* (₹ 1,80,000 ÷ 20,000 km.)

The Second alternative i.e., use of own car by the executive and reimbursement of expenses by the company is the best alternative from company's point of view.

CHAPTER 13- STANDARD COSTING

ILLUSTRATION 1

The standard and actual figures of product 'Z' are as under:

	Standard	Actual
Material quantity	50 units	45 units
Material price per unit	Rs. 1.00	Rs. 0.80

CALCULATE material cost variances.

SOLUTION

The variances may be calculated as under:

$$(a) \text{ Standard cost} = \text{Std. Qty} \times \text{Std. price} = 50 \text{ units} \times \text{Rs.}1.00 = \text{Rs.}50$$

$$(b) \text{ Actual cost} = \text{Actual qty.} \times \text{Actual price} = 45 \text{ units} \times \text{Rs.}0.80 = \text{Rs.} 36$$

Variances:

$$(i) \text{ Price variance} = \text{Actual qty} (\text{Std. price} - \text{Actual price}) \\ = 45 \text{ units} (\text{Rs.}1.00 - \text{Rs.}0.80) = \text{Rs.} 9 \text{ (F)}$$

$$(ii) \text{ Usage variance} = \text{Std. price} (\text{Std. qty} - \text{Actual qty.}) \\ = \text{Rs.}1 (50 \text{ units} - 45 \text{ units}) = \text{Rs.} 5 \text{ (F)}$$

$$(iii) \text{ Material cost variance} = \text{Standard cost} - \text{Actual cost} \\ (\text{Total variance}) = \text{Rs.} 50 - \text{Rs.} 36 = \text{Rs.} 14 \text{ (F)}$$

ILLUSTRATION 2

NXE Manufacturing Concern furnishes the following information:

Standard:	Material for 70 kg finished products	100 kg
	Price of material	Rs. 1 per kg
Actual:	Output	2,10,000 kg
	Material used	2,80,000 kg
	Cost of Materials	Rs. 2,52,000

CALCULATE: (a) Material usage variance, (b) Material price variance, (c) Material cost variance.

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SOLUTION

Standard Quantity of input for actual output (SQ) = $2,10,000 \text{ kg} / 70\text{kg} \times 100 \text{ kg}$
= 3,00,000 kg.

Actual Price (AP) = $(\text{Rs.}2,52,000 \div 2,80,000 \text{ kg}) = \text{Rs.}0.90 \text{ per kg.}$

(a) Material Usage Variance = $(\text{SQ} - \text{AQ}) \times \text{SP}$
= $(3,00,000 - 2,80,000) \times 1 = \text{Rs. } 20,000 \text{ (F)}$

(b) Material Price Variance = $(\text{SP} - \text{AP}) \times \text{AQ}$
= $(1 - 0.90) \times 2,80,000 = \text{Rs. } 28,000 \text{ (F)}$

(c) Material Cost Variance = $(\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})$
= $(3,00,000 \times 1) - (2,80,000 \times 0.90)$
= $\text{Rs. } 48,000 \text{ (F)}$

Check MCV = MPV + MUV

$\text{Rs. } 48,000 \text{ (F)} = \text{Rs. } 28,000 \text{ (F)} + \text{Rs. } 20,000 \text{ (F)}$

ILLUSTRATION 3

The standard cost of a chemical mixture is as follows:

40% material A at Rs. 20 per kg

60% material B at Rs. 30 per kg

A standard loss of 10% of input is expected in production. The cost records for a period showed the following usage:

90 kg material A at a cost of Rs. 18 per kg

110 kg material B at a cost of Rs. 34 per kg

The quantity produced was 182 kg of good product.

CALCULATE all material variances.

SOLUTION**Basic Calculation**

Material	Standard for 180 kg. output			Actual for 182 kg. output		
	Qty. Kg.	Rate (Rs.)	Amount	Qty Kg.	Rate	Amount (Rs.)
A	80	20	1,600	90	18	1,620
B	120	30	3,600	110	34	3,740
Total		200	5,200		200	
Less: Loss	20	-	-	18	-	-

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Std. cost of actual output = Rs.5,200 × 180 / 182 = Rs. 5, 257.78

Calculation of Variances

1. Material Cost Variance = (Std. cost of actual output – Actual cost)
= (5,257.78 – 5,360) = Rs. 102.22 (A)

2. Material Price Variance = (SP – AP) × AQ
Material A = (20 – 18) × 90 = Rs. 180.00 (F)

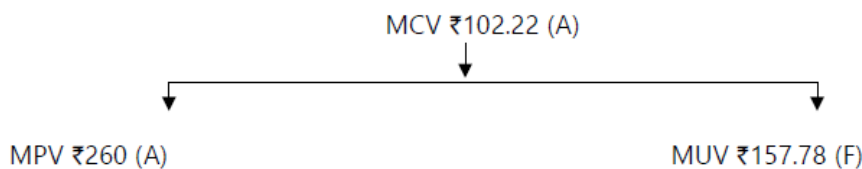
Material B = (30 – 34) × 110 = Rs. 440.00 (A)
MPV =Rs. 260.00 (A)

3. Material Usage Variance = (Std. Quantity for actual output – Actual Quantity) × Std. Price

Material A = $\left(80 \times \frac{182}{180} - 90\right) \times 20 = ₹ 182.22 (A)$

Material B = $\left(120 \times \frac{182}{180} - 110\right) \times 30 = ₹ 340.00 (F)$

MUV = $₹ 157.78 (F)$
Check


ILLUSTRATION 4:

The standard and actual figures of a firm are as under
Standard time for the job 1,000 hours
Standard rate per hour Rs. 50
Actual time taken 900 hours
Actual wages paid Rs. 36,000
CALCULATE variances.

SOLUTION

(a) Std. labour cost (Rs.)
(1,000 hours × Rs.50) 50,000

(b) Actual wages paid 36,000

(c) Actual rate per hour: Rs. 36,000/900 hours = Rs.40

Variations

(i) Labour Rate variance = Actual time (Std. rate – Actual rate)
= 900 hours (Rs.50 – Rs.40) = Rs.9,000 (F)

(ii) Efficiency variance = Std. rate per hr. (Std. time – Actual time)
= Rs.50 (1,000 hrs. – 900 hrs.) = Rs.5,000 (F)

(iii) Total labour cost variance = Std. labour cost – Actual labour cost
= {(Rs.50 × 1,000 hours) – Rs.36,000}
= (Rs.50,000 – Rs.36,000) = Rs.14,000 (F)

ILLUSTRATION 5

NPX Ltd. uses standard costing system for manufacturing of its product X. Following is the budget data given in relation to labour hours for manufacture of 1 unit of Product X :

Labour	Hours	Rate (Rs.)
Skilled	2	6
Semi-Skilled	3	4
Un- Skilled	5	3
Total	10	

In the month of January, 2020, total 10,000 units were produced following are the details:

Labour	Hours	Rate (Rs.)	Amount (Rs.)
Skilled	18,000	7	1,26,000
Semi-Skilled	33,000	3.5	1,15,500
Un- Skilled	58,000	4	2,32,000
Total	1,09,000		4,73,500

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Actual Idle hours (abnormal) during the month:

Skilled:	500
Semi- Skilled:	700
Unskilled:	800
Total	2,000

CALCULATE:

(a) Labour Variances.

(b) Also show the effect on Labour Rate Variance if 5,000 hours of Skilled Labour are paid @ Rs. 5.5 per hour and balance were paid @ Rs. 7 per hour.

SOLUTION

Working Notes:

	Budget			Standard for actual			Actual		
	Hours	Rate (Rs.)	Amount (Rs.)	Hours	Rate (Rs.)	Amount (Rs.)	Hours	Rate (Rs.)	Amount (Rs.)
Skilled	2	6	12	20000	6	120000	18000	7	126000
Semi-skilled	3	4	12	30000	4	120000	33000	3.5	115500
Unskilled	5	3	15	50000	3	150000	58000	4	232000
	10		39	100000		390000	109000		473500

	Idle Hours	Hours worked
Skilled	500	17,500
Semi-skilled	700	32,300
Unskilled	800	57,200
	2000	107000

(a) (i) Labour Cost Variance= (SH×SR – AH×AR)

Skilled 20,000 × 6 – 18,000 × 7 = Rs. 6,000 (A)

Semi-Skilled 30,000 × 4 – 33,000 × 3.5 = Rs. 4,500 (F)

Unskilled 50,000 × 3 – 58,000 × 4 = Rs. 82,000 (A)

Total Rs. 83,500 (A)

(ii) Labour Rate Variance = (SR – AR)×AHPaid

Skilled (6 – 7) × 18,000 = Rs. 18,000 (A)

Semi-Skilled (4 – 3.5) × 33,000 = Rs. 16,500 (F)

Unskilled (3 – 4) × 58,000 = Rs. 58,000 (A)

Total Rs. 59,500 (A)

(iii) Labour Efficiency Variance = (SH – AH) × SR

Skilled (20,000 – 17,500) × 6 = Rs. 15,000 (F)

Semi- Skilled (30,000 – 32,300) × 4 = Rs. 9,200 (A)

Unskilled (50,000 – 57,200) × 3 = Rs. 21,600 (A)

Total Rs. 15,800 (A)

(iv) Labour Idle Time Variance = (Idle Hours × SR)

Skilled 500 × 6 = Rs. 3,000 (A)

Semi- Skilled 700 × 4 = Rs. 2,800 (A)

Unskilled 800 × 3 = Rs. 2,400 (A)

Total Rs. 8,200 (A)

(v) Labour Mix Variance = (RSH – AHWorked)×SR

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$$\text{Revised Std. hours (RSH)} = \frac{\text{Std.Hours}}{\text{TotalStd.hours}} \times \text{TotalActual Hours}$$

$$\text{Skilled} \quad \left(\frac{20,000}{1,00,000} \times 1,07,000 - 17,500 \right) \times 6 = ₹ 23,400 \text{ (F)}$$

$$\text{Semi- Skilled} \quad \left(\frac{30,000}{1,00,000} \times 1,07,000 - 32,300 \right) \times 4 = ₹ 800 \text{ (A)}$$

$$\text{Unskilled} \quad \left(\frac{50,000}{1,00,000} \times 1,07,000 - 57,200 \right) \times 3 = ₹ 11,100 \text{ (A)}$$

Total **Rs. 11,500 (F)**

(vi) Labour Yield Variance = (SH – RSH) × SR

$$\text{Skilled} \quad \left(20,000 - \frac{20,000}{1,00,000} \times 1,07,000 \right) \times 6 = ₹ 8,400 \text{ (A)}$$

$$\text{Semi- Skilled} \quad \left(30,000 - \frac{30,000}{1,00,000} \times 1,07,000 \right) \times 4 = ₹ 8,400 \text{ (A)}$$

$$\text{Unskilled} \quad \left(50,000 - \frac{50,000}{1,00,000} \times 1,07,000 \right) \times 3 = ₹ 10,500 \text{ (A)}$$

Total **₹ 27,300 (A)**

(b) Labour Rate Variance = (SR – AR) × AHPaid

$$\begin{aligned} \text{Skilled} \quad & (6 - 5.5) \times 5,000 \\ & (6 - 7) \times 13,000 \end{aligned} \quad = \text{Rs. } 10,500 \text{ (A)}$$

$$\text{Semi- Skilled} \quad (4 - 3.5) \times 33,000 \quad = \text{Rs. } 16,500 \text{ (F)}$$

$$\text{Unskilled} \quad (3 - 4) \times 58,000 \quad = \text{Rs. } 58,000 \text{ (A)}$$

Total Rs. 52,000 (A)

ILLUSTRATION 6

The standard labour employment and the actual labour engaged in a week for a job are as under:

	Skilled workers	Semi-skilled workers	Unskilled workers
Standard no. of workers in the gang	32	12	6
Actual no. of workers employed	28	18	4
Standard wage rate per hour	3	2	1
Actual wage rate per hour	4	3	2

During the 40 hours working week, the gang produced 1,800 standard labour hours of work. CALCULATE:

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- (a) Labour Cost Variance
- (b) Labour Rate Variance
- (c) Labour Efficiency Variance
- (d) Labour Mix Variance
- (e) Labour Yield Variance

SOLUTION
Workings:

1. Standard hours (SH) for actual hours produced are calculated as below:

$$\begin{aligned} \text{Skilled} &= \frac{1,800}{2,000} \times 1,280 = 1,152 \text{ hrs.} \\ \text{Semi-skilled} &= \frac{1,800}{2,000} \times 480 = 432 \text{ hrs.} \\ \text{Unskilled} &= \frac{1,800}{2,000} \times 240 = 215 \text{ hrs.} \end{aligned}$$

2. Actual hours (AH) paid are calculated as below:

Category	No. of Worker	Hours in a week	Total Hours
Skilled	28	40	1,120
Semi-skilled	18	40	720
Unskilled	4	40	160
			2000

3. For 40 hours week total Revised standard hours (RSH) will be calculated as below:

Category	No. of Worker	Hours in a week	Total Hours
Skilled	32	40	1,280
Semi-skilled	12	40	480
Unskilled	6	40	240
			2000

Calculations

Category of workers	SH × SR	AH × SR	AH × AR	RSH × SR
Skilled	$1,152 \times 3 = 3,456$	$1,120 \times 3 = 3,360$	$1,120 \times 4 = 4,480$	$1,280 \times 3 = 3,840$
Semi-skilled	$432 \times 2 = 864$	$720 \times 2 = 1,440$	$720 \times 3 = 2,160$	$480 \times 2 = 960$
Unskilled	$216 \times 1 = 216$	$160 \times 1 = 160$	$160 \times 2 = 320$	$240 \times 1 = 240$
Total	Rs. 4,536	Rs. 4,960	Rs. 6,960	Rs. 5,040

(i) Labour Cost Variance = Std. Cost for hours worked – Actual cost paid
 = (SH × SR) – (AH × AR)
 = Rs.4,536 – 6,960 = Rs.2,424 (A)

(ii) Labour Rate Variance = AH (SR – AR) or (AH × SR) – (AH × AR)

Skilled = $3,360 - 4,480 = \text{Rs.}1,120$ (A)
 Semi-skilled = $1,440 - 2,160 = \text{Rs.}720$ (A)
 Unskilled = $160 - 320 = \text{Rs.}160$ (A) 2,000 (A)

(iii) Labour Efficiency Variance = SR (SH – AH) or (SR × SH) – (SR × AH)

Skilled = $3,456 - 3,360 = \text{Rs.}96$ (F)
 Semi-skilled = $864 - 1,440 = \text{Rs.}576$ (A)
 Unskilled = $216 - 160 = \text{Rs.}56$ (F) Rs.424 (A)

(iv) Labour Mix Variance = SR (RSH – AH) or (SR × RSH) – (SR × AH)

Skilled = $3,840 - 3,360 = \text{Rs.}480$ (F)
 Semi-skilled = $960 - 1,440 = \text{Rs.}480$ (A)
 Unskilled = $240 - 160 = \text{Rs.}80$ (F) Rs.80 (F)

(v) Labour Yield Variance = SR (SH – RSH) or (SR × SH – SR × RSH)

Skilled = $3,456 - 3,840 = \text{Rs.}384$ (A)
 Semi-skilled = $864 - 960 = \text{Rs.}96$ (A)
 Unskilled = $216 - 240 = \text{Rs.}24$ (A) Rs.504 (A)

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$$(i) LCV = LRV + LEV$$

$$Rs.2,424 (A) = Rs.2,000 (A) + Rs.424 (A)$$

$$(ii) LEV = LMV + LYV$$

$$Rs.424 (A) = Rs.80 (F) + Rs.504 (A)$$

ILLUSTRATION 7

From the following information of G Ltd., CALCULATE (i) Variable Overhead Cost Variance; (ii) Variable Overhead Expenditure Variance and (iii) Variable Overhead Efficiency Variance:

Budgeted production	6,000 units
Budgeted variable overhead	Rs. 1,20,000
Standard time for one unit of output	2 hours
Actual production	5,900 units
Actual overhead incurred	Rs. 1,22,000
Actual hours worked	11,600 hours

SOLUTION

Workings:

$$1. \text{ Standard cost per unit} = Rs.1,20,000 / 6,000\text{units} = Rs.20$$

$$2. \text{ Standard cost per hour} = Rs.1,20,000 / 6,000\text{units} \times 2\text{hours} = Rs.10$$

(i) Variable Overhead Cost Variance:

$$= \text{Std. Overhead for actual production} - \text{Actual overhead incurred}$$

$$= Rs.20 \times 5,900 \text{ units} - Rs.1,22,000 = Rs.4,000 (A)$$

(ii) Variable Overhead Expenditure Variance:

$$= \text{Std. overhead for Actual hours} - \text{Actual Overhead}$$

$$= Rs.10 \times 11,600 \text{ hours} - Rs.1,22,000 = Rs.6,000 (A)$$

(iii) Variable Overhead Efficiency Variance:

$$= \text{Std.rate per hour} \times (\text{Std. hours for actual production} - \text{Actual hours})$$

$$= Rs.10 (2 \text{ hours} \times 5,900 \text{ units} - 11,600 \text{ hours}) = Rs.2,000 (F)$$

ILLUSTRATION 8

The cost detail of J&G Ltd. for the month of September, 2020 is as follows:

	Budgeted	Actual
Fixed overhead	Rs. 15,00,000	Rs. 15,60,000
Units of production	7,500	7,800
Standard time for one unit	2 hours	-
Actual hours worked	-	16,000 hours

Required:

CALCULATE (i) Fixed Overhead Cost Variance (ii) Fixed Overhead Expenditure Variance (iii) Fixed Overhead Volume Variance (iv) Fixed Overhead Efficiency Variance and (v) Fixed Overhead Capacity Variance.

SOLUTION

(i) Fixed Overhead Cost Variance:

= Overhead absorbed for actual production – Actual overhead incurred

$$= (1500000/7500 \times 7800) - 1560000 = 0$$

(ii) Fixed Overhead Expenditure Variance:

= Budgeted overhead – Actual overhead

$$= \text{Rs.}15,00,000 - \text{Rs.}15,60,000 = \text{Rs.}60,000 \text{ (A)}$$

(iii) Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted overhead

$$= (1500000/7500 \times 7800) - 1500000 = 60000 \text{ (F)}$$

(iv) Fixed Overhead Efficiency Variance:

= Std. Rate (Std. hours for actual production - Actual hours)

$$= ((1500000 / (7500 \times 2)) \times (2 \text{ hours} \times 7800 \text{ hours}) - 16000 \text{ hours})$$

$$= \text{Rs. } 100 (15600 - 16000) = \text{Rs. } 40000 \text{ (A)}$$

(v) Fixed Overhead Capacity Variance:
 = Std. Rate (Actual hours - Budgeted hours)
 = (Rs.15,00,000 / (7,500×2)) × (16,000 hours - 15,000 hours)
 = Rs.100 (16,000- 15,000) = Rs.1,00,000 (F)

ILLUSTRATION 9

The overhead expense budget for a factory producing to a capacity of 200 units per month is as follows:

Description of overhead	Fixed cost per unit in Rs.	Variable cost per unit in Rs.	Total cost per unit in Rs.
Power and fuel	1,000	500	1,500
Repair and maintenance	500	250	750
Printing and stationary	500	250	750
Other overheads	1,000	500	1,500
	3000	1500	4500

The factory has actually produced only 100 units in a particular month. Details of overheads actually incurred have been provided by the accounts department and are as follows:

Description of overhead	Actual cost
Power and fuel	Rs. 4,00,000
Repair and maintenance	Rs. 2,00,000
Printing and stationary	Rs. 1,75,000
Other overheads	Rs. 3,75,000

You are required to CALCULATE the Overhead volume variance and the overhead expense variances.

SOLUTION

Overheads volume variance (in case of fixed overhead):

Standard fixed overheads per unit (SR): Rs.3,000 (Given)

Actual production : 100 units

Standard production (capacity) : 200 units

Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted Overhead

= (Rs.3,000× 100 units) – (Rs.3,000× 200 units)

= Rs.3,00,000 - Rs.6,00,000 = Rs.3,00,000 (Adverse)

Overhead expense variances

For variable overhead:

= AQ (SR – AR)

= 100 units (Rs.1,500 - Rs.1,500) = Nil

For fixed overhead:

= Budgeted Overhead – Actual Overhead

= (Rs.3,000 × 200 units) – (Total overhead – Variable overhead)

= (Rs.3,000 × 200 units) – (Rs.11,50,000 - Rs.1,50,000)

= Rs.6,00,000 – (Rs.11,50,000 - Rs.1,50,000)

= Rs.6,00,000 –Rs.10,00,000 = Rs.4,00,000 (Adverse)

ILLUSTRATION 10

The following information was obtained from the records of a manufacturing unit using standard costing system.

	Standard	Actual
Production	4,000 units	3,800 units
Working days	20	21
Machine hours	8,000 hours	7,800 hours
Fixed Overhead	Rs. 4,00,000	Rs. 3,90,000
Variable Overhead	Rs.1,20,000	Rs.1,20,000

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You are required to CALCULATE the following overhead variance:

- (a) Variable overhead variances
(b) Fixed overhead variances

SOLUTION
(a) Variable Overhead Variances

(i) Variable Overhead Variance:

= Std. overhead for actual production – Actual overhead

= (Rs.1,20,000 / 4,000 units × 3,800 units) - Rs.1,20,000

= Rs.1,14,000 – Rs.1,20,000 = Rs.6,000 (A)

(ii) Variable Overhead Expenditure Variance:

= Std. overhead for actual hours – Actual overhead

= (Rs. 1,20,000 / 8,000 hours × 7,800 hours) - Rs.1,20,000

= Rs.15 × 7,800 hours - Rs.1,20,000 = Rs.3,000 (A)

(iii) Variable Overhead Efficiency Variance:

= Std. Rate per hour (Std. hours for actual production – Actual hours)

$$= \frac{\text{₹1,20,000}}{8,000 \text{ hours}} \times \left[\left(\frac{8,000 \text{ hours}}{4,000 \text{ units}} \times 3,800 \text{ units} \right) - 7,800 \text{ hours} \right]$$

= ₹15 × (7,600 hours – 7,800 hours) = ₹3,000 (A)

(b) Fixed Overhead Variance:

(i) Fixed Overhead Variance:

= Absorbed overhead – Actual overhead

= {(SR × SH) – (AR × AH)}

= (Rs. 400000/400000 units × 3800 units) - 390000

= Rs.3,80,000 - Rs.3,90,000 = 10,000 (A)

(ii) Fixed Overhead Expenditure Variance:

= Budgeted Overhead – Actual Overhead

= Rs.4,00,000 - Rs.3,90,000 = Rs.10,000 (F)

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(iii) Fixed Overhead Volume Variance:
 = Absorbed overhead – Budgeted Overhead =
 (Rs.4,00,000 × 3,800 units / 4,000 units) - Rs.4,00,000
 = Rs. 3,80,000 - Rs.4,00,000 = Rs.20,000 (A)

(iv) Fixed Overhead Efficiency Variance:
 = SR × (Std. hours for actual production – Actual hours)
 = Rs.50 × {(2 hours × 3,800 units) – 7,800 hours}
 = Rs.3,80,000 - Rs.3,90,000 = Rs.10,000 (A)

(v) Fixed Overhead Capacity Variance:
 = SR × (Actual hours – Revised budgeted hours)
 = Rs.50 × (7,800 hours) – (8,000 × 21 days / 20 days)
 = Rs.50 × (7,800 hours – 8,400 hours) = Rs.30,000 (A)

(vi) Fixed Overhead Calendar Variance:
 = Rate per day (Budgeted days – Actual days)
 = (Rs.4,00,000 / 20 days) × (20 days – 21 days) = 20,000 (F)

ILLUSTRATION 11

ABC Ltd. produces an article by lending two basic raw materials. It operates a standard costing system and the following standards have been set for raw materials:

Material	Standard mix	Standard price (₹ per kg)
A	40%	4
B	60%	3

The standard loss in processing is 15%. During April 2021, the company produced 1,700 kgs. of finished output.

The position of stock and purchases for the month of April 2021 are as under:

Material	Stock on	Stock on	Purchased during April 2021	
	01.04.2021	30.04.2021	(Kg.)	(₹)
	(Kg.)	(Kg.)	(Kg.)	(₹)
A	35	5	800	3,400
B	40	50	1,200	3,000

Opening stock of material is valued at standard price.

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CALCULATE the following variances:

- (i) Material price variance
- (ii) Material usage variance
- (iii) Material yield variance
- (iv) Material mix variance
- (v) Total Material cost variance

ANSWER

Types of material	Standard			Actual		
	Qty. (Kg.)	Rate (₹)	Amount (₹)	Qty. (Kg.)	Rate (₹)	Amount (₹)
A	800	4	3,200	35	4	140.00
				795	4.25	3,378.775
B	1200	3	3,600	40	3	120.00
TOTAL	2,000		6,800	2,020		6,513.75

(i) Material price variance

= Actual qty. (Std. price – Actual price)

Material A: Since the actual price and standard price in respect of 35 kg. of raw materials A are same i.e. ₹ 4, there will be no price variance in respect of this quantity. Price variance will be in respect of only 795 kg. as given below:

= 795 kg. (₹ 4 – ₹ 4.25) = ₹ 198.75 (A)

Material B: For Material B also, price variance will only be in respect of 1,150 kg. as given below:

= 1,150 kg. (₹ 3 – ₹ 2.50) = ₹ 575 (F)

Total = ₹ 198.75 (A) + 575 (F) = ₹ 376.25(F)

(ii) Material usage variance

= (Std. qty. for actual output – Actual qty.) × Std. price

Material A	= (800 – 830) × 4	= 120 (A)
Material B	= (1,200 – 1,190) × 3	= 30 (F)
		₹ 90 (A)

(iii) Material yield variance

= (Std. qty. - Revised Std. qty.) × Std. Price

Material A = (800 – 808) × 4 = 32 (A)

Material B = (1,200 – 1,212) × 3 = 36 (A)

₹ 68 (A)

Check

MUV = MMV + MYV

90 (A) = 22 (A) + 68 (A)

(iv) Material mix variance

= (Revised std. qty. – Actual qty.) × Std. Price

Material A = (808 – 830) × 4 = 88 (A)

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Material B = $(1,212 - 1,190) \times 3 = 66$ (F)
₹ 22 (A)

(v) Total material cost variance

= Std. cost for actual output – Actual cost = $6,800 - 6,513.75 = 286.25$ (F)

Check

MCV = MPV + MUV

286.25 (F) = 376.25 (F) + 90 (A)

Working Notes:

1. Standard quantity for actual output

The standard loss being 15%. It means to produce, 1,700 kg. of the article, standard quantity of material required is:

= $100 \times 1,700 \text{ kgs} / 85 = 2,000 \text{ kg.}$

Out of 2,000 kg. of material used, 40% is of type A and 60% is of type B, i.e.,

Standard quantity for actual output for:

Material A = $40 \times 2,000 / 100 = 800 \text{ kg.}$

Material B = $60 \times 2,000 / 100 = 1,200 \text{ kg.}$

2. Actual quantity of material

= Opening stock + Purchases – Closing stock

Material A = $35 + 800 - 5 = 830 \text{ kg.}$

Material B = $40 + 1,200 - 50 = 1,190 \text{ kg.}$

3. Standard cost per unit

= Total standard cost / Total standard output of std. mix

= $₹ 6,800 / 1,700 \text{ kg.} = ₹ 4 \text{ per kg}$

4. Revised Standard Quantity

Material A = $2,020 \times 800 / 2,000 = 808 \text{ kg.}$

Material B = $2,020 \times 1,200 / 2,000 = 1,212 \text{ kg}$

ILLUSTRATION 12

The standard output of product 'EXE' is 25 units per hour in manufacturing department of a company employing 100 workers. The standard wage rate per labour hour is ₹ 6.

In a 42 hours week, the department produced 1,040 units of 'EXE' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were ₹ 6.20, ₹ 6 and ₹ 5.70 respectively to 10, 30 and 60 of the workers.

CALCULATE relevant labour variances.

ANSWER

Working Notes:

1. Calculation of standard man hours

When 100 worker works for 1 hr., then the std. output is 25 units.

Std. man hour per unit = $100 \text{ hrs.} / 25 \text{ units} = 4 \text{ hrs.}$

2. Calculation of std. man hours for actual output

Total std. man hours = 1,040 units × 4 hrs. = 4,160 hrs.

Standard for actual			Actual					
Hours	Rate (₹)	Amount (₹)	No. of workers	Actual hours paid	Idle time hrs.	Production hours	Rate (₹)	Amount paid (₹)
4,160	6	24,960	10	420	21	399	6.20	2,604
			30	1,260	63	1,197	6.00	7,560
			60	2,520	126	2,394	5.70	14,364
4,160	6	24,960	100	4,200	210	3,990		24,528

1. Labour cost variance

= Std. labour cost – Actual labour cost
 = 24,960 – 24,528 = ₹ 432 (F)

2. Labour rate variance

= (SR – AR) × AH_{paid}
 = (6 – 6.20) × 420 = 84 (A)
 = (6 – 6) × 1260 = NIL
 = (6 – 5.70) × 2,520 = 756 (F)
 = 672 (F)

3. Labour efficiency variance

= (SH – AH) × SR
 = (4,160 – 3,990) × 6 = 1,020 (F)

4. Labour Idle time variance

= Idle Hours × SR
 = 210 × 6 = 1,260 (A)

ILLUSTRATION 13

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overheads are budgeted at ₹ 1,44,000 per month. The standard time required to manufacture one unit of product is 4 hours.

In April 2021, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were ₹ 1,42,000.

COMPUTE the following Fixed Overhead variance:

1. Efficiency variance
2. Capacity variance
3. Calendar variance
4. Expenditure variance
5. Volume variance
6. Total Fixed overhead variance

SOLUTION

Working Notes:

		Budget	Actual
(1)	Fixed overheads for the month	1,44,000	1,42,000
(2)	Working days per month	25	24
(3)	Working hours per month	(120 machines × 8 hrs. × 25 days) = 24,000	(840 machines hours × 24 days) = 20,160
(4)	Production units per month	24,000 hrs. / 4 hrs. = 6,000	5,305

(5) Standard hours for actual production

= Actual production units × Std. hours per unit

= 5,305 × 4 = 21,220 hrs.

(6) Standard fixed overhead rate per unit = ₹1,44,000 / 6000 units = ₹ 24

(7) Standard fixed overhead rate per hour = ₹ 1,44,000 / 24,000 hrs. = ₹ 6

(8) Standard fixed overhead per day = ₹1,44,000 / 25 days = ₹ 5,760

1. Efficiency variance

= Std. rate per hr. (Std. hrs. for actual production – Actual hrs.)

= 6 × (21,220 – 20,160) = ₹ 6,360 (F)

2. Capacity variance

= Std. Rate (Actual hours - Budgeted hours)

= 6 × {20,160 – (24 days × 120 machine × 8 hrs.)} = ₹ 17,280 (A)

3. Calendar variance

= (Actual No. of days – Budgeted No. of days) × Std. rate per day

= (24 – 25) × 5,760 = ₹ 5,760 (A)

4. Expenditure variance

= Budgeted overhead – Actual overhead

= 1,44,000 – 1,42,000 = ₹ 2,000 (F)

5. Volume variance

= Absorbed overhead – Budgeted overhead

= (5,305 × 24) – 1,44,000 = ₹ 16,680 (A)

6. Total fixed overhead Variance

= Absorbed overhead – Actual overhead incurred

= (5,305 × 24) – 1,42,000 = ₹ 14,680 (A)

MCQs based Questions

1. Under standard cost system the cost of the product determined at the beginning of production is its:

(a) Direct cost

(b) Pre-determined cost

(c) Historical cost

(d) Actual cost

ANSWER 1-B

2. The deviations between actual and standard cost is known as:

- (a) Multiple analysis
- (b) Variable cost analysis
- (c) Variance analysis
- (d) Linear trend analysis

ANSWER 2-C

3. The standard which is attainable under favourable conditions is:

- (a) Theoretical standard
- (b) Expected standard
- (c) Normal standard
- (d) Basic standard

ANSWER 3-A

4. The standard most suitable from cost control point of view is:

- (a) Normal standard
- (b) Theoretical standard
- (c) Expected standard
- (d) Basic standard

ANSWER 4-C

5. Overhead cost variances is:

- (a) The difference between overheads recovered on actual output - actual overhead incurred.
- (b) The difference between budgeted overhead cost and actual overhead cost.

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(c) Obtained by multiplying standard overhead absorption rate with the difference between standard hours for actual output and actual hours worked.

(d) None of the above

ANSWER 5-A

6. Which of the following variance arises when more than one material is used in the manufacture of a product:

(a) Material price variance

(b) Material usage variance

(c) Material yield variance

(d) Material mix variance

ANSWER 6-D

7. If standard hours for 100 units of output are 400 @ Rs.2 per hour and actual hours take are 380 @ Rs. 2.25 per, then the labour rate variance is:

(a) Rs. 95 (adverse)

(b) Rs. 100 (adverse)

(c) Rs. 25 (favourable)

(d) Rs. 120 (adverse)

ANSWER 7-A

8. Controllable variances are best disposed-off by transferring to:

(a) Cost of goods sold

(b) Cost of goods sold and inventories

(c) Inventories of work-in-progress and finished goods

(d) Costing profit and loss account

ANSWER 8-D

9. Idle time variance is obtained by multiplying:

(a) The difference between standard and actual hours by the actual rate of labour per hour

(b) The difference between actual labour hours paid and actual labour hours worked by the standard rate

(c) The difference between standard and actual hours by the standard rate of labour per hour

(d) None of the above.

ANSWER 9-B

10. Basic standards are:

(a) Those standards, which require high degree of efficiency and performance.

(b) Average standards and are useful in long term planning.

(c) Standards, which can be attained or achieved

(d) Assuming to remain unchanged for a long time.

ANSWER 10-D

Theoretical Questions

1. DISCUSS the process of setting standards.

ANSWER 1

The process of standard cost is as below:

(i) Setting of Standards: The first step is to set standards which are to be achieved, the process of standard setting is explained below.

(ii) Ascertainment of actual costs: Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.

(iii) Comparison of actual cost with standard cost: Actual costs are compared with the standards costs and variances are determined.

(iv) Investigate the reasons for variances: Variances arises are investigated for further action. Based on this, performance is evaluated and appropriate actions are taken.

(v) Disposition of variances: Variances arise are disposed-off by transferring it the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.

2. DISCUSS the types of standards.**ANSWER 2**

Types of standards are as below:

(i) Ideal Standards: These represent **the level of performance attainable when prices for material and labour are most favourable**, when the highest output is achieved with the best equipment and layout and when the maximum efficiency in utilisation of resources results in maximum output with minimum cost. These types of standards are criticised on three grounds:

- (a) Since such standards would be unattainable, no one would take these seriously.
- (b) The variances disclosed would be variances from the ideal standards. These would not, therefore, indicate the extent to which they could have been reasonably and practically avoided.
- (c) There would be no logical method of disposing of these variances.

(ii) Normal Standards: These are **standards that may be achieved under normal operating conditions**. The normal activity has been defined as "the number of standard hours which will produce at normal efficiency sufficient good to meet the average sales demand over a term of years". These standards are, however, difficult to set because they require a degree of forecasting. The variances thrown out under this system are deviations from normal efficiency, normal sales volume, or normal production volume. If the actual performance is found to be abnormal, large variances may result and necessitate revision of standards.

(iii) Basic or Bogey Standards: These standards are used only when they are likely to remain constant or unaltered over a long period. According to this standard, a base year is chosen for comparison purposes in the same way as statisticians use price indices. Since basic standards do not represent what should be attained in the present period, current standards should also be prepared if basic standards are used. Basic standards are, however, well suited to businesses having a small range of products and long production runs. Basic standards are set, on a long-term basis and are seldom revised. When basic standards are in use, variances are not calculated. Instead, the actual cost is expressed as a percentage of basic cost. The current cost is also similarly expressed and the two percentages are compared to find out how much the actual cost has deviated from the current standard. The percentages are next compared with those of the previous periods to establish the trend of actual and current standard from basic cost.

(iv) Current Standards: These standards reflect the management's anticipation of what actual costs will be for the current period. These are the costs which the business will incur if the anticipated prices are paid for the goods and services and the usage corresponds to that believed to be necessary to produce the planned output. The variances arising from expected standards represent the degree of efficiency in usage of the factors of production, variation in prices paid for materials and services and difference in the volume of production.

3. HOW material usage standard is set

ANSWER 3

Material Usage Variance

It measures variance in material cost due to usage/ consumption of materials. It is computed as below:

Material Usage Variance = [Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity*]

Or

Std. Price (SP) × {Std. Quantity (SQ) - Actual Quantity (AQ)}

Or

[(SQ × SP) – (AQ × SP)]

(The difference between the Standard Quantity specified for actual production and the Actual Quantity used, at Standard Price)

*Here actual quantity means actual quantity of material used.

Responsibility for material usage variance: Material usage is the responsibility of production department and it is held responsible for adverse usage variance.

Reasons for variance: Actual material consumption may differ from the standard quantity either due to difference in proportion used from standard proportion or due to difference in actual yield from standard yield.

Material usage variance is divided into two parts (a) Material usage mix variance and (b) Material yield variance.

4. DISCUSS the various types of fixed overhead variances.

ANSWER 4

(1) Production Volume Variance: The term fixed overheads implies that the element of cost does not vary directly in proportion to the output. In other words, fixed overheads do not change within a given range of activity.

However, the unit cost changes even though the fixed overheads are constant in total within the given range of output. So, higher the level of activity, the lower will be the unit cost or vice versa.

The management is, therefore, faced with a costing difficulty because it requires a representative rate for charging fixed overheads irrespective of changes in volume of output.

(2) Overhead Expenses Variance: As discussed above, the Production Volume Variance analyses the unrecovered fixed overheads. Apart from this, there can be variations in the actual spending of both fixed and variable overheads when compared to what was established as a standard. Such variations can be accounted for by analyzing an overhead expenses variance. The analysis of overhead variances is different from that of material and labour variances. As overhead is the aggregate of indirect materials, indirect labour

and indirect expenses, this variance is considered to be a difficult part of variance analysis. It is important to understand that overhead variance is nothing but under or over-absorption of overhead.

Practical Questions

1. For making 10 kg. of CEMCO, the standard material requirements is:

Material	Quantity	Rate per kg. (Rs.)
A	8 kg	6.00
B	4 kg	4.00

During April, 1,000 kg of CEMCO were produced. The actual consumption of materials is as under:

Material	Quantity (Kg.)	Rate per kg. (Rs.)
A	750	7.00
B	500	5.00

CALCULATE (A) Material Cost Variance; (b) Material Price Variance; (c) Material usage Variance.

ANSWER 1

Basic Calculations

	Standard for 1,000 kg.			Actual for 1,000 kg.		
	Qty. Kg.	Rate (₹)	Amount (₹)	Qty. Kg.	Rate (₹)	Amount (₹)
A	800*	6	4,800	750	7	5,250
B	400*	4	1,600	500	5	2,500
Total	1,200		6,400	1,250		7,750

(* A- $8 \div 10 \times 1000 = 800$ B- $4 \div 10 \times 1000 = 400$)

Calculation of Variances:

(a) Material Cost Variance = Std. cost for actual output – Actual cost
 MCV = 6,400 – 7,750 = Rs.1, 350 (A)

(b) Material Price Variance = (SP – AP) × AQ

A = (6 – 7) × 750 = Rs. 750 (A)

B = (4 – 5) × 500 = Rs. 500 (A)

MPV = Rs.1,250 (A)

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(c) Material Usages Variance = (SQ – AQ) × SP

A = (800 – 750) × 6 = Rs. 300 (F)

B = (400 – 500) × 4 = Rs. 400 (A)

MUV = Rs. 100 (A)

Check

MCV = MPV + MUV

1,350 (A) = 1,250 (A) + 100 (A)

2. The standard mix to produce one unit of a product is as follows:

Material X 60 units @ Rs. 15 per unit = 900

Material Y 80 units @ Rs. 20 per unit = 1,600

Material Z 100 units @ Rs. 25 per unit = 2,500

240 units 5,000

During the month of April, 10 units were actually produced and consumption was as follows:

Material X 640 units @ Rs. 17.50 per unit = 11,200

Material Y 950 units @ Rs. 18.00 per unit = 17,100

Material Z 870 units @ Rs. 27.50 per unit = 23,925

2,460 units 52,225

CALCULATE all material variances.

ANSWER 2

Material	Standard for 10 units			Actual for 10 units		
	Qty. Units	Rate (₹)	Amount (₹)	Qty. units	Rate (₹)	Amount (₹)
X	600	15	9,000	640	17.50	11,200
Y	800	20	16,000	950	18.00	17,100
Z	1,000	25	25,000	870	27.50	23,925
Total	2,400		50,000	2,460		52,225

1. Material Cost Variance = Standard cost – Actual cost

= Rs. 50,000 – Rs. 52,225

MCV = Rs. 2,225 (A)

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2. Material Price Variance = (Std. Price – Actual Price) × Actual Qty.

Material X = $(15 - 17.50) \times 640 = \text{Rs. } 1,600 \text{ (A)}$

Material Y = $(20 - 18) \times 950 = \text{Rs. } 1,900 \text{ (F)}$

Material Z = $(25 - 27.50) \times 870 = \text{Rs. } 2,175 \text{ (A)}$

MPV = Rs. 1,875 (A)

3. Material Usage Variance = (Std. Qty. – Actual Qty.) × Std. Price

Material X = $(600 - 640) \times 15 = \text{Rs. } 600 \text{ (A)}$

Material Y = $(800 - 950) \times 20 = \text{Rs. } 3,000 \text{ (A)}$

Material Z = $(1,000 - 870) \times 25 = \text{Rs. } 3,250 \text{ (F)}$

MUV = Rs. 350 (A)

Check MCV = MPV + MUV

Rs.2,225 (A) = Rs.1,875 (A) + Rs.350 (A)

4. Material Mix Variance = (Revised Std. Qty. – Actual Qty.) × Std. Price

Material X = $(615^* - 640) \times 15 = \text{Rs. } 375 \text{ (A)}$

Material Y = $(820^* - 950) \times 20 = \text{Rs. } 2,600 \text{ (A)}$

Material Z = $(1,025 - 870) \times 25 = \text{Rs. } 3,875 \text{ (F)}$

MMV = Rs. 900 (F)

*Revised Standard Quantity (RSQ) is calculated as follows:

Material X = $\times 600 = 615 \text{ units } 24002460$

Material Y = $\times 800 = 820 \text{ units } 24002460$

Material Z = $\times 1,000 = 1,025 \text{ units } 24002460$

5. Material Yield Variance = (Std. Qty - Revised Std. Qty.) × Std. Price

Material X = $(600 - 615) \times 15 = \text{Rs. } 225 \text{ (A)}$

Material Y = $(800 - 820) \times 20 = \text{Rs. } 400 \text{ (A)}$

Material Z = $(1,000 - 1,025) \times 25 = \text{Rs. } 625 \text{ (A)}$

MYV = Rs.1,250 (A)

Check

MUV = MMV + MYV (Or MRUV)

Rs.350 (A) = Rs.900 (F) + Rs.1,250 (A)

or

MCV = MPV + MMV + MYV (Or MRUV)

Rs.2,225 (A) = Rs.1,875 (A) + Rs.900 (F) + Rs.1,250 (A)

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3. GAP Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. Following are the details.

Budgeted data:

Material	Qty	Price (Rs.)	Amount (Rs.)
A	60	20	1200
B	40	30	1200
Inputs	100		2400
Normal loss	20		
Output	80		2400

Actual data:

Actual output 80 units.

Material	Qty	Price (Rs.)	Amount (Rs.)
A	70	?	?
B	?	30	?

Material Price Variance (A) Rs. 105A
 Material cost variance Rs. 275A

You are required to CALCULATE:

- (i) Actual Price of material A
- (ii) Actual Quantity of material B
- (iii) Material Price Variance
- (iv) Material Usage Variance
- (v) Material Mix Variance
- (vi) Material Sub Usage Variance

ANSWER 3

(i) Actual Price of Material A

Let Actual Price of Material A be 'X'

Material Price Variance (A) = Rs. 105 (A)

Material Price Variance = (SP – AP) × AQ

$(20 - X) \times 70 = 105$ (A)

$1,400 - 70X = -105$

$X = 1,505 \div 70 = 21.5$

Therefore X (Actual Price) = Rs. 21.5

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(ii) Actual Quantity of Material B

Let Actual Quantity of Material B be 'X'

$$\text{Material Cost Variance} = (\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})$$

$$\text{Material Cost Variance} = 275 \text{ (A)}$$

$$\{(60 \times 20) - (70 \times 21.5)\} + \{(40 \times 30) - (X \times 30)\} = 275 \text{ (A)}$$

$$\{(1,200 - 1,505) + (1,200 - 30X)\} = -275$$

$$(895 - 30X) = -275$$

$$X = 1,170 \div 30 = 39 \text{ units}$$

(iii) Material Price Variance = (SP - AP) × AQ

$$\text{Material A} = (20 - 21.5) \times 70 = \text{Rs. } 105 \text{ (A)}$$

$$\text{Material B} = (30 - 30) \times 39 = \text{Rs. } 0$$

$$\text{Total} = \text{Rs. } 105 \text{ (A)}$$

(iv) Material Usage Variance = (SQ - AQ) × SP

$$\text{Material A} = (60 - 70) \times 20 = \text{Rs. } 200 \text{ (A)}$$

$$\text{Material B} = (40 - 39) \times 30 = \text{Rs. } 30 \text{ (F)}$$

$$\text{Total} = \text{Rs. } 170 \text{ (A)}$$

(v) Material Mix Variance = (RSQ - AQ) × SP

$$\text{Material A} = \left(\frac{109}{100} \times 60 - 70\right) \times 20 = ₹ 92 \text{ (A)}$$

$$\text{Material B} = \left(\frac{109}{100} \times 40 - 39\right) \times 30 = ₹ 138 \text{ (F)}$$

$$\text{Total} = ₹ 46 \text{ (F)}$$

(vi) Material Yield Variance = (SQ - RSQ) × SP

$$\text{Material A} = \left(60 - \frac{109}{100} \times 60\right) \times 20 = ₹ 108 \text{ (A)}$$

$$\text{Material B} = \left(40 - \frac{109}{100} \times 40\right) \times 30 = ₹ 108 \text{ (A)}$$

$$\text{Total} = ₹ 216 \text{ (A)}$$

4. The following standards have been set to manufacture a product:

Direct Material:	(Rs.)
2 units of A @ Rs. 4 per unit	8.00
3 units of B @ Rs. 3 per unit	9.00
15 units of C @ Rs. 1 per unit	15.00
	32.00
Direct Labour: 3 hours @ Rs. 8 per hour	24.00
Total standard prime cost	56.00

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows:

12,500 units of A at Rs. 4.40 per unit
 18,000 units of B at Rs. 2.80 per unit
 88,500 units of C at Rs. 1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours, the company paid at Rs. 12 per hour while for the remaining, the wages were paid at standard rate.

CALCULATE

(i) Materials price variance & Usage variance

(ii) Labour rate & Efficiency variances.

ANSWER 4

For Material Cost Variances

	SQ X SP	AQ X AP	AQ X SP
A	12,000 × 4 = 48,000	12,500 × 4.40 = 55,000	12,500 × 4 = 50,000
B	18,000 × 3 = 54,000	18,000 × 2.80 = 50,400	18,000 × 3 = 54,000
C	90,000 × 1 = 90,000	88,500 × 1.20 = 1,06,200	88,500 × 1 = 88,500
Total	Rs. 1,92,000	Rs. 2,11,600	Rs. 1,92,500

Variances:

Material Price Variance = Actual quantity (Std. price – Actual price)

Or, = (AQ × SP) – (AQ × AP)

Or, = Rs. 1,92,500 – Rs. 2,11,600

= Rs. 19,100 (A)

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Material Usage Variance = Standard Price (Std. Quantity – Actual Quantity)

Or, = (SP × SQ) – (SP × AQ)

Or, = Rs. 1,92,000 – Rs. 1,92,500 = Rs. 500 (A)

For Labour Cost Variance :

	SH × SR	AH × AR	AH × SR
Labour	(6,000 × 3) × Rs. 8 = 1,44,000	2,500 × 12 = 30,000 15,000 × 8 = 1,20,000	17,500 × 8 = 1,40,000
Total	Rs. 1,44,000	Rs. 1,50,000	Rs. 1,40,000

Variances:

Labour Rate Variance: Actual Hours (Std. Rate – Actual Rate)

Or, = (AH × SR) – (AH × AR)

Or, = Rs.1,40,000 – Rs.1,50,000

= Rs.10,000 (A)

Labour Efficiency Variance: Standard Rate (Std. Hours – Actual Hours)

Or, = (SR × SH) – (SR × AH)

Or, = Rs.1,44,000 – Rs.1,40,000

= Rs.4,000 (F)

5. XYZ Company has established the following standards for factory overheads.

Variable overhead per unit: Rs. 10/-
Fixed overheads per month Rs. 1,00,000

Capacity of the plant 20,000 units per month.

The actual data for the month are as follows:

Actual overheads incurred Rs. 3,00,000

Actual output (units) 15,000 units

Required:

CALCULATE overhead variances viz:

(i) Production volume variance

(ii) Overhead expense variance

ANSWER 5

Production/ Overhead volume variance (only for fixed overhead)

Fixed Overhead Volume Variance:
 = Absorbed overhead – Budgeted Overhead
 = (Rs.5 × 15,000 units) – (Rs.5 × 20,000 units)
 = Rs.75,000 - Rs.1,00,000 = Rs.25,000 (Adverse)

Overhead expense variances

For variable overhead:
 = AQ (SR – AR)
 = 15,000 units (Rs.10 - Rs.10) = Nil

For fixed overhead:
 = Budgeted Overhead – Actual Overhead
 = (Rs.5 × 20,000 units) – (Total overhead – Variable overhead)
 = (Rs.5 × 20,000 units) – (Rs.3,00,000 - Rs.10 × 15,000 units)
 = Rs.1,00,000 – (Rs.3,00,000 - Rs.1,50,000)
 = Rs.1,00,000 – Rs.1,50,000 = Rs. 50,000 (Adverse)

6. A company has a normal capacity of 120 machines, working 8 hours per day for 25 days in a month. The fixed overheads are budgeted at Rs. 1,44,000 per month. The standard time required to manufacture one unit of product is 4 hours. In April, 2020, the company worked 24 days of 840 machine hours per day and produced 5,305 units of output. The actual fixed overheads were Rs.1,42,000.

CALCULATE:

- (i) Expense variance
- (ii) Volume variance
- (iii) Total fixed overheads variance.

ANSWER 6
Working Notes:

	Budget	Actual
1. Working hours per month	24,000	20,160
2. Production units per month = (Budget 24,000 ÷ 4 hrs, Actual given)	6,000	5,305

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3. Standard fixed overhead rate per unit = Rs. $1,44,000 \div 6,000 = \text{Rs. } 24$		
4. Standard fixed overhead rate per hour = $\text{Rs. } 1,44,000 \div 24,000 = \text{Rs. } 6$		
5. Standard fixed overhead rate per day = Rs. $1,44,000 \div 25 = \text{Rs. } 5,760$		

Fixed Overhead Variances:

Actual Fixed overhead incurred = Rs. 1,42,000 (given)

Budgeted fixed overhead for the period = Rs. 1,44,000.

Standard fixed overhead for actual production

= (Standard output for actual time \times Standard Fixed Overhead per unit)

= $5,305 \times \text{Rs. } 24 = \text{Rs. } 1,27,320$.

Variances:

(i) F.O. Expenditure Variance = (Budgeted fixed overhead – Actual fixed overhead)
= $1,44,000 - 1,42,000 = \text{Rs. } 2,000$ (F)

(ii) Total Volume Variance = (Standard fixed overhead – Budgeted fixed overhead)
= $1,27,320 - 1,44,000 = \text{Rs. } 16,680$ (A)

(iii) Fixed overhead variance = (Standard fixed overhead – Actual Fixed overhead)
= $1,27,320 - 1,42,000 = \text{Rs. } 14,680$ (A)

Alternatively:

Expenditure Variance + Volume Variance = $2,000$ (F) + $16,680$ (A) = $\text{Rs. } 14,680$ (A)

7. Following information is available from the records of a factory:

	Budget	Actual
Fixed overhead for June, 2020	Rs. 10,000	Rs. 12,000
Production in June, 2020 (units)	2,000	2,100
Standard time per unit (hours)	10	–
Actual hours worked in June	–	21,000

CALCULATE:

(i) Fixed overhead cost variance,

(ii) Expenditure variance,

(iii) Volume variance.

ANSWER 7

For fixed overhead variances: Actual F.O. incurred (given)	Rs.12,000
Budgeted F.O. for the period	Rs.10,000
Standard F.O. for production (Standard output for actual time × Standard Fixed Overhead per unit) 2,100 units × {Rs.10,000 ÷ 2,000 units}	Rs.10,500

(i) Fixed Overhead Variance = Standard F.O. – Actual F.O.
 = Rs. 10,500 – Rs.12,000
 = Rs.1,500 (A)

(ii) F.O. Expenditure Variance = Budgeted F.O – Actual F.O.
 = Rs.10,000 – Rs.12,000
 = Rs.2,000 (A)

(iii) F.O. Volume Variance = Standard F.O – Budgeted F.O.
 = Rs.10,500 – Rs. 10,000 = Rs. 500 (F)

8. XYZ Ltd. has furnished you the following information for the month of August, 2020:

	Budget	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed overhead	Rs. 45,000	50,000
Variable overhead	Rs. 60,000	68,000
Working days	25	26

CALCULATE overhead variances.

ANSWER 8**Basic Calculations:**

$$\text{Standard hours per unit} = \frac{\text{Budgeted hours}}{\text{Budgeted units}} = \frac{30,000}{30,000} = 1 \text{ hour}$$

$$\text{Std. hrs. for actual output} = 32,500 \text{ units} \times 1 \text{ hr} = 32,500$$

$$\text{Standard overhead rate per hour} = \frac{\text{Budgeted overhead}}{\text{Budgeted hours}}$$

$$\text{For fixed overhead} = \frac{45,000}{30,000} = ₹1.50 \text{ per hour}$$

$$\text{For variable overhead} = \frac{60,000}{30,000} = ₹2 \text{ per hour}$$

$$\text{Std. F.O. rate per day} = \text{Rs.}45,000 \div 25 \text{ days} = \text{Rs.}1,800$$

$$\text{Recovered overhead} = \text{Std. hrs. for actual output} \times \text{St. rate}$$

$$\text{For fixed overhead} = 32,500 \text{ hrs.} \times \text{Rs.}1.50 = \text{Rs.}48,750$$

$$\text{For variable overhead} = 32,500 \text{ hrs.} \times \text{Rs.}2 = \text{Rs.}65,000$$

$$\text{Standard overhead} = \text{Actual hours} \times \text{Std. rate}$$

$$\text{For fixed overhead} = 33,000 \times 1.50 = \text{Rs.}49,500$$

$$\text{For variable overhead} = 33,000 \times 2 = \text{Rs.}66,000$$

$$\begin{aligned} \text{Revised budget hours} &= \frac{\text{Budgeted hours}}{\text{Budgeted days}} \times \text{Actual days} \\ &= \frac{30,000}{25} \times 26 = 31,200 \text{ hours} \end{aligned}$$

Revised budgeted overhead (for fixed overhead) = $31,200 \times 1.50 = \text{Rs.}46,800$

Calculation of variances

Fixed Overhead Variances:

(i) F.O. cost Variance = Recovered Overhead – Actual Overhead
 = $48,750 - 50,000$
 = Rs.1,250 (A)

(ii) F.O. Expenditure Variance = Budgeted Overhead – Actual Overhead
 = $45,000 - 50,000$
 = Rs. 5,000 (A)

(iii) F.O. Volume Variance = Recovered Overhead – Budgeted Overhead
 = $48,750 - 45,000$
 = Rs. 3,750 (F)

(iv) F.O. Efficiency Variance = Recovered Overhead – Standard Overhead
 = $48,750 - 49,500 = \text{Rs.}750$ (A)

(v) F.O. Capacity Variance = Standard Overhead- Revised Budgeted Overhead
 = $49,500 - 46,800 = \text{Rs.} 2,700$ (F)

(vi) Calendar Variance = (Actual Days - Budget Days) × St. rate per day.
 = $(26 - 25) \times 1,800 = \text{Rs.}1,800$ (F)

Variable Overhead Variances

(i) V.O. Cost variance = Recovered Overhead – Actual Overhead
 = $65,000 - 68,000 = \text{Rs.} 3,000$ (A)

(ii) V.O. Expenditure Variance= Standard Overhead – Actual Overhead
 = $66,000 - 68,000 = \text{Rs.} 2,000$ (A)

(iii) V.O. Efficiency Variance = Recovered Overhead – Standard Overhead
 = $65,000 - 66,000 = \text{Rs.}1,000$ (A)

Check

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(i) F.O. Cost Variance = Expenditure variance + Volume variance
 1,250 (A) = 5,000 (A) + 3,750 (F)

(ii) F.O. Volume Variance = Efficiency Variance + Capacity Variance + Calendar Variance
 3,750 (F) = 750 (A) + 2,700 (F) + 1,800 (F)

(iii) V.O. Cost Variance = Expenditure Variance + Efficiency Variance
 3,000 (A) = 2,000 (A) + 1,000 (A).

9. S.V. Ltd. has furnished the following data:

	Budget	Actual
No. of working days	25	27
Production in units	20,000	22,000
Fixed overheads	Rs. 30,000	Rs. 31,000

Budgeted fixed overhead rate is Rs. 1.00 per hour. In July, 2020, the actual hours worked were 31,500.

CALCULATE the following variances:

- (i) Volume variance.
- (ii) Expenditure variance.
- (iii) Total overhead variance.

ANSWER 9

For Fixed Overhead Variances

Actual fixed overhead incurred	Rs. 31,000
Budgeted fixed overhead for the period	Rs.30,000
Standard fixed overhead for production (Standard output for actual time × Standard Fixed Overhead per unit) (Rs. 30,000 ÷ 20,000 units) × 22,000	Rs.33,000

Computation of Variances:

(i) Fixed overhead expenditure variance:
 = Budgeted fixed overhead – Actual fixed overhead
 = Rs.30,000 – Rs.31,000 = Rs. 1,000 (A)

(ii) Fixed overhead volume variance:

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$$= \text{Standard fixed overhead} - \text{Budgeted fixed overhead}$$

$$= \text{Rs.33,000} - \text{Rs. 30,000} = \text{Rs. 3,000 (F)}$$

(iii) Fixed overhead variance:

$$= \text{Standard fixed overhead} - \text{Actual fixed overhead}$$

$$= \text{Rs.33,000} - \text{Rs. 31,000} = \text{Rs. 2,000 (F)}$$

10. The following data has been collected from the cost records of a unit for computing the various fixed overhead variances for a period:

Number of budgeted working days	25
Budgeted man-hours per day	6,000
Output (budgeted) per man-hour (in units)	1
Fixed overhead cost as budgeted	Rs. 1,50,000
Actual number of working days	27
Actual man-hours per day	6,300
Actual output per man-hour (in-units)	0.9
Actual fixed overhead incurred	Rs. 1,56,000

CALCULATE fixed overhead variances:

- (i) Expenditure Variance
- (ii) Volume Variance,
- (iii) Fixed Cost Variance.

ANSWER 10

For Fixed overheads Variances:

Actual fixed overhead incurred = Rs. 1,56,000

Budgeted fixed overhead for the period = 1,50,000

Standard fixed overhead for production (Standard output for actual time × Standard Fixed Overhead per unit)

(6,300 hrs × 27 days × 0.9) × (Rs. 1,50,000 ÷ 1,50,000 units) = Rs. 1,53,090 (a) Fixed Overhead Expenditure Variance	= Budgeted fixed overhead – Actual fixed overhead = Rs.1,50,000 – Rs.1,56,000 =	Rs. 6,000 (A)
(b) Fixed Overhead Volume Variance	= Standard fixed overhead – Budgeted fixed overhead = Rs.1,53,090 – Rs. 1,50,000 =	Rs. 3,090 (F)

(c) Fixed Overhead Variance	= Standard fixed overhead – Actual fixed overhead = Rs.1,53,090 – Rs. 1,56,000 =	Rs. 2,910 (A)
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11. J.K. Ltd. manufactures NXE by mixing three raw materials. For every batch of 100 kg. of NXE, 125 kg. of raw materials are used. In April, 2020, 60 batches were prepared to produce an output of 5,600 kg. of NXE. The standard and actual particulars for April, 2020, are as follows:

Raw Materials	Standard			Actual		Quantity of Raw Materials Purchased (Kg.)
	Mix (%)	Price per kg. (Rs.)	Mix (%)	Price per Kg. (Rs.)		
A	50	20	60		21	5,000
B	30	10	20		8	2,000
C	20	5	20		6	1,200

You are required to CALCULATE:

- (i) Material Price variance
- (ii) Material Usage Variance

ANSWER 11

Actual material used = 125 kg × 60 = 7,500 kg.

Actual cost of actual material used (AQ × AR) (Rs.)

A	(60%) 4,500 kg × Rs.21 =	94,500
B	(20%) 1,500 kg × Rs. 8 =	12,000
C	(20%) 1,500 kg × Rs. 6 =	9,000
	7500	115500

Standard cost of actual material used (AQ × SR) (Rs.)

A	4,500 kg × Rs.20 =	90,000
B	1,500 kg × Rs.10 =	15,000
C	1,500 kg × Rs. 5 =	7,500
	7,500	1,12,500

Standard cost of material, if it had been used in standard proportion (Standard Proportion × Standard Rate)

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A	(50%) 3,750 kg × Rs.20 =	75,000
B	(30%) 2,250 kg × Rs.10 =	22,500
C	(20%) 1,500 kg × Rs. 5 =	7,500
	7500	105000

Standard cost of production (SQ for actual production × SR)

Standard cost of output for 100 kg: (Rs.)

A	62.50 kg × Rs.20 =	1,250
B	37.50 kg × Rs.10 =	375
C	25.00 kg × Rs. 5 =	125
	125.00	1750

Standard cost for output of 5,600 kg.

$$= 1750 \text{ kg} \times 5600 \text{ kg} / 100 = \text{Rs. } 98000$$

Material Price Variance = Standard cost of actual material used – Actual cost of actual material used

$$= \text{Rs. } 1,12,500 - \text{Rs. } 1,15,500 = \text{Rs. } 3,000 \text{ (A)}$$

Material Usage Variance = Standard cost of production – Standard cost of actual material used

$$= \text{Rs. } 98,000 - \text{Rs. } 1,12,500 = \text{Rs. } 14,500 \text{ (A)}$$

Note: Material Price Variance can be calculated at the time of purchase as well. In that case, material variance will be as follows:

Material Price Variance = Standard cost of actual material used – Actual cost of actual material used

$$= \text{Rs. } 1,12,500 - \text{Rs. } 1,15,500 = \text{Rs. } 3,000 \text{ (A)}$$

Material Usage Variance = Standard cost of production – Standard cost of actual material used

$$= \text{Rs. } 98,000 - \text{Rs. } 1,12,500 = \text{Rs. } 14,500 \text{ (A)}$$

Note: Material Price Variance can be calculated at the time of purchase as well. In that case, material variance will be as follows:

Actual cost of material purchased

A	5,000 kg × Rs. 21 =	Rs. 1,05,000
B	2,000 kg × Rs. 8 =	Rs. 16,000
C	1,200 kg × Rs. 6 =	Rs. 7,200
		128200

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Standard cost of material purchased

A	5,000 kg × Rs. 20 =	Rs. 1,00,000
B	2,000 kg × Rs. 10 =	Rs. 20,000
C	1,200 kg × Rs. 5 =	Rs. 6,000
		126000

Material Price variance (if calculated at the time of purchase)
= Standard cost of actual material used – Actual cost of actual material used
= Rs.1,26,000 – Rs.1,28,200 = Rs. 2,200 (A)

12. Following data is extracted from the books of XYZ Ltd. for the month of January, 2020:

(i) Estimation-

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	800	?	--
Material-B	600	30.00	18,000

Normal loss was expected to be 10% of total input materials.

(ii) Actuals-

1480 kg of output produced.

Particulars	Quantity (kg)	Price (Rs.)	Amount (Rs.)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

(iii) Other Information-

Material Cost Variance = Rs. 3,625 (F)

Material Price Variance = Rs. 175 (F)

You are required to **CALCULATE:**

(i) Standard Price of Material-A;

(ii) Actual Quantity of Material-B;

(iii) Actual Price of Material-A;

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(iv) Revised standard quantity of Material-A and Material-B; and

(v) Material Mix Variance.

ANSWER 12

(i) Material Cost Variance (A + B) = $\{(SQ \times SP) - (AQ \times AP)\}$

$$Rs.3,625 = (SQ \times SP) - Rs.59,825$$

$$(SQ \times SP) = Rs. 63,450$$

$$(SQA \times SPA) + (SQB \times SPB) = Rs. 63,450$$

$$(940 \text{ kg} \times SPA) + (705 \text{ kg} \times Rs.30) = Rs. 63,450$$

$$(940 \text{ kg} \times SPA) + Rs.21,150 = Rs. 63,450$$

$$(940 \text{ kg} \times SPA) = Rs. 42,300$$

$$SP_A = Rs.42,300 / 940\text{kg}$$

Standard Price of Material-A = Rs. 45

Working Note:

SQ i.e. quantity of inputs to be used to produce actual output

$$= \frac{1,480\text{kg}}{90\%} = 1,645 \text{ kg}$$

$$SQ_A = \frac{800\text{kg}}{(800+600)} \times 1,645\text{kg} = 940 \text{ kg}$$

$$SQ_B = \frac{600\text{kg}}{(800+600)} \times 1,645\text{kg} = 705 \text{ kg}$$

(ii) Material Price Variance (A + B) = $\{(AQ \times SP) - (AQ \times AP)\}$

$$₹ 175 = (AQ \times SP) - ₹ 59,825$$

$$(AQ \times SP) = ₹ 60,000$$

$$(AQ_A \times SP_A) + (AQ_B \times SP_B) = ₹ 60,000$$

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$$\begin{aligned} & (900 \text{ kg} \times ₹ 45 \text{ (from (i) above)}) \\ & + (AQ_B \times ₹ 30) \qquad \qquad \qquad = ₹ 60,000 \\ ₹ 40,500 + (AQ_B \times ₹ 30) \qquad \qquad \qquad & = ₹ 60,000 \\ (AQ_B \times ₹ 30) \qquad \qquad \qquad & = ₹ 19,500 \\ AQ_B = \frac{19,500}{30} & = 650 \text{ kg} \end{aligned}$$

Actual Quantity of Material B = 650 kg.

$$\begin{aligned} \text{(iii)} \quad (AQ \times AP) \qquad \qquad \qquad & = ₹ 59,825 \\ (AQ_A \times AP_A) + (AQ_B \times AP_B) \qquad \qquad \qquad & = ₹ 59,825 \\ (900 \text{ kg} \times AP_A) + (650 \text{ kg (from (ii) above)} \times ₹ 32.5) \qquad \qquad \qquad & = ₹ 59,825 \\ (900 \text{ kg} \times AP_A) + ₹ 21,125 \qquad \qquad \qquad & = ₹ 59,825 \\ (900 \text{ kg} \times AP_A) \qquad \qquad \qquad & = ₹ 38,700 \\ AP_A = \frac{38,700}{900} & = 43 \end{aligned}$$

Actual Price of Material-A = ₹ 43

$$\begin{aligned} \text{(iv)} \quad \text{Total Actual Quantity of Material-A and Material-B} \\ = AQ_A + AQ_B \qquad \qquad \qquad & = 900 \text{ kg} + 650 \text{ kg (from (ii) above)} \\ & = 1,550 \text{ kg} \end{aligned}$$

Now,

$$\begin{aligned} \text{Revised } SQ_A & = \frac{800 \text{ kg}}{(800+600)} \times 1,550 \text{ kg} = \mathbf{886 \text{ kg}} \\ \text{Revised } SQ_B & = \frac{600 \text{ kg}}{(800+600)} \times 1,550 \text{ kg} = \mathbf{664 \text{ kg}} \end{aligned}$$

$$\begin{aligned} \text{(v)} \quad \text{Material Mix Variance (A + B)} & = \{(RSQ \times SP) - (AQ \times SP)\} \\ & = \{(RSQ_A \times SP_A) + (RSQ_B \times SP_B) - 60,000\} \\ & = (886 \text{ kg (from (iv) above)} \times ₹ 45 \text{ (from (i) above)}) \\ & + (664 \text{ kg (from (iv) above)} \times ₹ 30) - ₹ 60,000 \\ & = (39,870 + 19,920) - 60,000 = \mathbf{₹ 210 (A)} \end{aligned}$$

13. Paras Synthetics uses Standard costing system in manufacturing of its product 'Star 95 Mask'. The details are as follows;

Direct Material 0.50 Meter @ Rs. 60 per meter	Rs. 30
Direct Labour 1 hour @ Rs. 20 per hour	Rs. 20
Variable overhead 1 hour @ Rs. 10 per hour	Rs. 10
Total	Rs. 60

During the month of August, 2020 10,000 units of 'Star 95 Mask' were manufactured.

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Details are as follows:

Direct material consumed 5700 meters @ Rs. 58 per meter

Direct labour Hours ? @ ? Rs. 2,24,400
Variable overhead incurred Rs. 1,12,200

Variable overhead efficiency variance is Rs. 2,000 A. Variable overheads are based on Direct Labour Hours.

You are required to calculate the missing data and all the relevant Variances.

ANSWER 13
(i) Material Variances

	Budget			Standard for actual			Actual		
	Quantity	Price (Rs.)	Amount (Rs.)	Quantity	Price (Rs.)	Amount (Rs.)	Quantity	Price (Rs.)	Amount (Rs.)
Material	0.5	60	30	5000	60	300000	5700	58	330600

Material Cost Variance = (SQ×SP – AQ ×AP)
3,00,000 – 3,30,600 = Rs. 30,600(A)

Material Price Variance = (SP – AP) AQ
(60 -58) 5,700 = Rs. 11,400 (F)

Material Usage Variance = (SQ – AQ) SP
(5,000 – 5,700) 60 = Rs. 42,000 (A)

(ii) Variable Overheads variances

Variable overhead cost Variance = (Standard variable overhead – Actual Variable Overhead)

Standard Variable Overheads: 10,000 units × 10 = 1,00,000
(1,00,000 – 1,12,200) = Rs. 12,200(A)

Variable overhead Efficiency Variance = (Standard Hours – Actual Hours) × Standard Rate per Hour

Let Actual Hours be 'X'
(10,000 – X) × 10 = 2,000 (A)
1,00,000 – 10X = -2,000
X = 1,02,000 ÷ 10

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Therefore, Actual Hours (X) = 10,200

Variable overhead Expenditure Variance = (Variable Overhead at Actual Hours - Actual Variable Overheads)

$$10,200 \times 10 - 1,12,200 = \text{Rs. } 10,200 \text{ (A)}$$

(iii) Labour variances

	Budget			Standard for actual			Actual		
	Hours	Rate (Rs.)	Amount (Rs.)	Hours	Rate (Rs.)	Amount (Rs.)	Hours	Rate (Rs.)	Amount (Rs.)
Labour	1	20	0	10000	20	200000	10200	22	224400

$$\text{Actual Rate} = \text{Rs. } 2,24,400 \div 10,200 \text{ hours} = \text{Rs. } 22$$

Labour Cost Variance = (SH × SR) – (AH × AR)

$$10,000 \times 20 - 10,200 \times 22 = \text{Rs. } 24,400 \text{ (A)}$$

Labour Rate Variance = (SR – AR) × AH

$$(20 - 22) \times 10,200 = \text{Rs. } 20,400 \text{ (A)}$$

Labour Efficiency Variance = (SH – AH) × SR

$$(10,000 - 10,200) \times 20 = \text{Rs. } 4,000 \text{ (A)}$$

14. One kilogram of product K requires two chemicals A and B. The following were the details of product K for the month of June 2021:

- Standard mix for chemical A is 50% and chemical B is 50%.
- Standard price kilogram of chemical A is ₹ 12 and chemical B is ₹ 15.
- Actual input of chemical B is 70 kilograms.
- Actual price per kilogram of chemical A is ₹ 15
- Standard normal loss is 10% of total input
- Total Material cost variance is ₹ 650 adverse.
- Total Material yield variance is ₹ 135 adverse.

You are required to **CALCULATE:**

- Total Material mix variance
- Total Material usage variance
- Total Material price variance
- Actual loss of actual input
- Actual input of chemical A
- Actual price per kg. of chemical B

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ANSWER**Working Notes:**

(1) Calculation of standard mix of input (assuming Standard input as 100 kg)

	Qty. (Kg)	Price (₹)	Amount (₹)
Chemical A	50	12	600
Chemical B	50	15	750
	100	13.50	1,350
Normal Loss (10%)	(10)		
	90		1,350

(2) Let the actual input of chemical A be X kg. and the actual price of chemical B be ₹ Y.

Given,

Material yield variance = (Total standard input – Total Actual input) x Standard cost per unit of input

$$= [100 - (70 + X)] \times 13.5 = 135 \text{ (A)}$$

Therefore, X = 40 kg.

Also, Material cost variance = (Standard quantity x Standard price) – (Actual quantity x Actual price)

$$= 1,350 - \{(40 \times 15) + (70 \times Y)\} = 650 \text{ (A)}$$

$$= 1,350 - 600 - 70Y = 650 \text{ (A)}$$

Therefore, Y = ₹ 20

(i) Material mix variance

= (Revised Std. Quantity* – Actual quantity) x Standard Price

$$\text{Chemical A} = (55 - 40) \times 12 = 180 \text{ (F)}$$

$$\text{Chemical B} = (55 - 70) \times 15 = 225 \text{ (A)}$$

$$= ₹ 45 \text{ (A)}$$

*Revised Std. Quantity:

$$\text{Chemical A} = (70 + 40) \times 50\% = 55$$

$$\text{Chemical B} = (70 + 40) \times 50\% = 55$$

(ii) Material usage variance

= (Std. qty. – Actual qty.) x Std. price

$$\text{Chemical A} = (50 - 40) \times 12 = 120 \text{ (F)}$$

$$\text{Chemical B} = (50 - 70) \times 15 = 300 \text{ (A)}$$

$$= ₹ 180 \text{ (A)}$$

(iii) Material price variance

= (Std. price – Actual price) x Actual qty.

$$\text{Chemical A} = (12 - 15) \times 40 = 120 \text{ (A)}$$

$$\text{Chemical B} = (15 - 20) \times 70 = 350 \text{ (A)}$$

$$= ₹ 470 \text{ (A)}$$

(iv) Actual loss of actual input

Actual total input = 110 kg.

Less: Actual output = 90 kg.

Actual loss = 20 kg.

(v) Actual input of chemical A = 40 kg. [As calculated in Working note (2)].

(vi) Actual price per kg. of chemical B = ₹ 20 [As calculated in Working note (2)].

15. The following information is available from the cost records of Novell & Co. for the month of March 2021:

Materials purchased	20,000 units @ ₹ 88,000
Materials consumed	19,000 units
Actual wages paid for 4,950 hrs.	₹ 24,750
Units produced	1,800 units
Standard rates and pieces are:	
Direct material	₹ 4 per unit
Standard output	10 number for one unit
Direct labour rate	₹ 4.00 per hour
Standard requirement	2.5 hours per unit

You are required to CALCULATE relevant material and labour variance for the month.

ANSWER

Material variances

1. Material cost variance

$$\begin{aligned}
 &= (\text{Std. qty for actual output}^* \times \text{Std. price}) - (\text{Actual qty.} \times \text{Actual price}) \\
 &= (18,000 \times 4) - (19,000 \times 4.40) \\
 &= 72,000 - 83,600 = ₹ 11,600 \text{ (A)}
 \end{aligned}$$

$$* \text{Std. qty. for actual output} = 1,800 \times 10 = 18,000 \text{ units}$$

2. Material price variance

$$\begin{aligned}
 &= (\text{Std. price} - \text{Actual price}) \times \text{Actual qty.} \\
 &= (4 - 4.40) \times 19,000 \\
 &= 0.40 \times 19,000 = ₹ 7,600 \text{ (A)}
 \end{aligned}$$

3. Material usage variance

$$\begin{aligned}
 &= (\text{Std. qty.} - \text{Actual qty.}) \times \text{Std. price} \\
 &= (18,000 - 19,000) \times 4 \\
 &= 1,000 \times 4 = ₹ 4,000 \text{ (A)}
 \end{aligned}$$

Labour variances

1. Labour cost variance

$$\begin{aligned}
 &= (\text{Std. hours for actual output}^* \times \text{Std. price}) - \text{Actual cost} \\
 &= (4,500 \times 4) - 24,750 \\
 &= 18,000 - 24,750 = ₹ 6,750 \text{ (A)}
 \end{aligned}$$

$$* \text{Std. hours for actual output} = 1,800 \times 2.5 = 4,500 \text{ hrs.}$$

2. Labour rate variance

$$\begin{aligned}
 &= (\text{Std. rate} - \text{Actual rate}) \times \text{Actual hrs.} \\
 &= (4 - 5) \times 4,950 = ₹ 4,950 \text{ (A)}
 \end{aligned}$$

3. Labour efficiency variance

$$\begin{aligned}
 &= (\text{Std. hrs. for actual output} - \text{Actual hrs.}) \times \text{Std. rate} \\
 &= (4,500 - 4,950) \times 4 = ₹ 1,800 \text{ (A)}
 \end{aligned}$$

16. The following data for Pijee Ltd. is given:

	Budget	Actual
Production (in units)	400	360
Man hours to produce above	8,000	7,000
Variable overheads (in ₹)	10,000	9,150

The standard time to produce one unit of the product is 20 hours.
CALCULATE relevant Variable overhead variances.

ANSWER

Working Notes:

- Calculation of standard variable overhead per unit
 = Budgeted variable overhead / Budgeted production = $10,000 / 400 = ₹ 25$ per unit
 - Calculation of standard variable overhead per hour
 = Budgeted variable overhead / Budgeted man hours = $10,000 / 8,000 = ₹ 1.25$ per hour
 - Calculation of Std. variable overhead for actual output
 = Actual output × Std. variable overhead per unit
 = $360 \text{ units} \times ₹ 25 = ₹ 9,000$
 - Calculation of Budgeted variable overhead based on actual hours worked
 = Actual hours worked × Std. variable overhead per hour
 = $7,000 \times 1.25 = ₹ 8,750$
 - Calculation of standard hours for actual output
 = Actual output × Std. hours per unit
 = $360 \text{ units} \times 20 \text{ hours} = 7,200 \text{ hours}$
- (i) Variable overhead cost variance**
 = Std. variable overhead for actual output – Actual Variable Overheads
 = $9,000 - 9,150 = ₹ 150$ (A)
- (ii) Variable overhead expenditure variance**
 = Std. overhead for Actual hours – Actual Overhead
 = $8,750 - 9,150 = ₹ 400$ (A)
- (iii) Variable overhead efficiency variance**
 = (Std. hours for actual output – Actual hours) × Std. rate per hour
 = $(7,200 - 7,000) \times 1.25 = ₹ 250$ (F)

CHAPTER 14- MARGINAL COSTING

ILLUSTRATION 1

MNP Ltd sold 2,75,000 units of its product at Rs. 37.50 per unit. Variable costs are Rs. 17.50 per unit (manufacturing costs of Rs. 14 and selling cost Rs. 3.50 per unit). Fixed costs are incurred uniformly throughout the year and amounting to Rs. 35,00,000 (including depreciation of Rs. 15,00,000). There are no beginning or ending inventories. Required:

COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

SOLUTION

$$\begin{aligned} \text{Break even Sales Quantity} &= \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 35,00,000}{\text{₹ } 20} \\ &= 1,75,000 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Cash Break-even Sales Quantity} &= \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 20,00,000}{\text{₹ } 20} \\ &= 1,00,000 \text{ units.} \end{aligned}$$

ILLUSTRATION 2

You are given the following particulars CALCULATE:

- (a) Break-even point
- (b) Sales to earn a profit of Rs. 20,000

- i. Fixed cost Rs. 1,50,000
- ii. Variable cost Rs. 15 per unit
- iii. Selling price is Rs. 30 per unit

SOLUTION

$$\text{(a) Break-even point (BEP)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}^*} = \frac{\text{₹ } 1,50,000}{\text{₹ } 15} = 10,000 \text{ Units}$$

* (Contribution per unit = Sales per unit – Variable cost per unit = ₹ 30 - ₹ 15)

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(b) Sales to earn a Profit of ₹ 20,000:

$$= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}} \times \text{Selling price per unit}$$

$$= \frac{₹1,50,000 + ₹20,000}{₹15} \times ₹30 = ₹ 3,40,000$$

Or

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V Ratio}} = \frac{₹1,70,000}{\text{P/V Ratio}} = \frac{₹1,70,000}{50\%} = ₹3,40,000$$

$$\text{PV Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

ILLUSTRATION 3

A company has a P/V ratio of 40%. COMPUTE by what percentage must sales be increased to offset: 20% reduction in selling price?

SOLUTION

$$\text{Revised Sales Value} = \text{Desired Contribution} / \text{Revised P/V Ratio}^* = 0.40 / 0.25 = 1.6$$

This means sales value to be increased by 60% of the existing sales.

$$*\text{Revised P/V Ratio} = \text{Revised Contribution} / \text{Revised Selling Price} = (0.80 - 0.60) / 0.80 = 0.25$$

$$\text{Required Sales Quantity} = (\text{Desired Contribution}) / (\text{Revised P/V Ratio}^* \times \text{Revised Selling Price})$$

$$= 0.40 / 0.25 \times 0.80 = 2$$

Therefore, Sales value to be increased by 60% and sales quantity to be doubled to offset the reduction in selling price.

Proof:

Let selling price per unit is Rs.10 and sales quantity is 100 units.

Data before change in selling price:

Sales (Rs.10 × 100 units)	1,000
Contribution (40% of 1,000)	400
Variable cost (balancing figure)	600

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Data after the change in selling price:

Selling price is reduced by 20% that means it became Rs.8 per unit. Since, we have to maintain the earlier contribution margin i.e. Rs.400 by increasing the sales quantity only. Therefore, the target contribution will be Rs.400.
The new P/V Ratio will be

Sales	8.00
Variable cost	6.00
Contribution per unit	2.00
P/V Ratio	25%

Sales Value = Desired Contribution / Revised P/V Ratio = Rs.400 / 0.25 = Rs.1,600

Sales quantity = Sales value / Selling price per unit = 1,600 / 8 = 200 units

ILLUSTRATION 4

PQR Ltd. has furnished the following data for the two years:

Sales	Rs. ,00,000	?
Profit/Volume Ratio (P/V ratio)	50%	37.5%
Margin of Safety sales as a % of total sales	40%	21.875%

There has been substantial savings in the fixed cost in the year 2020 due to the restructuring process. The company could maintain its sales quantity level of 2019 in 2020 by reducing selling price.

You are required to **CALCULATE** the following:

- (i) Sales for 2020 in Value,
- (ii) Fixed cost for 2020 in Value,
- (iii) Break-even sales for 2020 in Value.

SOLUTION

In 2019, PV ratio = 50%

Variable cost ratio = 100% - 50% = 50%

Variable cost in 2019 = Rs. 8,00,000 50% = Rs. 4,00,000 ×

In 2020, sales quantity has not changed. Thus, variable cost in 2020 is Rs. 4,00,000.

In 2020, P/V ratio = 37.50%

Thus, Variable cost ratio = 100% - 37.5% = 62.5%

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(i) Thus, sales in 2020 = $4,00,000 / 62.5\% = \text{Rs.}6,40,000$

In 2020, Break-even sales = $100\% - 21.875\%$ (Margin of safety) = 78.125%

(ii) Break-even sales = $6,40,000 \times 78.125\% = \text{Rs.} 5,00,000$

(iii) Fixed cost = B.E. sales \times P/V ratio
 $= 5,00,000 \times 37.50\% = \text{Rs.}1,87,500$

ILLUSTRATION 5

You are given the following data for the year 2020 of Rio Co. Ltd:

Variable cost	60,000	60%
Fixed cost	30,000	30%
Net profit	10,000	10%
Sales	1,00,000	100%

FIND OUT (a) Break-even point, (b) P/V ratio, and (c) Margin of safety. Also DRAW a break-even chart showing contribution and profit.

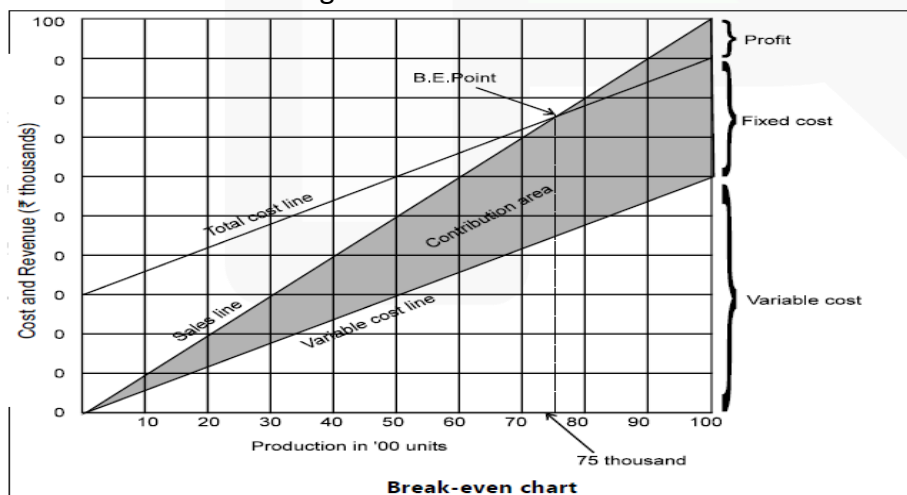
SOLUTION

P/V ratio = $(\text{Sales} - \text{Variable Cost}) / \text{Sales}$
 $= (1,00,000 - 60,000) / 1,00,000 = 40\%$

Break Even Point = $\text{Fixed Cost} / \text{P/V ratio} = 30,000 / 40\% = 75$

Margin of safety = $\text{Actual Sales} - \text{BE point} = 1,00,000 - 75,000 = \text{Rs.} 25,000$

Break even chart showing contribution is shown below



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ILLUSTRATION 6

PREPARE a profit graph for products A, B and C and find break-even point from the following data:

Products	A	B	C	Total
Sales (Rs.)	7,500	7,500	3,750	18,750
Variable cost (Rs.)	1,500	5,250	4,500	11,250
Fixed cost (Rs.)	---	---	---	5,000

SOLUTION**Statement Showing Cumulative Sales & Profit**

Sales	Cumulative Sales		Variable Cost	Contribution	Cumulative Contribution	Cumulative Profit
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
A	7,500	7,500	1,500	6,000	6,000	1,000
B	7,500	15,000	5,250	2,250	8,250	3,250
C	3,750	18,750	4,500	(750)	7,500	2,500

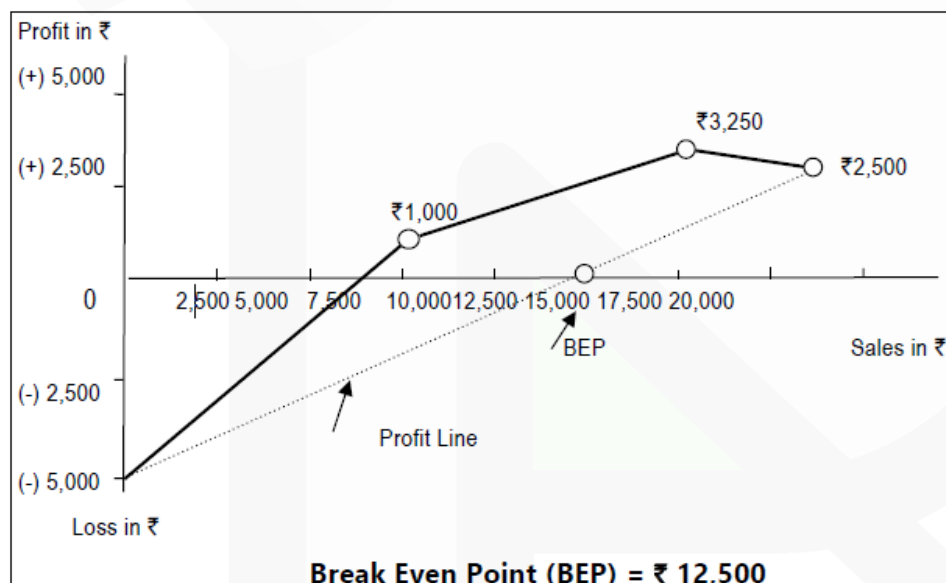


ILLUSTRATION 7 A company earned a profit of Rs. 30,000 during the year 2020. If the marginal cost and selling price of the product are Rs. 8 and Rs. 10 per unit respectively, **FIND OUT** the amount of margin of safety.

SOLUTION

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$$\text{P/V ratio} = \frac{\text{Selling price} - \text{Variable cost per unit}}{\text{Selling price}} = \frac{\text{₹10} - \text{₹8}}{\text{₹10}} = 20\%$$

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V ratio}} = \frac{30,000}{20\%} = \text{₹ } 1,50,000$$

ILLUSTRATION 8

A Ltd. Maintains margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to Rs. 5 lakhs.

CALCULATE the following:

- i. Break-even sales**
- ii. Total sales**
- iii. Total variable cost**
- iv. Current profit**
- v. New 'margin of safety' if the sales volume is increased by 7 ½ %.**

SOLUTION

(i) We know that: Break- even Sales (BES) × P/V Ratio = Fixed Cost
 Break-even Sales (BES) × 40% = Rs. 5,00,000
 Break- even Sales (BES) = Rs. 12,50,000

(ii) Total Sales (S) = Break Even Sales + Margin of Safety
 S = Rs. 12,50,000 + 0.375S
 Or, S – 0.375S = Rs. 12,50,000
 Or, S = Rs. 20,00,000

(iii) Contribution to Sales Ratio = 40%
 Therefore, Variable cost to Sales Ratio = 60%
 Variable cost = 60% of sales = 60% of 20,00,000
 Variable cost = 12,00,000

(iv) Current Profit = Sales – (Variable Cost + Fixed Cost)
 = Rs. 20,00,000 – (12,00,000 + 5,00,000) = Rs. 3,00,000

(v) If sales value is increased by 7 ½ %
 New Sales value = Rs. 20,00,000 × 1.075 = Rs. 21,50,000
 New Margin of Safety = New Sales value – BES
 = Rs. 21,50,000 – Rs. 12,50,000 = Rs. 9,00,000

ILLUSTRATION 9

By noting "P/V will increase or P/V will decrease or P/V will not change", as the case may be, STATE how the following independent situations will affect the P/V ratio:

- (i) An increase in the physical sales volume;
- (ii) An increase in the fixed cost;
- (iii) A decrease in the variable cost per unit;
- (iv) A decrease in the contribution margin;
- (v) An increase in selling price per unit;
- (vi) A decrease in the fixed cost;
- (vii) A 10% increase in both selling price and variable cost per unit;
- (viii) A 10% increase in the selling price per unit and 10% decrease in the physical sales volume;
- (ix) A 50% increase in the variable cost per unit and 50% decrease in the fixed cost.
- (x) An increase in the angle of incidence.

SOLUTION

Item no.	P/V Ratio	Reason
(i)	Will not change	
(ii)	Will not change	
(iii)	Will increase	
(iv)	Will decrease	
(v)	Will increase	
(vi)	Will not change	
(vii)	Will not change	Reasoning 1
(viii)	Will increase	Reasoning 2
(ix)	Will decrease	Reasoning 3
(x)	Will increase	Reasoning 4

A 10% increase in both selling price and variable cost per unit.

Reasoning 1.

Assumptions:

- a) Variable cost is less than selling price.

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- b) Selling price Rs.100 variable cost Rs. 90 per unit.
 c) P/V ratio = $(100 - 90) / 100 = 10\%$
 10% increase in S.P. = Rs.110 10% increase in variable cost = Rs.99

$$\text{P/V ratio} = (110 - 99) / 10 = 10\% \text{ i.e.}$$

P/v ratio will not change

Reasoning 2. Increase or decrease in physical sales volume will not change P/V ratio.

Hence 10% increase in selling price per unit will increase P/V ratio.

Reasoning 3. Increase or decrease in fixed cost will not change P/V ratio. Hence 50% increase in the variable cost per unit will decrease P/V ratio.

Reasoning 4. Angle of incidence is the angle at which sales line cuts the total cost line. If it is large, it indicates that the profits are being made at higher rate. Hence increase in the angle of incidence will increase the P/V ratio.

ILLUSTRATION 10

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year.

Relevant information about the products for the next year is given below.

	X	Y	Z
Selling Price (Rs. / unit)	10	12	12
Variable Costs (Rs. / unit)	6	9	7
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs	30000		

Required

COMPUTE the opportunity costs for each of the products.

SOLUTION

	X	Y	Z
I. Contribution per unit (Rs.)	4	3	5
II. Units (Lower of Production / Market Demand)	2,000	2,000	900
III. Possible Contribution (Rs.) [I × II]	8,000	6,000	4,500
IV. Opportunity Cost* (Rs.)	6,000	8,000	8,000

(* Opportunity cost is the maximum possible contribution forgone by not producing alternative product i.e. if Product X is produced then opportunity cost will be maximum of (Rs. 6,000 from Y, Rs. 4,500 from Z).

ILLUSTRATION 11

M.K. Ltd. manufactures and sells a single product X whose selling price is Rs. 40 per unit and the variable cost is Rs. 16 per unit.

(i) If the Fixed Costs for this year are Rs. 4,80,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%

(ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 50 per unit and the variable cost Rs. 10 per unit. The total fixed costs are estimated at Rs. 6,66,600. The sales mix of X : Y would be 7 : 3.

DETERMINE at what

level of sales next year, would M.K. Ltd. break even? Give separately for both X and Y the break-even sales in rupee and quantities.

SOLUTION

$$\begin{aligned}
 \text{(i) Contribution per unit} &= \text{Selling price} - \text{Variable cost} \\
 &= ₹40 - ₹16 = ₹24 \\
 \text{Break-even Point} &= \frac{₹4,80,000}{₹24} = 20,000 \text{ units} \\
 \text{Percentage Margin of Safety} &= \frac{\text{Actual Sales} - \text{Break - even Sales}}{\text{Actual Sales}} \\
 \text{Or, 60\%} &= \frac{\text{Actual Sales} - 20,000 \text{ units}}{\text{Actual Sales}} \\
 \therefore \text{Actual Sales} &= 50,000 \text{ units}
 \end{aligned}$$

Sales Value (50,000 units × Rs.40)	20,00,000
Less: Variable Cost (50,000 units × Rs.16)	8,00,000
Contribution	12,00,000
Less: Fixed Cost	4,80,000
Profit	7,20,000
Less: Income Tax @ 40%	2,88,000
Net Return	4,32,000

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$$\text{Rate of Net Return on Sales} = 21.6\% \left(\frac{\text{₹}4,32,000}{\text{₹}20,00,000} \times 100 \right)$$

(ii) Products

	X	Y
Selling Price	40	50
Less: Variable Cost	16	10
Contribution per unit	24	40
Sales Ratio	7	3
Contribution in sales Ratio	168	120

Based on Weighted Contribution

$$\text{Weighted Contribution} = \frac{24 \times 7 + 40 \times 3}{10} = \text{₹} 28.8 \text{ per unit}$$

$$\text{Total Break-even Point} = \frac{\text{Total Fixed Cost}}{\text{Weighted Cost}} = \frac{6,66,600}{28.8} = 23,145.80 \text{ units}$$

Break-even Point

$$X = \frac{7}{10} \times 23,145.80 = 16,202 \text{ units}$$

$$\text{or } 16,202 \times \text{₹} 40 = \text{₹} 6,48,080$$

$$Y = \frac{3}{10} \times 23,145.80 = 6,944 \text{ units or } 6,944 \times \text{₹} 50 = \text{₹} 3,47,200$$

Based on distributing fixed cost in the weighted Contribution Ratio

Fixed Cost

$$X = \frac{168}{288} \times 6,66,600 = \text{₹} 3,88,850$$

$$Y = \frac{120}{288} \times 6,66,600 = \text{₹} 2,77,750$$

Break-even Point

$$X = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{3,88,850}{24} = 16,202 \text{ units or } \text{₹} 6,48,000$$

$$Y = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{2,77,750}{40} = 6,944 \text{ units or } \text{₹} 3,47,200$$

ILLUSTRATION 12

X Ltd. supplies spare parts to an air craft company Y Ltd. The production capacity of X Ltd. facilitates production of any one spare part for a particular period of time. The

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following are the cost and other information for the production of the two different spare parts A and B:

	Part A	Part B
Per Unit		
Alloy usage	1.6 kgs.	1.6 kgs.
Machine Time: Machine P	0.6 hrs	0.25 hrs.
Machine Time: Machine Q	0.5 hrs.	0.55 hrs.
Target Price (Rs.)	145	115

Total hours available	Machine P 4,000 hours
	Machine Q 4,500 hours

Alloy available is 13,000 kgs. @ Rs. 12.50 per kg.

Variable overheads per machine hours	Machine P Rs.80
	Machine Q Rs. 100

Required

- (i) IDENTIFY the spare part which will optimize contribution at the offered price.
(ii) If Y Ltd. reduces target price by 10% and offers Rs. 60 per hour of unutilized machine hour, CALCULATE the total contribution from the spare part identified above?

SOLUTION

(i)

	Part A	Part B
Machine "P" (4,000 hrs)	6,666	16,000
Machine "Q" (4,500 hrs)	9,000	8,181
Alloy Available (13,000 kg.)	8,125	8,125
Maximum Number of Parts to be manufactured (Minimum of the above three)	6,666	8,125

Material (Rs.12.5 × 1.6 kg.)	20.00	20.00
Variable Overhead: Machine "P"	48.00	20.00
Variable Overhead: Machine "Q"	50.00	55.00
Total Variable Cost per unit	118.00	95.00
Price Offered	145.00	115.00
Contribution per unit	27.00	20.00
Total Contribution for units produced ... (l)	1,79,982	1,62,500

Spare Part A will optimize the contribution

(ii)

Parts to be manufactured numbers	6,666
Machine P : to be used	4,000
Machine Q : to be used	3,333
Underutilized Machine Hours (4,500 hrs. – 3,333 hrs.)	1,167
Compensation for unutilized machine hours (1,167hrs. × Rs.60) (II)	70,020
Reduction in Price by 10%, Causing fall in Contribution of Rs.14.50 per unit (6,666 units × Rs.14.5) (III)	96,657
Total Contribution (I + II – III)	1,53,345

ILLUSTRATION 13

The profit for the year of R.J. Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales.....	Rs. 5,00,000
Direct Materials.....	Rs. 2,50,000
Direct Labour.....	Rs. 1,00,000
Variable Overheads.....	Rs. 40,000
Capital Employed.....	Rs. 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required

FIND OUT by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

SOLUTION

Statement Showing “Cost and Profit for the Next Year”

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Particulars	Existing Volume, etc.	Volume, Costs, etc. after 10% Increase	Estimated Sale, Cost, Profit, etc.*
	(₹)	(₹)	(₹)
Sales	5,00,000	5,50,000	5,72,000
Less: Direct Materials	2,50,000	2,75,000	2,69,500
Direct Labour	1,00,000	1,10,000	1,07,800
Variable Overheads	40,000	44,000	43,120
Contribution	1,10,000	1,21,000	1,51,580
Less: Fixed Cost [#]	60,000	60,000	58,800
Profit	50,000	61,000	92,780

(*) for the next year after increase in selling price @ 4% and overall cost reduction by 2%.

(#) Fixed Cost = Existing Sales – Existing Marginal Cost – 12.5% on Rs.4,00,000

= Rs.5,00,000 – Rs.3,90,000 – Rs.50,000 = Rs.60,000

Percentage Profit on Capital Employed equals to 23.19%

(92,780 / 4,00,000 x 100)

Rs. Since the Profit of Rs.92,780 is more than 23% of capital employed, the proposal of the Sales Manager can be adopted.

ILLUSTRATION 14

Wonder Ltd. manufactures a single product, ZEST. The following figures relate to ZEST for a one-year period:

Activity Level	50%	100%
Sales and production (units)	400	800
	(Rs.)	(Rs.)
Sales	8,00,000	16,00,000
Production costs:		
- Variable	3,20,000	6,40,000
- Fixed	1,60,000	1,60,000
Selling and distribution costs:		
- Variable	1,60,000	3,20,000
- Fixed	2,40,000	2,40,000

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of ZEST at the beginning of the year.

In the first quarter, 220 units were produced and 160 units were sold.

Required:

(a) COMPUTE the fixed production costs absorbed by ZEST if absorption costing is used?

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(b) CALCULATE the under/over-recovery of overheads during the period?

(c) CALCULATE the profit using absorption costing?

(d) CALCULATE the profit using marginal costing?

SOLUTION

(a) Fixed production costs absorbed: (Rs.)

Budgeted fixed production costs	1,60,000
Budgeted output (normal level of activity 800 units)	
Therefore, the absorption rate: $1,60,000/800$	= Rs. 200 per unit
During the first quarter, the fixed production cost absorbed by ZEST would be (220 units × Rs. 200)	44,000

(b) Under /over-recovery of overheads during the period: (Rs.)

Actual fixed production overhead	40,000
(1/4 of Rs. 1,60,000)	
Absorbed fixed production overhead	44,000
Over-recovery of overheads	4,000

(c) Profit for the Quarter (Absorption Costing)

	(Rs.)	(Rs.)
Sales revenue (160 units × Rs. 2,000): (A)		3,20,000
Less: Production costs:		
- Variable cost (220 units × Rs. 800)	1,76,000	
- Fixed overheads absorbed (220 units × Rs. 200)	44,000	2,20,000
Add: Opening stock		--
Less: Closing Stock (2,20,000 × 60 units / 220 units)		(60,000)
Cost of Goods sold		1,60,000
Less: Adjustment for over-absorption of fixed production overheads		(4,000)
Add: Selling & Distribution Overheads:		
- Variable (160 units × Rs.400)	64,000	
- Fixed (1/4th of Rs. 2,40,000)	60,000	1,24,000
Cost of Sales (B)		2,80,000
Profit {(A) – (B)}		40,000

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(d) Profit for the Quarter (Marginal Costing)

(Rs.)	(Rs.)
Sales revenue (160 units × Rs. 2,000): (A)	3,20,000
Less: Production costs:	
- Variable cost (220 units × Rs. 800)	1,76,000
Add: Opening stock	--
Less: Closing Stock (1,76,000×60units / 220units)Rs.	(48,000)
Variable cost of goods sold	1,28,000
Add: Selling & Distribution Overheads:	
- Variable (160 units × Rs.400)	64,000
Cost of Sales (B)	1,92,000

Contribution {(C) = (A) – (B)}	1,28,000
Less: Fixed Costs:	
- Production cost	(40,000)
- Selling & distribution cost	(60,000)
Profit	28,000

ILLUSTRATION 15

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse its production mix in respect of these three products - 'X', 'Y' and 'Z'.

You have the following information

	X	Y	Z
Direct Materials Rs. (per unit)	160	120	80
Variable Overheads Rs. (per unit)	8	20	12

Direct labour :

Departments:	Rate per Hour (Rs.)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below :

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (Rs.)	312	400	240
Sales departments estimate of possible sales in the coming year (in units)	12,000	16,000	24,000

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There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

(i) Identify the best possible product mix of Moon Ltd.

(ii) Calculate the total contribution from the best possible product mix.

ANSWER

(b) (i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X (Rs.)	Y (Rs.)	Z (Rs.)
Selling Price (A)	312	400	240
Variable Cost:			
Direct Material	160	120	80
Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	72	100	40
Hours in Dept. A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = 10,000 x 6hrs. + 12,000 x 10 hrs. + 20,000 x 5 hrs. = 2,80,000 hrs.

Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X' = 12,000 units

Hours Required = 72,000 hrs (12,000 units × 6 hrs.)

Balance Hours Available = 2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)

Produce 'Y' (the Next Best) = 16,000 units

Hours Required = 1,60,000 hrs (16,000 units × 10 hrs.)

Balance Hours Available = 48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)

Produce 'Z' (balance) = 9,600 units (48,000 hrs./ 5 hrs.)

(ii) Statement Showing "Contribution"

Product	Units	Contribution/ Unit (Rs.)	Total Contribution (Rs.)
X	12,000	72	8,64,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
Total			28,48,000

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ILLUSTRATION 16

ABC Limited produces and sells two product- X and Y. The product is highly demanded in the market. Following information relating to both the products are given as under :

	Per Unit (₹)	
	X	Y
Direct Materials	140	180
Direct Wages	60	100
Variable Overheads (₹ 5 per machine hour)	20	40
Selling price	300	450

The company is facing scarcity of machine hours for working. The availability of machine hours are limited to 60,000 hrs in a month. At present, the monthly demand of product X and product Y is 8,000 units and 6,000 units respectively. The fixed expenses of the company are ₹ 2,25,000 per month.

You are required to:

DETERMINE the product mix that generates maximum profit to the company in the given situation and also CALCULATE the profit of the company

ANSWER

Workings -

Calculation of contribution (per unit)

	X (₹)	Y (₹)
Selling price (A)	300	450
Variable cost:		
Direct materials	140	180
Direct wages	60	100
Variable overheads	20	40
Total Variable Cost (B)	220	320
Contribution per unit (A-B)	80	130
Machine hours (MH)	4	8
Contribution per MH	20	16.25
Ranking	I	II

(i) Product mix to maximise the profit

Produce 'X' = **8,000 units**

Hours Required = 32,000 hrs (8,000 units × 4 hrs.)

Balance Hours Available = 28,000 hrs (60,000 hrs. – 32,000 hrs.)

Produce 'Y' (balance) = **3,500 units** (28,000 hrs./ 8 hrs.)

(ii) Profitability of the concern in the best Product mix

	X (₹)	Y (₹)	Total (₹)
Sales (in units)	8,000 units	3,500 units	
Contribution per unit	80	130	
Contribution	6,40,000	4,55,000	
Less: Fixed cost			2,25,000
Profit			8,70,000

ILLUSTRATION 17

PQR Ltd. manufactures medals for winners of athletic events and other contests. Its manufacturing plant has the capacity to produce 10,000 medals each month. The company has current production and sales level of 7,500 medals per month. The current domestic market price of the medal is ₹ 150.

The cost data for the month of August 2021 is as under:

	(₹)
Variable costs:	
- Direct materials	2,62,500
- Direct labour cost	3,00,000
- Overhead	75,000
Fixed manufacturing costs	2,75,000
Fixed marketing costs	1,75,000
	10,87,500

PQR Ltd. has received a special one-time only order for 2,500 medals at ₹ 120 per medal.

Required:

- Should PQR Ltd. accept the special order? Why? EXPLAIN briefly.
- Suppose the plant capacity was 9,000 medals instead of 10,000 medals each month. The special order must be taken either in full or rejected totally. ANALYSE whether PQR Ltd. should accept the special order or not.

SOLUTION

In this question, the existing demand for the medals is 7,500 units per month against the 10,000 units capacity. There is an idle capacity for 2,500 medals in a month. Since, the capacity of the plant (supply) is more than the demand, any additional order could increase the existing profit provided the offered price is more than the marginal cost.

The existing cost and profit structure is as under:

Particulars	Amount (₹)	Amount (₹)
A. Selling price per unit		150.00
B. Variable Cost per unit:		
- Direct material (₹ 2,62,500 ÷ 7,500 units)	35.00	
- Direct labour (₹ 3,00,000 ÷ 7,500 units)	40.00	
- Overhead (₹ 75,000 ÷ 7,500 units)	10.00	85.00
C. Contribution per unit (A-B)		65.00
D. Total Contribution (₹ 85 × 7,500 units)		4,87,500
E. Fixed Costs:		
- Fixed manufacturing costs	2,75,000	
- Fixed marketing costs	1,75,000	4,50,000
F. Profit (D-E)		37,500

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(i) The offered price for the additional demand of 2,500 medals is more than the variable cost per unit. Any additional demand will contribute towards fixed costs and profit.

Particulars	Amount (₹)	Amount (₹)
A. Sales Value {(₹ 150 × 7,500) + (₹ 120 × 2,500)}		14,25,000
B. Variable Cost (₹ 85 × 10,000)		8,50,000
C. Contribution (A-B)		5,75,000
D. Fixed Costs:		
- Fixed manufacturing costs	2,75,000	
- Fixed marketing costs	1,75,000	4,50,000
E. Profit (C-D)		1,25,000

The offer for 2,500 unit be accepted as it increases the profit by ₹ 87,500 (₹ 1,25,000 – ₹ 37,500).

(ii) In this instant case, the capacity to produce medals is decreased by 1,000 unit per month and the existing demand for the medals is 7,500. The spare capacity is for 1,500 medals only but the special demand is for 2,500 medals. By accepting the offer, the company has to lose contribution on 1,000 medals from existing customers. The offer will only be acceptable if the gain from the new offer supersedes the loss from the existing customers.

Particulars	Amount (₹)	Amount (₹)
A. Sales Value {(₹ 150 × 7,500) + (₹ 120 × 2,500)}		12,75,000
B. Variable Cost (₹ 85 × 10,000)		7,65,000
C. Contribution (A-B)		5,10,000
D. Fixed Costs:		
- Fixed manufacturing costs	2,75,000	
- Fixed marketing costs	1,75,000	4,50,000
E. Profit (C-D)		60,000

By accepting the special order at ₹ 120 per unit, the total profit of the company is increased by ₹ 22,500 (₹ 60,000 – ₹ 37,500) hence the order may be accepted, however, other qualitative factors may also be taken care-off.

ILLUSTRATION 18

NN Ltd. manufactures automobiles accessories and parts. The following are the total cost of processing 2,00,000 units:

Direct materials cost	₹ 375 per unit
Direct labour cost	₹ 80 per unit
Variable factory overhead	₹ 16 per unit
Fixed factory overhead	₹ 500 lakhs

The purchase price of the component is ₹ 485. The fixed overhead would continue to be incurred even when the component is bought from outside.

REQUIRED:

(a) Should the part be made or bought from outside considering that the present facility when released following a buying decision would remain idle?

(b) In case the released capacity can be rented out to another manufacturer for ₹ 32,00,000 having good demand. What should be the decision?

SOLUTION

The present cost structure is as follows:

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Variable cost per unit is:

Direct materials cost	₹ 375
Direct labour cost	₹ 80
Variable factory overhead	₹ 16
Total variable cost per unit	₹ 471

The fixed cost of ₹ 500 lakhs is irrelevant for decision making as it would incur in either case.

(a) The decision shall be made comparing the marginal cost of making and buying the component.

Here the variable cost of making the component is ₹ 471 as compared to buying cost of ₹ 485. The component shall be made by using own production facility as it would save the company ₹ 14 per unit.

(b) If by releasing the production facility the company can earn a rental income of ₹ 32,00,000, then the additional cost of buying from outside and the rental income from releasing the capacity shall be compared for making decision.

(i) Rental income	₹ 32,00,000
(ii) Additional cost of buying (₹ 14 × 2,00,000 units)	₹ 28,00,000
Additional Income {(i)-(ii)}	₹ 4,00,000

The component should be bought from outside as it would save the company ₹ 4,00,000 in fixed cost.

MCQs based Questions

1. Under marginal costing the cost of product includes:

- (a) Prime costs only.
- (b) Prime costs and variable overheads.
- (c) Prime costs and fixed overheads.
- (d) Prime costs and factory overheads.

ANSWER 1-B

2. Reporting under marginal costing is accomplished by:

- (a) Treating all costs as period costs.
- (b) Eliminating the work-in-progress inventory account.
- (c) Matching variable costs against revenue and treating fixed costs as period costs.
- (d) Including only variable costs in income statement.

ANSWER 2-C

3. Period costs are:

- (a) Variable costs.
- (b) Fixed costs.
- (c) Prime costs.
- (d) Overheads costs.

ANSWER 3-B

4. When sales and production (in units) are same then profit under:

- (a) Marginal costing is higher than that of absorption costing.
- (b) Marginal costing is lower than that of absorption costing.
- (c) Marginal costing is equal to that of absorption costing.
- (d) None of the above.

ANSWER 4-C

5. When sales exceed production (in units) then profit under:

- (a) Marginal costing is higher than that of absorption costing.
- (b) Marginal costing is lower than that of absorption costing.
- (c) Marginal costing is equal than that of absorption costing.
- (d) None of above.

ANSWER 5-A

6. The main difference between marginal costing and absorption costing is regarding the treatment of:

- (a) Prime cost.
- (b) Fixed overheads.
- (c) Direct materials.

(d) Variable overheads.

ANSWER 6-B

7. Under profit volume ratio, the term profit:

(a) Means the sales proceeds in excess of total costs.

(b) Here mean the same thing as is generally understood.

(c) Is a misnomer, it in fact refers to contribution i.e. (sales revenue-variable costs).

(d) None of the above.

ANSWER 7-C

8. Factors which can change the break-even point:

(a) Change in fixed costs.

(b) Change in variable costs.

(c) Change in the selling price.

(d) All of the above.

ANSWER 8-D

9. If P/V ratio is 40% of sales then what about the remaining 60% of sales:

(a) Profit.

(b) Fixed cost.

(c) Variable cost.

(d) Margin of safety.

ANSWER 9-C

10. The P/V ratio of a product is 0.6 and profit is Rs. 9,000. The margin of safety is:

(a) Rs. 5,400

(b) Rs. 15,000

(c) Rs. 22,500

(d) Rs. 3,600

ANSWER 10-B

Theoretical Questions

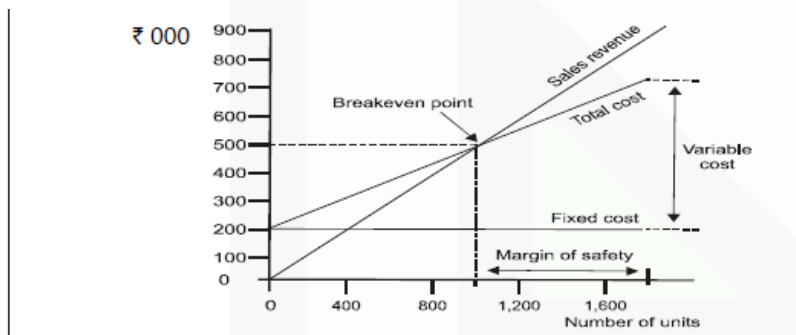
1. EXPLAIN and ILLUSTRATE break-even point with the help of break-even chart.

ANSWER 1

A breakeven chart records costs and revenues on the vertical axis and the level of activity on the horizontal axis. The making of the breakeven chart would require you to select appropriate axes. Subsequently, you will need to mark costs/revenues on the Y axis whereas the level of activity shall be traced on the X axis. Lines representing

- (i) Fixed costs (horizontal line at Rs. 2,00,000 for ABC Ltd),
- (ii) Total costs at maximum level of activity (joined to the Y-axis where the Fixed cost of Rs. 2,00,000 is marked) and (iii) Revenue at maximum level of activity (joined to the origin) shall be drawn next.

The breakeven point is that point where the sales revenue line intersects the total cost line. Other measures like the margin of safety and profit can also be measured from the chart.



2. WRITE a short note on Angle of Incidence.

ANSWER 2

This angle is formed by the intersection of sales line and total cost line at the break-even point. **This angle shows the rate at which profit is earned once the break-even point is reached.** The wider the angle the greater is the rate of earning profits. A large angle of incidence with a high margin of safety indicates extremely favourable position. The shaded area in the graph given below is representing the angle of incidence. The angle above and below the break-even point shows the rate of earning profitability (loss). Wider angle denotes higher rate of earnings and vice-versa.

3. DISCUSS basic assumptions of Cost Volume Profit analysis.

ANSWER 3

Assumptions:

1. **Changes in the levels of revenues and costs arise only because of changes in the number of product (or service) units produced and sold** – for example, the number of television sets produced and sold by Sony Corporation or the number of packages delivered by Overnight Express. The number of output units is the only revenue driver and the only cost driver. Just as a cost driver is any factor that affects costs, a revenue driver is a variable, such as volume, that causally affects revenues.
2. **Total costs can be separated into two components**; a fixed component that does not vary with output level and a variable component that changes with respect to output level. Furthermore, variable costs include both direct variable costs and indirect variable costs of a product. Similarly, fixed costs include both direct fixed costs and indirect fixed costs of a product
3. When represented graphically, **the behaviours of total revenues and total costs are linear** (meaning they can be represented as a straight line) in relation to output level within a relevant range (and time period).
4. **Selling price, variable cost per unit, and total fixed costs (within a relevant range and time period) are known and constant.**
5. The analysis either covers a single product or assumes that **the proportion of different products when multiple products are sold will remain constant** as the level of total units sold changes. 6. All revenues and costs can be added, subtracted, and compared **without taking into account the time value of money.** (Refer to the FM study material for a clear understanding of time value of money).

4. DISCUSS the practical application of Marginal Costing.

ANSWER 4

Some of the facts about marginal costing are depicted below:

Not a distinct method: Marginal costing is not a distinct method of costing like job costing, process costing, operating costing, etc., but a special technique used for managerial decision making. Marginal costing is used to provide a basis for the interpretation of cost data to measure the profitability of different products, processes and cost centres in the course of decision making. It can, therefore, be used in conjunction with the different methods of costing such as job costing, process costing, etc., or even with other techniques such as standard costing or budgetary control.

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Cost Ascertainment: In marginal costing, cost ascertainment is made on the basis of the nature of cost. It gives consideration to behaviour of costs. In other words, the technique has developed from a particular conception and expression of the nature and behaviour of costs and their effect upon the profitability of an undertaking.

Decision Making: According to traditional or total cost method, as opposed to marginal costing, the classification of costs is based on functional basis. Under this method the total cost is the sum total of the cost of direct material, direct labour, direct expenses,

manufacturing overheads, administration overheads, selling and distribution overheads. In this system, other things being equal, the total cost per unit will remain constant only when the level of output or mixture is the same from period to period. Since these factors are continually fluctuating, the actual total cost will vary from one period to another. Thus, it is possible for the costing department to say one day that an item costs Rs.20 and the next day it costs Rs.18. This situation arises because of changes in volume of output and the peculiar behavior of fixed expenses included in the total cost. Such fluctuating manufacturing activity, and consequently the variations in the total cost from period to period or even from day to day, poses a serious problem to the management in taking sound decisions. Hence, the application of marginal costing has been given wide recognition in the field of decision making.

5. DISCUSS the points of difference between absorption costing and marginal costing

ANSWER 5

	Marginal Costing	Absorption Costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

6. WRITE a short note on Margin of safety.

ANSWER 6

The margin of safety can be defined as **the difference between the expected level of sale and the breakeven sales**. The larger the margin of safety, the higher is the chances of making profits. The Margin of Safety can also be calculated by identifying the difference between the projected sales and breakeven sales in units multiplied by the contribution per unit. This is possible because, at the breakeven point all the fixed costs are recovered and any further contribution goes into the making of profits. It also can be calculated as:

$$\text{Margin of Safety} = \text{Profit} / \text{PV Ratio}$$

Practical Questions

1. If P/V ratio is 60% and the Marginal cost of the product is Rs. 20. CALCULATE the selling price?

ANSWER 1

$$\begin{aligned} \text{Variable Cost} &= 100 - \text{P/V Ratio} \\ &= 100 - 60 = 40 \end{aligned}$$

If Variable cost is 40, then selling price = 100

If Variable cost is 20, then selling price = $(100/40) \times 20 = \text{Rs. } 50$

2. The ratio of variable cost to sales is 70%. The break-even point occurs at 60% of the capacity sales. Find the capacity sales when fixed costs are Rs. 90,000. Also COMPUTE profit at 75% of the capacity sales.

ANSWER 2

Variable cost to sales = 70%, Contribution to sales = 30%,
Or P/V Ratio 30%

We know that: $\text{BES} \times \text{P/V Ratio} = \text{Fixed Cost}$

$$\begin{aligned} \text{BES} \times 0.30 &= \text{Rs. } 90,000 \\ \text{Or BES} &= \text{Rs. } 3,00,000 \end{aligned}$$

It is given that break-even occurs at 60% capacity.

$$\text{Capacity sales} = \text{Rs. } 3,00,000 \div 0.60 = \text{Rs. } 5,00,000$$

Computation of profit of 75% Capacity

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75% of capacity sales (i.e. Rs. 5,00,000 × 0.75) = Rs. 3,75,000
 Less: Variable cost (i.e. Rs. 3,75,000 × 0.70) = Rs. 2,62,500
 = Rs. 1,12,500

Less: Fixed Cost = Rs. 90,000

Profit = Rs. 22,500

3. You are required to-

(i)	DETERMINE profit, when sales	=	2,00,000
	Fixed Cost	=	40,000
	BEP	=	1,60,000
(ii)	DETERMINE sales, when fixed cost	=	20,000
	Profit	=	10,000
	BEP	=	40,000

ANSWER 3

(i) We know that: B.E. Sales × P/V Ratio = Fixed Cost

or Rs. 1,60,000 × P/V ratio = Rs. 40,000
 P/V ratio = 25%

We also know that Sales × P/V Ratio = Fixed Cost + Profit
 or Rs. 2,00,000 × 0.25 = Rs. 40,000 + Profit
 or Profit = Rs. 10,000

(ii) Again B.E. Sales × P/V ratio = Fixed Cost
 or Rs. 40,000 × P/V Ratio = Rs. 20,000
 or P/V ratio = 50%

We also know that: Sales × P/V ratio = Fixed Cost + Profit
 or Sales × 0.50 = Rs. 20,000 + Rs. 10,000
 or Sales = Rs. 60,000.

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4. A company has made a profit of Rs. 50,000 during the year 2019-20. If the selling price and marginal cost of the product are Rs. 15 and Rs. 12 per unit respectively, FIND OUT the amount of margin of safety.

ANSWER 4

$$\begin{aligned} \text{P/V Ratio} &= \text{Contribution} / \text{Sales} \times 100 \\ &= [(15 - 12)/15] \times 100 \\ &= (3/15) \times 100 = 20\% \end{aligned}$$

$$\begin{aligned} \text{Marginal of Safety} &= \text{Profit} \div \text{P/V Ratio} \\ &= 50,000 \div 20\% = \text{Rs. } 2,50,000 \end{aligned}$$

5. (a) If margin of safety is Rs. 2,40,000 (40% of sales) and P/V ratio is 30% of AB Ltd, CALCULATE its (1) Break even sales, and (2) Amount of profit on sales of Rs.9,00,000.

(b) X Ltd. has earned a contribution of Rs.2,00,000 and net profit of Rs.1,50,000 of sales of Rs. 8,00,000. What is its margin of safety?

ANSWER 5

$$\begin{aligned} \text{(a) Total Sales} &= 2,40,000 \times \frac{100}{40} = ₹ 6,00,000 \\ \text{Contribution} &= 6,00,000 \times 30\% = ₹ 1,80,000 \\ \text{Profit} &= \text{M/S} \times \text{P/V ratio} = 2,40,000 \times 30\% = ₹ 72,000 \\ \text{Fixed cost} &= \text{Contribution} - \text{Profit} \\ &= 1,80,000 - 72,000 = ₹ 1,08,000 \\ \text{(1) Break-even Sales} &= \frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{1,08,000}{30\%} = ₹ 3,60,000 \\ \text{(2) Profit} &= (\text{Sales} \times \text{P/V ratio}) - \text{Fixed cost} \\ &= (9,00,000 \times 30\%) - 1,08,000 = ₹ 1,62,000 \end{aligned}$$

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$$(b) \text{ P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} = \frac{2,00,000}{8,00,000} = 25\%$$

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V ratio}} = \frac{1,50,000}{25\%} = ₹ 6,00,000$$

Alternatively:

$$\text{Fixed cost} = \text{Contribution} - \text{Profit}$$

$$= ₹ 2,00,000 - ₹ 1,50,000 = ₹ 50,000$$

$$\text{B.E. Point} = ₹ 50,000 \div 25\% = ₹ 2,00,000$$

$$\text{Margin of Safety} = \text{Actual sales} - \text{B.E. sales}$$

$$= 8,00,000 - 2,00,000 = 6,00,000$$

6. A company sells its product at Rs. 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of Rs. 5 per unit. If the volume is raised to 20,000 units, it earns a profit of Rs. 4 per unit. CALCULATE break-even point both in terms of Value as well as in units.

ANSWER 6

We know that $S - V = F + P$

∴ Suppose variable cost = x, Fixed Cost = y

In first situation:

$$15 \times 8,000 - 8,000x = y - 40,000 \quad (1)$$

In second situation:

$$15 \times 20,000 - 20,000x = y + 80,000 \quad (2)$$

$$\text{or, } 1,20,000 - 8,000x = y - 40,000 \quad (3)$$

$$3,00,000 - 20,000x = y + 80,000 \quad (4)$$

From (3) & (4) we get $x = \text{Rs. } 5$, Variable cost per unit = Rs. 5

Putting this value in 3rd equation:

$$1,20,000 - (8,000 \times 5) = y - 40,000$$

$$\text{or, } y = \text{Rs. } 1,20,000$$

Fixed Cost = Rs. 1,20,000

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7. You are given the following data:

	Sales	Profit
Year 2019	Rs. 1,20,000	8,000
Year 2020	Rs. 1,40,000	13,000

FIND OUT –

(i) P/V ratio,

(ii) B.E. Point,

(iii) Profit when sales are Rs. 1,80,000,

(iv) Sales required earn a profit of Rs. 12,000,

(v) Margin of safety in year 2020.

ANSWER 7

	Sales	Profit
Year 2019	Rs. 1,20,000	8,000
Year 2020	Rs. 1,40,000	13,000
Difference	Rs. 20,000	5,000

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$$(i) \text{ P/V Ratio} = \frac{\text{Difference in profit}}{\text{Difference in Sales}} \times 100 = \frac{5,000}{20,000} \times 100 = 25\%$$

(₹)

Contribution in 2019 (1,20,000 × 25%) 30,000

Less: Profit 8,000Fixed Cost* 22,000

*Contribution = Fixed cost + Profit

∴ Fixed cost = Contribution - Profit

$$(ii) \text{ Break-even point} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{22,000}{25\%} = ₹ 88,000$$

(iii) Profit when sales are ₹1,80,000 (₹)

Contribution (₹1,80,000 × 25%) 45,000

Less: Fixed cost 22,000Profit 23,000

(iv) Sales to earn a profit of ₹12,000

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V ratio}} = \frac{22,000 + 12,000}{25\%} = ₹1,36,000$$

(v) Margin of safety in 2020 –

Margin of safety = Actual sales – Break-even sales

$$= 1,40,000 - 88,000 = ₹ 52,000.$$

8. The product mix of a Gama Ltd. is as under:

	Products	
	M	N
Units	54,000	18,000
Selling price	Rs. 7.50	Rs. 15.00
Variable cost	Rs. 6.00	Rs. 4.50

FIND the break-even points in units, if the company discontinues product 'M' and replace with product 'O'. The quantity of product 'O' is 9,000 units and its selling price and variable costs respectively are Rs. 18 and Rs. 9. Fixed Cost is Rs. 15,000.

ANSWER 8

N = 18,000 units

O = 9,000 units

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Ratio (N : O) = 2:1

Let

t = No. of units of 'O' for BEP

2t = No. of units of 'N' for BEP

Contribution of 'N' = Rs. 10.5 per unit

Contribution of 'O' = Rs. 9 per unit

At Break Even Point:

$$10.5 \times (2t) + 9 \times t - 15,000 = 0$$

$$30t = 15,000 \quad t = 500 \text{ units}$$

BEP of 'N' = 2t = 1,000 units B

EP of 'O' = t = 500 units

9. Mr. X has Rs. 2,00,000 investments in his business firm. He wants a 15 per cent return on his money. From an analysis of recent cost figures, he finds that his variable cost of operating is 60 per cent of sales, his fixed costs are Rs. 80,000 per year. Show COMPUTATIONS to answer the following questions:

(i) What sales volume must be obtained to break even?

(ii) What sales volume must be obtained to get 15 per cent return on investment?

(iii) Mr. X estimates that even if he closed the doors of his business, he would incur Rs. 25,000 as expenses per year. At what sales would he be better off by locking his business up?

ANSWER 9

Particulars	(₹)
Suppose sales	100
Variable cost	<u>60</u>
Contribution	<u>40</u>
P/V ratio	40%
Fixed cost	= ₹ 80,000

(i) Break-even point = Fixed Cost ÷ P/V ratio = 80,000 ÷ 40% or ₹ 2,00,000

(ii) 15% return on ₹ 2,00,000 30,000

Fixed Cost 80,000

Contribution required 1,10,000

Sales volume required = ₹ 1,10,000 ÷ 40% or ₹ 2,75,000

(iii) Avoidable fixed cost if business is locked up = ₹ 80,000 - ₹ 25,000
= ₹ 55,000

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Minimum sales required to meet this cost: Rs. 55,000 ÷ 40% or Rs. 1,37,500

10. A company had incurred fixed expenses of Rs. 4,50,000, with sales of Rs. 15,00,000 and earned a profit of Rs. 3,00,000 during the first half year. In the second half, it suffered a loss of Rs. 1,50,000.

CALCULATE:

- (i) The profit-volume ratio, break-even point and margin of safety for the first half year.
 (ii) Expected sales volume for the second half year assuming that selling price and fixed expenses remained unchanged during the second half year.
 (iii) The break-even point and margin of safety for the whole year.

ANSWER 10

(i) In the First half year:

$$\begin{aligned} \text{Contribution} &= \text{Fixed cost} + \text{Profit} \\ &= 4,50,000 + 3,00,000 = ₹ 7,50,000 \\ \text{P/V ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{7,50,000}{15,00,000} \times 100 = 50\% \\ \text{Break-even point} &= \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{4,50,000}{50\%} \times 100 = ₹ 9,00,000 \\ \text{Margin of safety} &= \text{Actual sales} - \text{Break-even point} \\ &= 15,00,000 - 9,00,000 = ₹ 6,00,000 \end{aligned}$$

(ii) In the second half year:

$$\begin{aligned} \text{Contribution} &= \text{Fixed cost} - \text{Loss} \\ &= 4,50,000 - 1,50,000 = ₹ 3,00,000 \\ \text{Expected sales volume} &= \frac{\text{Fixed cost} - \text{Loss}}{\text{P/V ratio}} = \frac{3,00,000}{50\%} = ₹ 6,00,000 \end{aligned}$$

(iii) For the whole year:

$$\begin{aligned} \text{B.E. point} &= \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{4,50,000 \times 2}{50\%} = ₹ 18,00,000 \\ \text{Margin of safety} &= \frac{\text{Profit}}{\text{P/V ratio}} = \frac{3,00,000 - 1,50,000}{50\%} = ₹ 3,00,000. \end{aligned}$$

11. The following information is given by Star Ltd.:

Margin of Safety	Rs. 1,87,500
Total Cost	Rs. 1,93,750
Margin of Safety	3,750 units
Break-even Sales	1,250 units

Required:

CALCULATE Profit, P/V Ratio, BEP Sales (in Rs.) and Fixed Cost.

ANSWER 11

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$$\begin{aligned} \text{Margin of Safety (\%)} &= \frac{3,750 \text{ units}}{3,750 \text{ units} + 1,250 \text{ units}} \\ &= 75\% \\ \text{Total Sales} &= \frac{\text{₹}1,87,500}{0.75} = \text{₹}2,50,000 \\ \text{Profit} &= \text{Total Sales} - \text{Total Cost} \\ &= \text{₹}2,50,000 - \text{₹}1,93,750 \\ &= \text{₹}56,250 \\ \text{P/V Ratio} &= \frac{\text{Profit}}{\text{Margin of Safety (₹)}} \times 100 \\ &= \frac{\text{₹}56,250}{\text{₹}1,87,500} \times 100 \\ &= 30\% \\ \text{Break-even Sales} &= \text{Total Sales} \times [100 - \text{Margin of Safety \%}] \\ &= \text{₹}2,50,000 \times 0.25 \\ &= \text{₹}62,500 \\ \text{Fixed Cost} &= \text{Sales} \times \text{P/V Ratio} - \text{Profit} \\ &= \text{₹}2,50,000 \times 0.30 - \text{₹}56,250 \\ &= \text{₹}18,750 \end{aligned}$$

12. A single product company sells its product at Rs. 60 per unit. In 2019, the company operated at a margin of safety of 40%. The fixed costs amounted to Rs. 3,60,000 and the variable cost ratio to sales was 80%.

In 2020, it is estimated that the variable cost will go up by 10% and the fixed cost will increase by 5%.

(i) FIND the selling price required to be fixed in 2020 to earn the same P/V ratio as in 2019.

(ii) Assuming the same selling price of Rs. 60 per unit in 2020, FIND the number of units required to be produced and sold to earn the same profit as in 2019.

ANSWER 12

(i) Profit earned in 2019

Particulars	(Rs.)
Total contribution (50,000 × Rs. 12)	6,00,000
Less: Fixed cost	3,60,000
Profit	2,40,000
Selling price to be fixed in 2020:	
Revised variable cost (Rs. 48 × 1.10)	52.80
Revised fixed cost (3,60,000 × 1.05)	3,78,000
P/V Ratio (Same as of 2019)	20%
Variable cost ratio to selling price	80%

Therefore, revised selling price per unit = Rs. 52.80 ÷ 80% = Rs. 66

(iii) **No. of units to be produced and sold in 2020 to earn the same profit:**

We know that Fixed Cost plus profit =	Contribution (Rs.)
Profit in 2019	2,40,000
Fixed cost in 2020	3,78,000
Desired contribution in 2020	6,18,000

Contribution per unit = Selling price per unit – Variable cost per unit.
= Rs. 60 – Rs. 52.80 = Rs. 7.20.

No. of units to be produced in 2020 = Rs. 6,18,000 ÷ Rs. 7.20 = 85,834 units.

Workings:

1. PV Ratio in 2019

Selling price per unit	60
Variable cost (80% of Selling Price)	48
Contribution	12
P/V Ratio	20%

2. No. of units sold in 2019

Break-even point = Fixed cost ÷ Contribution per unit
= Rs. 3,60,000 ÷ Rs. 12 = 30,000 units.

Margin of safety is 40%.

Therefore, break-even sales will be 60% of units sold.

No. of units sold = Break-even point in units ÷ 60%
= 30,000 ÷ 60% = 50,000 units.

13. (a) You are given the following data for the coming year for a factory.

Budgeted output	8,00,000 units
Fixed expenses	Rs. 40,00,000
Variable expenses per unit	Rs. 100
Selling price per unit	Rs. 200

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DRAW a break-even chart showing the break-even point.
 (b) If price is reduced to Rs. 180, what will be the new break-even point?

ANSWER 13

(a) Contribution = $S - V = ₹ 200 - ₹ 100 = ₹ 100$ per unit.

$$\text{B.E. Point} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{40,00,000}{₹100} = 40,000 \text{ unit}$$

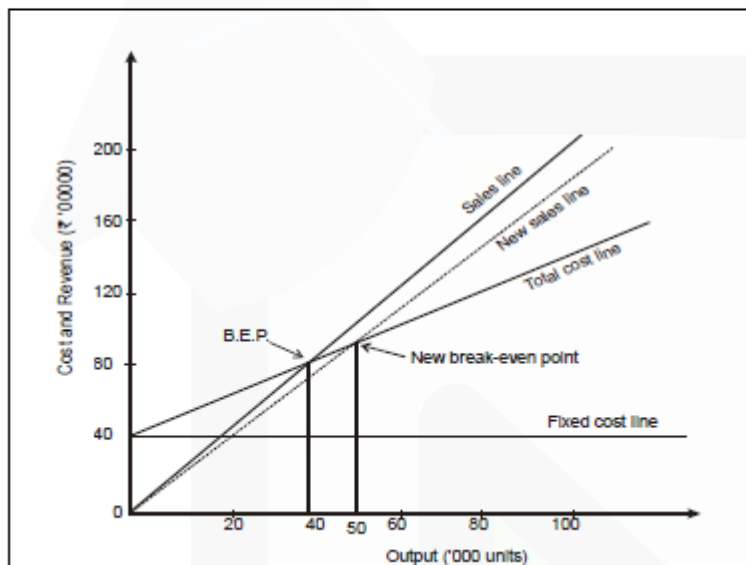
(b) When selling price is reduced

New selling price = ₹ 180

New Contribution = ₹ 180 - ₹ 100 = ₹ 80 per unit.

$$\text{New B.E. Point} = \frac{₹40,00,000}{₹ 80} = 50,000 \text{ units.}$$

The break-even chart is shown below:



14. A company has three factories situated in north, east and south with its Head Office in Mumbai. The management has received the following summary report on the operations of each factory for a period:

(Rs. in '000)

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	Sales		Profit	
	Actual	Over/(Under) Budget	Actual	Over/(Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE for each factory and for the company as a whole for the period:

- (i) the fixed costs.
- (ii) break-even sales.

ANSWER 14
Calculation of P/V Ratio

(₹' 000)

	Sales	Profit
North : Actual	1,100	135
Add : Under budgeted	<u>400</u>	<u>180</u>
Budgeted	<u>1,500</u>	<u>315</u>

$$\text{P/V ratio} = \frac{\text{Difference in Profit}}{\text{Difference in Sales}} = \frac{315 - 135}{1,500 - 1,100} \times 100 = \frac{180}{400} \times 100 = 45\%$$

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(₹ '000)

	Sales	Profit
East : Actual	1,450	210
Less : Over budgeted	<u>(150)</u>	<u>(90)</u>
Budgeted	<u>1,300</u>	<u>120</u>

$$P/V \text{ ratio} = \frac{90}{150} \times 100 = 60\%$$

(₹ '000)

	Sales	Profit
South : Actual	1,200	330
Add: Under budgeted	<u>200</u>	<u>110</u>
Budgeted	<u>1,400</u>	<u>440</u>

$$P/V \text{ ratio} = \frac{110}{200} \times 100 = 55\%$$

(i) Calculation of fixed cost

Fixed Cost = (Actual sales × P/V ratio) – Profit

North = (1,100 × 45%) – 135 = 360

East = (1,450 × 60%) – 210 = 660

South = (1,200 × 55%) – 330 = 330

Total Fixed Cost 1,350

(ii) Calculation of break-even sales (in ₹ '000)

B.E. Sales = $\frac{\text{Fixed Cost}}{\text{P/V ratio}}$

North = $\frac{360}{45\%} = 800$

East = $\frac{660}{60\%} = 1,100$

South = $\frac{330}{55\%} = \underline{600}$

Total 2,500

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15. An automobile manufacturing company produces different models of Cars. The budget in respect of model 007 for the month of March, 2020 is as under:

Budgeted Output		40,000 Units
	Rs. In lakhs	Rs. In lakhs
Net Realisation		2,10,000
Variable Costs:		
Materials	79,200	
Labour	15,600	
Direct expenses	37,200	1,32,000
Specific Fixed Costs	27,000	
Allocated Fixed Costs	33,750	60,750
	Total Costs	1,92,750
	Profit	17,250
	Sales	2,10,000

CALCULATE:

(i) Profit with 10 percent increase in selling price with a 10 percent reduction in sales volume.

(ii) Volume to be achieved to maintain the original profit after a 10 percent rise in material costs, at the originally budgeted selling price per unit.

ANSWER 15

(i) Budgeted selling price = 2,10,000 lakhs/ 40,000 units = Rs.5,25,000 per unit.

Budgeted variable cost = 1,32,000 lakhs/ 40,000 units = Rs. 3,30,000 per unit.

Increased selling price = Rs.5,25,000 + 10% = Rs. 5,77,500 per unit

New volume 40,000 – 10% = 36,000 units

Statement of Calculation of Profit: (Rs. In lakhs)	
Sales 36,000 units at Rs. 5,77,500 =	2,07,900
Less: Variable cost: 36,000 × Rs.3,30,000	1,18,800
=	
Contribution	89,100
Less: fixed costs	60,750
Profit	28,350

(ii) Budgeted Material Cost = 79,200 Lakhs/ 40,000 Units = Rs.1,98,000 per Unit

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Increased material cost = Rs.1,98,000×110% =	2,17,800
Labour cost 15,600 lakhs/ 40,000 units =	39,000
Direct expenses, 37,200 lakhs/ 40,000 units =	93,000
Variable cost per unit	3,49,800
Budgeted selling price per unit	5,25,000
Contribution per unit (5,25,000 – 3,49,800)	1,75,200

$$\text{Sales volume} = \frac{\text{Fixed costs} + \text{Profit}}{\text{Contribution Per Unit}} = \frac{60,750 \text{ lakhs} + 17,250 \text{ lakhs}}{\text{₹1.752 lakhs}}$$

= 44,521 units are to be sold to maintain the original profit of Rs. 17,250 lakhs.

16. An Indian soft drink company is planning to establish a subsidiary company in Bhutan to produce mineral water. Based on the estimated annual sales of 40,000 bottles of the mineral water, cost studies produced the following estimates for the Bhutanese subsidiary:

	Total annual costs	Percent of Total Annual Cost which is variable
Material	2,10,000	100%
Labour	1,50,000	80%
Factory Overheads	92,000	60%
Administration Expenses	40,000	35%

The Bhutanese production will be sold by manufacturer's representatives who will receive a commission of 8% of the sale price. No portion of the Indian office expenses is to be allocated to the Bhutanese subsidiary. You are required to

- (i) COMPUTE the sale price per bottle to enable the management to realize an estimated 10% profit on sale proceeds in Bhutan.
- (ii) CALCULATE the break-even point in rupees sales as also in number of bottles for the Bhutanese subsidiary on the assumption that the sale price is Rs. 14 per bottle.

ANSWER 16
(i) Computation of Sale Price Per Bottle

Output: 40,000 Bottles

Particulars	(Rs.)
Variable Cost:	
Material	2,10,000

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Labour (Rs.1,50,000 × 80%)	1,20,000
Factory Overheads (Rs.92,000 × 60%)	55,200
Administrative Overheads (Rs.40,000 × 35%)	14,000
Commission (8% on Rs.6,00,000) (W.N.-1)	48,000
Fixed Cost:	
Labour (Rs.1,50,000 × 20%)	30,000
Factory Overheads (Rs.92,000 × 40%)	36,800
Administrative Overheads (Rs.40,000 × 65%)	26,000
Total Cost	5,40,000
Profit (W.N.-1)	60,000
Sales Proceeds (W.N.-1)	6,00,000
Sales Price per bottle (6,00,000 / 40,000Bottles)	15

(ii) Calculation of Break-even Point

Sales Price per Bottle = Rs.14

Sales Price per Bottle	=	₹14	
Variable Cost per Bottle	=	$\frac{₹4,44,000 \text{ (W.N.-2)}}{40,000 \text{ Bottles}}$	= ₹11.10
Contribution per Bottle	=	₹14 - ₹11.10	= ₹2.90
Break -even Point:			
(in number of Bottles)	=	$\frac{\text{Fixed Costs}}{\text{Contribution per Bottle}}$	
	=	$\frac{₹92,800}{₹2.90}$	= 32,000Bottles
(in Sales Value)	=	32,000 Bottles × ₹14	
	=	₹4,48,000	

Working Note
W.N.-1

Let the Sales Price be 'x'

Commission	=	$\frac{8x}{100}$
Profit	=	$\frac{10x}{100}$

$$\begin{aligned}
 x &= 4,92,000 + \frac{8x}{100} + \frac{10x}{100} \\
 100x - 8x - 10x &= 4,92,00,000 \\
 82x &= 4,92,00,000 \\
 x &= 4,92,00,000 / 82 = ₹6,00,000
 \end{aligned}$$

W.N.-2

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Total Variable Cost	(Rs.)
Material	2,10,000
Labour	1,20,000
Factory Overheads	55,200
Administrative Overheads	14,000
Commission [(40,000 Bottles × Rs.14) × 8%]	44,800
	4,44,000

17. XYZ Ltd. has a production capacity of 2,00,000 units per year. Normal capacity utilisation is reckoned as 90%. Standard variable production costs are Rs. 11 per unit. The fixed costs are Rs.3,60,000 per year. Variable selling costs are Rs. 3 per unit and fixed selling costs are Rs.2,70,000 per year. The unit selling price is Rs. 20.

In the year just ended on 30th June, 2020, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 30th June was 20,000 units. The actual variable production costs for the year were Rs. 35,000 higher than the standard.

(i) CALCULATE the profit for the year

(a) by absorption costing method and

(b) by marginal costing method.

(ii) EXPLAIN the difference in the profits.

ANSWER 17

Income Statement (Absorption Costing) for the year ending 30th June 2020

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	(₹)	(₹)
Sales (1,50,000 units @ ₹20)		30,00,000
Production Costs:		
Variable (1,60,000 units @ ₹11)	17,60,000	
Add: Increase	<u>35,000</u>	17,95,000
Fixed (1,60,000 units @ ₹2*)		<u>3,20,000</u>
Cost of Goods Produced		21,15,000
Add: Opening stock (10,000 units @ ₹13) *		<u>1,30,000</u>
		22,45,000
Less: Closing stock $\left(\frac{₹ 21,15,000}{1,60,000 \text{ units}} \times 20,000 \text{ units} \right)$		<u>2,64,375</u>
Cost of Goods Sold		19,80,625
Add: Under absorbed fixed production overhead (3,60,000 – 3,20,000)		<u>40,000</u>
		20,20,625
Add: Non-production costs:		
Variable selling costs (1,50,000 units @ ₹3)		4,50,000
Fixed selling costs		<u>2,70,000</u>
Total cost		<u>27,40,625</u>
Profit (Sales – Total Cost)		<u>2,59,375</u>

*** Working Notes:**

- Fixed production overhead is absorbed at a pre-determined rate based on normal capacity, i.e. $\text{Rs. } 3,60,000 \div 1,80,000 \text{ units} = \text{Rs. } 2$.
- Opening stock is 10,000 units, i.e., $1,50,000 \text{ units} + 20,000 \text{ units} - 1,60,000 \text{ units}$. It is valued at Rs.13 per unit, i.e., $\text{Rs. } 11 + \text{Rs. } 2$ (Variable + fixed).

Income Statement (Marginal Costing) for the year ended 30th June, 2020

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	₹	₹
Sales (1,50,000 units @ ₹20)		30,00,000
Variable production cost (1,60,000 units @ ₹11 + ₹35,000)		17,95,000
Variable selling cost (1,50,000 units @ ₹3)		4,50,000
		22,45,000
Add: Opening Stock (10,000 units @ ₹11)		1,10,000
		23,55,000
Less: Closing stock		
$\left(\frac{₹17,95,000}{1,60,000 \text{ units}} \times 20,000 \text{ units} \right)$		2,24,375
Variable cost of goods sold		21,30,625
Contribution (Sales – Variable cost of goods sold)		8,69,375
Less: Fixed cost – Production	3,60,000	
– Selling	2,70,000	6,30,000
Profit		2,39,375

Reasons for Difference in Profit:	(Rs.)
Profit as per absorption costing	2,59,375
Add: Op. stock under –valued in marginal costing (Rs.1,30,000 – 1,10,000)	20,000
	2,79,375
Less: Cl. Stock under –valued in marginal closing (Rs.2,64,375 – 2,24,375)	40,000
Profit as per marginal costing	2,39,375

18. The following are cost data for three alternative ways of processing the clerical work for cases brought before the LC Court System:

	A Manual (Rs.)	B Semi-Automatic (Rs.)	C Fully-Automatic (Rs.)
Monthly fixed costs:			
Occupancy	15,000	15,000	15,000
Maintenance contract	---	5,000	10,000
Equipment lease	---	25,000	1,00,000
Unit variable costs (per report):			
Supplies	40	80	20
Labour	Rs.200 (5 hrs × Rs.40)	Rs.60 (1 hr × Rs.60)	Rs.20 (0.25 hr × Rs.80)

Required:

(i) CALCULATE cost indifference points. Interpret your results.

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(ii) If the present case load is 600 cases and it is expected to go up to 850 cases in near future, SELECT most appropriate on cost considerations?

ANSWER 18
(i) Cost Indifference Point

	A and B	A and C	B and C
	(Rs.)	(Rs.)	(Rs.)
Differential Fixed Cost (I)	Rs.30,000	Rs.1,10,000	Rs.80,000
(Rs.45,000 –Rs.15,000)		(Rs.1,25,000 – Rs.15,000)	(Rs.1,25,000 – Rs.45,000)
Differential Variable Costs (II)	Rs.100	Rs.200	Rs.100
(Rs.240 –Rs.140)		(Rs.240 – Rs.40)	(Rs.140 – Rs.40)
Cost Indifference Point (I/II)	300	550	800
(Differential Fixed Cost / Differential Variable Costs per case)	Cases	Cases	Cases

Interpretation of Results

At activity level below the indifference points, the alternative with lower fixed costs and higher variable costs should be used. At activity level above the indifference point alternative with higher fixed costs and lower variable costs should be used.

No. of Cases	Alternative to be Chosen
Cases ≤ 300	Alternative 'A'
300 ≥ Cases ≤ 800	Alternative 'B'
Cases ≥ 800	Alternative 'C'

(ii) Present case load is 600. Therefore, alternative B is suitable. As the number of cases is expected to go upto 850 cases, alternative C is most appropriate.

19. XY Ltd. makes two products X and Y, whose respective fixed costs are F1 and F2. You are given that the unit contribution of Y is one fifth less than the unit contribution of X, that the total of F 1 and F2 is Rs.1,50,000, that the BEP of X is 1,800 units (for BEP of X, F2 is not considered) and that 3,000 units is the indifference point between X and Y.(i.e. X and Y make equal profits at 3,000 unit volume, considering their respective fixed costs). There is no inventory buildup as whatever is produced is sold.

Required

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FIND OUT the values F1 and F2 and units contributions of X and Y.
ANSWER 19

Let Cx be the Contribution per unit of Product X.
Therefore, Contribution per unit of Product Y = $Cy = 4/5Cx = 0.8Cx$

Given $F1 + F2 = 1,50,000$,
 $F1 = 1,800Cx$ (Break even Volume \times Contribution per unit)
Therefore, $F2 = 1,50,000 - 1,800Cx$.

$3,000Cx - F1 = 3,000 \times 0.8Cx - F2$ or $3,000Cx - F1 = 2,400Cx - F2$ (Indifference Point)
i.e., $3,000Cx - 1,800Cx = 2,400Cx - 1,50,000 + 1,800Cx$
i.e., $3,000Cx = 1,50,000$, Therefore, $Cx = \text{Rs. } 50/-$ ($1,50,000 / 3,000$)

Therefore, Contribution per unit of X = Rs. 50
Fixed Cost of X = $F1 = \text{Rs. } 90,000$ ($1,800 \times 50$)

Therefore, Contribution per unit of Y is $\text{Rs. } 50 \times 0.8 = \text{Rs. } 40$ and
Fixed Cost of Y = $F2 = \text{Rs. } 60,000$ ($1,50,000 - 90,000$)
The Value of $F1 = \text{Rs. } 90,000$, $F2 = \text{Rs. } 60,000$ and X = Rs. 50 and Y = Rs. 40

20. Prisha Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	A	B	C
Sales Mix	40%	35%	25%
Selling Price	Rs. 300	Rs. 400	Rs. 200
Variable Cost	Rs. 150	Rs. 200	Rs. 120
Total Fixed Costs			Rs. 18,00,000
Total Sales			Rs. 60,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product C and replace it with Product E, when the following results are anticipated:

	Products		
	A	B	C
Sales Mix	45%	30%	25%
Selling Price	Rs. 300	Rs. 400	Rs. 300
Variable Cost	Rs. 150	Rs. 200	Rs. 150

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Total Fixed Costs	Rs. 18,00,000
Total Sales	Rs. 60,00,000

Required:

(i) CALCULATE the total contribution to sales ratio and present break-even sales at existing sales mix.

(ii) CALCULATE the total contribution to sales ratio and present break-even sales at proposed sales mix.

(iii) STATE whether the proposed sales mix is accepted or not?

ANSWER 20

(i) Calculation of Contribution to sales ratio at existing sales mix:

	Products			Total
	A	B	C	
Selling Price (Rs.)	300	400	200	
Less: Variable Cost (Rs.)	150	200	120	
Contribution per unit (Rs.)	150	200	80	
P/V Ratio	50%	50%	40%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	20%	17.5%	10%	47.5%
Present Total Contribution (Rs. 60,00,000 × 47.5%)				Rs. 28,50,000
Less: Fixed Costs				Rs. 18,00,000
Present Profit				Rs. 10,50,000
Present Break-Even Sales (Rs. 18,00,000/0.475)				Rs. 37,89,473.68

(ii) Calculation of Contribution to sales ratio at proposed sales mix:

	Products			Total
	A	B	E	
Selling Price (Rs.)	300	400	300	
Less: Variable Cost (Rs.)	150	200	150	
Contribution per unit (Rs.)	150	200	150	
P/V Ratio	50%	50%	50%	
Sales Mix	45%	30%	25%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	22.5%	15%	12.5%	50%
Present Total Contribution (Rs. 64,00,000 × 50 %)				Rs. 32,00,000
Less: Fixed Costs				Rs. 18,00,000
Present Profit				Rs. 14,00,000
Present Break-Even Sales (Rs. 18,00,000/0.475)				Rs. 36,00,000

(iii) The proposed sales mix increases the total contribution to sales ratio from 47.5% to 50% and the total profit from Rs. 10,50,000 to Rs. 14,00,000. Thus, the proposed sales mix should be accepted.

21. A company is considering four alternative proposals for a new toy manufacturing Machine launched in the market. New machine is expected to produce approximately 25,000 toys every year. The proposals are as follows:

(i) Purchase and maintain the new toy manufacturing Machine and bear all related costs. These machines will run on fuel. The average cost of a Machine is ₹ 10,00,000. Life of the machine is 4 years with annual production of 25,000 toys and the Resale value is ₹ 2,00,000 at the end of the fourth year.

(ii) Hire from Agency-A: It can hire the machine from the Agency-A and pay hire charges at the rate of ₹ 20 per toy and bear no other cost.

(iii) Hire from Agency-B: It can hire the machine from the Agency-B and pay hire charges at the rate of ₹ 12 per toy and also bear insurance costs. All other costs will be borne by Agency-B.

(iv) Hire from Agency-C: Hire machine from Agency-C at ₹ 2,50,000 per year. These machines are more advanced and run on electricity and therefore, the running cost is considerably low. The company will have to bear costs of electricity, licensing fees and spare parts. However, Repairs and maintenance and Insurance cost are borne by Agency-C.

The following further details are available:

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The cost of Fuel is ₹ 8 per toy, the cost of spare parts is ₹ 0.20 per toy and the cost of electricity is ₹ 2 per toy. Further, the cost of Repairs and maintenance is ₹ 0.25 per toy, the amount of licensing fees to be paid is ₹ 5,000 per machine per annum and the cost of Insurance to be paid is ₹ 25,000 per machine per annum. Consider no taxes.

You are required to:

- (i) CALCULATE the relative costs of four proposals on cost per toy basis.
- (ii) RANK the proposals on the basis of total cost for 25,000 toys per year.
- (iii) RECOMMEND the best proposal to company in view of (ii) above.

ANSWER

Calculation of relative costs of proposals

Particulars	Proposals			
	Purchase of machine (₹)	Hire Agency-A (₹)	Hire Agency-B (₹)	Hire Agency-C (₹)
Depreciation of machine (Working note 1)	2,00,000	-	-	-
Hire charges	-	5,00,000 (₹ 20 × 25,000)	3,00,000 (₹ 12 × 25,000)	2,50,000
Cost of fuel	2,00,000 (₹ 8 × 25,000)	-	-	-
Cost of spare parts	5,000 (₹ 0.2 × 25,000)	-	-	5,000 (₹ 0.2 × 25,000)
Cost of electricity	-	-	-	50,000 (₹ 2 × 25,000)
Repair & maintenance	6,250 (₹ 0.25 × 25,000)	-	-	-
Licencing fees	5,000	-	-	5,000
Insurance cost	25,000	-	25,000	-
Total Cost (A)	4,41,250	5,00,000	3,25,000	3,10,000
No. of toys (units) (B)	25,000	25,000	25,000	25,000
(i) Cost per toy (A/B)	17.65	20.00	13.00	12.40
(ii) Ranking of proposals	III	IV	II	I

(iii) Recommendation: Proposal of Hire machine from Agency-C is acceptable as the cost of manufacturing toys is lowest.

Working Notes:

(1) Depreciation per year:

$$= (\text{Cost of machine} - \text{Resale value}) / (\text{Life of machine}) = (\text{₹}10,00,000 - 2,00,000) / 4 \text{ years} = \text{₹}2,00,000$$

CHAPTER 15-BUDGETS & BUDGETARY CONTROL

ILLUSTRATION 1

A factory which expects to operate 7,000 hours, i.e., at 70% level of activity, furnishes details of expenses as under:

Variable expenses Rs.1,260
Semi-variable expenses Rs.1,200
Fixed expenses Rs.1,800

The semi-variable expenses go up by 10% between 85% and 95% activity and by 20% above 95% activity. PREPARE a flexible budget for 80, 90 and 100 per cent activities.

SOLUTION

Head of Account	Control basis	70%	80%	90%	100%
Budgeted hours		7,000	8,000	9,000	10,000
		(Rs.)	(Rs.)	(Rs.)	(Rs.)
Variable expenses	Variable	1,260	1,440	1,620	1,800
Semi-variable expenses	Semi-variable	1,200	1,200	1,320	1,440
Fixed expenses	Fixed	1,800	1,800	1,800	1,800
Total expenses	4,260	4,440		4,740	5,040
Recovery rate per hour:					
Total expenses/Bud hours		0.61	0.55	0.53	0.50

Conclusion:

We notice that the recovery rate at 70% activity is Rs. 0.61 per hour. If in a particular month the factory works 8,000 hours, it will be incorrect to estimate the allowance as Rs.4,880 @ Rs.0.61. The correct allowance will be Rs.4,440 as shown in the table. If the actual expenses are Rs.4,500 for this level of activity, the company has not saved any money but has over-spent by Rs.60 (Rs.4,500 – Rs.4,440).

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ILLUSTRATION 2:

A department of Company X attains sale of Rs. 6,00,000 at 80 per cent of its normal capacity and its expenses are given below:

Administration costs:	(Rs.)
Office salaries	90,000
General expenses	2 per cent of sales
Depreciation	7,500
Rates and taxes	8,750

Selling costs:

Salaries 8 per cent of sales
 Travelling expenses 2 per cent of sales
 Sales office expenses 1 per cent of sales
 General expenses 1 per cent of sales

Distribution costs:

Wages 15,000
 Rent 1 per cent of sales
 Other expenses 4 per cent of sales

PREPARE flexible administration, selling and distribution costs budget, operating at 90 per cent, 100 per cent and 110 per cent of normal capacity.

SOLUTION**Flexible Budget of Department....of Company 'X'**

	80% (Rs.)	90% (Rs.)	100%(Rs.)	110%(Rs.)
Sales	6,00,000	6,75,000	7,50,000	8,25,000
Administration Costs:				
Office Salaries (fixed)	90,000	90,000	90,000	90,000
General expenses (2% of Sales)	12,000	13,500	15,000	16,500
Depreciation (fixed)	7,500	7,500	7,500	7,500
Rent and rates (fixed)	8,750	8,750	8,750	8,750
(A) Total Adm. Costs	1,18,250	1,19,750	1,21,250	1,22,750
Selling Costs:				
Salaries (8% of sales)	48,000	54,000	60,000	66,000
Travelling expenses (2% of sales)	12,000	13,500	15,000	16,500
Sales office (1% of sales)	6,000	6,750	7,500	8,250

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General expenses (1% of sales)	6,000	6,750	7,500	8,250
(B) Total Selling Costs	72,000	81,000	90,000	99,000
Distribution Costs:				
Wages (fixed)	15,000	15,000	15,000	15,000
Rent (1% of sales)	6,000	6,750	7,500	8,250
Other expenses (4% of sales)	24,000	27,000	30,000	33,000
(C) Total Distribution Costs	45,000	48,750	52,500	56,250
Total Costs (A + B + C)	2,35,250	2,49,500	2,63,750	2,78,000

Note: In the absence of information it has been assumed that office salaries, depreciation, rates and taxes and wages remain the same at 110% level of activity also. However, in practice some of these costs may change if present capacity is exceeded.

ILLUSTRATION 3

Action Plan Manufacturers normally produce 8,000 units of their product in a month, in their Machine Shop. For the month of January, they had planned for a production of 10,000 units. Owing to a sudden cancellation of a contract in the middle of January, they could only produce 6,000 units in January.

Indirect manufacturing costs are carefully planned and monitored in the Machine Shop and the Foreman of the shop is paid a 10% of the savings as bonus when in any month the indirect manufacturing cost incurred is less than the budgeted provision.

The Foreman has put in a claim that he should be paid a bonus of Rs.88.50 for the month of January. The Works Manager wonders how anyone can claim a bonus when the Company has lost a sizeable contract. The relevant figures are as under:

Indirect manufacturing	Expenses for a normal month (Rs.)	Planned for January (Rs.)	Actual in costs January (Rs.)
Salary of foreman	1,000	1,000	1,000
Indirect labour	720	900	600
Indirect material	800	1,000	700
Repairs and maintenance	600	650	600
Power	800	875	740
Tools consumed	320	400	300
Rates and taxes	150	150	150
Depreciation	800	800	800
Insurance	100	100	100
	5290	5875	4990

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Do you agree with the Works Manager? Is the Foreman entitled to any bonus for the performance in January? Substantiate your answer with facts and figures. EXPLAIN.

SOLUTION

Flexible Budget of "Action Plan Manufacturers" (for the month of January)

Indirect manufacturing cost	Nature of cost	Expenses for a normal month	Planned expenses	Expenses as per flexible budget	Actual expenses	Difference
	(Rs.)		(Rs.)	(Rs.)	(Rs.)	(Rs.)
	(1)	(2)	(3)	(4)	(5)	(6)=(5)-(4)
Salary of foreman	Fixed	1,000	1,000	1,000	1,000	Nil
Indirect labour (WN 1)	Variable	720	900	540	600	60
Indirect material (WN 2)	Variable	800	1,000	600	700	100
Repair and maintenance (WN 3)	Semi-variable	600	650	550	600	50
Power (WN 4)	Semi-variable	800	875	725	740	15
Tools consumed (WN 5)	Variable	320	400	240	300	60
Rates and taxes	Fixed	150	150	150	150	Nil
Depreciation	Fixed	800	800	800	800	Nil
Insurance	Fixed	100	100	100	100	Nil
		5,290	5,875	4,705	4,990	285

Conclusion: The above statement of flexible budget shows that the concern's expenses in the month of January have increased by Rs.285 as compared to flexible budget. Under such circumstances, assuming the expenses are controllable and based on the financial perspective the Foreman of the company should not be entitled for any performance bonus for the month of January.

Working notes:

- Indirect labour cost per unit = Rs. 720/8,000 = Rs. 0.09
Indirect labour for 6,000 units = 6,000 × Rs. 0.09 = Rs.540.

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2. Indirect material cost per unit = $800 / 8,000 = \text{Rs.}0.10$
 Indirect material for 6,000 units = $6,000 \times \text{Rs.}0.10 = \text{Rs.}600$

3. According to high and low point method of segregating semi-variable cost into fixed and variable components, following formulae may be used.

Variable cost of repair and maintenance per unit = $\frac{\text{Change in expense level}}{\text{Change in output level}}$
 $= (650 - 600) / 2,000 = \text{Rs. } 0.025$

For 8,000 units
 Total Variable cost of repair and maintenance = Rs.200
 Fixed repair & maintenance cost = Rs.400

Hence at 6,000 units output level, total cost of repair and maintenance should be
 $= \text{Rs. } 400 + \text{Rs. } 0.025 \times 6,000 \text{ units} = \text{Rs.}400 + \text{Rs. } 150 = \text{Rs. } 550$

4. Variable cost of power per unit
 $= (875 - 800) / 2,000 \text{ units} = \text{Rs.}0.0375$

For 8,000 units
 Total variable cost of power = Rs.300
 Fixed cost = Rs.500

Hence, at 6,000 units output level, total cost of power should be
 $= \text{Rs.}500 + \text{Rs.}0.0375 \times 6,000 \text{ units} = \text{Rs.}500 + \text{Rs.}225 = \text{Rs.}725$

5. Tools consumed cost for 8,000 units = Rs.320
 Hence, tools consumed cost for 6,000 units = $(\text{Rs.}320 / 8,000 \text{ units}) \times 6,000 \text{ units}$
 $= \text{Rs.}240$

ILLUSTRATION 4

A single product company estimated its quarter-wise sales for the next year as under:

Quarter	Sales (Units)
I	30,000
II	37,500
III	41,250
IV	45,000

The opening stock of finished goods is 6,000 units and the company expects to maintain the closing stock of finished goods at 12,250 units at the end of the year. The production pattern in each quarter is based on 80% of the sales of the current quarter and 20% of the sales of the next quarter. The company maintains this 20% of sales of next quarter as closing stock of current quarter.

The opening stock of raw materials in the beginning of the year is 10,000 kg. and the closing stock at the end of the year is required to be maintained at 5,000 kg. Each unit of finished output requires 2 kg. of raw materials.

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The company proposes to purchase the entire annual requirement of raw materials in the first three quarters in the proportion as

Quarter	Purchase of raw materials % to total annual requirement in quantity	Price per kg. (Rs.)
I	30%	2
II	50%	3
III	20%	4

The value of the opening stock of raw materials in the beginning of the year is Rs. 20,000. You are required to PREPARE the following for the next year, quarter wise:

- (i) Production budget (in units).
- (ii) Raw material consumption budget (in quantity).
- (iii) Raw material purchase budget (in quantity and value).
- (iv) Priced stores ledger card of the raw material using First in First out method.

SOLUTION
Working Note:
Calculation of total annual production

	(Units)
Sales in 4 quarters	1,53,750
Add: Closing balance	12,250
	1,66,000
Less: Opening balance	(6,000)
Total number of units to be produced in the next year	1,60,000

(i) Production Budget (in units)

Quarters	I Units	II Units	III Units	IV Units	Total Units
Sales	30,000	37,500	41,250	45,000	1,53,750
Production in current quarter	24,000	30,000	33,000	36,000	
(80% of the sale of current quarter)					
Production for next quarter	7,500	8,250	9,000	12,250	
(20% of the sale of next quarter)					
Total production	31,500	38,250	42,000	48,250	1,60,000

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ii) Raw material consumption budget in quantity

Quarters	I	II	III	IV	Total
Units to be produced in each quarter: (A)	31,500	38,250	42,000	48,250	1,60,000
Raw material consumption p.u. (kg.): (B)		2	2	2	2
Total raw material consumption (Kg.) : (A × B)	63,000	76,500	84,000	96,500	3,20,000

(iii) Raw material purchase budget (in quantity)

	Qty. (kg.)
Raw material required for production	3,20,000
Add : Closing balance of raw material	5,000
	3,25,000
Less : Opening balance	(10,000)
Material to be purchased	3,15,000

Raw material purchase budget (in value)

Quarters	% of annual requirement	Qty. of material	Rate per kg. (Rs.)	Amount (Rs.)
(1)	(2)	(3)	(4)	(5)=(3×4)
I	30	94,500 (3,15,000 kg. × 30%)	2	1,89,000
II	50	1,57,500 (3,15,000 kg. × 50%)	3	4,72,500
III	20	63,000 (3,15,000 kg. × 20%)	4	2,52,000
Total		3,15,000		9,13,500

(iv) Priced Stores Ledger Card
(of the raw material using FIFO method)

	Quarters											
	I			II			III			IV		
	Kg.	Rate (₹)	Value (₹)	Kg.	Rate (₹)	Value (₹)	Kg.	Rate (₹)	Value (₹)	Kg.	Rate (₹)	Value (₹)
Opening balance	10,000	2	20,000	41,500	2	83,000	1,22,500	3	3,67,500	38,500	3	1,15,500
(A)										63,000	4	2,52,000
Purchases: (B)	94,500	2	1,89,000	1,57,500	3	4,72,500	63,000	4	2,52,000	-	-	-
Consumption: (C)	63,000	2	1,26,000	41,500	2	83,000	84,000	3	2,52,000	38,500	3	1,15,500
Balance: (D)	41,500	2	83,000	1,22,500	3	3,67,500	38,500	3	1,15,500	58,000	4	2,32,000
(D) = (A) + (B) - (C)							63,000	4	2,52,000			

ILLUSTRATION 5

A company is engaged in the manufacture of specialised sub-assemblies required for certain electronic equipment. The company envisages that in the forthcoming month, December, 2020, the sales will be in the ratio of 3 : 4 : 2 respectively of sub-assemblies, ACB, MCB and DP.

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The following is the schedule of components required for manufacture:

Component requirements					
Sub-assembly	Selling Price	Base board	IC08	IC12	IC26
ACB	520	1	8	4	2
MCB	500	1	2	10	6
DP	350	1	2	4	8
Purchase price (₹)		60	20	12	8

The direct labour time and variable overheads required for each of the sub-assemblies are:

	Labour hours		Variable overheads
	Grade A	Grade B	
ACB	8	16	36
MCB	6	12	24
DP	4	8	24
Direct wage rate per hour (₹)	5	4	—

The labourers work 8 hours a day for 25 days a month.

The opening stocks of sub-assemblies and components for December, 2020 are as under:

	Sub-assemblies		Components
ACB	800	Base Board	1,600
MCB	1,200	IC08	1,200
DP	2,800	IC12	6,000
		IC26	4,000

Fixed overheads amount to Rs.7,57,200 for the month and a monthly profit target of Rs. 12 lacs has been set.

The company is eager for a reduction of closing inventories for December, 2020 of sub-assemblies and components by 10% of quantity as compared to the opening stock. PREPARE the following budgets for December 2020

- Sales budget in quantity and value.
- Production budget in quantity
- Component usage budget in quantity.
- Component purchase budget in quantity and value.

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(e) Manpower budget showing the number of workers and the amount of wages payable.

SOLUTION
Working Note:

1. Statement showing contribution:

Sub- assemblies	ABC	MCB	DP	Total
(Rs.)		(Rs.)	(Rs.)	(Rs.)
Selling price per unit (p.u.) : (A)		520	500	350
Marginal Cost per unit.				
Components				
- Base board	60	60	60	
- IC08	160	40	40	
- IC12	48	120	48	
- IC26	16	48	64	
Labour				
- Grade A	40	30	20	
- Grade B	64	48	32	
Variable production overhead	36	24	24	
Total marginal cost per unit. : (B)	424	370	288	
Contribution per unit. : (C) = (A) – (B)	96	130	62	
Sales ratio : (D)	3	4	2	
Contribution × Sales ratio: [(E) = (C) × (D)]	288	520	124	932

2. Desired Contribution for the forthcoming month December, 2020

	(Rs.)
Fixed overheads	7,57,200
Desired profit	12,00,000
Desired contribution	19,57,200

3. Sales mix required i.e. number of batches for the forthcoming month December, 2020

Sales mix required = Desired contribution/contribution × Sales ratio
 = Rs.19,57,200/932 (Refer to Working notes 1 and 2)
 = 2,100 batches

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Budgets for December, 2020
(a) Sales budget in quantity and value

Sub-assemblies	ACB	MCB	DP	Total
Sales (Qty.)	6,300	(2,100×3)	8,400 (2,100×4)	6,300 (2,100×3)
Selling price p.u. (Rs.)	520		500	350
Sales value (Rs.)	32,76,000	42,00,000	14,70,000	89,46,000
		0	0	

(b) Production budget in quantity

Sub-assemblies	ACB	MCB	DP
Sales	6,300	8,400	4,200
Add : Closing stock	720	1,080	2,520
(Opening stock less 10%)	—	—	—
Total quantity required	7,020	9,480	6,720
Less : Opening stock	(800)	(1,200)	(2,800)
Production	6,220	8,280	3,920

(c) Component usage budget in quantity

Sub-assemblies	ACB	MCB	DP	Total
Production	6,220	8,280	3,920	—
Base board (1 each)	6,220	8,280	3,920	18,420
Component IC08 (8:2:2)	49,760 (6,220 × 8)	16,560 (8,280 × 2)	7,840 (3,920 × 2)	74,160
Component IC12 (4:10:4)	24,880 (6,220 × 4)	82,800 (8,280 × 10)	15,680 (3,920 × 4)	1,23,360
Component IC26 (2:6:8)	12,440 (6,220 × 2)	49,680 (8,280 × 6)	31,360 (3,920 × 8)	93,480

(d) Component Purchase budget in quantity and value

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Sub-assemblies	Base board	IC08	IC12	IC26	Total
Usage in production		18,420	74,160	1,23,360	93,480
Add :Closing stock (Opening stock less 10%)		1,440	1,080	5,400	3,600
	19,860	75,240		1,28,760	97,080
Less :Opening stock		(1,600)	(1,200)	(6,000)	(4,000)
Purchase (Qty.)		18,260	74,040	1,22,760	93,080
Purchase price (Rs.)		60	20	12	8
Purchase value (Rs.)	10,95,600	14,80,800	14,73,120	7,44,640	47,94,160

(e) Manpower budget showing the number of workers and the amount of wages payable

Sub-assemblies		Budgeted Production		Direct labour		Total
		Grade A		Grade B		
		Hours p.u.	Total hours	Hours p.u.	Total hours	
ACB	6,220	8	49,760	16	99,520	
MCB	8,280	6	49,680	12	99,360	
DP	3,920	4	15,680	8	31,360	
(A) Total hours		1,15,120		2,30,240		
(B) Hours per man per month		200		200		
(C) Number of workers per month : (A/B)		576		1,152		
(D) Wage rate per month (Rs.)		1,000		800		
(E) Wages payable (Rs.) : (C × D)		5,76,000		9,21,600	14,97,600	

ILLUSTRATION 6

Float glass Manufacturing Company requires you to PREPARE the Master budget for the next year from the following information:

Sales:	
Toughened Glass	Rs. 6,00,000
Bent Glass	Rs. 2,00,000
Direct material cost	60% of sales
Direct wages	20 workers @ Rs. 150 per month

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Factory overheads:	
Indirect labour –	
Works manager	Rs. 500 per month
Foreman	Rs. 400 per month
Stores and spares	2.5% on sales
Depreciation on machinery	Rs. 12,600
Light and power	Rs. 3,000
Repairs and maintenance	Rs. 8,000
Others sundries	10% on direct wages
Administration, selling and distribution expenses	Rs. 36,000 per year

SOLUTION**Master Budget for the year ending**

Sales:			(Rs.)
Toughened Glass			6,00,000
Bent Glass			2,00,000
Total Sales			8,00,000
Less: Cost of production:			
Direct materials (60% of Rs.8,00,000)		4,80,000	
Direct wages (20 workers × Rs.150 × 12months)		36,000	
Prime Cost		5,16,000	
Fixed Factory Overhead:			
Works manager's salary (500 × 12)	6,000		
Foreman's salary (400 × 12)	4,800		
Depreciation	12,600		
Light and power (assumed fixed)	3,000	26,400	
Variable factory Overheads			
Stores & Repairs	20000		
Repairs & Maintenance	8000		
Sundry Expenses	3600	31600	
Works Contract			574000
Gross Profit (Sales- Works Cost)			226000
Less: Admn, selling and distribution expenses			36000
Net Profit			190000

ILLUSTRATION 7

Following data is available for DKG and Co:

Standard working hours 8 hours per day of 5 days per week

Maximum capacity 50 employees

Actual working 40 employees

Actual hours expected to be worked per four week 6,400 hours

Std. hours expected to be earned per four weeks 8,000 hours

Actual hours worked in the four- week period 6,000 hours

Standard hours earned in the four- week period 7,000 hours.

The related period is of 4 weeks. In this period there was a one special day holiday due to national event.

CALCULATE the following ratios:

- (1) Efficiency Ratio,
- 2) Activity Ratio,
- (3) Calendar Ratio,
- (4) Standard Capacity Usage Ratio,
- (5) Actual Capacity Usage Ratio.
- (6) Actual Usage of Budgeted Capacity Ratio.

SOLUTION

Maximum Capacity in a budget period
= 50 Employees × 8 Hrs. × 5 Days × 4 Weeks = 8,000 Hrs.

Budgeted Hours
40 Employees × 8 Hrs. × 5 Days × 4 Weeks = 6,400 Hrs.

Actual Hrs. = 6,000 Hrs. (given)
Standard Hrs. for Actual Output = 7,000 Hrs.

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Budget No. of Days = 20 Days = 20 Days (4 Weeks x 5 Days)

Actual No. of Days = 20 – 1 = 19 Days

1. Efficiency Ratio = $\frac{\text{Standard Hrs}}{\text{Actual Hrs}} \times 100 = \frac{7,000 \text{ hours}}{6,000 \text{ hours}} \times 100 = 116.67\%$
2. Activity Ratio = $\frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 = \frac{7,000 \text{ hours}}{6,400 \text{ hours}} \times 100 = 109.375\%$
3. Calendar Ratio = $\frac{\text{Available working days}}{\text{Budgeted working days}} \times 100 = \frac{19 \text{ days}}{20 \text{ days}} \times 100 = 95\%$
4. Standard Capacity Usage Ratio = $\frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$
 $= \frac{6,400 \text{ hours}}{8,000 \text{ hours}} \times 100 = 80\%$
5. Actual Capacity Usage Ratio = $\frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}} \times 100$
 $= \frac{6,000 \text{ hours}}{8,000 \text{ hours}} \times 100 = 75\%$
6. Actual Usage of Budgeted Capacity Ratio = $\frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100$
 $= \frac{6,000 \text{ hours}}{6,400 \text{ hours}} \times 100 = 93.75\%$

MCQs based Questions

1. If a company wishes to establish a factory overhead budget system in which estimated costs can be derived directly from estimates of activity levels, it should prepare a:

- (a) Master budget
- (b) Cash budget
- (c) Flexible budget
- (d) Fixed budget

ANSWER 1-C

2. The classification of fixed and variable cost is useful for the preparation of:

- (a) Master budget
- (b) Flexible budget
- (c) Cash budget

(d) Capital budget

ANSWER 2-B

3. Budget manual is a document:

(a) Which contains different type of budgets to be formulated only.

(b) Which contains the details about standard cost of the products to be made.

(c) Setting out the budget organization and procedures for preparing a budget including fixation of responsibilities, formats and records required for the purpose of preparing a budget and for exercising budgetary control system.

(d) None of the above

ANSWER 3-C

4. The budget control organization is usually headed by a top executive who is known as :

(a) General manager

(b) Budget director/budget controller

(c) Accountant of the organization

(d) None of the above

ANSWER 4-B

5. "A favourable budget variance is always an indication of efficient performance". Do you agree, give reason?

(a) A favourable variance indicates, saving on the part of the organization hence it indicates efficient performance of the organization.

(b) Under all situations, a favourable variance of an organization speaks about its efficient performance.

(c) A favourable variance does not necessarily indicate efficient performance, because such a variance might have been arrived at by not carrying out the expenses mentioned in the budget.

(d) None of the above.

ANSWER 5-C

6. A budget report is prepared on the principle of exception and thus-

(a) Only unfavourable variances should be shown

(b) Only favourable variance should be shown

(c) Both favourable and unfavourable variances should be shown

(d) None of the above

ANSWER 6-C

7. Purchases budget and materials budget are same:

(a) Purchases budget is a budget which includes only the details of all materials purchased

(b) Purchases budget is a wider concept and thus includes not only purchases of materials but also other items as well

(c) Purchases budget is different from materials budget; it includes purchases of other items only

(d) None of the above

ANSWER 7-B

8. Efficiency ratio is:

(a) The extent of actual working days avoided during the budget period

(b) Activity ratio/ capacity ratio

(c) Whether the actual activity is more or less than budgeted activity

(d) None of the above

ANSWER 8-B

9. Activity Ratio depicts:

- (a) Whether actual capacity utilized exceeds or falls short of the budgeted capacity
- (b) Whether the actual hours used for actual production were more or less than the standard hours
- (c) Whether actual activity was more or less than the budgeted capacity
- (d) None of the above

ANSWER 9-C

10. Which of the following is usually a short-term budget:

- (a) Capital expenditure budget
- (b) Research and development budget
- (c) Cash budget
- (d) Sales budget

ANSWER 10-C

Theoretical Questions

1. EXPLAIN briefly the concept of 'flexible budget'.

ANSWER 1-

Flexible Budget: A flexible budget is a budget which, by recognising the difference in behaviour between fixed and variable costs in relation to fluctuations in output, turnover, or other variable factors, is designed to change appropriately with such fluctuations. According to CIMA, "a flexible budget is defined as a budget which, by recognizing the difference between fixed, semi-variable and variable costs is designed to change in relation to the level of activity attained." Unlike static (fixed) budgets, the flexible budgets show the expected results of a responsibility center for different activity levels. One can view a flexible budget as a series of static budgets for different levels of activity. Such budgets are especially useful in estimating and controlling factory costs and operating expenses. It is more realistic and practicable because it gives due consideration to behaviour of revenue and cost at different levels of activity. While preparing a flexible budget, the expenses are classified into three categories viz.

- (i) Fixed,
- (ii) Variable, and
- (iii) Semi-variable.

Semi-variable expenses are further segregated into fixed and variable expenses.

Flexible budgeting may be resorted to under the following situations:

- (i) In the case of new business venture, due to its typical nature, it may be difficult to forecast the demand of a product accurately.
- (ii) Where the business is dependent upon the fluctuations of nature e.g., a person dealing in wool trade may have enough market demand, if temperature goes below the freezing point and much less demand if the weather is relatively warm.
- (iii) In the case of labour intensive industry where the production of the entity is dependent upon the availability of labour.

2. DISCUSS the components of budgetary control system.

ANSWER 2

The policy of a business for a defined period is represented by the master budget, the detailed components of which are given in a number of individual budgets called functional budgets. These functional budgets are broadly grouped under the following heads:

1. **Physical budgets:** Those budgets which contain information in quantitative terms such as the physical units of sales, production etc. This may include quantity of sales, quantity of production, inventories, and manpower budgets are physical budgets.
2. **Cost budgets:** Budgets which provides cost information in respect of manufacturing, administration, selling and distribution, etc. for example, manufacturing costs, selling costs, administration cost, and research and development cost budgets are cost budgets.
3. **Profit budgets:** A budget which enables the ascertainment of profit. For example, sales budget, profit and loss budget, etc.
4. **Financial budgets:** A budget which facilitates in ascertaining the financial position of a concern, for example, cash budgets, capital expenditure budget, budgeted balance sheet etc.

3. LIST the eight functional budgets prepared by a business.

ANSWER 3

The various commonly used functional budgets are:

- (i) Sales budget
- (ii) Production budget
- (iii) Plant utilisation budget
- (iv) Direct-material usage budget

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- (v) Direct-material purchase budget
- (vi) Direct-labour (personnel) budget
- (vii) Factory overhead budget
- (viii) Production cost budget
- (ix) Ending-inventory budget
- (x) Cost-of-goods-sold budget
- (xi) Selling and distribution cost budget
- (xii) Administration expenses budget
- (xiii) Research and development cost budget
- (xiv) Capital expenditure budget

4. DISTINGUISH between Fixed and flexible budget.
ANSWER 4
Difference between Fixed and Flexible Budgets:

Sl. No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus it is known as rigid or inflexible budget.	It can be re-casted on the basis of activity level to be achieved. Thus it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity.
3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analysed according to its behaviour.
4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.
5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets

5. EXPLAIN the Essentials of budget.**ANSWER 5**

The main characteristics of budget are as follows:

1. A budget is concerned for a definite future period.
2. A budget is a written document.
3. A budget is a detailed plan of all the economic activities of a business.
4. All the departments of a business unit should co-operate for the preparation of a business budget.
5. Budget is a mean to achieve business objectives and it is not an end in itself.
6. Budget needs to be updated, corrected and controlled every time circumstances change. Therefore, it is a continuous process.
7. Budget helps in planning, coordination and control.
8. Different types of budgets are prepared by industries according to business requirements.
9. A budget acts as a business barometer.
10. Budget is usually prepared in the light of past experiences.
11. Budget is a constant endeavour of the Management

6. STATE the considerations on which capital expenditure budget is prepared.**ANSWER 6**

The preparation of capital budget is based on the following considerations:

1. Capital Budget is a budget prepared for capital receipts and expenditure such as investment on land and building, plant and machinery obtaining loans, issue of shares, purchase of assets etc.

2. Future development plans to increase output by expansion of plant facilities.
3. Replacement requests from the concerned departments.
4. Factors like sales potential to absorb the increased output, possibility of price reductions, increased costs of advertising and sales promotion to absorb increased output, etc.
5. Overhead on production facilities of certain departments as indicated by the plant utilisation budget.

7. DESCRIBE the steps involved in the budgetary control technique.**ANSWER 7**

The following steps are necessary for establishing a good budgetary control system:

1. **Determining the objectives to be achieved**, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. **Determining the activities that should be undertaken** for the achievement of the objectives.
3. **Drawing up a plan or a scheme** of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. **Laying out a system of comparison** of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. **Ensuring that corrective action will be taken** where the plan has not been achieved and, if that is not possible, for the revision of the plan.

8. DESCRIBE the salient features of budget manual.**ANSWER 8**

Typical budget manual may include the following:

- (i) A statement regarding the objectives of the organisation and how they can be achieved through budgetary control;
- (ii) A statement about the functions and responsibilities of each executive, both regarding preparation and execution of budgets;

- (iii) Procedures to be followed for obtaining the necessary approval of budgets. The authority of granting approval should be stated in explicit terms. Whether, one two or more signatures are required on each document should be clearly stated;
- (iv) A form of organisation chart to show who are responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- (v) A timetable for the preparation of each budget.
- (vi) The manner of scrutiny and the personnel to carry it out;
- (vii) Reports, statements, forms and other record to be maintained;
- (viii) The accounts classification to be employed. It is necessary that the framework within which the costs, revenue and other financial accounts are classified must be identical both in the accounts and budget department;
- (ix) The reporting of the remedial action;
- (x) The manner in which budgets, after acceptance and issuance, are to be revised or the matter amended these are included in budgets and on which action can be taken only with the approval of top management
- (xi) This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- (xii) Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- (xiii) A list of the organization's account codes, with full explanations of how to use them.
- (xiv) Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

Practical Questions

1. B Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2019-20:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	800 units at ₹18	1,200 units at ₹18	1,000 units at ₹18	1,400 units at ₹18
Y	600 units at ₹42	1,000 units at ₹42	400 units at ₹42	800 units at ₹42

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Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by Rs.2, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by Rs.2 it will have more demand in the market. The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over budgeted sales

Product	East Division	West Division
X	+ 12.5%	+ 7.5%
Y	+ 22.5%	+ 12.5%

With the help of intensive advertisement campaign, following additional sales (over and above the above mentioned estimated sales by Divisional Managers) are possible:

Product	East Division	West Division
X	120 units	140 units
Y	80 units	100 units

You are required to PREPARE Sales Budget for 2020-21 after incorporating above estimates and also SHOW the Budgeted Sales and Actual Sales of 2019-20.

ANSWER 1

Statement Showing Sales Budget for 2020-21

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	1,020 ¹	20	20,400	815 ³	40	32,600	53,000
West	1,430 ²	20	28,600	1,225 ⁴	40	49,000	77,600
Total	1,200		49,000	1,000		81,600	1,30,600

Workings

- $800 \times 112.5\% + 120 = 1,020$ units
- $1,200 \times 107.5\% + 140 = 1,430$ units
- $600 \times 122.5\% + 80 = 815$ units
- $1,000 \times 112.5\% + 100 = 1,225$ units

Statement Showing Sales Budget for 2019-20

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	800	18	14,400	600	42	25,200	39,600
West	1,200	18	21,600	1,000	42	42,000	63,600
Total	2,000		36,000	1,600		67,200	1,03,200

Statement Showing Actual Sales for 2019-20

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	1,000	18	18,000	400	42	16,800	34,800
West	1,400	18	25,200	800	42	33,600	58,800
Total	2,400		43,200	1,200		50,400	93,600

2. During the FY 2019-20, P Limited has produced 60,000 units operating at 50% capacity level. The cost structure at the 50% level of activity is as under:

Direct Material	300 per unit
Direct Wages	100 per unit
Variable Overheads	100 per unit
Direct Expenses	60 per unit
Factory Expenses (25% fixed)	80 per unit
Selling and Distribution Exp. (80% variable)	40 per unit
Office and Administrative Exp. (100% fixed)	20 per unit

The company anticipates that in FY 2020-21, the variable costs will go up by 20% and fixed costs will go up by 15%.

The selling price per unit will increase by 10% to Rs.880

Required:

- (i) CALCULATE the budgeted profit/ loss for the FY 2019-20.

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(ii) PREPARE an Expense budget on marginal cost basis for the FY 2020-21 for the company at 50% and 60% level of activity and FIND OUT the profits at respective levels.

ANSWER 2

(i) Calculation of Budgeted profit for the FY 2019-20

		60,000 units	
		Per unit (₹)	Amount (₹)
Sales	(A)	800.00	4,80,00,000
Variable Costs:			
- Direct Material		300.00	1,80,00,000
- Direct Wages		100.00	60,00,000
- Variable Overheads		100.00	60,00,000
- Direct Expenses		60.00	36,00,000
- Variable factory expenses (75% of ₹80 p.u.)		60.00	36,00,000
- Variable Selling & Dist. exp. (80% of ₹40 p.u.)		32.00	19,20,000
Total Variable Cost	(B)	652.00	3,91,20,000
Contribution	(C) = (A - B)	148.00	88,80,000
Fixed Costs:			
- Office and Admin. exp. (100%)		--	12,00,000
- Fixed factory exp. (25%)		--	12,00,000
- Fixed Selling & Dist. exp. (20%)		--	4,80,000
Total Fixed Costs	(D)	--	28,80,000
Profit	(C - D)	--	60,00,000

(ii) Expense Budget of P Ltd. for the FY 2020-21 at 50% & 60% level

		60,000 units		72,000 units	
		Per unit (₹)	Amount (₹)	Per unit (₹)	Amount (₹)
Sales	(A)	880.00	5,28,00,000	880.00	6,33,60,000
Variable Costs:					
- Direct Material		360.00	2,16,00,000	360.00	2,59,20,000
- Direct Wages		120.00	72,00,000	120.00	86,40,000

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- Variable Overheads	120.00	72,00,000	120.00	86,40,000
- Direct Expenses	72.00	43,20,000	72.00	51,84,000
- Variable factory expenses	72.00	43,20,000	72.00	51,84,000
- Variable Selling & Dist. exp.	38.40	23,04,000	38.40	27,64,800
Total Variable Cost (B)	782.40	4,69,44,000	782.40	5,63,32,800
Contribution (C) = (A – B)	97.60	58,56,000	97.60	70,27,200
Fixed Costs:				
- Office and Admin. exp. (100%)	--	13,80,000	--	13,80,000
- Fixed factory exp. (25%)	--	13,80,000	--	13,80,000
- Fixed Selling & Dist. exp. (20%)	--	5,52,000	--	5,52,000
Total Fixed Costs (D)	--	33,12,000	--	33,12,000
Profit (C – D)	--	25,44,000	--	37,15,200

3. K Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 2020.

The following information are made available for this purpose:

(i) It expects to sell 1,50,000 bags of 'X' during the second quarter of 2020 at the selling price of Rs.1,200 per bag.

(ii) Each bag of 'X' requires 2.5 mtr. of raw – material 'Y' and 7.5 mtr. of raw – material 'Z'.

(iii) Stock levels are planned as follows:

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	45,000	33,000
Raw – Material 'Y' (mtr)	96,000	78,000
Raw – Material 'Z' (mtr)	1,71,000	1,41,000
Empty Bag (Nos.)	1,11,000	84,000

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(iv) 'Y' cost Rs.160 per mtr., 'Z' costs Rs.30 per mtr. and 'Empty Bag' costs Rs.110 each.

(v) It requires 9 minutes of direct labour to produce and fill one bag of 'X'. Labour cost is Rs. 70 per hour.

(vi) Variable manufacturing costs are Rs.60 per bag. Fixed manufacturing costs Rs.40,00,000 per quarter.

(vii) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are Rs.3,75,000 per quarter.

Required

(i) PREPARE a production budget for the said quarter in quantity.

(ii) PREPARE a raw – material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity as well as in rupees.

(iii) COMPUTE the budgeted variable cost to produce one bag of 'X'.

ANSWER 3

(i) Production Budget of 'X' for the Second Quarter

Particulars	Bags (Nos.)
Budgeted Sales	1,50,000
Add: Desired Closing stock	33,000
Total Requirements	1,83,000
Less: Opening stock	(45,000)
Required Production	1,38,000

(ii) Raw–Materials Purchase Budget in Quantity as well as in Rs. for 1,38,000 Bags of 'X'

Particulars	'Y'	'Z'	Empty Bags
	Mtr.	Mtr.	Nos.
Production Requirements	2.5	7.5	1.0
Per bag of 'X' Requirement for Production	3,45,000	10,35,000	1,38,000
	(1,38,000 × 2.5)	(1,38,000 × 7.5)	(1,38,000 × 1)
Add: Desired Closing Stock	78,000	1,41,000	84,000
Total Requirements	4,23,000	11,76,000	2,22,000
Less: Opening Stock	(96,000)	(1,71,000)	(1,11,000)

Quantity to be purchased	3,27,000	10,05,000	1,11,000
Cost per mtr./Bag	Rs.160	Rs.30	Rs.110
Cost of Purchase (Rs.)	5,23,20,000	3,01,50,000	1,22,10,000

(iii) Computation of Budgeted Variable Cost of Production of 1 Bag of 'X'

Particulars	(Rs.)
Raw – Material	
Y 2.5 mtr @160	400.00
Z 7.5 mtr @30	225.00
Empty Bag	110.00
Direct Labour (Rs.70× 9 minutes / 60 minutes)	10.50
Variable Manufacturing Overheads	60.00
Variable Cost of Production per bag	805.50

4. ABC Ltd. is currently operating at 75% of its capacity. In the past two years, the levels of operations were 55% and 65% respectively. Presently, the production is 75,000 units. The company is planning for 85% capacity level during 2020-21. The cost details are as follows:

	55%	65%	75%
	(Rs.)	(Rs.)	(Rs.)
Direct Materials	11,00,000	13,00,000	15,00,000
Direct Labour	5,50,000	6,50,000	7,50,000
Factory Overheads	3,10,000	3,30,000	3,50,000
Selling Overheads	3,20,000	3,60,000	4,00,000
Administrative Overheads	1,60,000	1,60,000	1,60,000
	24,40,000	28,00,000	31,60,000

Profit is estimated @ 20% on sales.

The following increases in costs are expected during the year:

	In percentage
Direct Materials	8
Direct Labour	5
Variable Factory Overheads	5
Variable Selling Overheads	8
Fixed Factory Overheads	10
Fixed Selling Overheads	15
Administrative Overheads	10

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PREPARE flexible budget for the period 2020-21 at 85% level of capacity. Also ascertain profit and contribution.

ANSWER 4

ABC Ltd.

Budget for 85% capacity level for the period 2020-21

Budgeted production (units)	85,000	
	Per Unit (₹)	Amount (₹)
Direct Material (note 1)	21.60	18,36,000
Direct Labour (note 2)	10.50	8,92,500
Variable factory overhead (note 3)	2.10	1,78,500
Variable selling overhead (note 4)	4.32	3,67,200
Variable cost	38.52	32,74,200
Fixed factory overhead (note 3)		2,20,000
Fixed selling overhead (note 4)		1,15,000
Administrative overhead		1,76,000
Fixed cost		5,11,000
Total cost		37,85,200
Add: Profit 20% on sales or 25% on total cost		9,46,300
Sales		47,31,500
Contribution (Sales – Variable cost)		14,57,300

Working Notes:

1. Direct Materials:

	(₹)		(₹)
75% Capacity	15,00,000	65% Capacity	13,00,000
65% Capacity	13,00,000	55% Capacity	11,00,000
10% change in capacity	2,00,000	10% change in capacity	2,00,000

For 10% increase in capacity, i.e., for increase by 10,000 units, the total direct material cost regularly changes by Rs. 2,00,000

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Direct material cost (variable) = Rs. 2,00,000 ÷ 10,000 = Rs. 20

After 8% increase in price, direct material cost per unit = Rs. 20 × 1.08 = Rs. 21.60

Direct material cost for 85,000 budgeted units = 85,000 × Rs. 21.60 = Rs. 18,36,000

2. Direct Labour :

	(₹)		(₹)
75% Capacity	7,50,000	65% Capacity	6,50,000
65% Capacity	6,50,000	55% Capacity	5,50,000
10% change in capacity	1,00,000	10% change in capacity	1,00,000

For 10% increase in capacity, direct labour cost regularly changes by Rs. 1,00,000.

Direct labour cost per unit = Rs. 1,00,000 ÷ 10,000 = Rs. 10

After 5% increase in price, direct labour cost per unit = Rs. 10 × 1.05 = Rs. 10.50

Direct labour for 85,000 units = 85,000 units × Rs. 10.50 = Rs. 8,92,500.

3. Factory overheads are semi-variable overheads:

	(₹)		(₹)
75% Capacity	3,50,000	65% Capacity	3,30,000
65% Capacity	3,30,000	55% Capacity	3,10,000
10% change in capacity	20,000	10% change in capacity	20,000

Variable factory overhead = Rs. 20,000 ÷ 10,000 = Rs. 2

Variable factory overhead for 75,000 units = 75,000 × Rs. 2 = Rs. 1,50,000

Fixed factory overhead = Rs. 3,50,000 – Rs. 1,50,000 = Rs. 2,00,000.

Variable factory overhead after 5% increase = Rs. 2 × 1.05 = Rs. 2.10

Fixed factory overhead after 10% increase = Rs. 2,00,000 × 1.10 = Rs. 2,20,000.

4. Selling overhead is semi-variable overhead :

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	(₹)		(₹)
75% Capacity	4,00,000	65% Capacity	3,60,000
65% Capacity	3,60,000	55% Capacity	3,20,000
10% change in capacity	40,000	10% change in capacity	40,000

Variable selling overhead = Rs. 40,000 ÷ 10,000 units = Rs. 4

Variable selling overhead for 75,000 units = 75,000 × Rs. 4 = Rs. 3,00,000.

Fixed selling overhead = Rs. 4,00,000 – Rs. 3,00,000 = Rs. 1,00,000

Variable selling overhead after 8% increase = Rs. 4 × 1.08 = Rs. 4.32

Fixed selling overhead after 15% increase = Rs. 1,00,000 × 1.15 = Rs. 1,15,000

5. Administrative overhead is fixed:

After 10% increase = Rs. 1,60,000 × 1.10 = Rs. 1,76,000

5. The accountant of manufacturing company provides you the following details for year 2020:

Direct materials	1,75,000	Other variable costs	80,000
Direct Wages	1,00,000	Other fixed costs	80,000
Fixed factory overheads	1,00,000	Profit	1,15,000
Variable factory overheads	1,00,000	Sales	7,50,000

During the year, the company manufactured two products A and B and the output and costs were:

Output (units)	2,00,000	1,00,000
Selling price per unit	Rs. 2.00	Rs. 3.50
Direct materials per unit	Rs. 0.50	Rs. 0.75
Direct wages per unit	Rs. 0.25	Rs. 0.50

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A Rs.0.25 per unit; and B Rs.0.30 per unit.

During 2021, it is expected that the demand for product A will fall by 25 % and for B by 50%. It is decided to manufacture a further product C, the cost for which is estimated as follows

	Product C
Output (units)	2,00,000
Selling price per unit	Rs. 1.75
Direct materials per unit	Rs. 0.40
Direct wages per unit	Rs. 0.25

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It is anticipated that the other variable costs per unit will be the same as for product A. PREPARE a budget to present to the management, showing the current position and the position for 2021. Comment on the comparative results.

ANSWER 5
Budget Showing Current Position and Position for 2021

	Position for 2020			Position for 2021			
	A	B	Total (A+B)	A	B	C	Total (A+B+C)
Sales (units)	2,00,000	1,00,000	–	1,50,000	50,000	2,00,000	–
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
(A) Sales	4,00,000	3,50,000	7,50,000	3,00,000	1,75,000	3,50,000	8,25,000
Direct Material	1,00,000	75,000	1,75,000	75,000	37,500	80,000	1,92,500
Direct wages	50,000	50,000	1,00,000	37,500	25,000	50,000	1,12,500
Factory overhead (variable)	50,000	50,000	1,00,000	37,500	25,000	50,000	1,12,500
Other variable costs	50,000	30,000	80,000	37,500	15,000	50,000	1,02,500
(B) Marginal Cost	2,50,000	2,05,000	4,55,000	1,87,500	1,02,500	2,30,000	5,20,000
(C) Contribution (A-B)	1,50,000	1,45,000	2,95,000	1,12,500	72,500	1,20,000	3,05,000
Fixed costs – Factory			1,00,000				1,00,000
– Others			80,000				80,000
(D) Total fixed cost			1,80,000				1,80,000
Profit (C – D)			1,15,000				1,25,000

Comments: Introduction of Product C is likely to increase profit by Rs. 10,000 (i.e. from Rs. 1,15,000 to Rs. 1,25,000) in 2021 as compared to 2020. Therefore, introduction of product C is recommended.

6. TQM Ltd. has furnished the following information for the month ending 30th June, 2020:

	Master Budget	Actual	Variance
Units produced and sold	80,000	72,000	
Sales (Rs.)	3,20,000	2,80,000	40,000 (A)
Direct material (Rs.)	80,000	73,600	6,400 (F)
Direct wages (Rs.)	1,20,000	1,04,800	15,200 (F)
Variable overheads (Rs.)	40,000	37,600	2,400 (F)
Fixed overhead (Rs.)	40,000	39,200	800 (F)
Total Cost		2,80,000	2,55,200

The Standard costs of the products are as follows:

	Per unit
--	----------

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	(Rs.)
Direct materials (1 kg. at the rate of Rs.1 per kg.)	1.00
Direct wages (1 hour at the rate of Rs. 1.50)	1.50
Variable overheads (1 hour at the rate of Rs. 0.50)	0.50

Actual results for the month showed that 78,400 kg. of material were used and 70,400 labour hours were recorded.

Required:

- (i) PREPARE Flexible budget for the month and compare with actual results.
- (ii) CALCULATE Material, Labour, Sales Price, Variable Overhead and Fixed Overhead Expenditure variances and Sales Volume (Profit) variance.

ANSWER 6

(i) Statement showing Flexible Budget and its comparison with actual

		Master Budget 80,000 units	Flexible Budget (at standard cost)		Actual for 72,000 units	Variance
			Per unit	72,000 units		
A.	Sales	3,20,000	4.00	2,88,000	2,80,000	8,000 (A)
B.	Direct material	80,000	1.00	72,000	73,600	1,600 (A)
C.	Direct wages	1,20,000	1.50	1,08,000	1,04,800	3,200 (F)
D.	Variable overhead	40,000	0.50	36,000	37,600	1,600 (A)
E.	Total variable cost	2,40,000	3.00	2,16,000	2,16,000	—
F.	Contribution	80,000	1.00	72,000	64,000	—
G.	Fixed overhead	40,000	0.50	40,000	39,200	800 (F)
H.	Net profit	40,000	0.50	32,000	24,800	7,200 (A)

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(ii) Variances:	
Sales Price Variance	$= \text{Actual Quantity (Standard Rate - Actual Rate)}$ $= 72,000 \text{ units } (\text{₹ } 4.00 - \text{₹ } 3.89)$ $= \text{₹ } 8,000 \text{ (A)}$
Direct Material Cost Variance	$= \text{Standard Cost for Actual output - Actual cost}$ $= \text{₹ } 72,000 - \text{₹ } 73,600 = \text{₹ } 1,600 \text{ (A)}$
Direct Material Price Variance	$= \text{Actual Quantity (Standard rate - Actual Rate)}$ $= 78,400 \text{ units } \left(\text{₹ } 1.00 - \frac{\text{₹ } 73,600}{78,400 \text{ units}} \right)$ $= \text{₹ } 4,800 \text{ (F)}$
Direct Material Usage Variance	$= \text{Standard Rate (Std. Qty. - Actual Quantity)}$ $= \text{₹ } 1 (72,000 \text{ units} - 78,400 \text{ units})$ $= \text{₹ } 6,400 \text{ (A)}$
Direct Labour Cost Variance	$= \text{Standard Cost for actual output - Actual cost}$ $= \text{₹ } 1,08,000 - \text{₹ } 1,04,800 = \text{₹ } 3,200 \text{ (F)}$
Direct Labour Rate Variance	$= \text{Actual Hour (Std Rate - Actual Rate)}$ $= 70,400 \text{ hours } \left(\text{₹ } 1.5 - \frac{\text{₹ } 1,04,800}{70,400 \text{ hours}} \right)$ $= \text{₹ } 800 \text{ (F)}$
Direct Labour Efficiency	$= \text{Standard Rate (Standard Hour - Actual Hour)}$ $= \text{₹ } 1.5 (72,000 - 70,400) = \text{₹ } 2,400 \text{ (F)}$
Variable Overhead	$= \text{Recovered variable overhead - Actual variable overhead}$ $= (72,000 \text{ units} \times \text{₹ } 0.50) - \text{₹ } 37,600$ $= \text{₹ } 1,600 \text{ (A)}$
Fixed Overhead Expenditure	$= \text{Budgeted fixed overhead - Actual fixed overhead}$ $= \text{₹ } 40,000 - \text{₹ } 39,200 = \text{₹ } 800 \text{ (F)}$
Sales Volume (Profit) Variance	$= \text{Std. Profit (Budgeted Quantity - Actual Quantity)}$ $= \text{₹ } 0.50 (80,000 - 72,000) = \text{₹ } 4,000 \text{ (A)}$

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7. Jigyasa Ltd. is drawing a production plan for its two products Minimax (MM) and Heavyhigh (HH) for the year 2020-21. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	Heavyhigh (HH)
Budgeted Production units	1,80,000	1,20,000
	Rs.	Rs.
Direct material cost per unit	220	280
Direct labour cost per unit	130	120
Manufacturing overhead	4,00,000	5,00,000

The estimated units to be sold in the first four months of the year 2020-21 are as under

	April	May	June	July
Minimax	8,000	10,000	12,000	16,000
Heavyhigh	6,000	8,000	9,000	14,000

PREPARE production budget for the first quarter in month-wise.

ANSWER 7

Production Budget of Product Minimax and Heavyhigh (in units)

	April		May		June		Total	
	MM	HH	MM	HH	MM	HH	MM	HH
Sales	8,000	6,000	10,000	8,000	12,000	9,000	30,000	23,000
Add: Closing Stock (25% of next month's sale)	2,500	2,000	3,000	2,250	4,000	3,500	9,500	7,750
Less: Opening Stock	2,000*	1,500*	2,500	2,000	3,000	2,250	7,500	5,750
Production units	8,500	6,500	10,500	8,250	13,000	10,250	32,000	25,000

* Opening stock of April is the closing stock of March, which is as per company's policy 25% of next month's sale.

Production Cost Budget

Element of cost	Rate (₹)		Amount (₹)	
	MM (32,000 units)	HH (25,000 units)	MM	HH
Direct Material	220	280	70,40,000	70,00,000
Direct Labour	130	120	41,60,000	30,00,000
Manufacturing Overhead (4,00,000 ÷ 1,80,000 × 32,000) (5,00,000 ÷ 1,20,000 × 25,000)			71,111	1,04,167
			1,12,71,111	1,01,04,167

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8. Concorde Ltd. manufactures two products using two types of materials and one grade of labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product-A	Product-B
Budgeted sales (in units)	2,400	3,600
Budgeted material consumption per unit (in kg):		
Material-X	5	3
Material-Y	4	6
Standard labour hours allowed per unit of product	3	5

Material-X and Material-Y cost Rs. 4 and Rs. 6 per kg and labours are paid Rs. 25 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 180 direct workers.

The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition the non-productive down-time is budgeted at 20% of the productive hours worked.

There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product-A	400 units
Product-B	200 units
Material-X	1,000 kg.
Material-Y	500 kg.

The anticipated closing stocks for budget period are as below:

Product-A	4 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	6 days consumption

Required:

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month.

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ANSWER 8

Number of days in budget period = 4 weeks × 5 days = 20 days

Number of units to be produced

	Product-A (units)	Product-B (units)
Budgeted Sales	2,400	3,600
Add: Closing stock		
$\left(\frac{2,400\text{units}}{20\text{days}} \times 4\text{days}\right)$ $\left(\frac{3,600\text{units}}{20\text{days}} \times 5\text{days}\right)$	480	900
Less: Opening stock	400	200
	2,480	4,300

(i) Material Purchase Budget

	Material-X (Kg.)	Material-Y (Kg.)
Material required:		
Product-A	12,400 (2,480 units × 5 kg.)	9,920 (2,480 units × 4 kg.)
Product-B	12,900 (4,300 units × 3 kg.)	25,800 (4,300 units × 6 kg.)
	25,300	35,720
Add: Closing stock	12,650	10,716

$\left(\frac{25,300\text{kgs.}}{20\text{days}} \times 10\text{days}\right)$		
$\left(\frac{35,720\text{kgs.}}{20\text{days}} \times 6\text{days}\right)$		
Less: Opening stock	1,000	500
Quantity to be purchased	36,950	45,936
Rate per kg. of Material	₹ 4	₹ 6
Total Cost	₹ 1,47,800	₹ 2,75,616

(ii) Wages Budget

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	Product-A (Hours)	Product-B (Hours)
Units to be produced	2,480 units	4,300 units
Standard hours allowed per unit	3	5
Total Standard Hours allowed	7,440	21,500
Productive hours required for production	$\frac{7,440 \text{ hours}}{80\%} = 9,300$	$\frac{21,500 \text{ hours}}{80\%} = 26,875$
Add: Non-Productive down time	1,860 hours. (20% of 9,300 hours)	5,375 hours. (20% of 26,875 hours)
Hours to be paid	11,160	32,250

Total Hours to be paid	= 43,410 hours (11,160 + 32,250)
Hours to be paid at normal rate	= 4 weeks × 40 hours × 180 workers = 28,800 hours
Hours to be paid at premium rate	= 43,410 hours – 28,800 hours = 14,610 hours
Total wages to be paid	= 28,800 hours × Rs. 25 + 14,610 hours × Rs. 37.5 = Rs. 7,20,000 + Rs. 5,47,875 = Rs. 12,67,875

ICAI EXTRA QUESTIONS

Chapter-1 Introduction to Cost and Management Accounting

Question-1

STATE the Cost Control and Cost Reduction objectives of Cost and Management Accounting system.

Answer 1

Among other objectives of cost and management accounting system, cost control and cost reduction are principal objectives. Cost control objective ensures the compliance with the set standard of procedures, Cost Reduction objective explores the possibilities of improvements in terms of both quantitative and qualitative aspects. Both objectives are briefly explained as below:

Cost Control: Maintaining discipline in expenditure is one of the main objectives of a good cost and management accounting system. It ensures that expenditures are in consonance with predetermined set standard and any variation from these set standards is noted and reported on continuous basis. To exercise control over cost, following steps are followed:

- (a) Determination of pre-determined standard or results: Standard cost or performance targets for a cost object or a cost centre is set before initiation of production or service activity. These are desired cost or result that need to be achieved.
- (b) Measurement of actual performance: Actual cost or result of the cost object or cost centre is measured. Performance should be measured in the same manner in which the targets are set i.e. if the targets are set up operation-wise, and then the actual costs should also be collected and measured operation-wise to have a common basis for comparison.
- (c) Comparison of actual performance with set standard or target: The actual performance so measured is compared against the set standard and desired target. Any deviation (variance) between the two is noted and reported to the appropriate person or authority.
- (d) Analysis of variance and action: The variance in results so noted are further analysed to know the reasons for variance and appropriate action is taken to ensure compliance in

future. If necessary, the standards are further amended to take developments into account.

Cost Reduction: It may be defined "as the achievement of real and permanent reduction in the unit cost of goods manufactured or services rendered without impairing their suitability for the use intended or diminution in the quality of the product." Cost reduction is an approach of management where cost of an object is believed to be further reduced. No cost is termed as lowest and every possibility of cost reduction is explored. To do cost reduction, the following action is taken:

(a) Each activity within an entity is segmented to analyse and identify value added and non value added activities. All non-value added activities are eliminated without affecting the essential characteristics of the product or process. Value chain Analysis, a strategic tool, developed by Michael Porter, is one of the methods to do value analysis.

(b) Conducting continuous research and study to know better way to do anything. The three-fold assumptions involved in the definition of cost reduction may be summarised as under:

- (i) There is a saving in unit cost.
- (ii) Such saving is of permanent nature.
- (iii) The utility and quality of the goods and services remain unaffected, if not improved.

Question-2

STATE in brief how Cost Accounting and Management Accounting is related or different from each other.

Answer 2

The term Cost Accounting and Management Accounting is interchangeably by various laureates as both the disciplines are interrelated. Management accounting to enable its users to take timely and judicious decisions takes inputs from cost accounting, financial accounting, statistics and operation management tools etc. Among other sources of information Cost Accounting system provides cost related information. There are few differences between these two disciplines which are tabulated as below:

Difference between Cost Accounting and Management Accounting

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	Basis	Cost Accounting	Management Accounting
(i)	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
(ii)	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
(iii)	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
(iv)	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
(v)	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
(vi)	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.

Chapter-2 Material Cost

Question 1 (Economic Order Quantity):

Arnav Ltd. manufactures a product X which requires two raw materials A and B in a ratio of 1:4. The sales department has estimated a demand of 5,00,000 units for the product for the year. To produce one unit of finished product, 4 units of material A is required.

Stock position at the beginning of the year is as below:

Product- X 12,000 units

Material A 24,000 units

Material B 52,000 units

To place an order the company has to spend Rs.15,000. The company is financing its working capital using a bank cash credit @13% p.a. Product X is sold at Rs.1,040 per unit. Material A and B is purchased at Rs.150 and Rs.200 respectively.

Required:

COMPUTE economic order quantity (EOQ):

- (i) If purchase order for the both materials is placed separately.
- (ii) If purchase order for the both materials is not placed separately.

Answer 1

Workings:

Annual production of Product X = Annual demand – Opening stock
 = 5,00,000 – 12,000 = 4,88,000 units

Annual requirement for raw materials = Annual production × Material per unit – Opening stock of material

Material A = 4,88,000 × 4 units – 24,000 units = 19,28,000 units

Material B = 4,88,000 × 16 units – 52,000 units = 77,56,000 units

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(i) Computation of EOQ when purchase order for the both materials is placed separately

$$\text{EOQ} = \sqrt{\frac{2 \times \text{Annual Requirement for material} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}}$$

$$\text{Material A} = \sqrt{\frac{2 \times 19,28,000 \text{ units} \times ₹15,000}{13\% \text{ of } ₹150}} = \sqrt{\frac{38,56,000 \times ₹15,000}{₹19.5}} = 54,462 \text{ units}$$

$$\text{Material B} = \sqrt{\frac{2 \times 77,56,000 \text{ units} \times ₹15,000}{13\% \text{ of } ₹200}} = \sqrt{\frac{1,55,12,000 \times ₹15,000}{₹26}} = 94,600 \text{ units}$$

(ii) Computation of EOQ when purchase order for the both materials is not placed separately

$$\begin{aligned} \text{Material A \& B} &= \sqrt{\frac{2 \times (19,28,000 + 77,56,000) \text{ units} \times ₹15,000}{13\% \text{ of } ₹190}} \\ &= \sqrt{\frac{1,93,68,000 \times ₹15,000}{₹24.7}} = 1,08,452 \text{ units} \end{aligned}$$

$$\text{Material A} = \frac{1,08,452 \times 19,28,000}{96,84,000} = 21,592 \text{ units}$$

$$\text{Material B} = \frac{1,08,452 \times 77,56,000}{96,84,000} = 86,860 \text{ units}$$

$$* \frac{(\₹150 \times 19,28,000) + (\₹200 \times 77,56,000)}{(19,28,000 + 77,56,000)} = ₹190$$

Question 2 (Stock levels):

A company manufactures 5,00,000 units of a product per month. The cost of placing an order is Rs.1,000. The purchase price of the raw material is Rs.50 per kg. The re-order period is 4 to 8 days. The consumption of raw materials varies from 14,000 kg to 18,000 kg per day, the average consumption being 16,000 kg. The carrying cost of inventory is 20% per annum.

You are required to CALCULATE

- (i) Re-order quantity (ii) Re-order level
- (iii) Maximum level (iv) Minimum level
- (v) Average stock level

Answer 2

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(i) **Reorder Quantity (ROQ)** = 34,176 kg. (Refer to working note)

(ii) **Reorder level (ROL)** = Maximum usage × Maximum re-order period
 = 18,000 kg. × 8 days = 1,44,000 kg..

(iii) **Maximum level** = ROL + ROQ – (Min. usage × Min. re-order period)
 = 1,44,000 kg. + 34,176 kg. – (14,000 kg. × 4 days)
 = 1,22,176 kg.

(iv) **Minimum level** = ROL – (Normal usage × Normal re-order period)
 = 1,44,000 kg. – (16,000 kg. × 6 days)
 = 48,000 kg.

(v) **Average stock level** = $\frac{1}{2}$ (Maximum level + Minimum level)
 = $\frac{1}{2}$ (1,22,176 kg. + 48,000 kg.) = 85,088 kg.
 OR
 = Minimum level + $\frac{1}{2}$ ROQ
 = 48,000 kg. + $\frac{1}{2}$ × 34,176 kg. = 65,088 kg.

Working Note

Annual consumption of raw material (A) = (16,000 kg. × 365 days) = 58,40,000 kg.

Cost of placing an order (O) = ₹ 1,000

Carrying cost per kg. Per annum (c × i) = ₹ 50 × 20% = ₹ 10

Economic order quantity (EOQ) = $\sqrt{\frac{2AO}{C \times i}}$
 = $\sqrt{\frac{2 \times 58,40,000 \text{ kgs.} \times ₹ 1,000}{₹ 10}}$ = 34,176 kg.

Chapter-3 Employee Cost and Direct Expenses

Question 1:

The following particulars have been extracted from the records of MJ Ltd.

	Workers		
	A	B	C
Actual hours worked in a month	152	160	136
Hourly rate of wages	₹ 50	₹ 55	₹ 48
Production in units			
Product- P	84	-	240
Product- Q	144	-	540
Product -R	184	100	-

Standard time allowed per unit of each product is:

	P	Q	R
Minutes	12	18	30

For the purpose of piece rate, each minute is valued at Rs.1/-

You are required to CALCULATE the wages of each worker under:

- Guaranteed hourly rates basis
- Piece work earnings basis, but guaranteed at 75% of basic pay (guaranteed hourly rate) if the earnings are less than 50% of basic pay.
- Premium bonus basis where the worker receives bonus based on Rowan scheme.

Answer:

(i) Computation of wages of each worker under guaranteed hourly rate basis

Workers	Actual hours worked in a week	Hourly rate of wages (₹)	Wages (₹)
(a)	(b)	(c)	(d) = (b) × (c)
A	152	50	7,600
B	160	55	8,800
C	136	48	6,528

(ii) Computation of wages of each worker under piece work earnings basis

Product	Rate per unit	Worker A		Worker B		Worker C	
		Units	Wages (₹)	Units	Wages (₹)	Units	Wages (₹)
(a)	(b)	(c)	(d = b*c)	(e)	(f = b*e)	(g)	(h = b*g)
P	12	84	1,008	-	-	240	2,880
Q	18	144	2,592	-	-	540	9,720
R	30	184	5,520	100	3,000	-	-
			9,120		3,000		12,600

Since each worker has been guaranteed at 75% of basic pay, if their earnings are less than 50% of basic pay (guaranteed hourly rate), earning of the workers will be as follows:

Workers A and C will be paid the wages as computed viz., Rs.9,120 and Rs.12,600 respectively. The computed earnings under piece rate basis for worker B is Rs.3,000 which is less than 50% of basic pay i.e., Rs. 4,400 (Rs.8,800 × 50%) therefore B would be paid Rs.6,600 i.e. 75% × Rs.8,800 .

Working Notes:
1. Piece rate / per unit

Product	Standard time per unit in minutes	Piece rate each minute (₹)	Piece rate per unit (₹)
(a)	(b)	(c)	(d) = (b) × (c)
P	12	1.00	12.00
Q	18	1.00	18.00
R	30	1.00	30.00

2. Time allowed to each worker

Worker A = (84 units × 12 minutes) + (144 units × 18 minutes) + (184 units × 30 minutes)
= 9,120 minutes or 152 hours

Worker B = 100 units × 30 minutes
= 3,000 minutes or 50 hours

Worker C = (240 units × 12 minutes) + (540 units × 18 minutes)
= 12,600 minutes or 210 hours

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(iii) Computation of wages of each worker under Premium bonus basis (where each worker receives bonus based on Rowan Scheme)

Workers	Time allowed hours	Time taken hours	Time saved hours	Wage rate/hour (₹)	Earnings (₹)	Bonus (₹)	Total of earning & bonus (₹)
A	152	152	-	50	7,600	-	7,600
B	50	160	-	55	8,800	-	8,800
C	210	136	74	48	6,528	2,300*	8,828

$$\begin{aligned}
 \text{* Bonus under Rowan scheme} &= \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour} \\
 &= \frac{74 \text{ hours}}{210 \text{ hours}} \times 136 \text{ hours} \times ₹48 = ₹2,300
 \end{aligned}$$

Question 2 :

The existing incentive system of Alpha Limited is as under:

Normal working week 5 days of 8 hours each plus 3 late shifts of 3 hours each

Rate of Payment Day work: Rs.160 per hour

Late shift: Rs.225 per hour

Average output per operator for 49-hours week i.e. including 3 late shifts = 240 articles

In order to increase output and eliminate overtime, it is decided to switch on to a system of payment by results.

The following information is obtained:

Time-rate (as usual) : Rs.160 per hour

Basic time allowed for 15 articles : 2.5 hours

Piece-work rate : Add 20% to basic piecerate

Premium Bonus : Add 50% to time.

If during the last week 270 articles are produced in a 40-hour week.

Required:

(i) CALCULATE weekly earnings, number of articles produced and labour cost per article for one operator under the following systems:

- Existing time-rate
- Straight piece-work
- Rowan system
- Halsey premium system

(ii) PREPARE a Statement showing hours worked, weekly earnings, number of articles produced and labour cost per article for one operator under the above systems.

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Answer 2
(i) (a) Existing time rate

Weekly wages:

Normal shift (40 hours × Rs.160):	Rs.6,400
Late shift (9 hours × Rs.225)	Rs.2,025
	Rs.8,425

(b) Piece Rate System

15 articles are produced in 2.5 hours

Therefore, to produce 270 articles, hours required is $\frac{2.5 \text{ hours}}{15 \text{ articles}} \times 270 \text{ articles} = 45 \text{ hours}$.

Cost of producing 270 articles:

At basic time rate (45 hours × ₹160) =	₹7,200
Add: Bonus @ 20% on basic Piece rate	<u>₹1,440</u>
Earning for the week	<u>₹8,640</u>

(c) Rowan Premium System

(i) Time allowed for producing 270 articles $\left(\frac{2.5 \text{ hours}}{15 \text{ articles}} \times 270 \text{ articles} \times 150\% \right) = 67.5 \text{ hours}$

(ii) Time taken to produce 270 articles = 40.0 hours

(iii) Time Saved = 67.5 – 40 = 27.5 hours

Earnings under Rowan Premium system:

$$= (\text{Time taken} \times \text{Rate per hour}) + \left(\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour} \right)$$

$$= (40 \text{ hours} \times ₹ 160) + \left(\frac{27.5 \text{ hours}}{67.5 \text{ hours}} \times 40 \text{ hours} \times ₹ 160 \right) = ₹ 9,007.41$$

(d) Halsey Premium System

$$= (\text{Time taken} \times \text{Rate per hour}) + \left(\frac{1}{2} \times \text{Time saved} \times \text{Rate per hour} \right)$$

$$= (40 \text{ hours} \times ₹ 160) + \left(\frac{1}{2} \times 27.5 \text{ hours} \times ₹ 160 \right) = ₹ 6,400 + ₹ 2,200 = ₹ 8,600$$

(ii) Statement showing hours worked, weekly earnings, number of articles produced and cost per article

Method of Payment	Hours worked	Weekly earnings (₹)	Number of articles produced	Labour cost per article (₹)
Existing time rate	49	8,425.00	240	35.10
Straight piece rate system	40	8,640.00	270	32.00
Rowan Premium System	40	9,007.41	270	33.36
Halsey Premium System	40	8,600.00	270	31.85

Chapter-4 Overhead: Absorption Costing Method

Question 1 (Re-apportionment of overheads using Trial and Error Method):

SA Ltd. has three production (M1, M2 and A1) and three service departments (Stores, Engineering services and General service). Engineering department serves the M1 and M2 only.

The relevant information related with Product X and Y are as follows:

	Product X	Product Y
M1	10 Machine hours	6 Machine hours
M2	4 Machine hours	14 Machine hours
A1	14 Direct labour hours	18 Direct labour hours

The annual budgeted overhead cost for the year is

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	Indirect Wages (₹)	Consumable Supplies(₹)
M ₁	9,30,400	2,52,000
M ₂	8,26,800	3,64,000
A ₁	3,24,400	84,000
Stores	1,64,000	56,000
Engineering Service	1,06,800	84,000
General Service	1,50,400	64,000

- Depreciation on Machinery 7,92,000
- Insurance of Machinery 1,44,000
- Insurance of Building 64,800 (Total building insurance cost for M₁ is one third of annual premium)
- Power 1,29,600
- Light 1,08,000
- Rent 2,53,500 (The general service deptt. is located in a building owned by the company. It is valued at Rs.1,20,000 and is charged into cost at notional value of 8% per annum. This cost is additional to the rent shown above)

Department	Book value Machinery (₹)	Area (Sq. ft.)	Effective H.P. hours %	Production Direct Labour hour	Capacity Machine hour
M ₁	24,00,000	5,000	50	2,00,000	40,000
M ₂	18,00,000	6,000	35	1,50,000	50,000
A ₁	6,00,000	8,000	05	3,00,000	—
Stores	2,40,000	2,000	—	—	—
Engg. Service	7,20,000	2,500	10	—	—
General Service	2,40,000	1,500	—	—	—

Required:

(i) PREPARE an overhead analysis sheet, showing the bases of apportionment of overhead to departments.

(ii) PREPARE a statement allocating service department overheads to production department ignoring the apportionment of service department costs among service departments.

(iii) CALCULATE suitable overhead absorption rate for the production departments.

(iv) CALCULATE the overheads to be absorbed by two products, X and Y.

Answer 1

(i) Summary of Apportionment of Overheads

Items	Basis of Apportionment	Total Amount	Production Deptt.			Service Deptt.		
			M ₁	M ₂	A ₁	Store Service	Engineering Service	General Service
Indirect wages	Allocation given	25,02,800	9,30,400	8,26,800	3,24,400	1,64,000	1,06,800	1,50,400
Consumable stores	Allocation given	9,04,000	2,52,000	3,64,000	84,000	56,000	84,000	64,000
Depreciation	Capital value of machine (20:15:5:2:6:2)	7,92,000	3,16,800	2,37,600	79,200	31,680	95,040	31,680
Insurance of Machine	Capital value of machine (20:15:5:2:6:2)	1,44,000	57,600	43,200	14,400	5,760	17,280	5,760
Insurance on Building	1/3 rd to M ₁ Balance area basis (-:12:16:4:5:3)	64,800	21,600	12,960	17,280	4,320	5,400	3,240
Power	HP Hr% (10:7:1:-:2:-)	1,29,600	64,800	45,360	6,480	—	12,960	—
Light	Area (10:12:16:4:5:3)	1,08,000	21,600	25,920	34,560	8,640	10,800	6,480
Rent*	Area (10:12:16:4:5:-)	2,53,500	53,940	64,720	86,300	21,580	26,960	—
Total		48,98,700	17,18,740	16,20,560	6,46,620	2,91,980	3,59,240	2,61,560

*Rent to be apportioned among the departments which actually use the rented building. The notional rent is imputed cost and is not included in the calculation.

(ii) Allocation of service departments overheads

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Service Deptt.	Basis of Apportionment	Production Deptt.			Service Deptt.		
		M ₁	M ₂	A ₁	Store Service	Engineering Service	General Service
Store	Ratio of consumable value (126 : 182 : 42)	1,05,120	1,51,820	35,040	(2,91,980)	–	–
Engineering service	In Machine hours Ratio of M ₁ and M ₂ (4 : 5)	1,59,660	1,99,580	–	–	(3,59,240)	–
General service	Labour hour Basis (20 : 15 : 30)	80,480	60,360	1,20,720	–	–	(2,61,560)
Production Department allocated in (i)		17,18,740	16,20,560	6,46,620			
Total		20,64,000	20,32,320	8,02,380			

(iii) Overhead Absorption rate

	M ₁	M ₂	A ₁
Total overhead allocated	20,64,000	20,32,320	8,02,380
Machine hours	40,000	50,000	–
Labour hours	–	–	3,00,000
Rate per machine hour	51.60	40.65	–
Rate per Direct labour	–	–	2.67

(iv) Statement showing overhead absorption for Product X and Y

Machine Deptt.	Absorption Rate	Product X		Product Y	
		Hours	(₹)	Hours	(₹)
M ₁	51.60	10	516.00	6	309.60
M ₂	40.65	4	162.60	14	569.10
A ₁	2.67	14	37.38	18	48.06
			715.98		926.76

Question 2 (Re-apportionment of overheads using Repeated distribution method):

DT Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following budget is for December 20X8:

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	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct material		20,00,000	40,00,000	80,00,000	40,00,000	20,00,000
Direct wages		1,00,00,000	40,00,000	1,60,00,000	20,00,000	40,00,000
Factory rent	80,00,000					
Power	50,00,000					
Depreciation	20,00,000					
Other overheads	1,80,00,000					
Additional information:						
Area (Sq. ft.)		500	250	500	250	500
Capital value of assets (₹ lakhs)		400	800	400	200	200
Machine hours		1,000	2,000	4,000	1,000	1,000
Horse power of machines		50	40	20	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X' (%)	45	15	30	–	10
Service Dept. 'Y' (%)	60	35	–	5	–

Required:

- (i) PREPARE a statement showing distribution of overheads to various departments.
- (ii) PREPARE a statement showing re-distribution of service departments expenses to production departments.
- (iii) CALCULATE machine hour rates of the production departments 'A', 'B' and 'C'.

Answer 2

(i) Overhead Distribution Summary

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	Basis	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct materials	Direct	–	–	–	–	40,00,000	20,00,000
Direct wages	Direct	–	–	–	–	20,00,000	40,00,000
Factory rent	Area	80,00,000	20,00,000	10,00,000	20,00,000	10,00,000	20,00,000
Power	H.P. × Machine Hrs.	50,00,000	10,00,000	16,00,000	16,00,000	3,00,000	5,00,000
Depreciation	Capital value	20,00,000	4,00,000	8,00,000	4,00,000	2,00,000	2,00,000
Other overheads	Machine hrs.	1,80,00,000	20,00,000	40,00,000	80,00,000	20,00,000	20,00,000
			54,00,000	74,00,000	1,20,00,000	95,00,000	1,07,00,000

(ii) Redistribution of Service Department's expenses

	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Total overheads	54,00,000	74,00,000	1,20,00,000	95,00,000	1,07,00,000
Dept. X overhead apportioned in the ratio (45:15:30:—:10)	42,75,000	14,25,000	28,50,000	(95,00,000)	9,50,000
Dept. Y overhead apportioned in the ratio (60:35:—:5:—)	69,90,000	40,77,500	–	5,82,500	(1,16,50,000)
Dept. X overhead apportioned in the ratio (45:15:30:—:10)	2,62,120	87,380	1,74,760	(5,82,500)	58,240
Dept. Y overhead apportioned in the ratio (60:35:—:5:—)	34,940	20,380	–	2,920	(58,240)
Dept. X overhead apportioned in the ratio (45:15:30:—:10)	1,300	440	880	(2,920)	300
Dept. Y overhead apportioned in the ratio (60:35:—:5:—)	180	120	–	–	(300)
	1,69,63,540	1,30,10,820	1,50,25,640	–	–

(iii) Machine hour rate:

		A	B	C
A	Total overheads (₹)	1,69,63,540	1,30,10,820	1,50,25,640
B	Machine hours	1,000	2,000	4,000
C	Machine hour rate (₹) [A ÷ B]	16,963.54	6,505.41	3,756.41

Chapter-5 Activity Based Costing (ABC)

Question-1

A company manufactures three products namely A, B and C in a factory. The following cost data for the month of March, 20X8 are as under:

Activity	A	B	C
Unit produced	10,000	15,000	20,000
Direct labour hour per unit	3	4.5	4
Machine hour per unit	6	4	5
Set-up of machines	20	25	30
Number of orders	15	12	10
Machine operating cost (₹)			34,50,000
Machine set-up cost (₹)			4,36,000
Order processing cost (₹)			2,56,000

Required:

- IDENTIFY Cost pool, Cost drivers.
- CALCULATE cost driver rate.
- CALCULATE overheads rate per unit using activity-based costing method.

Answer 1

(i) Identification of Cost pools and cost drivers:

Cost Pools	Cost Drivers
Machine operating cost	No. of machine hours
Machine set-up cost	No. of machine set-ups
Order processing cost	No. of orders

(ii) Calculation of cost driver rate:

Cost Pools	Cost (₹)	Cost Drivers	Rate per cost driver (₹)
Machine operating cost	34,50,000	2,20,000 machine hours {(10,000×6)+(15,000×4)+(20,000×5)}	15.68
Machine set-up cost	4,36,000	75 set-ups (20+25+30)	5,813.33
Order processing cost	2,56,000	37 orders (15+12+10)	6,918.92

(iii) Calculation of overhead rate per unit using ABC:

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Activity	Cost driver rate (₹)	Products					
		A		B		C	
		Total Cost	Rate per unit		Rate per unit		Rate per unit
(i)	(ii) = (i)×Cost driver	(iii) ÷ units	(ii) = (i)×Cost driver	(iii) ÷ units	(ii) = (i)×Cost driver	(iii) ÷ units	
Machine operating cost	15.68	9,40,800 (15.68×60000)	94.08	9,40,800 (15.68×60000)	62.72	15,68,000 (15.68×1,00000)	78.40
Machine set-up cost	5,813.33	1,16,267 (5,813.33×20)	11.63	1,45,333 (5,813.33×25)	9.69	1,74,400 (5,813.33×30)	8.72
Order processing cost	6,918.92	1,03,784 (6,918.92×15)	10.38	83,027 (6,918.92×12)	5.54	69,189 (6,918.92×10)	3.46

Question-2

CDE Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. or orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was Rs.24,62,000 and wages Rs.4,68,500. Usage activities of the said batch are as follows:

Material orders 56
 Material movements 84
 Maintenance hours 1,420 hours
 Set-ups 60
 No. of inspections 18

Required:

- (i) CALCULATE cost driver rates.
- (ii) CALCULATE the total and unit cost for the batch.

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Answer 2
(i) Calculation of cost driver rate:

Cost pool	Budgeted overheads (₹)	Cost driver	Cost driver rate (₹)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

(ii) Calculation of cost for the batch:

Particulars	Amount (₹)	Amount (₹)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
- Material procurement (1,535×56 orders)	85,960.00	
- Material handling (685.48×84 movements)	57,580.32	
- Maintenance (139.94×1,420 hours)	1,98,714.80	
- Set-up (628.97×60 set-ups)	37,738.20	
- Quality control (242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per units		436.17

Question-3

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost (₹)
Power	Kilowatt hours	50,000 kilowatt hours	40,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	60,00,000

The company makes three products M, S and T. For the year ended March 31, 20X7, the following consumption of cost drivers was reported:

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Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

- (i) PREPARE a statement showing cost allocation to each product from each activity.
(ii) CALCULATE the cost of unused capacity for each activity.
(iii) STATE the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

Answer 3

(i) Statement of cost allocation to each product from each activity

	Product			
	M (₹)	S (₹)	T (₹)	Total (₹)
Power (Refer to working note)	8,00,000 (10,000 kWh × 80)	16,00,000 (20,000 kWh × 80)	12,00,000 (15,000 kWh × 80)	36,00,000
Quality Inspections (Refer to working note)	21,00,000 (3,500 inspections × 600)	15,00,000 (2,500 inspections × 600)	18,00,000 (3,000 inspections × 600)	54,00,000

Working Note:

Rate per unit of cost driver:

Power : (Rs.40,00,000 ÷ 50,000 kWh) = Rs.80/kWh

Quality Inspection : (Rs.60,00,000 ÷ 10,000 inspections) = Rs.600 per inspection

(ii) Calculation of cost of unused capacity for each activity:

	(₹)
Power (*40,00,000 – *36,00,000)	4,00,000
Quality Inspections (*60,00,000 – *54,00,000)	6,00,000
Total cost of unused capacity	10,00,000

(iii) Factors management consider in choosing a capacity level to compute the budgeted fixed

overhead cost rate:

- Effect on product costing & capacity management
- Effect on pricing decisions.
- Effect on performance evaluation
- Effect on financial statements
- Regulatory requirements.
- Difficulties in forecasting for any capacity level.

Chapter-6 Cost Sheet

Question 1:

Arnav Inspat Udyog Ltd. has the following expenditures for the year ended 31st March, 20X8:

Sl. No.	Amount (₹)	Amount (₹)
(i)	Raw materials purchased	10,00,00,000
(ii)	GST paid on the above purchases @18% (eligible for input tax credit)	1,80,00,000
(iii)	Freight inward	11,20,600
(iv)	Wages paid to factory workers	29,20,000
(v)	Contribution made towards employees' PF & ESIS	3,60,000
(vi)	Production bonus paid to factory workers	2,90,000
(vii)	Royalty paid for production	1,72,600
(viii)	Amount paid for power & fuel	4,62,000
(ix)	Amount paid for purchase of moulds and patterns (life is equivalent to two years production)	8,96,000
(x)	Job charges paid to job workers	8,12,000
(xi)	Stores and spares consumed	1,12,000
(xii)	Depreciation on:	
	- Factory building	84,000
	- Office building	56,000
	- Plant & Machinery	1,26,000
	- Delivery vehicles	86,000
		3,52,000
(xiii)	Salary paid to supervisors	1,26,000
(xiv)	Repairs & Maintenance paid for:	48,000
	- Plant & Machinery	
	- Sales office building	18,000
	- Vehicles used by directors	19,600
		85,600
(xv)	Insurance premium paid for:	
	- Plant & Machinery	31,200

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	- Factory building	18,100	
	- Stock of raw materials & WIP	36,000	85,300
(xvi)	Expenses paid for quality control check activities		19,600
(xvii)	Salary paid to quality control staffs		96,200
(xviii)	Research & development cost paid improvement in production process		18,200
(xix)	Expenses paid for pollution control and engineering & maintenance		26,600
(xx)	Expenses paid for administration of factory work		1,18,600
(xxi)	Salary paid to functional managers:		
	- Production control	9,60,000	
	- Finance & Accounts	9,18,000	
	- Sales & Marketing	10,12,000	28,90,000
(xxii)	Salary paid to General Manager		12,56,000
(xxiii)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	96,000	
	- For re-distribution of finished goods	1,12,000	2,08,000
(xxiv)	Interest and finance charges paid		7,20,000
(xxv)	Fee paid to auditors		1,80,000
(xxvi)	Fee paid to legal advisors		1,20,000
(xxvii)	Fee paid to independent directors		2,20,000
(xxviii)	Performance bonus paid to sales staffs		1,80,000
(xxix)	Value of stock as on 1 st April, 20X7:		
	- Raw materials	18,00,000	
	- Work-in-process	9,20,000	
	- Finished goods	11,00,000	38,20,000
(xxx)	Value of stock as on 31 st March, 20X8:		
	- Raw materials	9,60,000	
	- Work-in-process	8,70,000	
	- Finished goods	18,20,000	36,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – Rs.86,000/-

From the above data you are requested to PREPARE Statement of cost for Arnav Ispat Udyog Ltd. for the year ended 31st March, 20X8, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Answer 1

Statement of Cost of Arnav Ispat Udyog Ltd. for the year ended 31st March, 20X8:

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Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	10,00,00,000	
	- Freight inward	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers	29,20,000	
	- Contribution made towards employees' PF & ESIS	3,60,000	
	- Production bonus paid to factory workers	2,90,000	35,70,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,72,600	
	- Amount paid for power & fuel	4,62,000	
	- Amortised cost of moulds and patterns	4,48,000	
	- Job charges paid to job workers	8,12,000	18,94,600
	Prime Cost		10,74,25,200
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,12,000	
	- Depreciation on factory building	84,000	
	- Depreciation on plant & machinery	1,26,000	
	- Repairs & Maintenance paid for plant & machinery	48,000	
	- Insurance premium paid for plant & machinery	31,200	
	- Insurance premium paid for factory building	18,100	
	- Insurance premium paid for stock of raw materials & WIP	36,000	

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	- Salary paid to supervisors	1,26,000	
	- Expenses paid for pollution control and engineering & maintenance	26,600	6,07,900
	Gross factory cost		10,80,33,100
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		10,80,83,100
(v)	Quality control cost:		
	- Expenses paid for quality control check activities	19,600	
	- Salary paid to quality control staffs	96,200	1,15,800
(vi)	Research & development cost paid improvement in production process		18,200
(vii)	Administration cost related with production:		
	- Expenses paid for administration of factory work	1,18,600	
	- Salary paid to Production control manager	9,60,000	10,78,600
(viii)	Less: Realisable value on sale of scrap and waste		(86,000)
(ix)	Add: Primary packing cost		96,000
	Cost of Production		10,93,05,700
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,00,000)
	Cost of Goods Sold		10,86,05,700
(x)	Administrative overheads:		
	- Depreciation on office building	56,000	
	- Repairs & Maintenance paid for vehicles used by directors	19,600	
	- Salary paid to Manager- Finance & Accounts	9,18,000	
	- Salary paid to General Manager	12,56,000	
	- Fee paid to auditors	1,80,000	
	- Fee paid to legal advisors	1,20,000	
	- Fee paid to independent directors	2,20,000	
	- Interest and finance charges paid	7,20,000	34,89,600

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	(assuming related with non-equity fund)		
(xi)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	18,000	
	- Salary paid to Manager- Sales & Marketing	10,12,000	
	- Performance bonus paid to sales staffs	1,80,000	12,10,000
(xii)	Distribution overheads:		
	- Depreciation on delivery vehicles	86,000	
(xiii)	- Packing cost paid for re-distribution of finished goods	1,12,000	1,98,000
	Cost of Sales		11,35,03,300

Notes:

(i) GST paid of purchase of raw materials would not be part of cost of materials as it is eligible for input credit.

Chapter-8 Unit & Batch Costing

Question-1

A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated costs of production are as under:

Direct material Rs.300 per unit

Direct employee cost Rs.160 per unit

Indirect expenses:

- Fixed Rs.32,50,000 per annum

- Variable Rs.50 per unit

- Semi-variable Rs.80,000 per annum up to 50% capacity and Rs.15,000 for every 20% increase in the capacity or part thereof.

If production program of the factory is as indicated below and the management desires to ensure a profit of Rs.10,00,000 for the year, DETERMINE the average selling price at which each unit should be quoted:

First three months of the year- 50% of capacity;

Remaining nine months of the year- 75% of capacity.

Answer 1

Statement of Cost

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	First three months (₹)	Remaining nine months (₹)	Total (₹)
	37,500 units	1,68,750 units	2,06,250 units
Direct material	1,12,50,000	5,06,25,000	6,18,75,000
Direct employee cost	60,00,000	2,70,00,000	3,30,00,000
Indirect- variable expenses	18,75,000	84,37,500	1,03,12,500
Indirect – fixed expenses	8,12,500	24,37,500	32,50,000
Indirect- semi-variable expenses			
- For first three months @ ₹80,000 p.a.	20,000		
- For remaining nine months @ ₹1,10,000 p.a.		82,500	1,02,500
Total cost	1,99,57,500	8,85,82,500	10,85,40,000
Desired profit	-	-	10,00,000
Sales value	-	-	10,95,40,000
Average selling price per unit			531.10

Question-2

Star study centre provides coaching classes to school students. The study centre has taken an auditorium of 250 seat capacity on rent of Rs.3,75,000 per month. It has also hired some renowned teachers for taking classes. A teacher takes Rs.3,000 per hour. The study centre has decided to conduct a batch of 2-hour per day for 3 days a week for 4 months.

- CALCULATE the total cost per batch.
- COMPUTE the minimum fee to be charged per student in a batch, if the centre operates at 60% capacity.
- DETERMINE the fee per student if the study centre desires to earn a profit of 50% and study centre operates at 50% capacity.

Answer 2

(i) Calculation of total cost per batch:

Particulars	Amount
(Rs.)	
(i) Auditorium hire charges (Rs.3,75,000 × 4 months)	15,00,000
(ii) Teachers' remuneration (Rs.3,000 × 2 hours × 3 days × 4 weeks × 4 months)	2,88,000
Total cost	17,88,000

(ii) Computation of minimum fee per student per batch:

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$$\text{Minimum fee to be charged} = \frac{\text{Total Cost}}{\text{No. of students}} = \frac{₹17,88,000}{150 \text{ students}} = ₹11,920/-$$

$$\text{(iii) Fee to be charged per student} = \frac{\text{Total Cost} + \text{Profit}}{\text{No. of students}} = \frac{₹17,88,000 + ₹8,94,000}{125 \text{ students}}$$

$$= \frac{₹26,82,000}{125 \text{ students}} ₹21,456/-$$

Chapter-13 Service Costing

Question 1 (Costing of Toll Roads):

SLS Infrastructure built and operates 110 k.m. highway on the basis of Built-Operate-Transfer (BOT) for a period of 25 years. A traffic assessment has been carried out to estimate the traffic flow per day shows the following figures:

Sl. No.	Type of vehicle	Daily traffic volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450
3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Sl. no.	Activities	Amount (₹ in lakh)
1	Site clearance	170.70
2	Land development and filling work	9,080.35
3	Sub base and base courses	10,260.70
4	Bituminous work	35,070.80
5	Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	29,055.60
6	Drainage and protection work	9,040.50
7	Traffic sign, marking and road appurtenance	8,405.00
8	Maintenance, repairing and rehabilitation	12,429.60
9	Environmental management	982.00
	Total Project cost	114,495.25

An average cost of Rs.1,120 lakh has to be incurred on administration and toll plaza operation.

On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles

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Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

Required:

(i) **CACULATE** the total project cost per day of concession period.

(ii) **COMPUTE** toll fee to be charged for per vehicle of each type, if the company wants earn a profit of 15% on total cost.

[Note: Concession period is a period for which an infrastructure is allowed to operate and recovers its investment]

Answer 1

(i) **Calculation of total project cost per day of concession period:**

Activities	Amount (₹ in lakh)
Site clearance	170.70
Land development and filling work	9,080.35
Sub base and base courses	10,260.70
Bituminous work	35,070.80
Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	29,055.60
Drainage and protection work	9,040.50
Traffic sign, marking and road appurtenance	8,405.00
Maintenance, repairing and rehabilitation	12,429.60
Environmental management	982.00
Total Project cost	114,495.25
Administration and toll plaza operation cost	1,120.00
Total Cost	115,615.25
Concession period in days (25 years × 365 days)	9,125
Cost per day of concession period (₹ in lakh)	12.67

(ii) **Computation of toll fee:**

Cost to be recovered per day = Cost per day of concession period + 15% profit on cost
 = Rs.12,67,000 + Rs.1,90,050 = Rs.14,57,050

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$$\text{Cost per equivalent vehicle} = \frac{\text{₹14,57,050}}{76,444 \text{ units (Refer workingnote)}} = \text{₹19.06 per equivalent vehicle}$$

Vehicle type-wise toll fee:

Sl. No.	Type of vehicle	Equivalent cost [A]	Weight [B]	Toll fee per vehicle [A×B]
1.	Two wheelers	₹19.06	1	19.06
2.	Car and SUVs	₹19.06	4	76.24
3.	Bus and LCV	₹19.06	6	114.36
4.	Heavy commercial vehicles	₹19.06	9	171.54

Working Note:

The cost per day has to be recovered from the daily traffic. The each type of vehicle is to be converted into equivalent unit. Let's convert all vehicle types equivalent to Two-wheelers..

Sl. No.	Type of vehicle	Daily traffic volume [A]	Weight	Ratio [B]	Equivalent Two-wheeler [A×B]
1.	Two wheelers	44,500	0.05	1	44,500
2.	Car and SUVs	3,450	0.20	4	13,800
3.	Bus and LCV	1,800	0.30	6	10,800
4.	Heavy commercial vehicles	816	0.45	9	7,344
	Total				76,444

NOV- 19 PAPER**Question 1**

Answer the following:

(a) Surekha Limited produces 4,000 Litres of paints on a quarterly basis. Each Litre requires 2 kg of raw material. The cost of placing one order for raw material is Rs. 40 and the purchasing price of raw material is Rs. 50 per kg. The storage cost and interest cost is 2% and 6% per annum respectively. The lead time for procurement of raw material is 15 days.

Calculate Economic Order Quantity and Total Annual Inventory Cost in respect of the above raw material.

(b) The following data is presented by the supervisor of a factory for a Job:

Direct Material	Rs. per unit
Direct Wages @	120
(Departments A-4 hrs, B-7 hrs, C-2 hrs & D-2 hrs)	Rs. 4 per hour
Chargeable Expenses	60
Total	20
	200

Analysis of the Profit and Loss Account for the year ended
31st March, 2019

Material	2,00,000		Sales	4,30,000
Direct Wages				
Dept. A	12,000			
Dept. B	8,000			
Dept. C	10,000			
Dept. D	20,000	50,000		
Special Store items		6,000		
Overheads				
Dept. A	12,000			
Dept. B	6,000			
Dept. C	9,000			
Dept. D	17,000	44,000		
Gross Profit c/d		1,30,000		
4,30,000		4,30,000		4,30,000
Selling Expenses	90,000	Gross Profit b/d	1,30,000	
Net Profit	40,000			
	1,30,000			1,30,000

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It is also to be noted that average hourly rates for all the four departments are similar.

Required:

- (i) Prepare a Job Cost Sheet.
- (ii) Calculate the entire revised cost using the above figures as the base.
- (iii) Add 20% profit on selling price to determine the selling price.

(c) A Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are :

Direct Material Rs.30,000

Direct Labour Rs. 9,600

Variable Overheads Rs. 12,000

Fixed Overheads Rs. 32,000

Sales: A- 100 units@ Rs. 600 per unit; B – 120 units @ Rs. 200 per unit.

I. Apportion joints costs on the basis of:

- (i) Physical Quantity of each product.
- (ii) Contribution Margin method, and

II. Determine Profit or Loss under both the methods.

(d) When volume is 4,000 units; average cost is Rs. 3.75 per unit. When volume is 5,000 units, average cost is Rs. 3.50 per unit. The Break-Even point is 6,000 units.

Calculate:

- (i) Variable Cost per unit
 - (ii) Fixed Cost and
 - (iii) Profit Volume Ratio.
- (4 x 5 = 20 Marks)

ANSWER 1

(a) Working:

Calculation of Annual demand of raw material

= 4,000 Litres (per quarter) x 4 (No. of Quarter in a year) x 2 kg. (raw material required for each Litre of paint)

= **32,000 kg.**

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Calculation of Carrying cost

Storage rate = 2%

Interest Rate = 6%

Total = 8% per annum

Carrying cost per unit per annum = 8% of Rs. 50 = Rs. 4 per unit per annum

$$(i) \text{ EOQ} = \sqrt{\frac{2 \times \text{Annual demand (A)} \times \text{Ordering Cost per order (O)}}{\text{Carrying cost per unit per annum (C)}}$$

$$= \sqrt{\frac{2 \times 32,000 \text{ kg} \times ₹ 40}{₹ 4}} = 800 \text{ Kg}$$

(ii) Total Annual Inventory Cost

Purchasing cost of 32,000 kg @ ₹ 50 per kg = ₹ 16,00,000

Ordering Cost $\left(\frac{32,000 \text{ kg}}{800 \text{ kg}} \times ₹ 40 \right)$ = ₹ 1,600

Carrying Cost of Inventory $\left(\frac{15 \text{ days}}{30 \text{ days}} \times 800 \text{ kg} \times ₹ 4 \right)$ = ₹ 1,600

₹ 16,03,200

(b) Job Cost Sheet

Customer Details — — —

Job No. _____

Date of commencement — — —

Date of completion

Particulars		Amount (Rs.)
Direct materials		120
Direct wages:		
Deptt. A Rs. 4.00 × 4 hrs.	Rs. 16.00	
Deptt. B Rs. 4.00 × 7 hrs.	Rs. 28.00	
Deptt. C Rs. 4.00 × 2 hrs.	Rs. 8.00	
Deptt. D Rs. 4.00 × 2 hrs.	Rs. 8.00	60
Chargeable expenses	20	
Prime cost	200	
Overheads		
Deptt. A	Rs. 16	
Deptt. B	Rs. 21	
Deptt. C	Rs. 7.20	
Deptt. D	Rs. 6.80	51.00
Works cost	251.00	
Selling expenses = = 30% of work cost 90,000 × 100 3,00,000 Rs. Rs.	75.30	
Total cost	326.30	
Profit (20% profit on selling price i.e 25% of total cost)	81.58	
Selling price	407.88	

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(c) Total Joint Cost

Direct Material	30,000
Direct Labour	9,600
Variable Overheads	12,000
Total Variable Cost	51,600
Fixed Overheads	32,000
Total joint cost	83,600

Apportionment of Joint Costs:

			Product-A	Product-B	
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	₹ 38,000 $\left(\frac{₹ 83,600}{100+120\text{units}} \times 100\right)$	₹ 45,600 $\left(\frac{₹ 83,600}{100+120\text{units}} \times 120\right)$	
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':			
	-	Variable Costs (on basis of physical units)	₹ 23,455 $\left(\frac{₹ 51,600}{100+120\text{units}} \times 100\right)$	₹ 28,145 $\left(\frac{₹ 51,600}{100+120\text{units}} \times 120\right)$	
		Contribution Margin	36,545 (₹600×100 – 23,455)	-4,145 (₹200×120 – 28,145)	
		Fixed Costs*	₹ 32,000		
		Total apportioned cost	₹ 55,455	₹ 28,145	
	II.	(iii)	Profit or Loss:		
When Joint cost apportioned on basis of physical units					
A.		Sales Value	₹ 60,000	₹ 24,000	
B.		Apportioned joint cost on basis of 'Physical Quantity':	₹ 38,000	₹ 45,600	
A-B		Profit or (Loss)	22,000	(21,600)	
When Joint cost apportioned on basis of 'Contribution Margin Method'					
C		Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 55,455	₹ 28,145	
A-C		Profit or (Loss)	₹ 4,545	₹ (4,145)	

The fixed cost of Rs. 32,000 is to be apportioned over the joint products A and B in the ratio of their contribution margin but contribution margin of Product B is Negative so fixed cost will be charged to Product A only.

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(d) (i) Variable cost per unit = $\frac{\text{Change in Total cost}}{\text{Change in units}}$

$$= \frac{(\text{₹ } 3.50 \times 5,000 \text{ units}) - (\text{₹ } 3.75 \times 4,000 \text{ units})}{5,000 - 4,000}$$

$$= \frac{\text{₹ } 17,500 - \text{₹ } 15,000}{1,000} = \text{₹ } 2,500/1000 = \text{₹ } 2.5$$

(ii) Fixed cost = Total Cost – Variable cost (at 5,000 units level)

$$= \text{₹ } 17,500 - \text{₹ } 2.5 \times 5,000 = \text{₹ } 5,000$$

(iii) Contribution per unit = $\frac{\text{Fixed cost}}{\text{BEP (in units)}} = \frac{\text{₹ } 5,000}{6,000 \text{ units}} = 0.833$

P/V Ratio = $\frac{\text{Contribution per unit}}{\text{Sale price per unit}} = \frac{0.833}{2.5 + 0.833} = 25\%$

Question 2

(a) PQR Ltd has decided to analyse the profitability of its five new customers. It buys soft drink bottles in cases at Rs. 45 per case and sells them to retail customers at a list price of Rs. 54 per case. The data pertaining to five customers are given below:

	Particulars				
	A	B	C	D	E
Number of Cases Sold	9,360	14,200	62,000	38,000	9,800
List Selling Price (Rs.)	54	54	54	54	54
Actual Selling Price (Rs.)	54	53.40	49	50.20	48.60
Number of Purchase Orders	30	50	60	50	60
Number of Customers visits	4	6	12	4	6
Number of Deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expediate Deliveries	0	0	0	0	2

Its five activities and their cost drivers are:

Activity	Cost Driver
Order taking	Rs. 200 per purchase order
Customer visits	Rs. 300 per each visit
Deliveries	Rs. 4.00 per delivery km travelled
Product Handling	Rs. 2.00 per case sold
Expedited deliveries	Rs. 100 per such delivery

You are required to :

(i) Compute the customer level operating income of each of five retail customers by using the Cost Driver rates.

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(ii) Examine the results to give your comments on Customer 'D' in comparison with Customer 'C' and on Customer 'E' in comparison with Customer 'A'. (10 Marks)

(b) ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal the following information:

Budgeted production overheads Rs. 10,35,000

Budgeted machine hours Rs. 90,000

Actual machine hours worked Rs. 45,000

Actual production overheads Rs. 8,80,000

Production overheads (actual) include-

Paid to worker as per court's award Rs. 50,000

Wages paid for strike period Rs. 38,000

Stores written off Rs. 22,000

Expenses of previous year booked in current year Rs. 18,500

Production -

Finished goods 30,000 units

Sale of finished goods 27,000 units

The analysis of cost information reveals that $\frac{1}{3}$ of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

(i) To find out the amount of under absorbed production overheads.

(ii) To give the ways of treating it in Cost Accounts.

(iii) To apportion the under absorbed overheads over the items. (10 Marks).

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Answer**(a) Working note:**

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particular	Customers				
	A	B	C	D	E
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800
Revenues (at listed price) (Rs.): (b) {(a) × Rs. 54}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Discount (Rs.): (c) {(a) × Discount per case}	-	8,520 (14,200 cases × Rs. 0.6)	3,10,000 (62,000 cases × Rs. 5)	1,44,400 (38,000 cases × Rs. 3.80)	52,920 (9,800 cases × Rs. 5.40)
Cost of goods sold (Rs.): (d) {(a) × Rs. 45}	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000

Customer level operating activities costs

Order taking costs (Rs.): (No. of purchase × Rs. 200)	6,000	10,000	12,000	10,000	12,000
Customer visits costs (Rs.) (No. of customer visits × Rs. 300)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (Rs.) (Kms travelled by delivery vehicles × Rs. 4 per km.)	3,200	2,880	4,800	6,400	9,600
Product handling costs (Rs.) {(a) × Rs. 2}	18,720	28,400	1,24,000	76,000	19,600
Cost of expediting deliveries (Rs.) {No. of expedited deliveries × Rs. 100}	-	-	-	-	200
Total cost of customer level operating activities (Rs.)	29,120	43,080	1,44,400	93,600	43,200

(i) Computation of Customer level operating income

Particular	Customers				
	A	B	C	D	E
Revenues (At list price) (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Less: Discount (Refer to working note)	-	8,520	3,10,000	1,44,400	52,920
Revenue (At actual price)	5,05,440	7,58,280	30,38,000	19,07,600	4,76,280

Less: Cost of goods sold (Refer to working note)	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Gross margin	84,240	1,19,280	2,48,000	1,97,600	35,280
Less: Customer level operating activities costs (Refer to working note)	29,120	43,080	1,44,400	93,600	43,200
Customer level operating income	55,120	76,200	1,03,600	1,04,000	(7,920)

(ii) Comments

Customer D in comparison with Customer C: Operating income of Customer D is more than of Customer C, despite having only 61.29% (38,000 units) of the units volume sold in comparison to Customer C (62,000 units). Customer C receives a higher percent of discount i.e. 9.26% (Rs. 5) while Customer D receive a discount of 7.04% (Rs. 3.80). Though the gross margin of customer C (Rs. 2,48,000) is more than Customer D (Rs. 1,97,600) but total cost of customer level operating activities of C (Rs. 1,44,400) is more in comparison to Customer D (Rs. 93,600). As a result, operating income is more in case of Customer D.

Customer E in comparison with Customer A: Customer E is not profitable while Customer A is profitable. Customer E receives a discount of 10% (Rs. 5.4) while Customer A doesn't receive any discount. Sales Volume of Customer A and E is almost same. However, total cost of customer level operating activities of E is far more (Rs. 43,200) in comparison to Customer A (Rs. 29,120). This has resulted in occurrence of loss in case of Customer E.

(b) (i) Amount of under absorption of production overheads:

Particular	Amount (₹)	Amount (₹)
Total production overheads actually incurred		8,80,000
Less: Amount paid to worker as per court order	50,000	
Wages paid for the strike period under an award	38,000	
Stores written off	22,000	
Expenses of previous year booked in the current year	18,500	1,28,500
		7,51,500
Less: Production overheads absorbed as per machine hour rate (45,000 hours × ₹11.50*)		5,17,500
Amount of under- absorbed production overheads		2,34,000

$$\text{*Budgeted Machine hour rate (Blanket rate)} = \frac{\text{₹ } 10,35,000}{90,000} = \text{₹ } 11.50 \text{ per hour}$$

(ii) Accounting treatment of under absorbed production overheads:

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(a) As 1/3rd of the under absorbed overheads were due to defective production planning, this being abnormal, hence should be debited to Costing Profit and Loss Account.

Amount to be debited to Costing Profit and Loss Account

= Rs. 2,34,000 × 1/3 = Rs. **78,000**.

(b) Balance of under absorbed production overheads should be distributed over Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = Rs. 2,34,000 × 2/3 = Rs. **1,56,000**

*Supplementary rate = $\frac{\text{₹ } 1,56,000}{30,000 \text{ units}} = \text{₹ } 5.20 \text{ per unit}$

(iii) Apportionment of under absorbed production overheads over Finished goods and Cost of sales:

Particular	Units	Amount (Rs.)
Finished goods (3,000 units × Rs.5.20)	3,000	15,600
Cost of sales (27,000 units × Rs.5.20)	27,000	1,40,400
Total	30,000	1,56,000

Question 3

(a) A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season months in a year.

During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending 31st March, 2019:

(i) Occupancy during the season is 80% while in the off-season it is 40%.

(ii) Total investment in the hotel is Rs. 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

(iii) Room attendants are paid Rs. 15 per room per day on the basis of occupancy of rooms in a month.

(iv) Expenses:

- Staff salary (excluding that of room attendants) Rs. 8,00,000
- Repairs to Buildings Rs. 3,00,000
- Laundry Charges Rs. 1,40,000
- Interior Charges Rs. 2,50,000
- Miscellaneous Expenses Rs. 2,00,200

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(v) Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.

(vi) Monthly lighting charges are Rs. 110, except in four months in winter when it is Rs. 30 per room and this cost is on the basis of full occupancy for a month.

You are required to workout the room rent chargeable per day both during the season and the off-season months using the foregoing information.

(Assume a month to be of 30 days and winter season to be considered as part of off-season). (10 Marks)

(b) XYZ a manufacturing firm, has revealed following information for September ,2019:
 1st September 30th September

	(Rs.)	(Rs.)
Raw Materials	2,42,000	2,92,000
Works-in-progress	2,00,000	5,00,000

The firm incurred following expenses for a targeted production of 1,00,000 units during the month :

Consumable Stores and spares of factory	3,50,000
Research and development cost for process improvements	2,50,000
Quality control cost	2,00,000
Packing cost (secondary) per unit of goods sold	2
Lease rent of production asset	2,00,000
Administrative Expenses (General)	2,24,000
Selling and distribution Expenses	4,13,000
Finished goods (opening)	Nil
Finished goods (closing)	5000 units

Defective output which is 4% of targeted production, realizes Rs. 61 per unit.

Closing stock is valued at cost of production (excluding administrative expenses)

Cost of goods sold, excluding administrative expenses amounts to Rs. 78,26,000.

Direct employees cost is 1/2 of the cost of material consumed.

Selling price of the output is Rs. 110 per unit.

You are required to :

(i) Calculate the Value of material purchased

(ii) Prepare cost sheet showing the profit earned by the firm. (10 Marks)

Answer

(a) Working Notes:

(i) Total Room days in a year

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = 28,800 Room Days	28,800 Room Days × 100% = 28,800
Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = 43,200 Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is Rs.110 per month and during winter season of 4 months it is Rs.30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	Occupancy (Room-days) S
Season & Non-winter – 80% Occupancy	200 Rooms × 80% × 6 months × Rs. 110 per month = Rs. 1,05,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × Rs.110 per month = Rs. 17,600
Off- season & -winter – 40% Occupancy months)	200 Rooms × 40% × 4 months × Rs. 30 per month = Rs. 9,600
Total Lighting charges	Rs. 1,05,600+ Rs. 17,600 + Rs. 9,600 = Rs. 132,800

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Statement of total cost:

Staff salary	8,00,000
Repairs to building	3,00,000
Laundry	1,40,000
Interior	2,50,000
Miscellaneous Expenses	2,00,200
Depreciation on Building (Rs. 300 Lakhs × 80% × 5%)	12,00,000
Depreciation on Furniture & Equipment (Rs. 300 Lakhs × 20% × 15%)	9,00,000
Room attendant's wages (Rs. 15 per Room Day for 43,200 Room Days)	6,48,000
Lighting charges	1,32,800
Total cost	45,71,000
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	57,13,750

Calculation of Room Rent per day:

Total Rent / Equivalent Full Room days = Rs. 57,13,750 / 36,000 = Rs. 158.72

Room Rent during Season – Rs. 158.72

Room Rent during Off season = Rs. 158.72 × 50% = Rs. 79.36

(b) Workings:
1. Calculation of Sales Quantity:

Particular	Units
Production units	1,00,000
Less: Defectives (4%×1,00,000 units)	4,000
Less: Closing stock of finished goods	5,000
No. of units sold	91,000

2. Calculation of Cost of Production

Particular	Amount (Rs.)
Cost of Goods sold (given)	78,26,000
Add: Value of Closing finished goods	4,30,000
Cost of Production	82,56,000

3. Calculation of Factory Cost

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Particular	Amount (Rs.)
Cost of Production	82,56,000
Less: Quality Control Cost	(2,00,000)
Less: Research and Development Cost	(2,50,000)
Add: Credit for Recoveries/Scrap/By-Products/ misc. income (1,00,000 units × 4% × Rs. 61)	2,44,000
Factory Cost	80,50,000

4. Calculation of Gross Factory Cost

Particular	Amount (Rs.)
Cost of Factory Cost	80,50,000
Less: Opening Work in Process	(2,00,000)
Add: Closing Work in Process	5,00,000
Cost of Gross Factory Cost	83,50,000

5. Calculation of Prime Cost

Particular	Amount (Rs.)
Cost of Gross Factory Cost	83,50,000
Less: Consumable stores & spares	(3,50,000)
Less: Lease rental of production assets	(2,00,000)
Prime Cost	78,00,000

6. Calculation of Cost of Materials Consumed & Labour cost

Let Cost of Material Consumed = M and Labour cost = 0.5M

Prime Cost = Cost of Material Consumed + Labour Cost

$$78,00,000 = M + 0.5M$$

$$M = 52,00,000$$

Therefore, Cost of Material Consumed = Rs. 52,00,000 and

Labour Cost = Rs. 26,00,000

(i) Calculation of Value of Materials Purchased

Particular	Amount (Rs.)
Cost of Material Consumed	52,00,000

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Add: Value of Closing stock	2,92,000
Less: Value of Opening stock	(2,42,000)
Value of Materials Purchased	52,50,000

Cost Sheet

Sl. Particulars	Total Cost (Rs.)
1. Direct materials consumed:	
Opening Stock of Raw Material	2,42,000
Add: Additions/ Purchases [balancing figure as per requirement (i)]	52,50,000
Less: Closing stock of Raw Material	(2,92,000)
Material Consumed	52,00,000
2. Direct employee (labour) cost	26,00,000
3. Prime Cost (1+2)	78,00,000
4. Add: Works/ Factory Overheads	3,50,000
Consumable stores and spares	2,00,000
Lease rent of production asset	
5. Gross Works Cost (3+4)	83,50,000
6. Add: Opening Work in Process	2,00,000
7. Less: Closing Work in Process	(5,00,000)
8. Works/ Factory Cost (5+6-7)	80,50,000
9. Add: Quality Control Cost	2,00,000
10. Add: Research and Development Cost	2,50,000
11. Less: Credit for Recoveries/Scrap/By-Products/misc. income	(2,44,000)
12. Cost of Production (8+9+10-11)	82,56,000
13. Add: Opening stock of finished goods	-
14. Less: Closing stock of finished goods (5000 Units)	(4,30,000)
15. Cost of Goods Sold (12+13-14)	78,26,000
16. Add: Administrative Overheads (General)	2,24,000
17. Add: Secondary packing	1,82,000
18. Add: Selling Overheads& Distribution Overheads	4,13,000
19. Cost of Sales (15+16+17+18)	86,45,000
20. Profit	13,65,000
21 Sales 91,000 units@ Rs. 110 per unit	1,00,10,000

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Question 4

(a) Zico Ltd. has its factory at two locations viz Nasik and Satara. Rowan plan is used at Nasik factory and Halsey plan at Satara factory.

Standard time and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Normal working hours is 8 hours per day in a 5 day week.

Job at Nasik factory is completed in 32 hours while at Satara factory it has taken 30 hours. Conversion costs at Nasik and Satara are Rs. 5,408 and Rs. 4,950 respectively.

Overheads account for Rs. 25 per hour.

Required:

(i) To find out the normal wage; and

(ii) To compare the respective conversion costs.

(10 Marks)

(b) A product passes through two distinct processes before completion.

Following information are available in this respect :

	Process-1	Process-2
Raw materials used	10,000 units	-
Raw material cost (per unit)	Rs. 75	-
Transfer to next process/Finished good	9,000 units	8,200 units
Normal loss (on inputs)	5%	10%
Direct wages	Rs. 3,00,000	Rs. 5,60,000
Direct expenses	50% of direct wages	65% of direct wages
Manufacturing overheads	25% of direct wages	15% of direct wages
Realisable value of scrap (per unit)	Rs. 13.50	Rs. 145

8,000 units of finished goods were sold at a profit of 15% on cost.

There was no opening and closing stock of work-in-progress.

Prepare:

(i) Process-1 and Process-2 Account

(ii) Finished goods Account

(iii) Normal Loss Account

(iv) Abnormal Loss Account

(v) Abnormal Gain Account. (10 Marks)

Answer 4

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(a)

Particulars	Nasik	Satara
Hours worked	32 hr.	30 hr.
Conversion Costs	Rs.5,408	Rs.4,950
Less: Overheads	Rs.800 (Rs.25×32 hr.)	Rs.750 (Rs.25×30 hr.)
Labour Cost	Rs.4,608	Rs.4,200

(i) Finding of Normal wage rate:

Let Wage rate be Rs.R per hour, this is same for both the Nasik and Satara factory.

Normal wage rate can be found out taking total cost of either factory.

Nasik: Rowan Plan

Total Labour Cost = Wages for hours worked + Bonus as per Rowan plan

$$₹ 4,608 = \text{Hours worked} \times \text{Rate per hour} + \left(\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Hours worked} \times \text{Rate per hour} \right)$$

$$\text{Or, } ₹ 4,608 = 32 \text{ hr.} \times R + \left(\frac{40-32}{40} \times 32 \times R \right)$$

$$\text{Or, } ₹ 4,608 = 32R + 6.4R$$

$$R = ₹ 120$$

$$\text{Normal wage} = 32 \text{ hrs} \times ₹ 120 = ₹ 3,840$$

OR

Satara: Halsey Plan

Total Labour Cost = Wages for hours worked + Bonus as per Halsey plan

$$\text{Rs. } 4,200 = \text{Hours worked} \times \text{Rate per hour} + () 50\% \times \text{Hours saved} \times \text{Rate per hour}$$

$$\text{Rs. } 4,200 = 30 \text{ hr.} \times R + 50\% \times (40 \text{ hr.} - 30 \text{ hr.}) \times R$$

$$\text{Rs. } 4,200 = 35 R$$

$$\text{Or } R = \text{Rs. } 120$$

$$\text{Normal Wage} = 30 \text{ hrs} \times \text{Rs. } 120 = \text{Rs. } 3,600$$

(ii) Comparison of conversion costs:

Particulars	Nasik (₹)	Satara (₹)
Normal Wages (32 x 120)	3,840	
(30x120)		3,600
Bonus (6.4 x 120)	768	
(5 x 120)		600
Overhead	800	750
	5,408	4,950

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(b) (i)

Dr.				Process-1 Account				Cr.		
	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)			
To	Raw Material Consumed	10,000	7,50,000	By	Normal Loss A/c @ 13.5	500	6,750			
"	Direct Wages	--	3,00,000	"	Process 2 @ 133.5	9,000	12,01,500			
"	Direct	--	1,50,000	"	By Abnormal	500	66,750			
	Expenses				Loss @ 133.5					
"	Manufacturing Overheads		75,000							
		10,000	12,75,000			10,000	12,75,000			

(iii)

Dr.				Process-2 Account				Cr.		
	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)			
To	Process-I A/c	9,000	12,01,500	By	Normal Loss A/c @ 145	900	1,30,500			
"	To Direct Wages	--	5,60,000	"	By Finished Stock A/c [bal fig]	8,200	21,04,667			
"	Direct Expenses	--	3,64,000							
"	Manufacturing Overheads	--	84,000							
"	To Abnormal gain (₹ 256.67 × 100 units)	100	25,667							
		9,100	22,35,167			9,100	22,35,167			

Cost per unit of completed units and abnormal gain:

$$= \frac{\text{₹ } 22,09,500 - \text{₹ } 130,500}{8,100 \text{ units}} = \text{₹ } 256.67$$

Dr.				Finished Goods A/c				Cr.		
	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)			
To	Process II A/c	8,200	21,04,667	By	By Cost of Sales	8,000	20,53,333			
				"	By Balance c/d	200	51,334			
		8,200	21,04,667			8,200	21,04,667			

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(iii) Normal Loss A/c

Dr.				Cr.			
	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	6,750	By	By abnormal Gain II	100	14,500
	Process II	900	1,30,500		By Cash	500	6,750
					By Cash	800	1,16,000
		1400	1,37,250			1400	1,37,250

(iv) Abnormal Loss A/c

Dr.				Cr.			
	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	66,750	By	By Cost Ledger Control A/c	500	6,750
					By Costing P & L A/C (Abnormal Loss)		60,000
			66,750				66,750

(v) Abnormal Gain A/c

Dr.				Cr.			
	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Normal Loss A/c @ 145	100	14,500	By	Process II	100	25,667
To	Costing P & L A/C		11,167				
		100	25,667			100	25,667

Question 5

(a) PJ Ltd manufactures hockey sticks. It sells the products at Rs. 500 each and makes a profit of Rs. 125 on each stick. The Company is producing 5,000 sticks annually by using 50% of its machinery capacity.

The cost of each stick is as under:

Direct Material Rs. 150

Direct Wages Rs. 50

Works Overhead Rs. 125 (50% fixed)

Selling Expenses Rs. 50 (25% variable)

The anticipation for the next year is that cost will go up as under:

Fixed Charges 10%

Direct Wages 20%

Direct Material 5%

There will not be any change in selling price.

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There is an additional order for 2,000 sticks in the next year.

Calculate the lowest price that can be quoted so that the Company can earn the same profit as it has earned in the current year? (10 Marks)

(b) The standard cost of a chemical mixture is as follows:

60% of Material A @ Rs. 50 per kg

40% Material B @ Rs. 60 per kg

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.

540 kg of Material A @ Rs. 60 per kg

260 kg of Material B @ Rs. 50 per kg

The quantity processed was 680 kilograms of good product.

From the above given information

Calculate:

(i) Material Cost Variance

(ii) Material Price Variance

(iii) Material Usage Variance

(iv) Material Mix Variance

(v) Material Yield Variance. (10 Marks)

Answer

(a) Selling Price = Rs. 500

Profit = Rs. 125

No of Sticks = 5,000

Particular	Current Year (Rs.)	Next Year (Rs.)
Direct Material	150	157.50 (150 + 5%)
Direct Wages	50	60 (50+20%)
Works Overheads	62.50 (125 × 50%)	62.5

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Selling Expenses	12.50 (50 × 25%)	12.5
Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	5,00,000	5,50,000

Let: Lowest Price Quoted = K

Now, Sales = Target Profit (5,000 units × Rs. 125) + Variable Cost + Fixed Cost

Or, $(5,000 \times 500) + (2,000 \times K) = 6,25,000 + 20,47,500 + 5,50,000$

Or, K = Rs. **361.25**

So, Lowest Price that can be quoted to earn the profit of Rs. 6,25,000 (same as current year) is Rs. 361.25

(b) Basic Calculation

Material	Standard for 640 kg. output			Actual for 680 kg. output		
	Qty. Kg.	Rate (₹)	Amount (₹)	Qty Kg.	Rate (₹)	Amount (₹)
A	480	50	24,000	540	60	32,400
B	320	60	19,200	260	50	13,000
Total	800		43,200	800		45,400
Less: Loss	160	—	—	120	—	—
	640		43,200	680		45,400

Std. cost of actual output = Rs. 43,200 × 680/640 = Rs. 45,900

Calculation of Variances

(i) **Material Cost Variance** = (Std. cost of actual output – Actual cost)
 = (45,900 – 45,400)
 = Rs. 500 (F)

(ii) **Material Price Variance** = (SP – AP) × AQ
 Material A = (50 – 60) × 540 = Rs. 5400 (A)

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$$\begin{aligned} \text{Material B} &= (60 - 50) \times 260 = \underline{\underline{\text{₹ 2600 (F)}}} \\ \text{MPV} &= \underline{\underline{\text{₹ 2800 (A)}}} \\ \text{(iii) Material Usage Variance (MUV)} &= (\text{Std. Quantity for actual output} - \text{Actual Quantity}) \times \text{Std. Price} \\ \text{Material A} &= \left(\frac{480 \times 680}{640} - 540 \right) \times 50 = \text{₹ 1,500 (A)} \\ \text{Material B} &= \left(\frac{320 \times 680}{640} - 260 \right) \times 60 = \underline{\underline{\text{₹ 4,800 (F)}}} \\ \text{MUV} &= \underline{\underline{\text{₹ 3,300 (F)}}} \\ \text{(iv) Material Mix Variance} &= \text{SP} \times (\text{RAQ} - \text{AQ}) \\ \text{A} &= \text{₹ } 50 \times (480 \text{ Kg} - 540 \text{ Kg}) = \text{₹ 3,000 (A)} \\ \text{B} &= \text{₹ } 60 \times (320 \text{ Kg.} - 260 \text{ Kg.}) = \text{₹ 3,600 (F)} \\ \text{Total} &= \text{₹ 3,000 (A)} + \text{₹ 3,600 (F)} = \underline{\underline{\text{₹ 600 (F)}}} \\ \text{(v) Material Yield Variance} &= \text{SP} \times (\text{SQ} - \text{RAQ}) \\ \text{A} &= \text{₹ } 50 \times (510 \text{ Kg.} - 480 \text{ Kg}) = \text{₹ 1,500 (F)} \\ \text{B} &= \text{₹ } 60 \times (340 \text{ Kg.} - 320 \text{ Kg.}) = \text{₹ 1,200 (F)} \\ \text{Total} &= \text{₹ 1,500 (F)} + \text{₹ 1,200 (F)} = \underline{\underline{\text{₹ 2,700 (F)}}} \end{aligned}$$

Question 6

Answer any four of the following:

(a) Describe Composite Cost unit as used in Service Costing and discuss the ways of computing it .

(b) Journalise the following transactions in cost books under Non-Integrated system of Accounting.

(i) Credit Purchase of Material Rs. 27,000

(ii) Manufacturing overhead charged to Production Rs. 6,000

(iii) Selling and Distribution overheads recovered from Sales Rs. 4,000

(iv) Indirect wages incurred Rs. 8,000

(v) Material returned from production to stores Rs. 9,000

(c) Define Inventory Control and give its objectives.

List down the basis to be adopted for Inventory Control.

(d) Mention the Cost Unit of the following Industries:

(i) Electricity

(ii) Automobile

(iii) Cement

(iv) Steel

- (v) Gas
 - (vi) Brick Making
 - (vii) Coal Mining
 - (viii) Engineering
 - (ix) Professional Services
 - (x) Hospital
- (e) Define Zero Base Budgeting and mention its various stages. (4 x 5 = 20 Marks)

Answer

(a) Composite Cost Unit: Sometime two measurement units are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometre.

Examples of Composite units are Ton- km., Quintal- km, Passenger-km., Patient-day etc.

Composite unit may be computed in two ways:

(i) Absolute (Weighted Average) basis.

(ii) Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

(i) Weighted Average or Absolute basis – It is summation of the products of qualitative and quantitative factors. For example, to calculate absolute Ton-Km for a goods transport is calculated as follows.:

$$\Sigma (\text{Weight Carried} \times \text{Distance})_1 + (\text{Weight Carried} \times \text{Distance})_2 + \dots + (\text{Weight Carried} \times \text{Distance})_n$$

Similarly, in case of Cinema theatres, price for various classes of seats are fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second Class seat – to ensure proper cost per composite unit.

(ii) Simple Average or Commercial basis – It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Ton-Km is arrived at by multiplying total distance km., by average load quantity.

$$\Sigma (\text{Distance}_1 + \text{Distance}_2 + \dots + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \dots + W_n}{n} \right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

(b) Journal entries are as follows:

		Dr. (Rs.)	Cr. (Rs.)
(i)	Stores Ledger Control A/c..... Dr. To Cost Ledger Control A/c	27,000	27,000
(ii)	Work-in-Process Control A/c..... Dr. To Manufacturing Overhead Control A/c	6,000	6,000
(iii)	Cost of Sales A/c..... Dr. To Selling & Dist. Overhead Control A/c	4,000	4,000
(iv)	(1) Wage Control A/c..... Dr. To Cost Ledger Control A/c	8,000	8,000
(2)	Manufacturing Overhead Control A/c..... Dr. To Wages Control A/c	8,000	8,000
OR			
	Manufacturing Overhead Control A/c..... Dr To Cost Ledger Control A/c .	8,000	8,000
(v)	Stores Ledger Control A/c Dr. To Work-in-Process Control A/c	9,000	9,000

*Cost Ledger Control A/c is also known as General Ledger Control A/c

(c) Inventory Control: The Chartered Institute of Management Accountants (CIMA) defines Inventory Control as “The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks.”

The **objective** of inventory control is to make a balance between sufficient stock and over - stock. The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. A trade-off between Stock-out and Over-stocking is required. The management may employ various methods of Inventory control to have a balance.

(d) Cost Unit of Industries:

S. No.	Industry	Cost Unit Basis
(i)	Electricity	Kilowatt-hour (kWh)
(ii)	Automobile	Number
(iii)	Cement	Ton/ per bag etc.
(iv)	Steel	Ton
(v)	Gas	Cubic feet
(vi)	Brick-making	1,000 bricks
(vii)	Coal mining	Tonne/ton
(viii)	Engineering	Contract, job
(ix)	Professional services	Chargeable hour, job, contract
(x)	Hospitals	Patient day

(e) Zero-based Budgeting: (ZBB) is an emergent form of budgeting which arises to overcome the limitations of incremental (traditional) budgeting system. Zero- based

Budgeting (ZBB) is **defined** as 'a method of budgeting which requires each cost element to be specifically justified, although the activities to which the budget relates are being undertaken for the first time, without approval, the budget allowance is zero'.

ZBB is an activity based budgeting system where budgets are prepared for each activities rather than functional department. Justification in the form of cost benefits for the activity is required to be given. The activities are then evaluated and prioritized by the

management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

ZBB is suitable for both corporate and non-corporate entities. In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

ZBB involves the following stages:

- (i) Identification and description of Decision packages
- (ii) Evaluation of Decision packages
- (iii) Ranking (Prioritisation) of the Decision packages
- (iv) Allocation of resources

MAY 2019- PAPER**Question 1**

Answer the following:

(a) Following data is available for ABC Ltd.:

Standard working hours	8 hours per day of 5 days per week
Maximum Capacity	60 employees
Actual working	50 employees
Actual hours expected to be worked per four week	8,000 hours
Standard hours expected to be earned per four week	9,600-hours
Actual hours worked in the four week period	7,500 hours
Standard hours earned in the four week period	8,800 hours

The related period is of four weeks. Calculate the following Ratios :

- (i) Efficiency Ratio
- (ii) Activity Ratio
- (iii) Standard Capacity Usage Ratio
- (iv) Actual Capacity Usage Ratio
- (v) Actual Usage of Budgeted Capacity Ratio

(b) M/s Zeba Private Limited allotted a standard time of 40 hours for a job and the rate per hour is Rs. 75. The actual time taken by a worker is 30 hours.

You are required to calculate the total earnings under the following plans:

- (i) Halsey Premium Plan (Rate 50%)

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(ii) Rowan Plan

(iii) Time Wage System

(iv) Piece Rate System

(v) Emerson Plan

(c) A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarised cost data:

	Joint Expenses (₹)	Separate Expenses (₹)	
		Bomex	Cromex
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling Price per unit		100	40
Estimated profit per unit on sale of Cromex			5
Number of units produced		2,000 units	2,000 units

The factory uses net realisable value method for apportionment of joint cost to by-products.

You are required to prepare statements showing :

(i) Joint cost allocable to Cromex

(ii) Product wise and overall profitability of the factory for April 2019.

(d) M/s Abid Private Limited disclosed a net profit of Rs. 48,408 as per cost books for the year ending 31st March 2019. However, financial accounts disclosed net loss of Rs. 15,000 for the same period. On scrutinizing both the set of books of accounts, the following information was revealed:

Works Overheads under-recovered in Cost Books 48,600

Office Overheads over-recovered in Cost Books 11,500

Dividend received on Shares 17,475

Interest on Fixed Deposits 21,650

Provision for doubtful debts 17,800

Obsolescence loss not charged in Cost Accounts 17,200

Stores adjustments (debited in Financial Accounts) 35,433

Depreciation charged in financial accounts 30,000

Depreciation recovered in Cost Books 35,000

Prepare a Memorandum Reconciliation Account.
(Marks)

(4 x 5 = 20)

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Answer

(a) (i) **Efficiency Ratio:**

$$= \frac{\text{Standard Hrs}}{\text{Actual Hrs}} \times 100 = \frac{8,800 \text{ hours}}{7,500 \text{ hours}} \times 100 = 117.33\%$$

(ii) **Activity Ratio:**

$$= \frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 = \frac{8,800 \text{ hours}}{8,000 \text{ hours}} \times 100 = 110\%$$

(iii) **Standard Capacity Usage Ratio:**

$$= \frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100$$

$$= \frac{8,000 \text{ hours}}{9,600 \text{ hours}} \times 100 = 83.33\%$$

(iv) **Actual Capacity Usage Ratio:**

$$= \frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}} \times 100$$

$$= \frac{7,500 \text{ hours}}{9,600 \text{ hours}} \times 100 = 78.125\%$$

(v) **Actual Usage of Budgeted Capacity Ratio:**

$$= \frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100 = \frac{7,500 \text{ hours}}{8,000 \text{ hours}} \times 100 = 93.75\%$$

Working Notes:

1. Maximum Capacity in a budget period
= 60 Employees × 8 Hrs. × 5 Days × 4 Weeks = 9,600 Hrs.
2. Budgeted Hours (Hrs)
= 50 Employees × 8 Hrs. × 5 Days × 4 Weeks = 8,000 Hrs.
3. Actual Hrs. = 7,500 Hrs. (given)
4. Standard Hrs. for Actual Output = 8,800 Hrs.

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(b) (i) Halsey Premium plan:

$$= (\text{Time taken} \times \text{Rate per hour}) + \left(\frac{1}{2} \times \text{Time saved} \times \text{Rate per hour}\right)$$

$$= (30 \text{ hours} \times \text{Rs. } 75) + \left(\frac{1}{2} \times 10 \text{ hours} \times \text{Rs. } 75\right)$$

$$= ₹ 2,250 + ₹ 375 = ₹ 2,625$$

(ii) Rowan Premium plan:

$$= (\text{Time taken} \times \text{Rate per hour}) + \left(\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour}\right)$$

$$= (30 \text{ hours} \times ₹ 75) + \left(\frac{10}{40} \times 30 \times ₹ 75\right)$$

$$= ₹ 2,250 + ₹ 562.5 = ₹ 2,812.5 \text{ or } ₹ 2,813$$

(iii) Time wage system:

$$= \text{Time taken} \times \text{Rate per hour}$$

$$= 30 \times \text{Rs. } 75 = \text{Rs. } 2,250$$

(iv) Piece Rate System:

$$= \text{Std. Time} \times \text{Rate per hour}$$

$$= 40 \times \text{Rs. } 75 = \text{Rs. } 3,000$$

(v) Emerson plan:

$$\text{Efficiency level} = 40/30 = 133.33\%$$

$$\text{Time taken} \times (120\% + 33.33\%) \text{ of Rate}$$

$$= 30 \text{ hours} \times 153.33\% \text{ of Rs. } 75$$

$$= \text{Rs. } 3,450$$

(c) (i) Statement Showing Joint Cost Allocation to 'Cromex'

Particulars	Cromex (Rs.)
Sales (Rs. 40 × 2,000 units)	80,000
Less: Post Split Off Costs (4,000+18,000+6,000)	(28,000)
Less: Estimated Profit (Rs. 5 × 2,000 units)	(10,000)
Joint cost allocable	42,000

(ii) Statement Showing Product Wise and Overall Profitability

Particulars	Bomex (Rs.)	Cromex (Rs.)	Total (Rs.)
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	(1,38,000)*	(42,000)	(1,80,000)
Less: Post Split Off Costs	(36,000)	(28,000)	(64,000)
Profit	26,000	10,000	36,000

(*) 1,80,000 – 42,000

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(d) Memorandum Reconciliation Account

Dr.		Cr.	
Particulars	(₹)	Particulars	(₹)
To Works overheads under recovered in Cost Accounts	48,600	By Net profit as per Costing books	48,408
To Provision for doubtful debts	17,800	By Office overheads over recovered in cost accounts	11,500
To Obsolescence loss	17,200	By Dividend received on shares	17,475
To Store adjustment (Debit)	35,433	By Interest on fixed deposit	21,650
		By Depreciation over-charged	5,000
		By Net loss as per financial accounts	15,000
	1,19,033		1,19,033

[Note: This question may also be solved by taking net loss as per financial accounts as basis.]

Question 2

(a) M/s Areeba Private Limited has a normal production capacity of 36,000 units of toys per annum. The estimated costs of production are as under: (i) Direct Material	Rs. 40 per unit
(ii) Direct Labour	Rs. 30 per unit (subject to a minimum of Rs. 48,000 p.m.)
(iii) Factory Overheads:	
(a) Fixed	Rs. 3,60,000 per annum
(b) Variable	Rs. 10 per unit
(c) Semi-variable	Rs. 1,08,000 per annum up to 50% capacity and additional Rs. 46,800 for every 20% increase in capacity or any part thereof.

(iv) Administrative Overheads Rs. 5, 18,400 per annum (fixed)

(v) Selling overheads are incurred at Rs. 8 per unit.

(vi) Each unit of raw material yields scrap which is sold at the rate of Rs. 5 per unit.

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(vii) In year 2019, the factory worked at 50% capacity for the first three months but it was expected that it would work at 80% capacity for the remaining nine months.

(viii) During the first three months, the selling price per unit was Rs. 145.

You are required to:

(i) Prepare a cost sheet showing Prime Cost, Works Cost, Cost of Production and Cost of Sales.

(ii) Calculate the selling price per unit for remaining nine months to achieve the total annual profit of Rs. 8,76,600. (10 Marks)

(b) KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019:

Particulars	Process		Finished stock (₹)
	A (₹)	B (₹)	
Opening Stock	5,000	5,500	10,000
Direct Materials	9,000	9,500	
Direct Wages	5,000	6,000	
Factory Overheads	4,600	2,030	
Closing Stock	2,000	2,490	5,000
Inter-process profit included in opening stock		1,000	4,000

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are Rs. 75,000.

Prepare the Process cost accounts and Finished stock account showing the profit element at each stage. (10 Marks)

Answer

(a) (i) Cost Sheet of M/s Areeba Pvt. Ltd. for the year 2019.

Normal Capacity: 36,000 units p.a.

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Normal Capacity: 36,000 units p.a.

Particulars	3 Months 4,500 Units		9 Months 21,600 units	
	Amount (₹)	Cost per unit (₹)	Amount (₹)	Cost per unit (₹)
Direct material	1,80,000		8,64,000	
Less: Scrap	(22,500)		(1,08,000)	
Materials consumed	1,57,500	35	7,56,000	35
Direct Wages	1,44,000	32	6,48,000	30
Prime Cost	3,01,500	67	14,04,000	65
Factory overheads:				
- Fixed	90,000		2,70,000	
- Variable	45,000		2,16,000	
- Semi variable	27,000	36	1,51,200	29.50
Works Cost	4,63,500	103	20,41,200	94.50
Add: Administrative overheads	1,29,600	28.80	3,88,800	18
Cost of Production	5,93,100	131.80	24,30,000	112.5
Selling Overheads	36,000	8	1,72,800	8
Cost of Sales	6,29,100	139.80	26,02,800	120.5

Working Notes:

1. Calculation of Costs

Particulars	4,500 units	21,600 units
	Amount (₹)	Amount (₹)
Material	1,80,000 (₹ 40 × 4,500 units)	8,64,000 (₹40 × 21,600 units)
Wages	1,44,000 (Max. of ₹ 30 × 4,500 units = ₹1,35,000 and ₹ 48,000 × 3 months = ₹1,44,000)	6,48,000 (21600 Units×30)
Variable Cost	45,000 (₹10 × 4,500 units)	2,16,000 (₹10 × 21,600 units)
Semi-variable Cost	27,000 ($\frac{₹ 1,08,000}{12 \text{ Months}} \times 3 \text{ Months}$)	1,51,200 ($\frac{₹ 1,08,000}{12 \text{ Months}} \times 9 \text{ Months}$)

		+46,800(for 20 % increase) +23,400(for 10% increase)
Selling Overhead	36,000 (₹8 × 4,500 units)	1,72,800(₹ 8 × 21,600 units)

Notes:

- Alternatively scrap of raw material can also be reduced from Work cost.
- Administrative overhead may be treated alternatively as a part of general overhead. In that case, Works Cost as well as Cost of Production will be same i.e. Rs. 4,63,500 and Cost of Sales will remain same as Rs. 6,29,100.

(ii) Calculation of Selling price for nine months period

Particulars	Amount (Rs.)
Total Cost of sales Rs. (6,29,100+26,02,800)	32,31,900
Add: Desired profit	8,76,600
Total sales value	41,08,500
Less: Sales value realised in first three months (Rs.145 × 4,500 units)	(6,52,500)
Sales Value to be realised in next nine months	34,56,000
No. of units to be sold in next nine months	21,600
Selling price per unit (Rs. 34,56,000 ÷ 21,600 units)	160

(b) Process-A A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,000	5,000	-	Process B A/c	28,800	21,600	7,200
Direct materials	9,000	9,000	-				
Direct wages	5,000	5,000	-				
	19,000	19,000	-				
Less: Closing stock	(2,000)	(2,000)	-				
Prime Cost	17,000	17,000	-				
Overheads	4,600	4,600	-				
Process Cost	21,600	21,600	-				
Profit (33.33% of total cost)	7,200	-	7,200				
	28,800	21,600	7,200		28,800	21,600	7,200

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Process-B A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,500	4,500	1,000	Finished stock A/c	61,675	41,550	20,125
Process A A/c	28,800	21,600	7,200				
Direct materials	9,500	9,500	-				
Direct wages	6,000	6,000	-				
	49,800	41,600	8,200				
Less: Closing stock	(2,490)	(2,080)	(410)				
Prime Cost	47,310	39,520	7,790				
Overheads	2,030	2,030	-				
Process Cost	49,340	41,550	7,790				
Profit (25% of total cost)	12,335	-	12,335				
	61,675	41,550	20,125		61,675	41,550	20,125

Finished Stock A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	10,000	6,000	4,000	Costing P&L A/c	75,000	44,181	30,819
Process B A/c	61,675	41,550	20,125				
	71,675	47,550	24,125				
Less: Closing stock	(5,000)	(3,369)	(1,631)				
COGS	66,675	44,181	22,494				
Profit	8,325	-	8,325				
	75,000	44,181	30,819		75,000	44,181	30,819

Question 3

(a) A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:
 Skilled Rs. 70

Semi-skilled Rs. 65

Unskilled Rs. 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The actual wages paid were at the rate of Rs. 75, Rs. 60 and Rs. 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.

Calculate the following variances showing clearly adverse (A) or favourable (F)

(i) Labour Cost Variance (ii) Labour Rate Variance

(iii) Labour Efficiency Variance (iv) Labour Mix Variance

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(v) Labour Idle Time Variance (10 Marks)

(b) MNO Ltd. manufactures two types of equipment A and B and absorbs overheads on the basis of direct labour hours. The budgeted overheads and direct labour hours for the month of March 2019 are Rs. 15,00,000 and 25,000 hours respectively. The information about the company's products is as follows:

	Equipment	
	A	B
Budgeted Production Volume	3,200 units	3,850 units
Direct Material Cost	₹ 350 per unit	₹ 400 per unit
Direct Labour Cost		
A: 3 hours @ ₹ 120 per hour	₹ 360	
B: 4 hours @ ₹ 120 per hour		₹ 480

Overheads of Rs. 15,00,000 can be identified with the following three major activities:

Order Processing: Rs. 3,00,000

Machine Processing: Rs. 10,00,000

Product Inspection: Rs. 2,00,000

These activities are driven by the number of orders processed, machine hours worked and inspection hours respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection hours
A	400	22,500	5,000
B	200	27,500	15,000
Total	600	50,000	20,000

Required:

(i) Prepare a statement showing the manufacturing cost per unit of each product using the absorption costing method assuming the budgeted manufacturing volume is attained.

(ii) Determine cost driver rates and prepare a statement showing the manufacturing cost per unit of each product using activity based costing, assuming the budgeted manufacturing volume is attained.

(iii) MNO Ltd.'s selling prices are based heavily on cost. By using direct labour hours as an application base, calculate the amount of cost distortion (under costed or over costed) for each equipment. (10 Marks)

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Answer

(a) (i) Labour Cost Variance = Standard Cost – Actual Cost
 = Rs.1,14,400 – Rs.1,54,400
 = 40,000 (A)
 (1,600*75+400*60+200*52= Rs.1,54,400)

Or

Types of workers	Standard Cost – Actual Cost	Amount (Rs.)
Skilled Workers	(30x40x70/2,000x1,600)- (40x40x75) 67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600)- (10x40x60) 31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600)- (5x40x52) 16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	40,000 (A)

(ii) Labour Rate Variance

Types of workers	Actual Hours × (Standard Rate - Actual Rate)	Amount (Rs.)
Skilled Workers	1,600 hours × (Rs.70.00 – Rs.75.00)	8,000 (A)
Semi- Skilled	400 hours × (Rs.65.00 – Rs.60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (Rs.50.00 – Rs.52.00)	400 (A)
Total	Rs.8,000 (A) + Rs.2,000 (F) + Rs.400 (A)	6,400 (A)

(iii) Labour Efficiency Variance

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (Rs.)
Skilled Workers	Rs.70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	Rs.65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	Rs.50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	18,800 (A)

Alternatively labour efficiency can be calculated on basis of labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (Rs.)
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)
Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	33,600 (A)

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(iv) Labour Mix Variance

$$= \text{Total Actual Time Worked (hours)} \times \{ \text{Average Standard Rate per hour of Standard Gang} \text{ Less } \text{Average Standard Rate per hour of Actual Gang} \}$$

@on the basis of hours worked

$$= 1,980 \text{ hours} \times \left(\frac{\text{₹}1,14,400}{1,760 \text{ hrs.}} - \frac{1,440 \text{ hrs.} \times \text{₹}70 + 360 \text{ hrs.} \times \text{₹}65 + 180 \text{ hrs.} \times \text{₹}50}{1,980 \text{ hrs.}} \right)$$

$$= \text{₹ } 4,500 \text{ (A)}$$

Or

labour Mix Variance

Types of workers	Std. Rate X(Revised Actual Hours Worked- Actual Hours Worked)	Amount (Rs.)
Skilled Workers	Rs.70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	Rs.65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un Skilled Workers	Rs.50 × (360 hrs. – 180 hrs.)	9,000 (F)
Total	Rs.25,200 (A) + Rs.11,700 (F) + Rs.9,000 (F)	4,500 (A)

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	Amount (Rs.)
Skilled Workers	Rs.70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	Rs.65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	Rs.50.00 × (200 hours – 180 hours)	1,000 (A)
Total	11,200 (A) + 2,600 (A) + 1,000 (A)	14,800 (A)

Verification:
Labour Cost Variance

$$= \text{Labour Rate Variance} + \text{Labour Efficiency Variance} + \text{Labour Idle Time Variance}$$

$$= 6,400 \text{ (A)} + 18,800 \text{ (A)} + 14,800 \text{ (A)} = \text{Rs. } 40,000 \text{ (A)}$$

Labour Cost Variance

$$= \text{Labour Rate Variance} + \text{Labour Efficiency Variance}$$

$$= 6400 \text{ (A)} + 33600 \text{ (A)} = \text{Rs. } 40000 \text{ (A)}$$

In this case, labour idle time variance is a part of labour efficiency variance.

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Working Notes:

Category	Standard Cost			Actual (1600 units)			Revised Actual Hours
	Hrs.	Rate	Amt. (Rs.)	Hrs.	Rate	Amt. (Rs.)	
Skilled	960 (30Wx40x1,600/2,000)	70.00	67,200	1,440 (40Wx36)	75.00	1,08,000	1,080 (1,980x6/11)
Semi-Skilled	480 (15Wx40x1,600/2,000)	65.00	31,200	360 (10Wx36)	60.00	21,600	540 (1,980x3/11)
Unskilled	320 (10Wx40x1,600/2,000)	50.00	16,000	180 (5Wx36)	52.00	9,360	360 (1,980x2/11)
Total	1,760	65	1,14,400	1,980		1,38,960	1,980

(b) (i) Overheads application base: Direct labour hours

	Equipment A	Equipment B
Direct material cost	350	400
Direct labour cost	360	480
Overheads*	180	240
	890	1120

$$\text{*Pre-determined rate} = \frac{\text{Budgeted overheads}}{\text{Budgeted direct labour hours}} = \frac{\text{₹ 15,00,000}}{25,000 \text{ hours}} = \text{₹60}$$

(ii) Estimation of Cost-Driver rate

Activity (Rs.)	Overhead cost	Cost-driver level (Rs.)	Cost driver rate
Order processing	3,00,000	600 Orders processed	500
Machine processing	10,00,000	50,000 Machine hours	20
Inspection	2,00,000	15,000 Inspection hours	10
		Equipment A	Equipment B
Direct material cost		350	400
Direct labour cost		360	480
Prime Cost(A)		710	880

Overhead Cost		
Order processing 400: 200	2,00,000	1,00,000
Machine processing 22,500: 27,500	4,50,000	5,50,000
Inspection 5,000: 15,000	50,000	1,50,000
Total overhead cost	7,00,000	8,00,000

(Overheads cost per unit for each overhead can also be calculated)

Per unit cost	A (₹)	B (₹)
7,00,000 / 3,200 (B)-A	218.75	
8,00,000 / 3,850 (B)-B		207.79
Unit manufacturing cost (A+B)	928.75	1,087.79

(iii) Calculation of Cost Distortion

	Equipment A	Equipment B
Unit manufacturing cost—using direct labour hours as an application base	890.00	1,120.00
Unit manufacturing cost—using activity based costing	928.75	1,087.79
Cost distortion	-38.75	32.21

Question 4

(a) X Ltd. distributes its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey.

The following information is available:

Diesel Consumption 8 km per litre

Diesel Cost Rs. 60 per litre

Engine Oil Rs. 200 per week

Driver's Wages (fixed) Rs. 2,500 per week

Repairs Rs. 600 per week

Garage Rent Rs. 800 per week

Cost of Lorry (excluding cost of tyres) Rs. 9,50,000

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Life of Lorry 1,60,000 kms

Insurance Rs. 18,200 per annum

Cost of Tyres Rs. 52,500

Life of Tyres 25,000 kms

Estimated sale value of the lorry at end of its life is Rs. 1,50,000

Vehicle License Cost Rs. 7,800 per annum

Other Overhead Cost Rs. 41,600 per annum

The lorry operates on a 5 day week.

Required:

(i) A statement to show the total cost of operating the vehicle for the four week period analysed into Running cost and Fixed cost.

(ii) Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year) (10 Marks)

(b) The following are the details of receipt and issue of material 'CXE' in a manufacturing Co. during the month of April 2019:

Date	Particulars	Quantity (kg)	Rate per kg
April 4	Purchase	3,000	Rs. 16
April 8	Issue	1,000	
April 15	Purchase	1,500	Rs. 18
April 20	Issue	1,200	
April 25	Return to supplier out of purchase made on April 15	300	
April 26	Issue	1,000	
April 28	Purchase	500	Rs. 17

Opening stock as on 01-04-2019 is 1,000 kg @ Rs. 15 per kg.

On 30th April, 2019 it was found that 50 kg of material 'CXE' was fraudulently misappropriated by the store assistant and never recovered by the Company.

Required:

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(i) Prepare a store ledger account under each of the following method of pricing the issue:

(a) Weighted Average Method

(b) LIFO

(ii) What would be the value of material consumed and value of closing stock as on 30-04-2019 as per these two methods? (10 Marks)

Answer

a) Working Notes

Particulars	For 4 weeks	For 1 week (by dividing by 4)
Total distance travelled (40 k.m × 2 × 2 trips × 5 days × 4 weeks)	3,200 km	800 km
Total tonne km (40 k.m × 10 tonnes × 2 × 5 days × 4 weeks)	16,000 tonne km	4,000 tonne km

(i) Statement showing Operating Cost

Amount (Rs.)

Particulars	For 4 weeks	For 1 week (by dividing by 4)
A. Fixed Charges:		
Drivers' wages (₹2,500 × 4 weeks)	10,000	2,500
Garage rent (₹800 × 4 weeks)	3,200	800
Insurance {(₹18,200 ÷ 52 weeks) × 4 weeks}	1,400	350
Vehicle license {(₹7,800 ÷ 52 weeks) × 4 weeks}	600	150
Other overheads cost {(₹41,600 ÷ 52 weeks) × 4 weeks}	3,200	800
Total (A)	18,400	4,600
B. Running Cost:		
Cost of diesel {(3,200 ÷ 8 kms) × ₹60}	24,000	6,000
Engine Oil (₹200 × 4 weeks)*	800	200
Repairs (₹600 × 4 weeks)*	2,400	600
Depreciation on vehicle $\left(\frac{₹9,50,000 - ₹1,50,000}{1,60,000 \text{ km}} \times 3,200 \text{ km} \right)$	16,000	4,000
Depreciation on tyres $\left(\frac{₹52,500}{25,000 \text{ km}} \times 3,200 \text{ km} \right)$	6,720	1,680
Total (B)	49,920	12,480
C. Total Cost (A + B)	68,320	17,080

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*Cost of engine oil & repairs may also be treated as fixed cost, as the question relates these with time i.e. in weeks instead of running of vehicle.

(ii) Calculation of vehicle operating cost:

$$\begin{aligned} \text{Operating cost per k.m.} &= \frac{\text{₹ } 68,320}{3,200 \text{ kms}} \text{ or } \frac{\text{₹ } 17,080}{800 \text{ Kms}} = \text{₹ } 21.35 \\ \text{Operating cost per Tonne-k.m.} &= \frac{\text{₹ } 68,320}{16,000} \text{ or } \frac{\text{₹ } 17,080}{4,000} = \text{₹ } 4.27 \end{aligned}$$

(b) (i) (a) Stores Ledger Account for the month of April, 2019 (Weighted Average Method)

Date	Receipt			Issue			Balance		
	Qty Units	Rate (Rs.)	Amount (Rs.)	Qty Units	Rate (Rs.)	Amount (Rs.)	Qty Units	Rate (Rs.)	Amount (Rs.)
1-4-19	—	—	—	—	—	—	1,000	15.00	15,000
4-4-19	3,000	16.00	48,000	—	—	—	4,000	15.75	63,000
8-4-19	—	—	—	1,000	15.75	15,750	3,000	15.75	47,250
15-4-19	1,500	18.00	27,000	—	—	—	4,500	16.50	74,250
20-4-19	—	—	—	1,200	16.50	19,800	3,300	16.50	54,450
25-4-19	—	—	—	300	18.00	5,400	3,000	16.35	49,050
26-4-19	—	—	—	1,000	16.35	16,350	2,000	16.35	32,700
28-4-19	500	17.00	8,500	—	—	—	2,500	16.48	41,200
30-4-19	—	—	—	50	16.48	824	2,450	16.48	40,376

(b) Stores Ledger Account for the month of April, 2019 (LIFO)

Date	Receipt			Issue			Balance		
	Qty Units	Rate (Rs.)	Amount (Rs.)	Qty Units	Rate (Rs.)	Amount (Rs.)	Qty Units	Rate (Rs.)	Amount (Rs.)
1-4-19	—	—	—	—	—	—	1,000	15	15,000
4-4-19	3,000	16	48,000	—	—	—	1,000	15	15,000
							3,000	16	48,000
8-4-19	—	—	—	1,000	16	16,000	1,000	15	15,000
							2,000	16	32,000
15-4-19	1,500	18	27,000	—	—	—	1,000	15	15,000
							2,000	16	32,000
							1,500	18	27,000
20-4-19	—	—	—	1,200	18	21,600	1,000	15	15,000
							2,000	16	32,000
							300	18	5,400

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25-4-19	–	–	–	300	18	5,400	1,000 2,000	15 16	15,000 32,000
26-4-19	–	–	–	1,000	16	16,000	1,000 1,000	15 16	15,000 16,000
28-4-19	500	17	8,500	–	–	–	1,000 1000 500	15 16 17	15,000 16000 8500
30-4-19	–	–	–	50	17	850	1,000 1,000 450	15 16 17	15,000 16,000 7,650

(ii) Value of Material Consumed and Closing Stock

	Weighted Average method (Rs.)	LIFO method (Rs.)
Opening stock as on 01-04-2019	15,000	15,000
Add: Purchases	83,500	83,500
98,500		98,500
Less: Return to supplier	5,400	5,400
Less: Abnormal loss	824	850
Less: Closing Stock as on 30-04-2019	40,376	38,650
Value of Material Consumed	51,900	53,600

Question 5

(a) M/s Gaurav Private Limited is manufacturing and selling two products: 'BLACK' and 'WHITE' at selling price of Rs. 20 and Rs. 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

- (i) Sales planned for the year will be Rs. 81,00,000 in the case of 'BLACK' and Rs. 54,00,000 in the case of 'WHITE'.
- (ii) The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.
- (iii) Break-even is planned at 70% of the total sales of each product.
- (iv) Profit for the year to be maintained at Rs. 8,26,200 in the case of 'BLACK' and Rs. 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of Rs. 42,00,000 allocated as Rs. 22,00,000 to 'BLACK' and Rs. 20,00,000 to 'WHITE'.

You are required to calculate:

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(1) Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.

(2) Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above. (5 Marks)

(b) M/s Zaina Private Limited has purchased a machine costing Rs. 29,14,800 and it is expected to have a salvage value of Rs. 1,50,000 at the end of its effective life of 15 years. Ordinarily the machine is expected to run for 4,500 hours per annum but it is estimated that 300 hours per annum will be lost for normal repair & maintenance. The other details in respect of the machine are as follows :

(i) Repair & Maintenance during the whole life of the machine are expected to be Rs. 5,40,000.

(ii) Insurance premium (per annum) 2% of the cost of the machine.

(iii) Oil and Lubricants required for operating the machine (per annum) Rs. 87,384.

(iv) Power consumptions: 10 units per hour @ Rs. 7 per unit. No power consumption during repair and maintenance. .

(v) Salary to operator per month Rs. 24,000. The operator devotes one third of his time to the machine.

You are required to calculate comprehensive machine hour rate. (5 Marks)

(c) A contractor prepares his accounts for the year ending 31st March each year. He commenced a contract on 1st September, 2018. The following information relates to contract as on 31st March, 2019:

Material sent to site	Rs. 18,75,000
Wages paid	Rs. 9,28,500
Wages outstanding at end	Rs. 84,800
Sundry expenses	Rs. 33,825
Material returned to supplier	Rs. 15,000
Plant purchased	Rs. 3,75,000
Salary of supervisor	Rs. 15,000 per month
(Devotes 1/3rd of his time on contract)	
Material at site as on 31-03-2019	Rs. 2,16,800

Some of material costing Rs. 10,000 was found unsuitable and was sold for Rs. 11,200. On 31-12-2018 plant which costs Rs. 25,000 was transferred to some other contract and on 31-01-2019 plant which costs Rs. 32,000 was returned to stores. The plant is subject to annual depreciation @ 15% on written down value method.

The contract price is Rs. 45,00,000. On 31st March, 2019 two-third-of the contract was completed. The architect issued certificate covering 50% of the contract price.

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Prepare Contract A/c and show the notional profit or loss as on 31st March, 2019.
(10 Marks)

Answer

(a) (i) Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (Rs.)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units),70% of total sales	3,15,000	1,57,500
Or		
Break Even sales (in Rs.),70% of total sales	56,70,000	37,80,000

(ii) Statement Showing Fixed Cost Reduction

Profit to be maintained (Rs.)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (Rs.)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) x 100	34%	46%
Contribution (Sales x 34% or 46%) (Rs.)	27,54,000	24,84,000
Less: Profit (Rs.)	8,26,200	7,45,200
Revised Fixed Cost (Rs.)	19,27,800	17,38,800
Present Fixed Cost (Rs.)	22,00,000	20,00,000
Reduction in Fixed Cost	2,72,200	2,61,200

(b) Effective machine hour = 4,500 – 300 = 4,200 hours

Calculation of Comprehensive machine hour rate

Elements of Cost and Revenue	Amount (Rs.) Per Annum
Repair and Maintenance (Rs.5,40,000 ÷15 years)	36,000
Power (4,200 hours × 10 units × Rs.7)	2,94,000
Depreciation	1,84,320
Insurance (Rs.29,14,800 × 2%)	58,296
Oil and Lubricant	87,384
Salary to Operator {(Rs.24,000×12)/3}	96,000
Total Cost	7,56,000
Effective machine hour	4,200
Total Machine Rate Per Hour	180

(c) Contract Account as on 31-03-2019

Particulars	(Rs.)	Particulars	(Rs.)
To Materials sent to site	18,75,000	By Material returned to Supplier	15,000
To Wages paid	9,28,500	By Material sold	11,200
Add: Outstanding 84,800	10,13,300	By Plant transferred to other contract	23,750
To Plant purchased	3,75,000	By Plant returned to stores	30,000
To Sundry Expenses	33,825	Plant at site c/d	2,90,175
To Salary of Supervisor {1/3rd (Rs.15,000 × 7 month)}	35,000	By Material at site c/d	2,16,800
To Costing P & L A/c (11,200-10,000)	1,200	By Works Cost	27,46,400
	33,33,325		33,33,325
To Works Cost	27,46,400	By Work-in-progress c/d Work certified	22,50,000
		By Work uncertified	6,86,600
To Notional profit (Profit for the year)	1,90,200		
	29,36,600		29,36,600

Working Notes:

1. Value of plant transferred to other contract:
Rs. 25,000 less Depreciation for 4 months
= Rs. 25,000-(Rs. 25,000×15%×4/12) = Rs. 23,750

2. Value of plant returned to stores:
Rs. 32,000 less Depreciation for 5 months
= Rs. 32,000-(Rs. 32,000×15%×5/12) = Rs. 30,000

3. Value for work uncertified:

The cost of 2/3rd of the contract is ₹27,46,400

$$\therefore \text{Cost of 100\% " " " " } \frac{\text{₹ 27,46,400}}{2} \times 3 = \text{₹ 41,19,600}$$

\therefore Cost of 50% of the contract which has been certified by the architect is ₹ 41,19,600 /2= ₹ 20,59,800. Also, the cost of 1/3rd of the contract, which has been completed but not certified by the architect is ₹ (27,46,400- 20,59,800) = ₹ 6,86,600/-

Question 6

Answer any four of the following:

- Differentiate between cost control and cost reduction.
- What are the cases when a flexible budget is found suitable?
- Explain integrated accounting system and state its advantages.
- Explain Direct Expenses and how these are measured and their treatment in cost accounting.
- What are the limitations of marginal costing? (4 x 5 = 20 Marks)

Answer
(a) Difference between Cost Control and Cost Reduction

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	1. Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to better them continuously.
2. Cost control seeks to attain lowest possible cost under existing conditions.	2. Cost reduction recognises no condition as permanent, since a change will result in lower cost.
3. In case of Cost Control, emphasis is on past and present.	3. In case of cost reduction it is on present and future.
4. Cost Control is a preventive function.	4. Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	5. Cost reduction has no visible end.

(b) Flexible budgeting may be resorted to under following situations:

- In the case of new business venture due to its typical nature it may be difficult to forecast the demand of a product accurately.
- Where the business is dependent upon the mercy of nature e.g., a person dealing in wool trade may have enough market if temperature goes below the freezing point.
- In the case of labour-intensive industry where the production of the concern is dependent upon the availability of labour.

Suitability for flexible budget:

- Seasonal fluctuations in sales and/or production, for example in soft drinks industry;
- a company which keeps on introducing new products or makes changes in the design of its products frequently;
- industries engaged in make-to-order business like ship building;
- an industry which is influenced by changes in fashion; and
- General changes in sales.

(c) Integrated Accounting System: Integrated Accounts is the name given to a system of accounting, whereby cost and financial accounts are kept in the same set of books. Obviously, then there will be no separate sets of books for Costing and Financial records. Integrated accounts provide or meet out fully the information requirement for Costing as well as for Financial Accounts. For Costing it provides information useful for ascertaining the cost of each product, job, and process, operation of any other identifiable activity and for carrying necessary analysis. Integrated accounts provide relevant information which is necessary for preparing profit and loss account and the balance sheets as per the requirement of law and also helps in exercising effective control over the liabilities and assets of its business.

Advantages of Integrated Accounting System

The main advantages of Integrated Accounts are as follows:

- (i) **No need for Reconciliation** - The question of reconciling costing profit and financial profit does not arise, as there is only one figure of profit.
- (ii) **Less efforts** - Due to use of one set of books, there is a significant saving in efforts made.
- (iii) **Less time consuming** - No delay is caused in obtaining information as it is provided from books of original entry.
- (iv) **Economical process** - It is economical also as it is based on the concept of "Centralisation of Accounting function".

(d) Direct Expense: Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

- (i) Royalty paid/ payable for production or provision of service;
- (ii) Hire charges paid for hiring specific equipment;
- (iii) Cost for product/ service specific design or drawing;
- (iv) Cost of product/ service specific software;
- (v) Other expenses which are directly related with the production of goods or provision of service.

The above list of expenses is not exhaustive; any other expenses which are directly attributable to the production or service are also included as direct expenses.

Measurement of Direct Expenses

The direct expenses are measured at invoice or agreed price net of rebate or discount but includes duties and taxes (for which input credit not available), commission and other directly attributable costs.

In case of sub-contracting, where goods are get manufactured by job workers independent of the principal entity, are measured at agreed price. Where the principal supplies some materials to the job workers, the value of such materials and other incidental expenses are added with the job charges paid to the job workers.

Treatment of Direct Expenses

Direct Expenses forms part the prime cost for the product or service to which it can be directly traceable and attributable. In case of lump-sum payment or one time payment, the cost is amortised over the estimated production volume or benefit derived. If the expenses

incurred are of insignificant amount i.e. not material, it can be treated as part of overheads.

(e) Limitations of Marginal Costing

(i) **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. Most of the expenses are neither totally variable nor wholly fixed. For example, various amenities provided to workers may have no relation either to volume of production or time factor.

(ii) **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.

(iii) **Scope for Low Profitability:** Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.

(iv) **Faulty valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in-progress. In order to show the correct position fixed overheads have to be included in work-in-progress.

(v) **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption that fixed cost will remain static throughout is not correct. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. The variable costs do not remain constant per unit of output. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.

(vi) **Marginal costing ignores time factor and investment:** The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

(vii) **Understating of W-I-P:** Under marginal costing stocks and work in progress are understated.

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1. Answer the following:

(a) A jobbing factory has undertaken to supply 300 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is Rs. 8 per piece. From the following data CALCULATE the cost and profit per piece of each batch order and overall position of the order for 1,800 pieces.

Month	Batch Output	Material cost (Rs.)	Direct wages (Rs.)	Direct labour hours
January	310	1150	120	240
February	300	1140	140	280
March	320	1180	150	280
April	280	1130	140	270
May	300	1200	150	300
June	320	1220	160	320

The other details are:

Month	Chargeable expenses (Rs.)	Direct labour (Hours)
January	12,000	4,800
February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

(b) A company deals in trading of a toy car 'Terminato'. The annual demand for the toy car is 9,680 units. The company incurs fixed order placement and transportation cost of Rs. 200 each time an order is placed. Each toy costs Rs. 400 and the trader has a carrying cost of 20 percent p.a.

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The company has been offered a quantity discount of 5% on the purchase of 'Terminato' provided the order size is 4,840 units at a time.

Required:

- (i) COMPUTE the economic order quantity
 (ii) STATE whether the quantity discount offer can be accepted.

(c) 'Mirror Look', a high gloss wooden manufacturing company, requires you to PREPARE the Master budget for the next year from the following information:

Sales:	
Acrylic finish wooden sheets	Rs. 70,00,000
Lacquer finish wooden sheets	Rs. 30,00,000
Direct material cost	65% of sales
Direct wages	25 workers @ Rs. 1,500 per month
Factory overheads:	
Indirect labour –	
Works manager	Rs. 5,500 per month
Foreman	Rs. 4,500 per month
Stores and spares	2.5% on sales
Depreciation on machinery	Rs. 1,26,000
Light and power (fixed)	Rs. 30,000
Repairs and maintenance	Rs. 80,000
Others sundries	10% on direct wages

Administration, selling and distribution expenses Rs. 3,99,000 p.a.

(d) 'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 2020, 'Buttery Butter' purchased 50 Kilolitre processed cream @ Rs. 100 per 1000 ml. Conversion cost of Rs. 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed into Ghee.

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The January, 2020 production and sales information is as follows:

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Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilolitre/tonne)	Selling price per Litre/Kg (Rs.)
Buttermilk	28	28	30
Butter	20	—	—
Ghee	16	16	480

All 20 tonne of butter were further processed at an incremental cost of Rs. 1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in January, 2020.

Required:

(i) SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realisable Value method.

(ii) 'Healthy Bones' offers to purchase 20 tonne of butter in February at Rs. 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself? [4 × 5 Marks = 20 Marks]

ANSWER 1

(a) Statement of Cost and Profit per batch

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	310	300	320	280	300	320	1,830
Sale value (Rs.)	2,480	2,400	2,560	2,240	2,400	2,560	14,640
Material cost (Rs.)	1,150	1,140	1,180	1,130	1,200	1,220	7,020
Direct wages (Rs.)	120	140	150	140	150	160	860
Chargeable expenses* (Rs.)	600	672	672	621	780	800	4,145
Total cost (Rs.)	1,870	1,952	2,002	1,891	2,130	2,180	12,025
Profit per batch (Rs.)	610	448	558	349	270	380	2,615
Total cost per unit (Rs.)	6.03	6.51	6.26	6.75	7.10	6.81	6.57
Profit per unit (Rs.)	1.97	1.49	1.74	1.25	0.90	1.19	1.43

Overall position of the order for 1,200 units

Sales value of 1,800 units @ Rs. 8 per unit	Rs. 14,400
Total cost of 1,800 units @ Rs. 6.57 per unit	Rs. 11,826
Profit	Rs. 2,574

$$\star \frac{\text{Chargeable expenses}}{\text{Direct labour hour for the month}} \times \text{Direct labour hours for batch}$$

- (b) (i) Calculation of Economic Order Quantity

$$\text{EOQ} = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 9,680 \text{ units} \times \text{Rs. } 200}{\text{Rs. } 400 \times 20\%}} = 220 \text{ units}$$

- (ii) Evaluation of Profitability of Different Options of Order Quantity

- (A) When EOQ is ordered

		(₹)
Purchase Cost	(9,680 units × ₹ 400)	38,72,000
Ordering Cost	[(9,680 units/220 units) × ₹ 200]	8,800
Carrying Cost	(220 units × ½ × ₹ 400 × 20%)	8,800
Total Cost		38,89,600

- (B) When Quantity Discount is accepted

		(₹)
Purchase Cost	(9,680 units × ₹ 380)	36,78,400
Ordering Cost	[(9,680 units/4,840 units) × ₹ 200]	400
Carrying Cost	(4,840 units × ½ × ₹ 380 × 20%)	1,83,920
Total Cost		38,62,720

Advise – The total cost of inventory is lower if quantity discount is accepted. The company would save Rs. 26,880 (Rs. 38,89,600 - Rs. 38,62,720)

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(c) Master Budget for the year ending _____

Particulars	(₹)	(₹)	(₹)
Sales:			
Acrylic finish wooden sheets			70,00,000
Lacquer finish wooden sheets			30,00,000
Total Sales			1,00,00,000
Less: Cost of production:			
Direct materials (65% of ₹ 1,00,00,000)		65,00,000	
Direct wages (25 workers × ₹ 1,500 × 12 months)		4,50,000	
Prime Cost		69,50,000	
Fixed Factory Overhead:			
Works manager's salary (5,500 × 12 months)	66,000		
Foreman's salary (4,500 × 12 months)	54,000		
Depreciation	1,26,000		
Light and power	30,000	2,76,000	
Variable Factory Overhead:			
Stores and spares (2.5% of ₹ 1,00,00,000)	2,50,000		
Repairs and maintenance	80,000		
Sundry expenses	45,000	3,75,000	
Works Cost			76,01,000
Gross Profit (Sales – Works cost)			23,99,000
Less: Adm., selling and distribution expenses			3,99,000
Net Profit			20,00,000

(d) (i) Estimated Net Realisable Value Method:

	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	8,40,000 (₹ 30 × 28 × 1000)	76,80,000 (₹ 480 × 16 × 1000)
Less: Post split-off cost (Further processing cost)	-	(1,20,000)
Net Realisable Value	8,40,000	75,60,000
Apportionment of Joint Cost of ₹ 51,00,000* in ratio of 1:9	5,10,000	45,90,000

* [(₹ 100 × 50 × 1000) + ₹ 1,00,000] = ₹ 51,00,000

(ii) Incremental revenue from further processing of Butter into Ghee

(₹ 480 × 16 × 1000 - ₹ 360 × 20 × 1000)	₹ 4,80,000
Less: Incremental cost of further processing of Butter into Ghee	₹ 1,20,000
Incremental operating income from further processing	₹ 3,60,000

The operating income of 'Buttery Butter' will be reduced by Rs. 3,60,000 in February if it sells 20 tonne of Butter to 'Healthy Bones', instead of further processing of Butter into Ghee for sale. Thus, 'Buttery Butter' is advised not to accept the offer and further process butter to make Ghee itself.

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2. (a) Following data is extracted from the books of XYZ Ltd. for the month of January, 2020:

(i) Estimation-

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	800	?	--
Material-B	600	30.00	18,000

Normal loss was expected to be 10% of total input materials.

(ii) Actuals-

1480 kg of output produced

Particulars	Quantity (kg.)	Price (Rs.)	Amount (Rs.)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

(iii) Other Information-

Material Cost Variance = Rs. 3,625 (F)

Material Price Variance = Rs. 175 (F)

You are required to CALCULATE:

(i) Standard Price of Material-A;

(ii) Actual Quantity of Material-B;

(iii) Actual Price of Material-A;

(iv) Revised standard quantity of Material-A and Material-B; and

(v) Material Mix Variance; [10 Marks]

b) *CanCola*, a zero sugar cold drink manufacturing Indian company, is planning to establish a subsidiary company in Nepal to produce coconut flavoured juice. Based on the estimated annual sales of 60,000 bottles of the juice, cost studies produced the following estimates for the Nepalese subsidiary:

	Total Annual Costs (Rs.)	Percent of Total Annual Cost which is variable
Material	2,70,000	100%
Labour	1,97,000	80%
Factory Overheads	1,20,000	60%
Administration Expenses	52,000	35%

The Nepalese production will be sold by manufacturer's representatives who will receive a commission of 9% of the sale price.

No portion of the Indian office expenses is to be allocated to the Nepalese subsidiary.

You are required to-

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- (i) COMPUTE the sale price per bottle to enable the management to realize an estimated 20% profit on sale proceeds in Nepal.
- (ii) CALCULATE the break-even point in rupees value sales and also in number of bottles for the Nepalese subsidiary on the assumption that the sale price is Rs. 14 per bottle.
- [10 Marks]

ANSWER 2

$$\begin{aligned}
 \text{(a) (i) Material Cost Variance (A + B)} &= \{(SQ \times SP) - (AQ \times AP)\} \\
 ₹ 3,625 &= (SQ \times SP) - ₹ 59,825 \\
 (SQ \times SP) &= ₹ 63,450 \\
 (SQ_A \times SP_A) + (SQ_B \times SP_B) &= ₹ 63,450 \\
 (940 \text{ kg} \times SP_A) + (705 \text{ kg} \times ₹ 30) &= ₹ 63,450 \\
 (940 \text{ kg} \times SP_A) + ₹ 21,150 &= ₹ 63,450 \\
 (940 \text{ kg} \times SP_A) &= ₹ 42,300 \\
 SP_A &= \frac{₹ 42,300}{940 \text{ kg}}
 \end{aligned}$$

$$\text{Standard Price of Material-A} = ₹ 45$$

Working Note:

SQ i.e. quantity of inputs to be used to produce actual output

$$= \frac{1,480 \text{ kg}}{90\%} = 1,645 \text{ kg}$$

$$SQ_A = \frac{800 \text{ kg}}{(800 + 600)} \times 1,645 \text{ kg} = 940 \text{ kg}$$

$$SQ_B = \frac{600 \text{ kg}}{(800 + 600)} \times 1,645 \text{ kg} = 705 \text{ kg}$$

$$\begin{aligned}
 \text{(ii) Material Price Variance (A + B)} &= \{(AQ \times SP) - (AQ \times AP)\} \\
 ₹ 175 &= (AQ \times SP) - ₹ 59,825 \\
 (AQ \times SP) &= ₹ 60,000 \\
 (AQ_A \times SP_A) + (AQ_B \times SP_B) &= ₹ 60,000 \\
 (900 \text{ kg} \times ₹ 45 \text{ (from (i) above)}) + (AQ_B \times ₹ 30) &= ₹ 60,000 \\
 ₹ 40,500 + (AQ_B \times ₹ 30) &= ₹ 60,000 \\
 (AQ_B \times ₹ 30) &= ₹ 19,500 \\
 AQ_B &= \frac{19,500}{30} = 650 \text{ kg}
 \end{aligned}$$

$$\text{Actual Quantity of Material B} = 650 \text{ kg.}$$

$$\begin{aligned}
 \text{(iii) (AQ} \times \text{AP)} &= ₹ 59,825 \\
 (AQ_A \times AP_A) + (AQ_B \times AP_B) &= ₹ 59,825 \\
 (900 \text{ kg} \times AP_A) + (650 \text{ kg (from (ii) above)} \times ₹ 32.5) &= ₹ 59,825 \\
 (900 \text{ kg} \times AP_A) + ₹ 21,125 &= ₹ 59,825 \\
 (900 \text{ kg} \times AP_A) &= ₹ 38,700
 \end{aligned}$$

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$$AP_A = \frac{38,700}{900} = 43$$

$$\text{Actual Price of Material-A} = ₹ 43$$

$$\begin{aligned} \text{(iv) Total Actual Quantity of Material-A and Material-B} \\ &= AQ_A + AQ_B \\ &= 900 \text{ kg} + 650 \text{ kg (from (ii) above)} \\ &= 1,550 \text{ kg} \end{aligned}$$

Now,

$$\text{Revised } SQ_A = \frac{800 \text{ kg}}{(800 + 600)} \times 1,550 \text{ kg} = 886 \text{ kg}$$

$$\text{Revised } SQ_B = \frac{600 \text{ kg}}{(800 + 600)} \times 1,550 \text{ kg} = 664 \text{ kg}$$

$$\begin{aligned} \text{(v) Material Mix Variance (A + B)} &= \{(RSQ \times SP) - (AQ \times SP)\} \\ &= \{(RSQ_A \times SP_A) + (RSQ_B \times SP_B) - 60,000\} \\ &= (886 \text{ kg (from (iv) above)} \times ₹ 45 \text{ (from (i) above)}) \\ &\quad + (664 \text{ kg (from (iv) above)} \times ₹ 30) - ₹ 60,000 \\ &= (39,870 + 19,920) - 60,000 = ₹ 210 \text{ (A)} \end{aligned}$$

(b) (i) Computation of Sale Price Per Bottle

Output: 60,000 Bottles

Variable Cost:	
Material	2,70,000
Labour (Rs. 1,97,000 × 80%)	1,57,600
Factory Overheads (Rs. 1,20,000 × 60%)	72,000
Administrative Overheads (Rs. 52,000 × 35%)	18,200
Commission (9% on Rs. 9,00,000 (Working Note - 1))	81,000
Fixed Cost:	
Labour (Rs. 1,97,000 × 20%)	39,400
Factory Overheads (Rs. 1,20,000 × 40%)	48,000
Administrative Overheads (Rs. 52,000 × 65%)	33,800
Total Cost	7,20,000
Profit (20% of Rs. 9,00,000)	1,80,000
Sales Proceeds	9,00,000
Sales Price per bottle	15

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(ii) Calculation of Break-even Point

$$\begin{aligned} \text{Sales Price per Bottle} &= ₹ 14 \\ \text{Variable Cost per Bottle} &= \frac{\text{Rs. } 5,93,400 (\text{working note -2})}{60,000 \text{ bottles}} = ₹ 9.89 \\ \text{Contribution per Bottle} &= ₹ 14 - ₹ 9.89 = ₹ 4.11 \\ \text{Break -even Point (in number of Bottles)} &= \frac{\text{Fixed cost}}{\text{Contribution per bottle}} \\ &= \frac{\text{Rs. } 1,21,200}{₹ 4.11} = 29,489 \\ \text{Break- even Point (in Sales Value)} &= 29,489 \text{ Bottles} \times ₹ 14 \\ &= ₹ 4,12,846 \end{aligned}$$

Working Note

(1) Let the Sales Price be 'X'

$$\text{Commission} = \frac{9X}{100}$$

$$\text{Profit} = \frac{20X}{100}$$

$$X = ₹ 2,70,000 + ₹ 1,57,600 + ₹ 72,000 + ₹ 18,200 + ₹ 39,400 + ₹ 48,000 + ₹ 33,800 + \frac{9X}{100} + \frac{20X}{100}$$

$$X = ₹ 6,39,000 + \frac{9X}{100} + \frac{20X}{100}$$

$$100X - 9X - 20X = 6,39,00,000$$

$$71X = 6,39,00,000$$

$$X = \frac{6,39,00,000}{71} = ₹ 9,00,000$$

(2)

Total Variable Cost	(Rs.)
Material	2,70,000
Labour	1,57,600
Factory Overheads	72,000
Administrative Overheads	18,200
Commission [(60,000 Bottles × Rs. 14) × 9%]	75,600
	5,93,400

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3. (a) 'Healthy Sweets' is engaged in the manufacturing of jaggery. Its process involve sugarcane crushing for juice extraction, then filtration and boiling of juice along with some chemicals and then letting it cool to cut solidified jaggery blocks. The main process of juice extraction (Process – I) is done in conventional crusher, which is then filtered and boiled (Process – II) in iron pots. The solidified jaggery blocks are then cut, packed and dispatched. For manufacturing 10 kg of jaggery, 100 kg of sugarcane is required, which extracts only 45 litre of juice. Following information regarding Process – I has been obtained from the manufacturing department of Healthy Sweets for the month of January, 2020:

Opening work-in process	(4,500 litre)	
Sugarcane	50,000	
Labour	15,000	
Overheads	45,000	
Sugarcane introduced for juice extraction (1,00,000 kg)	5,00,000	
Direct Labour	2,00,000	
Overheads		6,00,000

Abnormal Loss: 1,000 kg

Degree of completion:
 Sugarcane 100%
 Labour and overheads 80%

Closing work-in process: 9,000 litre

Degree of completion:
 Sugarcane 100%
 Labour and overheads 80%

Extracted juice transferred for filtering and boiling: 39,500 litre
 (Consider mass of 1 litre of juice equivalent to 1 kg)

You are required to PREPARE using average method:

- (i) Statement of equivalent production,
- (ii) Statement of cost,
- (iii) Statement of distribution cost, and
- (iv) Process-I Account. [10 Marks]

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(b) In a factory, the basic wage rate is Rs. 300 per hour and overtime rates are as follows:

Before and after normal working hours	180% of basic wage rate
Sundays and holidays	230% of basic wage rate
During the previous year, the following hours were worked	
- Normal time	1,00,000 hours
- Overtime before and after working hours	20,000 hours
Overtime on Sundays and holidays	5,000 hours
Total	1,25,000 hours

The following hours have been worked on job 'A'

Normal	1,000 hours
Overtime before and after working hrs.	100 hours.
Sundays and holidays	25 hours.
Total	1,125 hours

You are required to CALCULATE the labour cost chargeable to job 'A' and overhead in each of the following instances:

- Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
- Where overtime is worked irregularly to meet the requirements of production.
- Where overtime is worked at the request of the customer to expedite the job. [10 Marks]

ANSWER 3

(a) (i) Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Sugarcane		Labour & O.H.	
				%	Units	%	Units
Opening WIP	4,500	Completed and transferred to Process - II	39,500	100	39,500	100	39,500
Units introduced	1,00,000	Normal Loss (55%* of 1,00,000)	55,000	--	--	--	--
		Abnormal loss	1,000	100	1,000	80	800
		Closing WIP	9,000	100	9,000	80	7,200
	1,04,500		1,04,500		49,500		47,500

* 100 kg of sugarcane extracts only 45 litre of juice. Thus, normal loss = $100 - 45 = 55\%$

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(ii) Statement showing cost for each element

Particulars	Sugarcane (Rs.)	Labour (Rs.)	Overhead (Rs.)	Total (Rs.)
Cost of opening work-in-process	50,000	15,000	45,000	1,10,000
Cost incurred during the month	5,00,000	2,00,000	6,00,000	13,00,000
Total cost: (A)	5,50,000	2,15,000	6,45,000	14,10,000
Equivalent units: (B)	49,500	47,500	47,500	
Cost per equivalent unit: (C) = (A ÷ B)	11.111	4.526	13.579	29.216

(iii) Statement of Distribution of cost

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (39,500 units × ₹ 29.216)		11,54,032
2. Value of Abnormal Loss:		
- Sugarcane (1,000 units × ₹ 11.111)	11,111	
- Labour (800 units × ₹ 4.526)	3,621	
- Overheads (800 units × ₹ 13.579)	10,863	25,595
3. Value of Closing W-I-P:		
- Sugarcane (9,000 units × ₹ 11.111)	99,999	
- Labour (7,200 units × ₹ 4.526)	32,587	
- Overheads (7,200 units × ₹ 13.579)	97,769	2,30,355

(iv) Process-I A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Opening W.I.P:			By Normal Loss	55,000	--
- Sugarcane	4,500	50,000	By Abnormal loss (Rs.25,595 + Rs.18 (difference due to approximation))	1,000	25,613
- Labour	--	15,000	By Process-II A/c	39,500	11,54,032
- Overheads	--	45,000	By Closing WIP	9,000	2,30,355
To Sugarcane introduced	100,000	5,00,000			
To Direct Labour		2,00,000			
To Overheads		6,00,000			
	104,500	14,10,000		104,500	14,10,000

(b) Workings

Basic wage rate : Rs. 300 per hour

Overtime wage rate before and after working hours : Rs. 300 × 180% = Rs. 540 per hour

Overtime wage rate for Sundays and holidays : Rs. 300 × 230% = Rs. 690 per hour

Computation of average inflated wage rate (including overtime premium):

Particulars	Amount (Rs.)
Annual wages for the previous year for normal time (1,00,000 hrs. × Rs. 300)	3,00,00,000
Wages for overtime before and after working hours (20,000 hrs. × Rs. 540)	1,08,00,000
Wages for overtime on Sundays and holidays (5,000 hrs. × Rs. 690)	34,50,000
Total wages for 1,25,000 hrs.	4,42,50,000

(i) Where overtime is worked regularly as a policy due to workers' shortage:

The overtime premium is treated as a part of employee cost and job is charged at an inflated wage rate. Hence, employee cost chargeable to job 'A'

= Total hours × Inflated wage rate = 1,125 hrs. × Rs. 354 = Rs. 3,98,250

(ii) Where overtime is worked irregularly to meet the requirements of production:

Basic wage rate is charged to the job and overtime premium is charged to factory overheads as under:

Employee cost chargeable to Job 'A': 1,125 hours @ Rs.300 per hour = Rs.3,37,500

Factory overhead: {100 hrs. × Rs. (540 – 300)} + {25 hrs. × Rs. (690 – 300)}

= {Rs. 24,000 + Rs. 9,750} = Rs. 33,750

(iii) Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under:

	(Rs.)	
Job 'A' Employee cost 1,125 hrs. @ Rs. 300	=	3,37,500
Overtime premium 100 hrs. @ Rs. (540 – 300)	=	24,000
25 hrs. @ Rs. (690 – 300)	=	9,750
Total		3,71,250

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4. (a) Aloe Ltd. has the capacity to produce 2,00,000 units of a product every month. Its works cost at varying levels of production is as under:

Level	Works cost per unit (Rs.)
10%	400
20%	390
30%	380
40%	370
50%	360
60%	350
70%	340
80%	330
90%	320
100%	310

Its fixed administration expenses amount to Rs. 3,60,000 and fixed marketing expenses amount to Rs. 4,80,000 per month respectively. The variable distribution cost amounts to Rs. 30 per unit.

It can sell 100% of its output at Rs. 500 per unit provided it incurs the following further expenditure:

(i) It gives gift items costing Rs. 30 per unit of sale;

(ii) It has lucky draws every month giving the first prize of Rs. 60,000; 2nd prize of Rs. 50,000, 3rd prize of Rs. 40,000 and ten consolation prizes of Rs. 5,000 each to customers buying the product.

(iii) It spends Rs. 2,00,000 on refreshments served every month to its customers;

(iv) It sponsors a television programme every week at a cost of Rs. 20,00,000 per month.

It can market 50% of its output at Rs. 560 by incurring expenses referred from (ii) to (iv) above and 30% of its output at Rs. 600 per unit without incurring any of the expenses referred from (i) to (iv) above.

PREPARE a cost sheet for the month showing total cost and profit at 30%, 50% and 100% capacity level & COMPARE its profit. [10 Marks]

(b) A contractor has entered into a long term contract at an agreed price of Rs.18,70,000 subject to an escalation clause for materials and wages as spelt out in the contract and corresponding actuals are as follows:

	Standard		Actual	
Materials	Qty (tons)	Rate (Rs.)	Qty (tons)	Rate (Rs.)
A	6,000	50.00	6,050	48.00
B	3,000	80.00	2,950	79.00
C	2,500	60.00	2,600	66.00
Wages	Hours	Hourly Rate (Rs.)	Hours	Hourly Rate (Rs.)

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X	3,000	70.00	3,100	72.00
Y	2,500	75.00	2,450	75.00
Z	3,000	65.00	3,100	66.00

Reckoning the full actual consumption of material and wages, the company has claimed a final price of Rs. 18,94,100. Give your ANALYSIS of admissible escalation claim and indicate the final price payable. [10 Marks]

ANSWER 4

(a)

Cost Sheet (For the month)

Level of Capacity	30%		50%		100%	
	60,000 units		1,00,000 units		2,00,000 units	
	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)
Works Cost	380.00	2,28,00,000	360.00	3,60,00,000	310.00	6,20,00,000
Add: Fixed administration expenses	6.00	3,60,000	3.60	3,60,000	1.80	3,60,000
Add: Fixed marketing expenses	8.00	4,80,000	4.80	4,80,000	2.40	4,80,000
Add: Variable distribution cost	30.00	18,00,000	30.00	30,00,000	30.00	60,00,000
Add: Special Costs:						
- Gift items costs	-	-	-	-	30.00	60,00,000
- Customers' prizes*	-	-	2.00	2,00,000	1.00	2,00,000
- Refreshments	-	-	2.00	2,00,000	1.00	2,00,000
- Television programme sponsorship cost	-	-	20.00	20,00,000	10.00	20,00,000
Cost of sales	424.00	2,54,40,000	422.40	4,22,40,000	386.20	7,72,40,000
Profit (Bal. fig.)	176.00	1,05,60,000	137.60	1,37,60,000	113.80	2,27,60,000
Sales revenue	600.00	3,60,00,000	560.00	5,60,00,000	500.00	10,00,00,000

* Customers' prize cost:

Particulars	Amount (₹)
1 st Prize	60,000
2 nd Prize	50,000
3 rd Prize	40,000
Consolation Prizes (10 × ₹ 5,000)	50,000
Total	2,00,000

Comparison of Profit

30% capacity	50% capacity	100% capacity
$\frac{\text{Rs.176}}{\text{Rs.600}} \times 100$	$\frac{\text{Rs.137.6}}{\text{Rs.560}} \times 100$	$\frac{\text{Rs.113.8}}{\text{Rs.500}} \times 100$
29.33 %	24.57%	22.76%

Profit (in value as well as in percentage) is higher at 30% level of capacity than that at 50% and 100% level of capacity.

(b)

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	Standard Qty/Hrs.	Standard Rate (₹)	Actual Rate (₹)	Variation in Rate (₹)	Escalation Claim (₹)
	(a)	(b)	(c)	(d) = (c) - (b)	(e) = (a) × (d)
Materials					
A	6,000	50.00	48.00	(-) 2.00	(-) 12,000
B	3,000	80.00	79.00	(-) 1.00	(-) 3,000
C	2,500	60.00	66.00	(+) 6.00	15,000
Materials escalation claim: (A)					0
X	3,000	70.00	72.00	(+) 2.00	6,000
Y	2,500	75.00	75.00	-	-
Z	3,000	65.00	66.00	(+) 1.00	3,000
Wages escalation claim: (B)					9,000
Final claim: (A + B)					9,000

Statement showing final price payable

Agreed price		₹ 18,70,000
Agreed escalation:		
Material cost	--	
Labour cost	₹ 9,000	₹ 9,000
Final price payable		₹ 18,79,000

The claim of ₹ 18,94,100 is based on the total increase in cost. This can be verified as shown below:

Statement showing total increase in cost

	Standard Cost			Actual Cost			Increase/ (Decrease)
	Qty/hrs	Rate (₹)	Amount (₹)	Qty/hrs	Rate (₹)	Amount (₹)	
	(a)	(b)	(c) = (a) × (b)	(d)	(e)	(f) = (d) × (e)	
I. Materials							
A	6,000	50.00	3,00,000	6,050	48.00	2,90,400	
B	3,000	80.00	2,40,000	2,950	79.00	2,33,050	
C	2,500	60.00	1,50,000	2,600	66.00	1,71,600	
			6,90,000			6,95,050	5,050
II. Wages							
X	3,000	70.00	2,10,000	3,100	72.00	2,23,200	
Y	2,500	75.00	1,87,500	2,450	75.00	1,83,750	
Z	3,000	65.00	1,95,000	3,100	66.00	2,04,600	
			5,92,500			6,11,550	19,050
							24,100

Contract price	Rs. 18,70,000
Add: Increase in cost	Rs. 24,100
The final price claimed by the company	Rs. 18,94,100

This claim is not admissible because escalation clause covers only that part of increase in cost, which has been caused by inflation.

Note: It is fundamental principle that the contractee would compensate the contractor for the increase in costs which are caused by factors beyond the control of contractor and not for increase in costs which are caused due to inefficiency or wrong estimation.

5. (a) A Ltd. manufactures two products- A and B. The manufacturing division consists of two production departments P1 and P2 and two service departments S1 and S2. Budgeted overhead rates are used in the production departments to absorb factory overheads to the products.

The rate of Department P1 is based on direct machine hours, while the rate of Department P2 is based on direct labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours.

For allocating the service department costs to production departments, the basis adopted is as follows:

- (i) Cost of Department S1 to Department P1 and P2 equally, and
- (ii) Cost of Department S2 to Department P1 and P2 in the ratio of 2 : 1 respectively.

The following budgeted and actual data are available:

Annual profit plan data:

Factory overheads budgeted for the year:

Departments	P1	27,51,000	S1	8,00,000
	P2	24,50,000	S2	6,00,000

Budgeted output in units:

Product A 50,000; B 30,000.

Budgeted raw-material cost per unit:

Product A Rs. 120; Product B Rs. 150.

Budgeted time required for production per unit:

Department P1 : Product A : 1.5 machine hours
 Product B : 1.0 machine hour

Department P2 : Product A : 2 Direct labour hours
 Product B : 2.5 Direct labour hours

Average wage rates budgeted in Department P2 are:

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Product A - Rs. 72 per hour and Product B – Rs. 75 per hour.

All materials are used in Department P1 only.

Actual data (for the month of Jan, 2020):

Units actually produced: Product A : 4,000 units

Product B : 3,000 units

Actual direct machine hours worked in Department P1:

On Product A 6,100 hours, Product B 4,150 hours.

Actual direct labour hours worked in Department P2:

On Product A 8,200 hours, Product B 7,400 hours.

Costs actually incurred:	Product A		Product B	
	₹		₹	
Raw materials	4,89,000		4,56,000	
Wages	5,91,900		5,52,000	
Overheads: Department P ₁	2,50,000	S ₁	80,000	
	P ₂	2,25,000	S ₂	60,000

You are required to:

(i) COMPUTE the pre-determined overhead rate for each production department.

(ii) PREPARE a performance report for Jan, 2020 that will reflect the budgeted costs and actual costs. [10 Marks]

(b) BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three range of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December, 2019 are as follows:

	BABYSOFT- Gold		BABYSOFT- Pearl		BABYSOFT- Diamond	
Production of soaps (Units)	4,000		3,000		2,000	
Resources per Unit:	Qty	Rate	Qty	Rate	Qty	Rate
- Essential	60 ml	Rs. 200 / 100	55 ml	Rs. 300 / 100	65 ml	Rs. 300 / 100

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Oils		ml		ml		ml
- Cocoa Butter	20 g	Rs. 200 / 100 g	20 g	Rs. 200 / 100 g	20 g	Rs. 200 / 100 g
- Filtered Water	30 ml	Rs. 15 / 100 ml	30 ml	Rs. 15 / 100 ml	30 ml	Rs. 15 / 100 ml
- Chemicals	10 g	Rs. 30 / 100 g	12 g	Rs. 50 / 100 g	15 g	Rs. 60 / 100 g
- Direct Labour	30 minutes	Rs. 10 / hour	40 minutes	Rs. 10 / hour	60 minutes	Rs. 10 / hour

Bio-organic Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct labour hour rate, which were budgeted at Rs. 1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(Rs.)	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operators per unit of production are 5, 5, and 6 for BABYSOFT-Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.)

You are requested to:

(i) PREPARE a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) PREPARE a statement showing the product costs of each product using the ABC approach.

(iii) STATE what are the reasons for the different product costs under the two approaches? [10 Marks]

ANSWER 5

(a) (i) Computation of pre-determined overhead rate for each production department from budgeted data

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	Production Department		Service Department	
	P ₁	P ₂	S ₁	S ₂
Budgeted factory overheads for the year (₹)	27,51,000	24,50,000	8,00,000	6,00,000
Allocation of service department S ₁ 's costs to production departments P ₁ and P ₂ equally (₹)	4,00,000	4,00,000	(8,00,000)	--
Allocation of service department S ₂ 's costs to production departments P ₁ and P ₂ in the ratio of 2:1 (₹)	4,00,000	2,00,000	--	(6,00,000)
Total	35,51,000	30,50,000	--	--
Budgeted machine hours in department P ₁ (working note-1)	1,05,000	--		
Budgeted labour hours in department P ₂ (working note-1)	--	1,75,000		
Budgeted machine/ labour hour rate (₹)	33.82	17.43		

(ii) Performance report for Jan, 2020

(When 4,000 and 3,000 units of Products A and B respectively were actually produced)

	Budgeted (Rs.)	Actual (Rs.)
Raw materials used in Dept. P1:		
A : 4,000 units × Rs. 120	4,80,000	4,89,000
B : 3,000 units × Rs. 150	4,50,000	4,56,000
Direct labour cost (on the basis of labour worked in department P2) hours		
A : 4,000 units × 2 hrs. × Rs. 72	5,76,000	5,91,900
B : 3,000 units × 2.5 hrs. × Rs. 75	5,62,500	5,52,000
Overhead absorbed on machine hour basis in Dept. P1:		
A : 4,000 units × 1.5 hrs. × Rs. 33.82	2,02,920	1,96,420*
B : 3,000 units × 1 hr. × Rs. 33.82	1,01,460	1,33,630*
Overhead absorbed on labour hour basis in Dept. P2:		
A : 4,000 units × 2 hrs. × Rs. 17.43	1,39,440	1,49,814**
B : 3,000 units × 2.5 hrs. × Rs. 17.43	1,30,725	1,35,198**
	26,43,045	27,03,962

* (Refer to working note 4)

** (Refer to working note 5)

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Working notes:

1.

	Product A	Product B	Total
Budgeted output (units)		50,000	30,000
Budgeted machine hours in Dept. P1	75,000 (50,000×1.5 hrs.)	30,000 (30,000×1 hr.)	1,05,000
Budgeted labour hours in Dept. P2	1,00,000 (50,000×2 hrs.)	75,000 (30,000×2.5 hrs.)	1,75,000

2.

	Product A	Product B	Total
Actual output (units)	4,000	3,000	
Actual machine hours utilized in Dept. P1	6,100	4,150	10,250
Actual labour hours utilised in Dept. P2	8,200	7,400	15,600

3. Computation of actual overhead rates for each production department from actual data

	Production Department		Service Department	
	P ₁	P ₂	S ₁	S ₂
Actual factory overheads for the month of Jan, 2020 (₹)	2,50,000	2,25,000	80,000	60,000
Allocation of service Dept. S ₁ 's costs to production Dept. P ₁ and P ₂ equally (₹)	40,000	40,000	(80,000)	—
Allocation of service Dept. S ₂ 's costs to production Dept. P ₁ and P ₂ in the ratio of 2:1 (₹)	40,000	20,000	—	(60,000)
Total	3,30,000	2,85,000	—	—
Actual machine hours in Dept. P ₁ (working note 2)	10,250	—		
Actual labour hours in Dept. P ₂ (working note 2)	—	15,600		
Actual machine/ labour hour rate (₹)	32.20	18.27		

4. Actual overheads absorbed (based on machine hours)

A : 6,100 hrs × Rs. 32.20 = Rs. 1,96,420

B : 4,150 hrs × Rs. 32.20 = Rs. 1,33,630

5. Actual overheads absorbed (based on labour hours)

A : 8,200 hrs × Rs. 18.27 = Rs. 1,49,814

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B : 7,400 hrs × Rs. 18.27 = Rs. 1,35,198

(b) (i) Traditional Absorption Costing

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	
(a) Production of soaps (Units)	4,000	3,000	2,000	9,000
(b) Direct labour (minutes)	30	40	60	-
(c) Direct labour hours (a × b)/60 minutes	2,000	2,000	2,000	6,000

Overhead rate per direct labour hour:

= Budgeted overheads X Budgeted labour hours

= Rs. 1,98,000 X 6,000 hours

= Rs. 33 per direct labour hour

Unit Costs:

	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Direct Costs:			
- Direct Labour	5.00 $\left(\frac{10 \times 30}{60}\right)$	6.67 $\left(\frac{10 \times 40}{60}\right)$	10.00 $\left(\frac{10 \times 60}{60}\right)$
- Direct Material (Refer working note1)	167.50	215.50	248.50
Production Overhead:			
	16.50 $\left(\frac{33 \times 30}{60}\right)$	22.00 $\left(\frac{33 \times 40}{60}\right)$	33.00 $\left(\frac{33 \times 60}{60}\right)$
Total unit costs	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	7,56,000	7,32,510	5,83,000

Working note-1
Calculation of Direct material cost

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	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Essential oils	120.00 $\left(\frac{200 \times 60}{100}\right)$	165.00 $\left(\frac{300 \times 55}{100}\right)$	195.00 $\left(\frac{300 \times 65}{100}\right)$
Cocoa Butter	40.00 $\left(\frac{200 \times 20}{100}\right)$	40.00 $\left(\frac{200 \times 20}{100}\right)$	40.00 $\left(\frac{200 \times 20}{100}\right)$
Filtered water	4.50 $\left(\frac{15 \times 30}{100}\right)$	4.50 $\left(\frac{15 \times 30}{100}\right)$	4.50 $\left(\frac{15 \times 30}{100}\right)$
Chemicals	3.00 $\left(\frac{30 \times 10}{100}\right)$	6.00 $\left(\frac{50 \times 12}{100}\right)$	9.00 $\left(\frac{60 \times 15}{100}\right)$
Total costs	167.50	215.50	248.50

(ii) Activity Based Costing

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
Quantity (units)	4,000	3,000	2,000	-
Weight per unit (grams)	108 $\{(60 \times 0.8) + 20 + 30 + 10\}$	106 $\{(55 \times 0.8) + 20 + 30 + 12\}$	117 $\{(65 \times 0.8) + 20 + 30 + 15\}$	-
Total weight (grams)	4,32,000	3,18,000	2,34,000	9,84,000
Direct labour (minutes)	30	40	60	-
Direct labour hours	2,000 $\left(\frac{4,000 \times 30}{60}\right)$	2,000 $\left(\frac{3,000 \times 40}{60}\right)$	2,000 $\left(\frac{2,000 \times 60}{60}\right)$	6,000
Machine operations per unit	5	5	6	-
Total operations	20,000	15,000	12,000	47,000

Forklifting rate per gram = Rs. 58,000 / 9,84,000 grams = Rs. 0.06 per gram

Supervising rate per direct labour hour = Rs. 60,000 / 6,000 hours = Rs. 10 per labour hour

Utilities rate per machine operations = Rs. 80,000 / 47,000 machine operations

= Rs. 1.70 per machine operations

Unit Costs under ABC:

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	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
Direct Costs:			
- Direct Labour	5.00	6.67	10.00
- Direct material	167.50	215.50	248.50
Production Overheads:			
Forklifting cost	6.48 (0.06 × 108)	6.36 (0.06 × 106)	7.02 (0.06 × 117)
Supervising cost	5.00 $\left(\frac{10 \times 30}{60}\right)$	6.67 $\left(\frac{10 \times 40}{60}\right)$	10.00 $\left(\frac{10 \times 60}{60}\right)$
Utilities	8.50 (1.70 × 5)	8.50 (1.70 × 5)	10.20 (1.70 × 6)
Total unit costs	192.48	243.70	285.72
Number of units	4,000	3,000	2,000
Total costs	7,69,920	7,31,100	5,71,440

(iii) Comments: The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

6. Answer any four of the following:

- (a) DISCUSS the steps to be followed to exercise control over cost.
- (b) DISTINGUISH between Bill of Materials and Material Requisition Note.
- (c) LIST five financial expenses that causes differences in Financial and Cost Accounts.
- (d) EXPLAIN standing charges and running charges in the case of transport organisations. LIST three examples of both.
- (e) DESCRIBE objectives of Budgetary Control System. [4 × 5 = 20 Marks]

ANSWER 6

(a) To exercise control over cost, following steps are followed:

(i) *Determination of pre-determined standard or results:* Standard cost or performance targets for a cost object or a cost centre is set before initiation of production or service activity. These are desired cost or result that need to be achieved.

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(ii) *Measurement of actual performance*: Actual cost or result of the cost object or cost centre is measured. Performance should be measured in the same manner in which the targets are set i.e. if the targets are set up operation-wise, and then the actual costs should also be collected and measured operation-wise to have a common basis for comparison.

(iii) *Comparison of actual performance with set standard or target*: The actual performance so measured is compared against the set standard and desired target. Any deviation (variance) between the two is noted and reported to the appropriate person or authority.

(iv) *Analysis of variance and action*: The variance in results so noted are further analysed to know the reasons for variance and appropriate action is taken to ensure compliance in future. If necessary, the standards are further amended to take developments into account

(b)

Bill of Materials	Material Requisition Note
1. It is the document prepared by the engineering or planning department.	1. It is prepared by the production or other consuming department.
2. It is a complete schedule of component parts and raw materials required for a particular job or work order.	2. It is a document authorizing Store-keeper to issue materials to the consuming department.
3. It often serves the purpose of a material requisition as it shows the complete schedule of materials required for a particular job i.e. it can replace material requisition.	3. It cannot replace a bill of materials.
4. It can be used for the purpose of quotations.	4. It is useful in arriving historical cost only.
5. It helps in keeping a quantitative control on materials drawn through material requisition.	5. It shows the material actually drawn from stores.

(c) Financial expenses causing differences in Financial and Cost Accounts:

- (i) Interest on loans or bank mortgages.
- (ii) Expenses and discounts on issue of shares, debentures etc.
- (iii) Other capital losses i.e., loss by fire not covered by insurance etc.
- (iv) Losses on the sales of fixed assets and investments.
- (v) Goodwill written off.
- (vi) Preliminary expenses written off.
- (vii) Income tax, donations, subscriptions.
- (viii) Expenses of the company's share transfer office, if any.

(d) Standing Charges: These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following-

- ☐ Insurance

- ☐ License fees
- ☐ Salary to Driver, Conductor, Cleaners, etc. if paid on monthly basis
- ☐ Garage costs, including garage rent
- ☐ Depreciation (if related to efflux of time)
- ☐ Taxes
- ☐ Administration expenses, etc.

Running Charges: These costs are generally associated with the distance travelled. These costs include the following-

- ☐ Petrol and Diesel
- ☐ Lubricant oils,
- ☐ Wages to Driver, Conductor, Cleaners, etc. if it is related to operations
- ☐ Depreciation (if related to activity)
- ☐ Any other variable costs identified.

(e) Objectives of Budgetary Control System

1. **Portraying with precision the overall aims of the business** and determining targets of performance for each section or department of the business.
2. **Laying down the responsibilities** of each of the executives and other personnel so that everyone knows what is expected of him and how he will be judged. Budgetary control is one of the few ways in which an objective assessment of executives or department is possible.
3. **Providing a basis for the comparison** of actual performance with the predetermined targets and investigation of deviation, if any, of actual performance and expenses from the budgeted figures. This naturally helps in adopting corrective measures.
4. **Ensuring the best use of all available resources** to maximise profit or production, subject to the limiting factors. Since budgets cannot be properly drawn up without considering all aspects usually there is good co-ordination when a system of budgetary control operates.
5. **Co-ordinating the various activities** of the business, and centralising control and yet enabling management to decentralise responsibility and delegate authority in the overall interest of the business.
6. **Engendering a spirit of careful forethought**, assessment of what is possible and an attempt at it. It leads to dynamism without recklessness. Of course, much depends on the objectives of the firm and the vigour of its management.
7. **Providing a basis for revision** of current and future policies.
8. **Drawing up long range plans** with a fair measure of accuracy.
9. **Providing a yardstick** against which actual results can be compared.

MTP- NOV 2019

1. Answer the following:

(a) C.T. Ltd. manufactures and sells a single product X whose selling price is Rs. 100 per unit and the variable cost is Rs. 60 per unit.

(i) If the Fixed Costs for this year are Rs. 24,00,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%.

(ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 150 per unit and the variable cost Rs. 100 per unit. The total fixed costs are estimated at Rs. 28,00,000. The sales mix of X : Y would be 5 : 3. COMPUTE the break-even sales in units for both the products.

ANSWER 1

(a) (i) Contribution per unit	=	Selling price – Variable cost
	=	Rs.100 – Rs.60
	=	Rs.40
Break-even Point	=	$\frac{\text{Rs.24,00,000}}{\text{Rs.40}}$
	=	60,000 units
Percentage Margin of Safety	=	$\frac{\text{Actual Sales} - \text{Break - even Sales}}{\text{Actual Sales}}$
Or, 60%	=	$\frac{\text{Actual Sales} - 60,000 \text{ units}}{\text{Actual Sales}}$
∴ Actual Sales	=	1,50,000 units

	(Rs.)
Sales Value (1,50,000 units × Rs.100)	1,50,00,000
Less: Variable Cost (1,50,000 units × Rs.60)	90,00,000
Contribution	60,00,000
Less: Fixed Cost	24,00,000
Profit	36,00,000
Less: Income Tax @40%	14,40,000
Net Return	21,60,000

$$\text{Rate of Net Return on Sales} = 14.40\% \left(\frac{\text{Rs.21,60,000}}{\text{Rs.1,50,00,000}} \times 100 \right)$$

(ii) Products

	X (Rs.)	Y (Rs.)
Selling Price per unit	100	150
Variable Cost per unit	60	100
Contribution per unit	40	50

Composite contribution will be as follows:

$$\begin{aligned} \text{Contribution per unit} &= \left(\frac{40}{8} \times 5 \right) + \left(\frac{50}{8} \times 3 \right) \\ &= 25 + 18.75 = \text{Rs.43.75} \end{aligned}$$

$$\text{Break-even Sale} = 64,000 \text{ units} \left(\frac{\text{Rs.28,00,000}}{\text{Rs.43.75}} \right)$$

Break-even Sales Mix:

$$X (64,000 \text{ units} \times 5/8) = 40,000 \text{ units}$$

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Y (64,000 units × 3/8) = 24,000 units

2. (a) Asian Mfg. Co. has decided to increase the size of the store. It wants the information about the probability of the individual product lines : Lemon, Grapes and Papaya. It provides the following data for the 2018 for each product line:

Particulars	Lemon	Grapes	Papaya
Revenues (Rs.)	79,350	2,10,060	1,20,990
Cost of goods sold (Rs.)	60,000	1,50,000	90,000
Cost of bottles returned (Rs.)	1,200	0	0
Number of purchase orders placed	36	84	36
Number of deliveries received	30	219	66
Hours of shelf stocking time	54	540	270
Items sold	12,600	1,10,400	30,600

Asian Mfg. Co. also provides the following information for the year 2018:

Activity	Description of Activity	Total Costs (Rs.)	Cost Allocation Basis
Bottle returns	Returning of empty bottles to the store	1,200	Direct tracing to product line
Ordering	Placing of orders of purchases	15,600	156 purchase orders
Delivery	Physical delivery and the receipts of merchandise	25,200	315 deliveries
Self-stocking	Stocking of merchandise on store shelves and ongoing restocking	17,280	864 hours of time
Customer support	Assistance provided to customers including bagging and checkout	30,720	1,53,600 items sold

Required

(i) Asian Mfg. Co. currently allocates store support costs (all costs other than the cost of goods sold) to the product line on the basis of the cost of goods sold of each product line. CALCULATE the operating income and operating income as the percentage of revenue of each product line.

(ii) If Asian Mfg. Co. allocates store support costs (all costs other than the cost of goods sold) to the product lines on the basis of ABC system, CALCULATE the operating income and operating income as the percentage of revenue of each product line.

(iii) SHOW a comparison statement.

[10 Marks]

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ANSWER 2**(i) Absorption Costing System**

Operating Income-

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	4,10,400
Less: Cost of Goods Sold	60,000	1,50,000	90,000	3,00,000
Less: Store Support Cost	18,000	45,000	27,000	90,000
Operating Income	1,350	15,060	3,990	20,400
Operating Income (%)	1.70	7.17	3.30	4.97

(ii) ABC System

Overhead Allocation Rate-

Activity	Total Costs (Rs.)	Quantity of Cost Allocation Base	Overhead Allocation Rate (Rs.)
Ordering	15,600	156 Purchase Orders	100.00
Delivery	25,200	315 Delivering Orders	80.00
Shelf Stocking	17,280	864 Self Stocking Hours	20.00
Customer Support	30,720	1,53,600 Items Sold	0.20

Store Support Cost-

Particulars	Cost Driver	Lemon	Grapes	Papaya	Total
Bottle Returns	Direct	1,200	0	0	1,200
Ordering	Purchase Orders	3,600	8,400	3,600	15,600
Delivery	Deliveries	2,400	17,520	5,280	25,200
Self -Stocking	Hours of time	1,080	10,800	5,400	17,280
Customer Support	Items Sold	2,520	22,080	6,120	30,720
Grand Total		10,800	58,800	20,400	90,000

Operating Income-

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	410,400
Less: Cost of Goods Sold	60,000	1,50,000	90,000	300,000
Less: Store Support Cost	10,800	58,800	20,400	90,000
Operating Income	8,550	1,260	10,590	20,400
Operating Income (%)	10.78	0.60	8.75	4.97

(iii) Comparison

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Particulars	Lemon	Grapes	Papaya	Total
Under Traditional Costing System	1.70%	7.17%	3.30%	4.97%
Under ABC System	10.78%	0.60%	8.75%	4.97%

3. (b) V Ltd. manufactures luggage trolleys for airports. The factory, in which the company undertakes all of its production, has two production departments- 'Fabrication' and 'Assembly', and two service departments- 'Stores' and 'Maintenance'. The following information have been extracted from the company's budget for the financial year ended 31st March, 2019:

Particulars	Rs.
Allocated Overhead Costs	
Fabrication Department	15,52,000
Assembly Department	7,44,000
Stores Department	2,36,000
Maintenance Department	1,96,000
Other Overheads	
Factory rent	15,28,000
Factory building insurance	1,72,000
Plant & machinery insurance	1,96,000
Plant & Machinery Depreciation	2,65,000
Subsidy for staffs' canteen	4,48,000

Direct Costs	Rs.	Rs.
Fabrication Department:		
Material	63,26,000	
Labour	8,62,000	71,88,000
Assembly Department:		
Material	1,42,000	
Labour	13,06,000	14,48,000

The following additional information is also provided:

	Fabrication Department	Assembly Department	Stores Department	Maintenance Department
Floor area (square meters)	24,000	10,000	2,500	3,500
Value of plant & machinery (Rs.)	16,50,000	7,50,000	75,000	1,75,000
No. of stores requisitions	3,600	1,400	---	---

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Maintenance hours required	2,800	2,300	400	---
No. of employees	120	80	38	12
Machine hours	3000000	6000000		
Labour hours	70000	2600000		

Required:

- (i) PREPARE a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and
(ii) CALCULATE the most appropriate overhead recovery rate for each department.
(iii) Using the rates calculated in part (ii) above, CALCULATE the full production costs of the following job order:
Job number IGI2019

Direct Materials	Rs. 2,30,400
Direct Labour:	
Fabrication Department	240 hours @ Rs. 50 per hour
Assembly Department	180 hours @ Rs. 50 per hour
Machine hours required:	
Fabrication Department	210 hours
Assembly Department	180 hours

ANSWER 3
(i) Table of Primary Distribution of Overheads

Particulars	Basis of Apportionment	Total Amount	Production Department		Service Departments	
			Fabrication	Assembly	Stores	Stores
Overheads Allocated		27,28,000	15,52,000	7,44,000	2,36,000	1,96,000
Direct Costs	Actual	86,36,000	71,88,000	14,48,000	---	---
Other Overheads:						
Factory rent	Floor Area (48:20:5:7)	15,28,000	9,16,800	3,82,000	95,500	1,33,700
Factory building insurance	Floor Area (48:20:5:7)	1,72,000	1,03,200	43,000	10,750	15,050
Plant & Machinery insurance	Value of Plant & Machinery (66:30:3:7)	1,96,000	1,22,038	55,472	5,547	12,943
Plant & Machinery Depreciation	Value of Plant & Machinery	2,65,000	1,65,000	75,000	7,500	17,500

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	(66:30:3:7)					
Canteen Subsidy	No. of employees (60:40:19:6)	4,48,000	2,15,040	1,43,360	68,096	21,504
		13973000	10262078	2890832	422393	396697

Re-distribution of Service Departments' Expenses:

Particulars	Basis of Apportionment	Production Department		Service Departments	
		Fabrication	Assembly	Stores	Stores
Overheads as per Primary distribution	As per Primary distribution	1,02,62,078	28,90,832	4,23,393	3,96,697
Maintenance Department Cost	Maintenance Hours (28:23:4:-)	2,01,955	1,65,891	28,851	(3,96,697)
		10464033	3056723	452244	
Stores Department	No. of Stores Requisition (18:7:-:-)	325616	126628	-452244	
		10786649	3183351		

(ii) Overhead Recovery Rate

Department	Apportioned Overhead (Rs.) (I)	Basis of Overhead Recovery Rate (II)	Overhead Recovery Rate (Rs.) [(I) ÷ (II)]
Fabrication	1,07,89,649	30,00,000 Machine Hours	3.60 per Machine Hour
Assembly	31,83,351	26,00,000 Labour Hours	1.22 per Labour Hour

(iii) Calculation of full production costs of Job no. IGI2019.

Particulars	Amount (Rs.)
Direct Materials	2,30,400
Direct Labour:	
Fabrication Deptt. (240 hours × Rs.50)	12,000
Assembly Deptt. (180 hours × Rs.50)	9,000
Production Overheads:	
Fabrication Deptt. (210 hours × Rs. 3.60)	756
Assembly Deptt. (180 hours × Rs. 1.22)	220
Total Production Cost	2,52,376

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4. (a) In a manufacturing company the standard units of production of the year were fixed at 1,20,000 units and overhead expenditures were estimated to be

Fixed	Rs. 12,00,000;	Variable	Rs. 6,00,000;
Semi-Variable	Rs. 1,80,000		

Actual production during the April, 2019 of the year was 8,000 units. Each month has 20 working days.

During the month there was one public holiday. The actual overheads amounted to:

Fixed	Rs. ,10,000;	Variable	Rs. 48,000
Semi-variable	Rs. 19,200		

Semi-variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

CALCULATE the followings:

(i) Overhead Cost Variance

(ii) Fixed Overhead Cost Variance

(iii) Variable Overhead Cost Variance

(iv) Fixed Overhead Volume Variance

(v) Fixed Overhead Expenditure Variance

(vi) Calendar Variance.

[10 Marks]

ANSWER 4

(a) COMPUTATION OF VARIANCES

(i) **Overhead Cost Variance** = Absorbed Overheads – Actual Overheads
 = (Rs.87,200 + Rs.44,800) – (Rs.1,21,520 + Rs.55,680)
 = Rs. 45,200 (A)

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(ii) Fixed Overhead Cost = Absorbed Fixed Overheads – Actual Fixed Overheads **Variance** =
Rs. 87,200 – Rs.1,21,520

= Rs.34,320 (A)

(iii) Variable Overhead Cost = Standard Variable Overheads for Production – Actual
Variance Variable Overheads

= Rs. 44,800 – Rs. 55,680

= Rs. 10,880 (A)

(iv) Fixed Overhead Volume = Absorbed Fixed Overheads – Budgeted Fixed **Variance**
Overheads

= Rs. 87,200 – Rs.1,09,000

= Rs. 21,800 (A)

(v) Fixed Overhead Expenditure = Budgeted Fixed Overheads – Actual Fixed Overheads
Variance

= Rs.10.90 × 10,000 units – Rs.1,21,520

= Rs.12,520 (A)

(vi) Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads

= Rs.1,03,550 – Rs.1,09,000

= Rs. 5,450 (A)

WORKING NOTE

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Fixed Overheads per Unit = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{\text{Rs.12,00,000}}{1,20,000\text{units}}$	Rs. 10
Fixed Overheads element in Semi-Variable Overheads i.e. 60% of Rs.1,80,000	Rs. 1,08,000
Fixed Overheads per Unit = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{\text{Rs.1,08,000}}{1,20,000\text{units}}$	Rs. 0.90
Standard Rate of Absorption of Fixed Overheads per unit (Rs.10 + Rs.0.90)	Rs.10.90
Fixed Overheads Absorbed on 8,000 units @ Rs10.90	Rs. 87,200
Budgeted Variable Overheads	Rs. 6,00,000
Add : Variable element in Semi-Variable Overheads 40% of Rs. 1,80,000	<u>Rs. 72,000</u>
Total Budgeted Variable Overheads	Rs. 6,72,000
Standard Variable Cost per unit = $\frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} = \frac{\text{Rs.6,72,000}}{1,20,000\text{units}}$	Rs.5.60
Standard Variable Overheads for 8,000 units @ Rs.5.60	Rs. 44,800
Budgeted Annual Fixed Overheads (Rs. 12,00,000 + 60% of Rs. 1,80,000)	Rs.13,08,000
Possible Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Days}} \times \text{Actual Days}$ $= \left[\frac{\text{Rs.1,09,000}}{20\text{Days}} \times 19\text{Days} \right]$	Rs.1,03,550
Actual Fixed Overheads (Rs.1,10,000 + 60% of Rs. 19,200)	Rs.1,21,520
Actual Variable Overheads (Rs.48,000 + 40% of Rs.19,200)	Rs. 55,680

5 (b) In an Oil Mill, four products emerge from a refining process. The total cost of input during the quarter ending March 2019 is Rs.22,20,000. The output, sales and additional processing costs are as under:

Products	Output in Litres	Additional processing cost after split off (Rs.)	Sales value (Rs.)
A	8,000	6,45,000	25,87,500
B	4,000	1,35,000	2,25,000
C	2,000	-	90,000
D	4,000	22,500	6,75,000

In case these products were disposed-off at the split off point that is before further processing, the selling price per litre would have been:

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A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
225.00	90.00	45.00	112.50

PREPARE a statement of profitability based on:

(i) If the products are sold after further processing is carried out in the mill.

(ii) If they are sold at the split off point.

[10

Marks]

ANSWER 5

(i) Statement of profitability of an Oil Mill (after carrying out further processing) for the quarter ending 31st March 2019.

Products	Sales Value after further processing	Share of Joint cost	Additional processing cost	Total cost after processing	Profit (loss)
A	25,87,500	14,80,000	6,45,000	21,25,000	4,62,500
B	2,25,000	2,96,000	1,35,000	4,31,000	(2,06,000)
C	90,000	74,000	-	74,000	16,000
D	6,75,000	3,70,000	22,500	3,92,500	2,82,500
	3577500	2220000	802500	3022500	555000

ii) Statement of profitability at the split off point

Products	Selling price of split off	Output in units	Sales value at split off point	Share of joint cost	Profit at split off point
A	225.00	8,000	18,00,000	14,80,000	3,20,000
B	90.00	4,000	3,60,000	2,96,000	64,000
C	45.00	2,000	90,000	74,000	16,000
D	112.50	4,000	4,50,000	3,70,000	80,000
			2700000	2220000	480000

Note: Share of Joint Cost has been arrived at by considering the sales value at split off point.

6. (a) DISCUSS the remedial steps to be taken to minimize the labour turnover..

(b) DISTINGUISH between Job and Batch costing.

[4 × 5 = 20 Marks]

(c) DISCUSS the essential features of a good cost accounting system.

(d) DISTINGUISH between Bill of Materials and Material Requisition Note.

ANSWER 6

(a)

The following steps are useful for minimizing labour turnover:

(a) *Exit interview*: An interview to be arranged with each outgoing employee to ascertain the reasons of his leaving the organization.

(b) *Job analysis and evaluation*: to ascertain the requirement of each job.

(c) Organization should make use of a scientific system of recruitment, placement and promotion for employees.

(d) Organization should create healthy atmosphere, providing education, medical and housing facilities for workers.

(e) Committee for settling workers grievances

(b)

Sr. No	Job Costing	Batch Costing
1	Method of costing used for non-standard and non-repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job.	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality.

(c) The essential features, which a good cost and management accounting system should possess, are as follows:

(i) Informative and simple: Cost and management accounting system should be tailor-made, practical, simple and capable of meeting the requirements of a business concern. The system of costing should not sacrifice the utility by introducing meticulous and unnecessary details.

(ii) Accurate and authentic: The data to be used by the cost and management accounting system should be accurate and authenticated; otherwise it may distort the output of the system and a wrong decision may be taken.

(iii) Uniformity and consistency: There should be uniformity and consistency in classification, treatment and reporting of cost data and related information. This is required for benchmarking and comparability of the results of the system for both horizontal and vertical analysis.

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(iv) Integrated and inclusive: The cost and management accounting system should be integrated with other systems like financial accounting, taxation, statistics and operational research etc. to have a complete overview and clarity in results.

(v) Flexible and adaptive: The cost and management accounting system should be flexible enough to make necessary amendments and modification in the system to incorporate changes in technological, reporting, regulatory and other requirements.

(vi) Trust on the system: Management should have trust on the system and its output. For this, an active role of management is required for the development of such a system that reflects a strong conviction in using information for decision making.

(d)

Bills of Material	Material Requisition Note
1.It is document or list of materials prepared by the engineering/ drawing department.	1.It is prepared by the foreman of the consuming department.
2.It is a complete schedule of component parts and raw materials required for a particular job or work order.	2.It is a document authorizing Store-Keeper to issue material to the consuming department.
3.It often serves the purpose of a Store Requisition as it shows the complete schedule of materials required for a particular job i.e. it can replace stores requisition.	3.It cannot replace a bill of material.
4.It can be used for the purpose of quotation.	4.It is useful in arriving historical cost only.
5.It helps in keeping a quantitative control on materials drawn through Stores Requisition.	5.It shows the material actually drawn from stores

MTP- MAY 2019**1. Answer the following:**

(a) Yamuna Ltd. manufactures a product, currently utilising 80% capacity with a turnover of Rs.8,00,000 at Rs.25 per unit. The cost data are as under:

Material cost Rs.7.50 per unit, Labour cost Rs.6.25 per unit

Semi-variable cost (Including variable cost of Rs.3.75) per unit Rs.1,80,000.

Fixed cost Rs. 90,000 upto 80% level of output, beyond this an additional Rs. 20,000 will be incurred.

CALCULATE:

(i) Activity level at Break-Even-Point

(ii) Number of units to be sold to earn a net income of 8% of sales

(iii) Activity level needed to earn a profit of Rs. 95,000.

ANSWER**Working notes:**

1. (i) Number of units sold at 80% capacity

$$= \frac{\text{Turnover}}{\text{Selling price p.u.}} = \frac{\text{Rs. 8,00,000}}{\text{Rs. 25}} = 32,000 \text{ units.}$$

(ii) Number of units sold at 100% capacity

$$\frac{\text{Rs. 32,000 units}}{80} \times 100 = 40,000 \text{ units}$$

2. Component of fixed cost included in semi-variable cost of 32,000 units.

Fixed cost = {Total semi-variable cost – Total variable cost }

= Rs.1,80,000 – 32,000 units × Rs.3.75

= Rs.1,80,000 – Rs.1,20,000

= Rs.60,000

3. (i) Total fixed cost at 80% capacity

= Fixed cost + Component of fixed cost included in semi—variable cost

(Refer to working note 2)

= Rs.90,000 + Rs.60,000 = Rs.1,50,000

(ii) **Total fixed cost beyond 80% capacity**

= Total fixed cost at 80% capacity + Additional fixed cost to be incurred

= Rs.1,50,000 + Rs.20,000 = Rs.1,70,000

4. Variable cost and contribution per unit

Variable cost per unit = Material cost + Labour cost + Variable cost component in semi variable cost

= Rs.7.50 + Rs.6.25 + Rs.3.75 = Rs.17.50

Contribution per unit = Selling price per unit – Variable cost per unit

= Rs.25 – Rs.17.50 = Rs.7.50

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5. Profit at 80% capacity level

= Sales revenue – Variable cost – Fixed cost

= Rs.8,00,000 – Rs.5,60,000 (32,000 units × Rs.17.50) – Rs.1,50,000

= Rs.90,000

(i) Activity level at Break–Even Point

$$\text{Break-even point (units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{\text{Rs. 1,50,000}}{\text{Rs. 7.50}} = 20,000 \text{ units}$$

(Refer to working notes 3 & 4)

$$\text{Activity level at BEP} = \frac{\text{Break - Even point (units)}}{\text{No. of units at 100\% capacity level}} \times 100$$

(Refer to working note 1(ii))

$$= \frac{20,000 \text{ units}}{40,000 \text{ units}} \times 100 = 50\%$$

(ii) Number of units to be sold to earn a net income of 8% of sales

Let S be the number of units sold to earn a net income of 8% of sales.

Mathematically it means that : (Sales revenue of S units)

= Variable cost of S units + Fixed cost + Net income

Or, Rs.25S = Rs.17.5S + Rs.1,50,000 + × (Rs.25S) 8 100

Or, Rs.25S = Rs.17.5S + Rs.1,50,000 + Rs.2S

Or, S = (Rs.1,50,000/Rs.5.5) units

Or, S = 27,273 units.

(iii) Activity level needed to earn a profit of Rs. 95,000

The profit at 80% capacity level, is Rs. 90,000 which is less than the desired profit of Rs. 95,000, therefore the needed activity level would be more than 80%. Thus the fixed cost to be taken to determine the activity level needed should be Rs.1,70,000 (Refer to Working Note 3 (ii))

Units to be sold to earn a profit of Rs.95,000

$$= \frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}}$$

$$= \frac{\text{Rs. 1,70,000} + \text{Rs. 95,000}}{\text{Rs. 7.5}}$$

$$= 35,333.33 \text{ units}$$

Activity level needed to earn a profit of Rs.95,000

$$= \frac{35,333.33 \text{ units}}{40,000 \text{ units}} \times 100 = 88.33\%$$

(b) Madhu Ltd. has calculated a predetermined overhead rate of Rs.22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

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Total overheads	Number of machine hours
Rs.3,38,875	14,500
Rs.3,47,625	15,500
Rs.3,56,375	16,500

You are required to:

- (i) CALCULATE the variable overhead absorption rate per machine hour.
- (ii) CALCULATE the estimated total fixed overheads.
- (iii) CALCULATE the budgeted level of activity in machine hours.
- (iv) CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were Rs.3,22,000.
- (v) ANALYSE the arguments for and against using departmental absorption rates as opposed to a single or blanket factory wide rate.

ANSWER

(b) (i) Variable overhead absorption rate = $\frac{\text{Difference in Total Overheads}}{\text{Difference in levels in terms of machine hours}}$

$$= \frac{\text{Rs.3,47,625} - \text{Rs.3,38,875}}{15,500 \text{ hours} - 14,500 \text{ hours}} = \text{Rs.8.75 per machine hour.}$$

(ii) Calculation of Total fixed overheads:

	(Rs.)
Total overheads at 14,500 hours	3,38,875
Less: Variable overheads (Rs. 8.75 × 14,500)	(1,26,875)
Total fixed overheads	2,12,000

(iii) Calculation of Budgeted level of activity in machine hours:

Let budgeted level of activity = X

$$\text{Then, } \frac{(\text{Rs. } 8.75X + \text{Rs. } 2,12,000)}{X} = \text{Rs. } 22$$

$$8.75X + \text{Rs. } 2,12,000 = 22X$$

$$13.25X = 2,12,000$$

$$X = 16,000$$

Thus, budgeted level of activity = 16,000 machine hours.

(iv) Calculation of Under / Over absorption of overheads

	(Rs.)
Actual overheads	3,22,000
Absorbed overheads (14,970 hours × Rs. 22 per hour)	3,29,340
Over-absorption (3,29,340 – 3,22,000)	7,340

(v) Departmental absorption rates provide costs which are more precise than those provided by the use of blanket absorption rates. Departmental absorption rates facilitate variance analysis and cost control. The application of these rates make the task of stock and work-in-process (WIP) valuation easier and more precise. However, the setting up and monitoring of these rates can be time consuming and expensive.

(c) Anirban Ltd. wants to ascertain the profit lost during the year 20X8-X9 due to increased labour turnover. For this purpose, they have given you the following information:

- (1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.
- (2) 20% of the output during training period was defective. Cost of rectification of a defective unit was Rs. 25.
- (3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.
- (4) Selling price per unit is Rs.180 and P/V ratio is 20%.
- (5) Settlement cost of the workers leaving the organization was Rs.1,83,480.
- (6) Recruitment cost was Rs.1,56,340

(7) Training cost was Rs.1,13,180.

You are required to CALCULATE the profit lost by the company due to increased labour turnover during the year 20X8-X9.

ANSWER

- (c) Output by experienced workers in 50,000 hours = $50000 / 10 = 5000$ units
 Output by new recruits = 60% of 5,000 = 3,000 units
 Less of output = $5,000 - 3,000 = 2,000$ units
 Total loss of output = $10,000 + 2,000 = 12,000$ units
 Contribution per unit = 20% of 180 = Rs. 36
 Total contribution cost = $36 \times 12,000 = \text{Rs. } 4,32,000$
 Cost of repairing defective units = $3,000 \times 0.2 \times 25 = \text{Rs. } 15,000$

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Profit forgone due to labour turnover

	(Rs.)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 20X8-X9	9,00,000

(d) Nirmal Motors Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. Arnav Motors Ltd. is expected to have a market share of 1.15% of the total market demand of the pistons in the coming year. It is estimated that it costs Rs.150 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is Rs. 3,50,000.

(i) DETERMINE the optimum run size for piston manufacturing?

(ii) Assuming that the company has a policy of manufacturing 40,000 pistons per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above? (4 × 5 = 20 Marks)

ANSWER

$$(d) (i) \text{ Optimum run size or Economic Batch Quantity (EBQ)} = \sqrt{\frac{2 \times D \times S}{C}}$$

Where, D = Annual demand i.e. 1.15% of 8,00,00,000 = 9,20,000 units

S = Set-up cost per run = Rs. 3,50,000

C = Inventory holding cost per unit per annum

= Rs.150 × 12 months = Rs. 1,800

$$\text{EBQ} = \sqrt{\frac{2 \times 9,20,000 \text{ units} \times \text{Rs.} 3,50,000}{\text{Rs.} 1,800}} = 18,915 \text{ units}$$

(ii) Calculation of Total Cost of set-up and inventory holding

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	Batch size	No. of set-ups	Set-up Cost (Rs.)	Inventory holding cost (Rs.)	Total Cost (Rs.)
A	40,000 units	23 $\left(\frac{9,20,000}{40,000}\right)$	80,50,000 (23×Rs.3,50,000)	3,60,00,000 $\left(\frac{40,000 \times \text{Rs.}1,800}{2}\right)$	4,40,50,000
B	18,915 units	49 $\left(\frac{9,20,000}{18,915}\right)$	1,71,50,000 (49×Rs.3,50,000)	1,70,23,500 $\left(\frac{18,915 \times \text{Rs.}1,800}{2}\right)$	3,41,73,500
	Extra Cost (A – B)				98,76,500

2. (a) BBC Ltd. manufactures Ordinary Portland Cement (OPC). The standard data for the raw materials that are used to manufacture OPC are as follows:

Material	Composition (%)	Rate per Metric Ton (Rs.)
Limestone	65	565
Silica	20	4,800
Alumina	5	32,100
Iron ore	5	1,800
Others	5	2,400

During the month of February 20X8, A Ltd. produced 500 MT OPC. Actual data related with the consumption and costs are as follows:

Raw Material	Quantity (MT)	Total Cost (Rs.)
Limestone	340	1,90,400
Silica	105	5,09,250
Alumina	25	8,12,500
Iron ore	30	53,400
Others	23	51,750

You are required to COMPUTE the following variances related with the production of OPC for the month of February 20X8:

- (i) Material Price Variance
- (ii) Material Mix Variance
- (iii) Material Yield Variance
- (iv) Material Cost Variance. (10 Marks)

ANSWER

- a) (i) Material Price Variance = Actual Quantity (Std. Price – Actual Price)

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Limestone	=	$340 \left(\text{Rs. } 565 - \frac{\text{Rs. } 1,90,400}{340} \right)$	
	=	$340 (\text{Rs. } 565 - \text{Rs. } 560)$	= 1,700 (F)
Silica	=	$105 \left(\text{Rs. } 4,800 - \frac{\text{Rs. } 5,09,250}{105} \right)$	
	=	$105 (\text{Rs. } 4,800 - \text{Rs. } 4,850)$	= 5,250 (A)
Alumina	=	$25 \left(\text{Rs. } 32,100 - \frac{\text{Rs. } 8,12,500}{25} \right)$	
	=	$25 (\text{Rs. } 32,100 - \text{Rs. } 32,500)$	= 10,000 (A)
Iron ore	=	$30 \left(\text{Rs. } 1,800 - \frac{\text{Rs. } 53,400}{30} \right)$	
	=	$30 (\text{Rs. } 1,800 - \text{Rs. } 1,780)$	= 600 (F)
Others	=	$23 \left(\text{Rs. } 2,400 - \frac{\text{Rs. } 51,750}{23} \right)$	
	=	$23 (\text{Rs. } 2,400 - \text{Rs. } 2,250)$	= 3,450 (F)
			9,500 (A)

(ii) Material Mix Variance = Std. Price (Revised Std. Quantity – Actual Quantity) Limestone	= Rs. 565 (523 × 65% - 340) = Rs. 565 (339.95 - 340) = 28.25 (A)
Silica	= Rs. 4,800 (523 × 20% - 105) = Rs. 4,800 (104.6 - 105) = 1,920 (A)
Alumina	= 36,915 (F)
Iron ore	= Rs. 1,800 (523 × 5% - 30) = Rs. 1,800 (26.15 - 30) = 6,930 (A)
Others	= Rs. 2,400 (523 × 5% - 23) = Rs. 2,400 (26.15 - 23) = 7,560 (F)
	35,596.75 (F)

iii) Material Yield Variance = Std. Price (Standard Quantity – Revised Std. Quantity)

Limestone	= Rs. 565 (500 × 65% - 523 × 65%) = Rs. 565 (325 - 339.95) = 8,446.75 (A)
Silica	= Rs. 4,800 (500 × 20% - 523 × 20%) = Rs. 4,800 (100 - 104.6) = 22,080 (A)
Alumina	= Rs. 32,100 (500 × 5% - 523 × 5%) = Rs. 32,100 (25 - 26.15) = 36,915 (A)

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Iron ore	= Rs. 1,800 (500 × 5% - 523 × 5%) = Rs. 1,800 (25 - 26.15) = 2,070 (A)
Others	= Rs. 2,400 (500 × 5% - 523 × 5%) = Rs. 2,400 (25 - 26.15) = 2,760 (A)
	72,271.75 (A)

(iv) Material Cost Variance = (Std. Quantity × Std. Price) – (Actual Quantity × Actual Price)

Limestone	= Rs. 565 × (500 × 65%) - Rs. 1,90,400 = Rs. 1,83,625 - Rs. 1,90,400 = 6,775 (A)
Silica	= Rs. 4,800 × (500 × 20%) - Rs. 5,09,250 = Rs. 4,80,000 - Rs. 5,09,250 = 29,250 (A)

Alumina	= Rs. 32,100 (500 × 5%) – Rs. 8,12,500 = Rs. 8,02,500 – Rs. 8,12,500 = 10,000 (A)
Iron ore	= Rs. 1,800 (500 × 5%) – Rs. 53,400 = Rs. 45,000 – Rs. 53,400 = 8,400 (A)
Others	= Rs. 2,400 (500 × 5%) – Rs. 51,750 = Rs. 60,000 – Rs. 51,750 = 8,250 (F)
	46,175 (A)

b) Cimech Constructions Limited has entered into a big contract at an agreed price of Rs. 1,50,00,000 subject to an escalation clause for material and labour as spent out on the contract and corresponding actual are as follows:

Material:	Standard		Actual	
	Quantity	Rate per Ton	Quantity	Rate per Ton
	(Tons)	(Rs.)	(Tons)	(Rs.)
A	3,000	1,000	3,400	1,100
B	2,400	800	2,300	700
C	500	4,000	600	3,900
D	100	30,000	90	31,500
Labour:	Hours	Hourly Rate	Hours	Hourly Rate
		(Rs.)		(Rs.)
L ₁	60,000	15	56,000	18
L ₂	40,000	30	38,000	35

You are required to:

(i) ANALYSE admissible escalation claim and **DETERMINE** the final contract price payable.

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(ii) PREPARE the contract account, if the all expenses other than material and labour related to the contract are Rs. 13,45,000. (10 Marks)

ANSWER

In case of escalation clause in a contract, a contractor is paid for the any increase in price of materials and rate of labours which are beyond the control of the contractor. Any increase in the cost due to inefficiencies in usage of the materials and labours are not admissible. Thus any increase in cost due to usage in excess of standard quantity or hours are not paid.

(i) Statement showing Additional claim due to Escalation clause.

	Standard Qty / Hours	Std. Rate (Rs.)	Actual Rate (Rs.)	Variation in Rate (Rs.)	Escalation claim (Rs.)
	(a)	(b)	(c)	(d) = (c-b)	(e) = (a × d)
Material:					
A	3,000	1,000	1,100	+100	+3,00,000
B	2,400	800	700	-100	-2,40,000
C	500	4,000	3,900	-100	-50,000
D	100	30,000	31,500	+1,500	+1,50,000
Material escalation claim					1,60,000
Labour:					
L1	60,000	15	18	+3	+1,80,000
L2	40,000	30	35	+5	+2,00,000
Labour escalation claim					3,80,000

Statement showing Final Contract Price

	Rs.)	(Rs.)
Agreed contract price		1,50,00,000
Add: Agreed escalation claim:		
Material Cost	1,60,000	
Labour Cost	3,80,000	5,40,000
Final Contract Price		1,55,40,000

(ii) Contract Account		Cr.	
Dr.			
Particulars	(Rs.)	Particulars	(Rs.)
To Material:		By Contractee's A/c	1,55,40,000
A – (3,400 × Rs. 1,100)	37,40,000		
B – (2,300 × Rs. 700)	16,10,000		
C – (600 × Rs. 3,900)	23,40,000		
D – (90 × Rs. 31,500)	28,35,000	1,05,25,000	
To Labour:			
L1 – (56,000 × Rs.18)	10,08,000		
L2 – (38,000 × Rs.35)	13,30,000	23,38,000	
To Other expenses	13,45,000		
To Estimated Profit	13,32,000		
	1,55,40,000		1,55,40,000

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3. (a) The following data are available in respect of Process-I for January 20X9:

(1) Opening stock of work in process: 600 units at a total cost of Rs. 4,20,000.

(2) Degree of completion of opening work in process:

Material 100%

Labour 60%

Overheads 60%

(3) Input of materials at a total cost of Rs.55,20,000 for 9,200 units.

(4) Direct wages incurred Rs.18,60,000

(5) Production overhead Rs.8,63,000.

(6) Units scrapped 200 units. The stage of completion of these units was:

Materials 100%

Labour 80%

Overheads 80%

(7) Closing work in process; 700 units. The stage of completion of these units was:

Material 100%

Labour 70%

Overheads 70%

(8) 8,900 units were completed and transferred to the next process.

(9) Normal loss is 4% of the total input (opening stock plus units put in)

(10) Scrap value is Rs.60 per unit.

You are required to:

(i) COMPUTE equivalent production,

(ii) CALCULATE the cost per equivalent unit for each element.

(iii) CALCULATE the cost of abnormal loss (or gain), closing work in process and the units transferred to the next process using the FIFO method. (10 Marks)

ANSWER

(a) (i) Statement of Equivalent Production (FIFO Method)

Input		Output		Equivalent Production					
				Materials		Labour		Production Overhead	
Details	Units	Details	Units	%	Units	%	Units	%	Units
Opening Stock	600	From opening stock	600	-	-	40	240	40	240
		- From fresh materials	8,300	100	8,300	100	8,300	100	8,300
		Closing W-I-P	700	100	700	70	490	70	490
Fresh inputs	9,200	Normal loss	392	-	-	-	-	-	-
			9,992		9,000		9,030		9,030
		Less: Abnormal Gain	(192)	100	(192)	100	(192)	100	(192)
	9,800		9,800		8,808		8,838		8,838

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(ii) Statement of Cost per equivalent units

Elements	(Rs.)	Cost (Rs.)	Equivalent units (EU)	Cost per EU (Rs.)
Material Cost	55,20,000			
Less: Scrap realisation 392 units @ Rs. 60/- p.u.	(2,3520)	54,96,480	8,808	624.03
Labour cost		18,60,000	8,838	210.45
Production OH Cost		8,63,000	8,838	97.65
Total Cost		82,19,480		932.13

(iii) Cost of Abnormal Gain – 192 Units

	(Rs.)	(Rs.)
Material cost of 192 units @ Rs. 624.03 p.u.	1,19,813.76	
Labour cost of 192 units @ Rs. 210.45 p.u.	40,406.40	
Production OH cost of 192 units @ Rs. 97.65 p.u.	18,748.80	1,78,968.96

Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ Rs. 624.03 p.u.	4,36,821.00	
Labour cost of 490 equivalent units @ Rs. 210.45 p.u.	1,03,120.50	
Production OH cost of 490 equivalent @ Rs. 97.65 p.u.	47,848.50	5,87,790.00

Cost of 8,900 units transferred to next process

(i) Cost of opening W-I-P Stock b/f – 600 units	4,20,000.00
(ii) Cost incurred on opening W-I-P stock	
Material cost –	
Labour cost 240 equivalent units @ Rs. 210.45 p.u.	50,508.00
Production OH cost 240 equivalent units @ Rs 97.65 p.u.	23,436.00
	4,93,944.00
(iii) Cost of 8,300 completed units	
8,300 units @ Rs. 932.13 p.u.	77,36,679.00
Total cost [(i) + (ii) + (iii)]	86,50,623.00

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(b) 'Humara - Apna' bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.

The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget:

Activity	Present Cost (Rs.)	Estimation for the budget period
ATM Services: (a) Machine Maintenance (b) Rents (c) Currency Replenishment Cost	4,00,000 2,00,000 1,00,000 7,00,000	All fixed, no change. Fully fixed, no change. Expected to double during budget period.
	(This activity is driven by no. of ATM transactions)	
Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,50,000	---	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required

(i) CALCULATE the budgeted rate for each activity.

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- (ii) PREPARE the budgeted cost statement activity wise.
 (iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above.
 (10 Marks)

ANSWER**(b) Statement Showing "Budgeted Cost per unit of the Product"**

Activity	Activity Cost (Budgeted) (Rs.)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (Rs.)	Deposits	Loans	Credit Cards
ATM Services	8,00,000	No. of ATM Transaction	2,00,000	4.00	6,00,000	---	2,00,000
Computer Processing	10,00,000	No. of Computer Transaction	20,00,000	0.50	7,50,000	1,00,000	1,50,000
Issuing Statements	20,00,000	No. of Statements	5,00,000	4.00	14,00,000	2,00,000	4,00,000
Customer Inquiries	3,60,000	Telephone Minutes	7,20,000	0.50	1,80,000	90,000	90,000
Budgeted Cost	41,60,000		29,30,000		3,90,000	8,40,000	
Units of Product (as estimated in the budget period)					58,600	13,000	14,000
Budgeted Cost per unit of the product					50	30	60

Working Note

Activity	Budgeted Cost (Rs.)	Remark
ATM Services:		
(a) Machine Maintenance	4,00,000	– All fixed, no change. – Fully fixed, no change. – Doubled during budget period.
(b) Rents	2,00,000	
(c) Currency Replenishment Cost	2,00,000	
Total	8,00,000	
Computer Processing	2,50,000	– Rs.2,50,000 (half of Rs.5,00,000) is fixed and no change is expected. – Rs.2,50,000 (variable portion) is expected to increase to three times the current level.
Total	7,50,000	
	10,00,000	
Issuing Statements	18,00,000	– Existing. – 2 lakh statements are expected to be increased in budgeted period. For every increase of one lakh statement, one lakh rupees is the budgeted increase.
Total	2,00,000	
	20,00,000	
Computer Inquiries	3,60,000	– Estimated to increase by 80% during the budget period. (Rs.2,00,000 x 180%)
Total	3,60,000	

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4. (a) Nakata Ltd a Vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of Rs.5,71,400 is incurred and sold through dealers at a uniform selling price of Rs.8,57,100 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle.

Apart from other materials four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October.

There are 9,500 nos. of completed vehicles are in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.

You are required to

(i) PREPARE Production budget (in nos.) for the month of October, November, December and January.

(ii) PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.

(iii) CALCULATE the budgeted gross profit for the quarter October to December.(10 Marks)
ANSWER

(a) (i) Preparation of Production Budget (in units)

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000
Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

(ii) Preparation of Purchase budget for Part-X

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)

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	52,300	56,200	72,400
No. of units required for production	2,09,200 (52300 × 4 units)	2,24,800 (56200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14800 × 4 units)	(76,800) (19200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(iii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000
Net Selling Price per unit*	7,28,535	7,28,535	7,28,535	
Sales Revenue (Rs. in lakh)	2,91,414	2,54,987.25	3,27,840.75	8,74,242
Less: Cost of Sales (Rs. in lakh) (Sales unit × Cost per unit)	2,28,560	1,99,990.00	2,57,130.00	6,85,680
Gross Profit (Rs. in lakh)	62,854	54,997.25	70,710.75	1,88,562

* Net Selling price unit = Rs. 8,57,100 – 15% commission on Rs. 8,57,100 = Rs.7,28,535.

(b) R Limited showed a net loss of Rs.35,400 as per their cost accounts for the year ended 31st March, 20X8. However, the financial accounts disclosed a net profit of Rs.67,800 for the same period. The following information were revealed as a result of scrutiny of the figures of cost accounts and financial accounts:

	(Rs.)	(Rs.)
(i) Administrative overhead under recovered	25,500	
(ii) Factory overhead over recovered		1,35,000
(iii) Depreciation under charged in Cost Accounts	26,000	
(iv) Dividend received		20,000
(v) Loss due to obsolescence charged in Financial Accounts	16,800	
(vi) Income tax provided	43,600	
(vii) Bank interest credited in Financial Accounts	13,600	
(viii) Value of opening stock:		
- In Cost Accounts	1,65,000	
- In Financial Accounts	1,45,000	
(ix) Value of closing stock:		
- In Cost Accounts	1,25,500	
- In Financial Accounts	1,32,000	
(x) Goodwill written-off in Financial Accounts	25,000	
(xi) Notional rent of own premises charged in Cost Accounts	60,000	
(xii) Provision for doubtful debts in Financial Accounts	15,000	

PREPARE a reconciliation statement by taking costing net loss as base. (10 Marks)

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ANSWER

Statement of Reconciliation

Sl. No.	Particulars	Amount (Rs.)	Amount (Rs.)
	Net loss as per Cost Accounts		(35,400)
	Additions		
1.	Factory O/H over recovered	1,35,000	
2.	Dividend Received	20,000	
3.	Bank Interest received	13,600	
4.	Difference in Value of Opening Stock (1,65,000 – 1,45,000)	20,000	
5.	Difference in Value of Closing Stock (1,32,000 – 1,25,500)	6,500	
6.	Notional Rent of own Premises	60,000	2,55,100
	Deductions		
1.	Administration O/H under recovered	25,500	
2.	Depreciation under charged	26,000	
3.	Loss due to obsolescence	16,800	
4.	Income tax Provided	43,600	
5.	Goodwill written-off	25,000	
6.	Provision for doubtful debts	15,000	(1,51,900)
	Net Profit as per Financial A/c.		67,800

5. (a) XYZ LLP, contractors and civil engineers, are building a new wing to a school. The quoted fixed price for the contract is Rs.30,00,000. Work commenced on 1st January 20X8 and is expected to be completed on schedule by 30 June 20X9.

Data relating to the contract at the year ended 31st March 20X9 is as follows

Amount (Rs.)	
Plant sent to site at commencement of contract	2,40,000
Hire of plant and equipment	77,000
Materials sent to site	6,62,000
Materials returned from site	47,000
Direct wages paid	9,60,000
Wage related costs	1,32,000
Direct expenses incurred	34,000
Supervisory staff salaries - Direct	90,000
- Indirect	20,000
Regional office expenses apportioned to contract	50,000

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Head office expenses apportioned to contract	30,000
Surveyor's fees	27,000
Progress payments received from school	18,00,000

Additional information:

- Plant is to be depreciated at the rate of 25 % per annum following straight line method, with no residual value.
- Unused materials on site at 31st March are estimated at Rs. 50,000.
- Wages owed to direct workers total Rs. 40,000
- No profit in respect of this contract was included in the year ended 31st March 2016.
- Budgeted profit on the contract is Rs. 8,00,000
- Value of work certified by the surveyor is Rs. 24,00,000.
- The surveyor has not certified the work costing Rs. 1,80,000

You are required to PREPARE the account for the school contract for the fifteen months ended 31st March 20X9, and CALCULATE the notional profit to date. (10 Marks)

ANSWER**(a) School Contract Account**

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Plant	2,40,000	By Material returned	47,000
To Hire of plant	77,000	By Plant c/d	1,65,000
To Materials	6,62,000	By Materials c/d	50,000
To Direct wages 9,60,000		By WIP c/d:	
Add: Accrued 40,000	10,00,000	Value of work certified	24,00,000
To Wages related costs	1,32,000	Cost of work not certified	1,80,000
To Direct expenses	34,000		
To Supervisory staff:			
Direct 90,000	1,10,000		
Indirect 20,000			
To Regional office expenses	50,000		
To Head office expenses	30,000		
To Surveyors' fees	27,000		
To Notional profit c/d	4,80,000		
	28,42,000		28,42,000

(b) A Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will be able to sell 20,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

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- (i) The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
- (ii) Maximum consumption per day is 20 kg. more than the average consumption per day.
- (iii) There is an opening stock of 2,000 kg.
- (iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
- (v) The purchase price is Rs.125 per kg.

There is an opening stock of 1,800 units of the finished product Exe.

The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur Rs. 720 on paper and documentation work.

From the above information COMPUTE the followings in relation to raw material Dee:

- (a) Re-order Quantity
- (b) Maximum Stock level
- (c) Minimum Stock level
- (d) Impact on the profitability of the company by not ordering the EOQ.
 [Take 364 days for a year] (10 Marks)

ANSWER

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'Dee':

Sales forecast of the product 'Exe'	20,000 units
Less: Opening stock of 'Exe'	1,800 units
Fresh units of 'Exe' to be produced	18,200 units
Raw material required to produce 18,200 units of 'Exe' (18,200 units × 2 kg.)	36,400 kg.
Less: Opening Stock of 'Dee'	2,000 kg.
Annual demand for raw material 'Dee'	34,400 kg.

(ii) Computation of Economic Order Quantity (EOQ):

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$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times \text{Annual demand of 'Dee'} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}} \\ &= \sqrt{\frac{2 \times 34,400 \text{ kg.} \times \text{Rs.720}}{\text{Rs.125} \times 13.76\%}} = \sqrt{\frac{2 \times 34,400 \text{ kg.} \times \text{Rs.720}}{\text{Rs.17.2}}} = 1,697 \text{ kg.} \end{aligned}$$

iii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

= (Maximum consumption per day × Maximum lead time)

$$= \left\{ \left(\frac{\text{Annual Consumption of 'Dee'}}{364 \text{ days}} + 20 \text{ kg.} \right) \times 8 \text{ days} \right\}$$

$$= \left\{ \left(\frac{36,400 \text{ kg.}}{364 \text{ days}} + 20 \text{ kg.} \right) \times 8 \text{ days} \right\} = 960 \text{ kg.}$$

(iv) Minimum consumption per day of raw material 'Dee':

Average Consumption per day = 100 kg.

Hence, Maximum Consumption per day = 100 kg. + 20 kg. = 120 kg.

So, Minimum consumption per day will be

$$\text{Average Consumption} = \frac{\text{Min. consumption} + \text{Max. consumption}}{2}$$

$$\text{Or, } 100 \text{ kg.} = \frac{\text{Min. consumption} + 120 \text{ kg.}}{2}$$

$$\text{Or, } \text{Min. consumption} = 200 \text{ kg} - 120 \text{ kg.} = 80 \text{ kg.}$$

(a) Re-order Quantity:

EOQ – 200 kg. = 1,697 kg. – 200 kg. = 1,497 kg.

(b) Maximum Stock level:

= Re-order level + Re-order Quantity – (Min. consumption per day × Min. lead time)

= 960 kg. + 1,497 kg. – (80 kg. × 4 days)

= 2,457 kg. – 320 kg. = 2,137 kg.

(c) Minimum Stock level:

= Re-order level – (Average consumption per day × Average lead time)

= 960 kg. – (100 kg. × 6 days) = 360 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

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		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,497 kg.	1,697 kg.
II	No. of orders a year	$\frac{34,400\text{kg.}}{1,497\text{kg.}} = 22.9$ or 23 orders	$\frac{34,400\text{kg.}}{1,697\text{kg.}} = 20.27$ or 21 orders
III	Ordering Cost	23 orders \times Rs. 720 = Rs.16,560	21 orders \times Rs. 720 = Rs.15,120
IV	Average Inventory	$\frac{1,497\text{kg.}}{2} = 748.5\text{kg.}$	$\frac{1,697\text{kg.}}{2} = 848.5\text{kg.}$
V	Carrying Cost	748.5 kg. \times Rs. 17.2 = Rs.12,874.2	848.5 kg. \times Rs. 17.2 = Rs.14,594.2
VI	Total Cost	Rs. 29,434.20	Rs. 29,714.20

Cost saved by not ordering EOQ = Rs. 29,714.20 - Rs. 29,434.20 = Rs.280.

6. (a) DISCUSS the accounting treatment of Idle time and overtime wages.
ANSWER

Accounting treatment of idle time wages & overtime wages in cost accounts: Normal idle time is treated as a part of the cost of production. Thus, in the case of direct workers, an allowance for normal idle time is built into the labour cost rates. In the case of indirect workers, normal idle time is spread over all the products or jobs through the process of absorption of factory overheads.

Under Cost Accounting, the overtime premium is treated as follows:

If overtime is resorted to at the desire of the customer, then the overtime premium may be charged to the job directly.

If overtime is required to cope with general production program or for meeting urgent orders, the overtime premium should be treated as overhead cost of particular department or cost center which works overtime.

Overtime worked on account of abnormal conditions should be charged to costing Profit & Loss Account.

If overtime is worked in a department due to the fault of another department the overtime premium should be charged to the latter department

(b) EXPLAIN the difference between Cost Control and Cost Reduction
ANSWER

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	1. Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to better them continuously
2. Cost control seeks to attain lowest possible cost under existing conditions.	2. Cost reduction recognises no condition as permanent, since a change will result in lower cost.
3. In case of cost control, emphasis is on past and present	3. In case of cost reduction, it is on present and future.

4. Cost control is a preventive function	4. Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	5. Cost reduction has no visible end.

(c) STATE Direct Expenses with examples.

ANSWER

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

- (a) Royalty paid/ payable for production or provision of service;
- (b) Hire charges paid for hiring specific equipment;
- (c) Cost for product/ service specific design or drawing;
- (d) Cost of product/ service specific software;
- (e) Other expenses which are directly related with the production of goods or provision of service

(d) EXPLAIN the difference between product cost and period cost. (4 × 5 =20 Marks)

ANSWER

Product costs are those costs that are identified with the goods purchased or produced for resale. In a manufacturing organisation they are attached to the product and that are included in the inventory valuation for finished goods, or for incomplete goods. Product cost is also known as inventoriable cost. Under absorption costing method it includes direct material, direct labour, direct expenses, directly attributable costs (variable and non-variable) and other production (manufacturing) overheads. Under marginal costing method Product Costs includes all variable production costs and the all fixed costs are deducted from the contribution.

Periods costs are the costs, which are not assigned to the products but are charged as expense against revenue of the period in which they are incurred. General Administration, marketing, sales and distributor overheads are recognized as period costs

MTP- NOV 2018**1. Answer the following:**

(a) Arnava Ltd. is producing a single product, has the profit-volume ratio of 40%. The company wishes to increase the selling price by 10% which will increase the variable cost by 5%. The fixed overheads will increase from its present level of Rs.20,00,000 to Rs.30,00,000.

Required:

(i) COMPUTE the company's original break-even point sales and the break-even point sales after the increase.

(ii) ESTIMATE the sales value for the firm to make a profit of Rs. 4,50,000 after the increase.

ANSWER

$$(i) \text{ EOQ} = \sqrt{\frac{2AO}{C}}$$

$$A = \text{Annual consumption} = \frac{96,000 \text{ units} \times 1 \text{ kg.}}{4 \text{ units}} = 24,000 \text{ kgs.}$$

O = Cost of placing order = Handling cost + Freight = Rs. 1,500 + Rs.4,000 = Rs.5,500

C = Carrying cost per kg. per annum

Carrying cost (Rs.1.50 × 12) = Rs.18

Finance charges on investment in inventory = Rs.8

Rs.26

$$\text{EOQ} = \sqrt{\frac{2 \times 24,000 \text{ kgs.} \times \text{Rs.5,500}}{\text{Rs.26}}} = 3,186.5 \text{ kgs.}$$

(ii) Number of orders = 24,000 kgs. / 3,186.5 kgs. = 7.53 or 8 orders

Frequency in placing orders = 365 days / 8 orders = 45.63 or 46 days

(iii) If company places orders on quarterly basis, percentage of discount in price of raw material to be negotiated:

Cost under EOQ:

Ordering cost 8 orders × Rs. 5,500 = 44,000.00

Carrying cost 3,186.5kgs. × ½ × Rs.26 = 41,424.50

Total 85,424.50

Cost under Ordering on Quarterly Basis:

Ordering cost 4 orders × Rs.5,500= 22,000.00

Carrying cost (24,000 kgs. / 4 orders) × ½ × Rs.26= 78,000.00

Total 1,00,000.00

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Incremental cost if orders are placed on quarterly basis = Rs.1,00,000– Rs. 85,424.50 = Rs. 14,575.50

Reduction in purchase price to be negotiated = $\text{Rs.}14,575.50 \div 24,000 \text{ kgs.} = \text{Rs.}0.61 \text{ per kg.}$
Percentage of discount to be negotiated $0.61 \div 54 \times 100 = 1.13\%$

(b) A company manufactures a product from a raw material, which is purchased at Rs. 54 per kg. The company incurs a handling cost of Rs.1,500 plus freight of Rs.4,000 per order. The incremental carrying cost of inventory of raw material is Rs.1.50 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs.8 per kg per annum. The annual production of the product is 96,000 units and 4 units are obtained from one kg of raw material.

Required:

(i) CALCULATE the economic order quantity of raw materials.

(ii) ADVISE, how frequently orders should be placed for procurement.

(iii) If the company proposes to rationalize placement of orders on quarterly basis, DETERMINE what percentage of discount in the price of raw materials should be negotiated?

(c) RST Company Ltd. has computed labour turnover rates for the quarter ended 31st March, 2017 as 20%, 10% and 5% under flux method, replacement method and separation method respectively. If the number of workers replaced during that quarter is 50, CALCULATE

(i) Workers recruited and joined

(ii) Workers left and discharged and

(iii) Average number of workers on roll.

ANSWER

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$$\text{Labour Turnover Rate (Replacement method)} = \frac{\text{No. of workers replaced}}{\text{Average no. of workers}} \times 100$$

$$\text{Or, } \frac{10}{100} = \frac{50}{\text{Average no. of workers}}$$

Thus, Average No. of workers = 500

$$\text{Labour Turnover Rate (Separation method)} = \frac{\text{No. of workers separated}}{\text{Average No. of workers}} \times 100$$

$$\text{Or, } \frac{5}{100} = \frac{\text{Number of workers separated}}{500}$$

Thus, No. of workers separated = 25

Labour Turnover Rate (Flux Method)

$$= \frac{\text{No. of Separations} + \text{No. of Accession (Joinings)}}{\text{Average no. of workers}} \times 100$$

$$\text{Or, } \frac{20}{100} = \frac{25 + \text{No. of accessions (Joinings)}}{500}$$

$$\text{Or, } 100 (25 + \text{No. of Accessions}) = 10,000$$

$$\text{Or, } 25 + \text{No. of Accessions} = 100$$

$$\text{Thus, No. of Accessions} = 100 - 25 = 75$$

Accordingly, (i) Workers recruited and Joined = 75

(ii) Workers left and discharged = 25

(iii) Average number of workers on roll = 500

(d) M/s. KBC Bearings Ltd. is committed to supply 48,000 bearings per annum to M/s. KMR Fans on a steady daily basis. It is estimated that it costs Rs. 1 as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 3,200

(i) DETERMINE what would be the optimum run size of bearing manufacture?

(ii) DETERMINE What would be the interval between two consecutive optimum runs?

(iii) CALCULATE the minimum inventory cost? (5 × 4 = 20 Marks)

ANSWER

(i) Optimum batch size or Economic Batch Quantity (EBQ):

$$\text{EBQ} = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48,000 \times 3,200}{12}} = 5,060 \text{ units.}$$

(ii) Number of Optimum runs = $48,000 \div 5,060 = 9.49$ or 10 runs

Interval between 2 runs (in days) = $365 \text{ days} \div 10 = 36.5 \text{ days}$

(iii) Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum

Average Inventory = $5,060 \text{ units} \div 2 = 2,530 \text{ units}$

Carrying Cost per unit per annum = $\text{Rs.}1 \times 12 \text{ months} = \text{Rs.}12$

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Minimum Inventory Holding Costs = 2,530 units × Rs. 12 = Rs.30,360

2. (a) Arnav Ltd. manufactures a product Q, the standard cost of which is as follows:

	Standard Cost per unit (Rs.)
Direct Material	600
Direct labour:	
- Skilled @ Rs.80 per hour	120
- Unskilled @ Rs.60 per hour	90
Variable overheads	75
Fixed overheads	30
	915

During the month just ended 4,000 units of Q were produced. The actual labour cost was as follows.

	Rate per hour (Rs.)	Cost (Rs.)
Skilled	87.50	5,77,500
Unskilled	55.00	2,97,000

10% of the labour time was lost due to idle time. The standard idle time was 7.5% of labour time. Arnav Ltd. has budgeted to produce 4,200 units of Q. Arnav Ltd. absorbs its overheads on direct labour hour (effective hours) basis. Actual fixed and variable overheads incurred were Rs.1,55,000 and Rs.2,85,000 respectively.

CALCULATE:

- (i) Labour rate variance;
- (ii) Labour efficiency variance;
- (iii) Labour mix variance;
- (iv) Labour yield variance;
- (v) Labour idle time variance;
- (vi) Variable overhead expenditure variance and
- (vii) Variable overhead efficiency variance. (10 Marks)

ANSWER

(a) Workings:

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	Skilled	Unskilled
Standard Rate per hour	80	60
Standard time for producing one unit	1.5 hours (Rs.120 ÷ Rs.80)	1.5 hours (Rs.90 ÷ Rs.60)
Actual hours paid (AH _{Paid})	6,600 hours	5,400 hours
Standard hours required to produce 4,000 units (SH)	6,000 hours (1.5 hours × 4,000 units)	6,000 hours (1.5 hours × 4,000 units)
Actual hours worked (AH _{Worked})	$\frac{6,600}{100} \times 97.5$ = 6,435 hours	$\frac{5,400}{100} \times 97.5$ = 5,265 hours
Revised Std. Hours (RSH)	$\left(\frac{6,600 + 5,400}{100} \times 97.5\right) \times 0.5$ = 5,850 hours	$\left(\frac{6,600 + 5,400}{100} \times 97.5\right) \times 0.5$ = 5,850 hours
Idle time _{Abnormal}	6,600 - 6,435 = 165 hours	5,400 - 5,265 = 135 hours

i) Labour Rate Variance = AH_{Paid}(Std. Rate – Actual Rate)

- Skilled = 6,600 hours (Rs.80 – Rs.87.50) = Rs.49,500 (A)

- Unskilled = 5,400 hours (Rs.60 – Rs.55) = Rs.27,000 (F)

= Rs.22,500 (A)

(ii) Labour Efficiency Variance = Std. Rate (SH – AH_{Worked})

- Skilled = Rs.80 (6,000 hours – 6,435 hours) = Rs.34,800 (A)

- Unskilled = Rs.60 (6,000 hours – 5,265 hours) = Rs.44,100 (F)

= Rs.9,300 (F)

(iii) Labour Mix Variance = Std. Rate (RSH – AH_{Worked})

- Skilled = Rs.80 (5,850 hours – 6,435 hours) = Rs.46,800 (A)

- Unskilled = Rs.60 (5,850 hours – 5,265 hours) = Rs.35,100 (F)

= Rs.11,700 (A)

(iv) Labour Yield Variance = Std. Rate (SH – RSH)

- Skilled = Rs.80 (6,000 hours – 5,850 hours) = Rs.12,000 (F)

- Unskilled = Rs.60 (6,000 hours – 5,850 hours) = Rs.9,000 (F)

= Rs.21,000 (F)

(v) Labour Idle time Variance = Std. Rate × Idle time_{Abnormal}

- Skilled = Rs.80 × 165 hours = Rs.13,200 (A)

- Unskilled = Rs.60 × 135 hours = Rs.8,100 (A)

= Rs.21,300 (A)

(vi) Variable Overhead Expenditure Variance

$$= \text{AH}_{\text{Worked}} (\text{SR} - \text{AR})$$

$$= 11,700 \text{ hours} \left(\frac{\text{Rs.75}}{2 \times 1.5 \text{ hours}} - \frac{\text{Rs.2,85,000}}{11,700 \text{ hours}} \right)$$

vii) Variable Overhead Efficiency Variance

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= Std. Rate (SH – AH_{Worked})
= Rs.25 (12,000 – 11,700) = Rs.7,500 (F)

(b) The following information have been extracted from the cost records of JKL Manufacturing Company Ltd:

	Rs.
Stores:	
Opening Balance	90,000
Purchases	4,80,000
Transfer from WIP	2,40,000
Issue to WIP	4,80,000
Issue for repairs	60,000
Deficiency found in stock	18,000
Work-in-Process:	
Opening Balance	1,80,000
Direct wages applied	1,80,000
Overhead charged	7,20,000
Closing Balance	1,20,000
Finished Production:	
Entire production is sold at a profit of 10% on cost from work-in-progress	-
Wages Paid	2,10,000
Overhead Incurred	7,50,000

PREPARE Stores Ledger Control A/c., Work-in-Process Control A/c., Overheads Control A/c. and Costing Profit & Loss A/c. (10 Marks)

ANSWER

Stores Ledger Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	90,000	By Work in Process Control A/c	4,80,000
To General Ledger Adjustment A/c	4,80,000	By Overhead Control A/c	60,000
To Work in Process Control A/c	2,40,000	By Overhead Control A/c (Deficiency)	18,000*
		By Balance c/d	2,52,000
	8,10,000		8,10,000

*Deficiency assumed as normal (alternatively can be treated as abnormal loss)

Work in Process Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	1,80,000	By Stores Ledger Control A/c	2,40,000
To Stores Ledger Control A/c	4,80,000	By Costing P/L A/c (Balancing figures being Cost of finished goods)	12,00,000
To Wages Control A/c	1,80,000	By Balance c/d	1,20,000

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To Overheads Control A/c	7,20,000		
	15,60,000		15,60,000

Overheads Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Stores Ledger Control A/c	60,000	By Work in Process Control A/c	7,20,000
To Stores Ledger Control A/c	18,000	By Balance c/d* (Under absorption)	1,38,000
To Wages Control A/c (Rs. 2,10,000- Rs.1,80,000)	30,000		
To Gen. Ledger Adjust. A/c	7,50,000		
	8,58,000		8,58,000

*Alternatively may be transferred to Costing P& L A/c

Costing Profit & Loss A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Work in Process Control A/c	12,00,000	By Gen. Ledger Adjust. A/c (Sales) (12,00,000+1,20,000)	13,20,000
To Gen. Ledger Adjust. A/c (Profit)	1,20,000		
	13,20,000		13,20,000

General Ledger Adjustment A/c may also be written as Cost Ledger Control A/c

3. (a) DKG Airlines owns single passenger aircraft and operates between Melbourne and Delhi only. Flight leaves Melbourne on Monday and Thursday and departs from Delhi on Wednesday and Saturday. DKG Airlines cannot afford any more flight between Melbourne and Delhi. Only economical class seats are available on its flight and all tickets are booked by travel agents. The following information are collected.

Seating capacity per plane	360
Average passengers per flight	250
Flights per week	4
Flights per year	208
Average one-way fare	Rs.50,000
Variable fuel cost	Rs.28,00,000 per flight
Food service to passengers (not charged to Passengers)	Rs.2,600 per passenger

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Commission to travel agents	15% of fare
Fixed annual lease cost allocated to each flight	Rs. 15,30,000 per flight
Fixed ground services (maintenance, check in, Baggage handling cost) allocated to each flight	Rs.1,70,000 per flight
Fixed salaries of flight crew allocated to each flight	Rs.6,50,000 per flight

For the sake of simplicity assume that fuel cost is unaffected by the actual number of passengers on a flight.

Required:

(i) CALCULATE the operating income that DKG Airlines makes on each way flight between Melbourne and Delhi?

(ii) The market research department of DKG Airlines indicates that lowering the average one-way fare to Rs. 48,000 and increase in agents' commission to 17.5% will increase the average number of passenger per flight to 275. DECIDE whether DKG Airlines should lower its fare or not? (10 Marks)

ANSWER

(a) (i) Statement of operating income of DKG Airlines for Melbourne-Delhi flight (one way)

Particulars	Amount (Rs.)	Amount (Rs.)
Fare received (per flight): 250 passengers × Rs. 50,000		1,25,00,000
Variable costs (per flight):		
- Fuel cost	28,00,000	
- Food (250 × Rs. 2,600)	6,50,000	
	18,75,000	(53,25,000)
- Commission to Travel Agents (15% of Rs. 1,25,00,000)		
Contribution per flight		71,75,000
Fixed cost (per flight):		
Annual lease cost	15,30,000	
Fixed ground service costs	1,70,000	
Salaries of flight crew	6,50,000	(23,50,000)
Operating income per flight		48,25,000

(ii) Operating income of DKG Airlines per Melbourne-Delhi flight (one way) after reduction in fare

Fare received (per flight): 275 passengers × Rs. 48,000		1,32,00,000
Variable costs (per flight):		
Fuel cost	28,00,000	
Food (275 × Rs.2,600)	7,15,000	
Commission to Travel Agents (17.5% of Rs.1,32,00,000)	23,10,000	(58,25,000)
Contribution per flight		73,75,000

Excess contribution due to lowering of fare (Rs.73,75,000 – Rs.71,75,000) = Rs.2,00,000. DKG Airlines should lower its fare as it would increase its contribution by Rs.2,00,000

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(b) You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
	Total (Rs.)	Machines		
		A (Rs.)	B (Rs.)	C (Rs.)
Depreciation	20,000	7,500	7,500	5,000
Spare parts	10,000	4,000	4,000	2,000
Power	40,000			
Consumable stores	8,000	3,000	2,500	2,500
Insurance of machinery	8,000			
Indirect employee cost	20,000			
Building maintenance expenses	20,000			
Annual interest on capital outlay	50,000	20,000	20,000	10,000
Monthly charge for rent and rates	10,000			
Salary of foreman (per month)	20,000			
Salary of Attendant (per month)	5,000			

(The foreman and attendant control all the three machines and spend equal time on each of them.)

The following additional information is also available:

	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to:

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates. (10 Marks)

ANSWER

Computation of Machine Hour Rate

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	Basis of apportionment	Total (Rs)	Machines		
			A (Rs.)	B (Rs.)	C (Rs.)
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	8,000	3,000	3,000	2,000
Indirect employee cost	Direct Labour hours (2:3:3)	24,000	6,000	9,000	9,000
Building maintenance expenses	Floor Space (2:2:1)	20,000	8,000	8,000	4,000
Rent and Rates	Floor Space (2:2:1)	1,20,000	48,000	48,000	24,000
Salary of foreman	Equal	2,40,000	80,000	80,000	80,000
Salary of attendant	Equal	60,000	20,000	20,000	20,000
Total standing charges		4,72,000	1,65,000	1,68,000	1,39,000
Hourly rate for standing charges			84.70	86.24	71.36
(B) Machine Expenses:					
Depreciation	Direct	20,000	7,500	7,500	5,000
Spare parts	Final estimates	13,225	4,600	5,750	2,875
Power	K.W. rating (3:2:3)	40,000	15,000	10,000	15,000
Consumable Stores	Direct	8,000	3,000	2,500	2,500
Total Machine expenses		81,225	30,100	25,750	25,375
Hourly Rate for Machine expenses			15.45	13.22	13.03
Total (A + B)		553,225	1,95,100	1,93,750	1,64,375
Machine Hour rate			100.15	99.46	84.38

Working Notes:

(i) Calculation of effective working hours:

No. of full off-days = No. of Sunday + No. of holidays

= 52 + 12 = 64 days

No. of half working days = 52 days – 2 holidays = 50 days

No. of full working days = 365 days – 64 days – 50 days = 251 days

Total working Hours = {(251 days × 8 hours) + (50 days × 4 hours)}

= 2,008 hours + 200 = 2,208 hours.

Total effective hours = Total working hours × 90% - 2% for break-down

= 2,208 hours × 90% - 2% (2,208 hours × 90%)

= 1,987.2 hours – 39.74 hours

= 1947.46 or Rounded up to 1948 hours.

(ii) Amount of spare parts is calculated as under

	A (Rs.)	B (Rs.)	C (Rs.)
Preliminary estimates	4,000	4,000	2,000
Add: Increase in price @ 15%	600	600	300
	4,600	4,600	2,300
Add: Increase in consumption @ 25%	–	1,150	575
Estimated cost	4,600	5,750	2,875

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(iii) Amount of Indirect employee cost is calculated as under:

	(Rs.)
Preliminary estimates	20,000
Add: Increase in wages @ 20%	4,000
	24,000

(iv) Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

4. (a) The following information relate to Process A:

(i)	Opening Work-in-Process	8,000 units at Rs.15,00,000
	Degree of Completion: Material	100%
	Labour and Overhead	60%
(ii)	Input 1,82,000 units at	Rs.1,47,50,000
(iii)	Wages paid	Rs.68,12,000
(iv)	Overheads paid	Rs.34,06,000
(v)	Units scrapped	14,000
	Degree of Completion: Material	100%
	Wages and Overheads	80%
(vi)	Closing Work - in- Process	18,000 units
	Degree of Completion: Material	100%
	Wages and Overheads	70%
(vii)	Units completed and transferred to next process	
	1,58,000 units	
(viii)	Normal loss 10% of total input including opening WIP	
(ix)	Scrap value is Rs.15 per unit to be adjusted out of direct material cost	

You are required to COMPUTE on the basis of FIFO

- (i) Equivalent Production
- (ii) Cost per unit
- (iii) Value of units transferred to next process. (10 Marks)

ANSWER

a) (i) Statement of Equivalent Production
(FIFO Method)

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Input		Output		Equivalent Production			
Particulars	Units	Particulars	Units	Material		Labour & Overheads	
				(%)	Units	(%)	Units
Opening WIP	8,000	Transfer to next Process:					
Introduced	1,82,000	Opening WIP completed	8,000	--	--	40	3,200
		Introduced & completed	1,50,000	100	1,50,000	100	1,50,000
		Normal loss 10% (8,000 + 182,000)	19,000	--	--	--	--
		Abnormal gain	(5,000)	100	(5,000)	100	(5,000)
		Closing WIP	18,000	100	18,000	70	12,600
	1,90,000		1,90,000		1,63,000		1,60,800

(ii) Computation of Cost per unit

Particulars	Materials (Rs.)	Labour (Rs.)	Overhead (Rs.)
Input of Materials	1,47,50,000	--	--
Expenses	--	68,12,000	34,06,000
Total	1,47,50,000	68,12,000	34,06,000
Less: Sale of Scrap (19,000 units × Rs.15)	(2,85,000)	--	--
Net cost	1,44,65,000	68,12,000	34,06,000
Equivalent Units	1,63,000	1,60,800	1,60,800
Cost Per Unit	88.7423	42.3632	21.1816

Total cost per unit = Rs. (88.7423+42.3632+21.1816) = Rs.152.2871

(iii) Value of units transferred to next process:

	Amount (Rs.)	Amount (Rs.)
Opening W-I-P	15,00,000.00	
Add: Labour (3,200 units × Rs. 42.3632)	1,35,562.24	
Overhead (3,200 units × Rs. 21.1816)	67,781.12	17,03,343.36
New introduced (1,50,000 units × Rs. 152.2871)		2,28,43,065.00
		2,45,46,408.36

(b) Arnav Motors Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. Arnav Motors Ltd. is expected to have a market share of 1.15% of the total market demand of the pistons in the coming year. It is estimated that it costs Rs.1.50 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is Rs. 3,500.

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(i) DETERMINE the optimum run size for piston manufacturing?

(ii) Assuming that the company has a policy of manufacturing 40,000 pistons per run, CALCULATE the extra costs company would be incurring as compared to the optimum run suggested in (i) above?

(iii) IDENTIFY variability of cost with respect to unit and batch level from the following cost:

(a) Inventory carrying cost; (b) Designing cost for a job; (c) Machine set-up cost to run production and (d) Depreciation of factory building. (10 Marks)

ANSWER

(b) (i)

$$\text{Optimum run size or Economic Batch Quantity (EBQ)} = \sqrt{\frac{2 \times D \times S}{C}}$$

Where, D = Annual demand i.e. 1.15% of 8,00,00,000 = 9,20,000 units

S = Set-up cost per run = Rs. 3,500

C = Inventory holding cost per unit per annum

= Rs.1.5 × 12 months = Rs. 18

$$\text{EBQ} = \sqrt{\frac{2 \times 9,20,000 \text{ units} \times \text{Rs.} 3,500}{\text{Rs.} 18}} = 18,915 \text{ units}$$

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (Rs.)	Inventory holding cost (Rs.)	Total Cost (Rs.)
A	40,000 units	23 $\left(\frac{9,20,000}{40,000}\right)$	80,500 (23 × Rs. 3,500)	3,60,000 $\left(\frac{40,000 \times \text{Rs.} 18}{2}\right)$	4,40,500
B	18,915 units	49 $\left(\frac{9,20,000}{18,915}\right)$	1,71,500 (49 × Rs. 3,500)	1,70,235 $\left(\frac{18,915 \times \text{Rs.} 18}{2}\right)$	3,41,735
	Extra Cost (A – B)				98,765

(iii)

	Costs	Unit level	Batch level
(a)	Inventory carrying cost	Variable cost	Variable cost
(b)	Designing cost for a job	Fixed cost	Variable cost, provided the entire job work is processed in a single batch.
(c)	Machine set-up cost to run production	Fixed cost	Variable cost
(d)	Depreciation of factory building	Fixed cost	Fixed cost

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5. (a) C Ltd. manufactures two products using two types of materials and one grade of labour. Shown below is an extract from the company's working papers for the next month's budget:

	Product-A	Product-B
Budgeted sales (in units)	2,400	3,600
Budgeted material consumption per unit (in kg):		
Material-X	5	3
Material-Y	4	6
Standard labour hours allowed per unit of product	3	5

Material-X and Material-Y cost Rs. 4 and Rs. 6 per kg and labours are paid Rs. 25 per hour. Overtime premium is 50% and is paid, if a worker works for more than 40 hours a week. There are 180 direct workers.

The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct workers in actually manufacturing the products is 80%. In addition, the non-productive down-time is budgeted at 20% of the productive hours worked.

There are four 5-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product-A	400 units
Product-B	200 units
Material-X	1,000 kg.
Material-Y	500 kg.

The anticipated closing stocks for budget period are as below:

Product-A	4 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	6 days consumption

Required:

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month. (10 Marks)

ANSWER

(a) Number of days in budget period = 4 weeks × 5 days = 20 days
 Number of units to be produced

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	Product-A (units)	Product-B (units)
Budgeted Sales	2,400	3,600
Add: Closing stock	480	900
	$\left(\frac{2,400 \text{ units} \times 4 \text{ days}}{20 \text{ days}}\right)$	$\left(\frac{3,600 \text{ units} \times 5 \text{ days}}{20 \text{ days}}\right)$
Less: Opening stock	(400)	(200)
	2,480	4,300

(i) Material Purchase Budget

	Material-X (Kg.)	Material-Y (Kg.)
Material required:		
- Product-A	12,400 (2,480 units × 5 kg.)	9,920 (2,480 units × 4 kg.)
- Product-B	12,900 (4,300 units × 3 kg.)	25,800 (4,300 units × 6 kg.)
Add: Closing stock	25,300 12,650 $\left(\frac{25,300 \text{ kgs.} \times 10 \text{ days}}{20 \text{ days}}\right)$	35,720 10,716 $\left(\frac{35,720 \text{ kgs.} \times 6 \text{ days}}{20 \text{ days}}\right)$
Less: Opening stock	(1,000)	(500)
Quantity to be purchased	36,950	45,936
Rate per kg. of Material	Rs. 4	Rs. 6
Total Cost	Rs. 1,47,800	Rs. 2,75,616

(ii) Wages Budget

	Product-A (Hours)	Product-B (Hours)
Units to be produced	2,480 units	4,300 units
Standard hours allowed per unit	3	5
Total Standard Hours allowed	7,440	21,500
Productive hours required for production	$\frac{7,440 \text{ hours}}{80\%} = 9,300$	$\frac{21,500 \text{ hours}}{80\%} = 26,875$
Add: Non-Productive down time	1,860 hours. (20% of 9,300 hours)	5,375 hours. (20% of 26,875 hours)
Hours to be paid	11,160	32,250

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Total Hours to be paid	= 43,410 hours (11,160 + 32,250)
Hours to be paid at normal rate	= 4 weeks × 40 hours × 180 workers = 28,800 hours
Hours to be paid at premium rate	= 43,410 hours – 28,800 hours = 14,610 hours
Total wages to be paid	= 28,800 hours × Rs. 25 + 14,610 hours × Rs. 37.5 = Rs. 7,20,000 + Rs. 5,47,875 = Rs. 12,67,875

(b) Woolmark Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	P	Q	R
Machine hours per unit	10	18	14
Direct Labour hours per unit @ Rs. 20	4	12	8
Direct Material per unit (Rs.)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is Rs. 6 per hour. The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3

The total production overheads are analysed as under:

Machine set up costs	20%
Machine operation costs	30%
Inspection costs	40%
Material procurement related costs	10%

Required:

- (i) CALCULATE the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.
- (ii) CALCULATE the cost per unit of each product using activity based costing principles. (10 Marks)

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ANSWER**i) Statement Showing "Cost per unit - Traditional Method"**

Particulars of Costs	P	Q	R
	(Rs.)	(Rs.)	(Rs.)
Direct Materials	90	80	120
Direct Labour [(4, 12, 8 hours) × Rs.20]	80	240	160
Production Overheads [(10, 18, 14 hours) × Rs.6]	60	108	84
<i>Cost per unit</i>	230	428	364

(ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	P	Q	R
	(Rs.)	(Rs.)	(Rs.)
Production (units)	3,000	5,000	20,000
Direct Materials (90, 80, 120)	2,70,000	4,00,000	24,00,000
Direct Labour (80, 240, 160)	2,40,000	12,00,000	32,00,000
Machine Related Costs @ Rs.1.80 per hour (30,000, 90,000, 2,80,000)	54,000	1,62,000	5,04,000
Setup Costs @ Rs.9,600 per setup (20, 10, 20)	1,92,000	96,000	1,92,000
Inspection Costs @ Rs.4,800 per inspection (100, 40, 60)	4,80,000	1,92,000	2,88,000
Purchase Related Costs @ Rs.750 per purchase (60, 100, 160)	45,000	75,000	1,20,000
Total Costs	12,81,000	21,25,000	67,04,000
<i>Cost per unit</i> (Total Cost ÷ Units)	427.00	425.00	335.20

Workings**Number of Batches, Purchase Orders, and Inspections-**

	Particulars	P	Q	R	Total
A.	Production (units)	3,000	5,000	20,000	
B.	Batch Size (units)	150	500	1,000	
C.	Number of Batches [A ÷ B]	20	10	20	50
D.	Number of Purchase Order per batch	3	10	8	
E.	Total Purchase Orders [C × D]	60	100	160	320
F.	Number of Inspections per batch	5	4	3	
G.	Total Inspections [C × F]	100	40	60	200

Total Machine Hours-

	Particulars	P	Q	R
A.	Machine Hours per unit	10	18	14
B.	Production (units)	3,000	5,000	20,000
C.	Total Machine Hours [A × B]	30,000	90,000	2,80,000

Total Production Overheads-

= 4,00,000 hrs. × Rs. 6 = Rs. 24,00,000

Cost Driver Rates-

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Cost Pool	%	Overheads	Cost Driver	Cost Driver Rate
	(Rs.)	(Units)	(Rs.)	
Setup	20%	4,80,000	50	9,600 per Setup
Inspection	40%	9,60,000	200	4,800 per Inspection
Purchases	10%	2,40,000	320	750 per Purchase
Machine Hours	30%	7,20,000	4,00,000	1.80 per Machine Hour

6. (a) STATE the limitations of cost and management accounting.
ANSWER

Like other branches of accounting, cost and management accounting is also having certain limitations. The limitations of cost and management accounting are as follows:

- 1. Expensive:** It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work, and hence additional money.
- 2. Requirement of Reconciliation:** The results shown by cost accounts differ from those shown by financial accounts. Thus Preparation of reconciliation statements is necessary to verify their accuracy.
- 3. Duplication of Work:** It involves duplication of work as organization has to maintain two sets of accounts i.e. Financial Account and Cost Account.
- 4. Inefficiency:** Costing system itself does not control costs but its usage does.

(b) DISCUSS with example the level of activity method of segregating semi-variable costs into fixed and variable costs.
ANSWER

Level of activity method: Under this method, the variable overhead may be determined by comparing two levels of output with the amount of expenses at those levels. Since the fixed element does not change, the variable element may be ascertained with the help of the following formula.

Change in the amount of expense / Change in the quantity of output

Suppose the following information is available:

	Production Units	Semi-variable expenses (Rs.)
January	100	260
February	140	300
Difference	40	40

The variable cost :

$$\frac{\text{Change in Semi - variable expenses}}{\text{Change in production volume}} = \frac{\text{Rs. 40}}{40 \text{ units}} = \text{Re. 1/ unit}$$

Thus, in January, the variable cost will be $100 \times \text{Rs. } 1 = \text{Rs. } 100$ and the fixed cost element will be $(\text{Rs. } 260 - \text{Rs. } 100)$ or Rs. 160. In February, the variable cost will be $140 \times \text{Rs. } 1 = \text{Rs. } 140$ whereas the fixed cost element will remain the same, i.e., Rs. 160.

(c) STATE the advantages of Cost-Sheets
ANSWER

Advantages of Cost sheet or Cost Statements

The main advantages of a Cost Sheet are as follows:

- (i) It provides the total cost figure as well as cost per unit of production.
- (ii) It helps in cost comparison.
- (iii) It facilitates the preparation of cost estimates required for submitting tenders.
- (iv) It provides sufficient help in arriving at the figure of selling price.
- (v) It facilitates cost control by disclosing operational efficiency

(d) EXPLAIN the difference between Allocation and Apportionment of expenses. (4 × 5 =20 Marks)

ANSWER

The difference between the allocation and apportionment is important to understand because the purpose of these two methods is the identification of the items of cost to cost units or centers. However, the main difference between the above methods is given below.

(1) Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually.

On the other hand, apportionment deals with the proportions of an item of cost for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.

(2) Allocation is a direct process of charging expenses to different cost centres whereas apportionment is an indirect process because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.

(3) The allocation or apportionment of an expense is not dependent on its nature, but the relationship between the expense and the cost centre decides that whether it is to be allocated or apportioned.

(4) Allocation is a much wider term than apportionment.

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1. Answer the following:

(a) The following are the details in respect of Process A and Process B of a processing factory:

	Process A (Rs.)	Process B (Rs.)
Materials	40,000	--
Labour	40,000	56,000
Overheads	16,000	40,000

The output of Process A is transferred to Process B at a price calculated to give a profit of 20% on the transfer price and the output of Process B is charged to finished stock at a profit of 25% on the transfer price. The finished stock department realized Rs. 4,00,000 for the finished goods received from Process B.

PREPARE process accounts and CALCULATE total profit, assuming that there was no opening or closing work-in-progress.

ANSWER**(a) Process A Account**

Dr.

Cr.

	₹		₹
To Materials	40,000	By Process B A/c (Transfer to Process B)	1,20,000
To Labour	40,000		
To Overheads	16,000		
	96,000		
To Profit (20% of transfer price, i.e., 25% of cost)	24,000		
	1,20,000		1,20,000

Process B Account

Dr.

Cr.

	₹		₹
To Process A A/c (Transferred from Process A)	1,20,000	By Finished Stock A/c (Transfer to finished stock)	2,88,000
To Labour	56,000		
To Overhead	40,000		
	2,16,000		
To Profit (25% of transfer price i.e., 33.33% of cost)	72,000		
	2,88,000		2,88,000

Statement of Total Profit

	₹
Profit from Process A	24,000
Profit from Process B	72,000
Profit on Sales (₹ 4,00,000 – ₹ 2,88,000)	1,12,000
Total Profit	2,08,000

(b) Two workers 'A' and 'B' produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to Rowan scheme while 'B' is paid bonus according to Halsey scheme. The time allowed to make the product is 120 hours. 'A' takes 90 hours while 'B' takes 100 hours to complete the product. The factory overhead rate is Rs. 50 per

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hour actually worked. The factory cost of product manufactured by 'A' is Rs. 80,200 and for product manufactured by 'B' is Rs. 79,400.

Required:

- (i) COMPUTE the normal rate of wages.
- (ii) CALCULATE the material cost.
- (iii) PREPARE a statement comparing the factory cost of the product as made by two workers.

ANSWER

Let x be the cost of material and y be the normal rate of wage/hour

	Worker A (Rs.)	Worker B (Rs.)
Material cost	x	x
Labour wages	90 y	100 y
Bonus	Rowan system	Halsey system

	$\frac{\text{Time saved}}{\text{Time allowed}} \times \text{hour worked} \times \text{rate}$	Hours saved \times 50% \times rate
	$\frac{30}{120} \times 90 \times y = 22.5y$	$20 \times \frac{1}{2} \times y = 10y$
Overheads	$90 \times ₹ 50 = 4,500$	$100 \times ₹ 50 = 5,000$
Factory cost	$x + 112.5y + 4,500 = 80,200$ $\therefore x + 112.5y = 75,700 \dots\dots\dots (1)$	$x + 110y + 5,000 = 79,400$ $\therefore x + 110y = 74,400 \dots\dots (2)$

Solving (1) and (2) we get x = Rs.17,200 and y = Rs. 520

(i) Normal rate of wages is Rs. 520 per hour.

(ii) Cost of materials = Rs. 17,200.

(iii) **Comparative Statement of factory cost**

	Worker A (₹)	Worker B (₹)
Material cost	17,200	17,200
Wages	46,800 (90 \times ₹ 520)	52,000 (100 \times ₹ 520)
Bonus	11,700 $(\frac{30}{120} \times 90 \times 520)$	5,200 $(20 \times \frac{1}{2} \times 520)$
Overheads	4,500 (90 \times ₹ 50)	5,000 (100 \times ₹ 50)
Factory cost	80,200	79,400

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(c) Maximum Production capacity of KM (P) Ltd. is 28,000 units per month. Output at different levels along with cost data is furnished below:

Particulars of Costs	Activity Level		
	16,000 units	18,000 units	20,000 units
Direct Material	Rs. 12,80,000	Rs. 14,40,000	Rs. 16,00,000
Direct labour	Rs. 17,60,000	Rs. 19,80,000	Rs. 22,00,000
Total factory overheads	Rs. 22,00,000	Rs. 23,70,000	Rs. 25,40,000

You are required to CALCULATE the selling price per unit at an activity level of 24,000 units by considering profit at the rate of 25% on sales

ANSWER

(c) Computation of Overheads

$$\begin{aligned}
 \text{Variable Overhead per unit} &= \frac{\text{Change in Factory Overheads}}{\text{Change in activity level}} \\
 &= \frac{23,70,000 - 22,00,000}{18,000 - 16,000} \text{ or } \frac{25,40,000 - 23,70,000}{20,000 - 18,000} \\
 &= \frac{1,70,000}{2000} = ₹ 85 \text{ per unit}
 \end{aligned}$$

Fixed Overhead

Activity level = 16,000 units

Particulars	Amount (Rs.)
Total factory overheads	22,00,000
Less: Variable overheads 16,000 units @ Rs. 85 per unit	(13,60,000)
Fixed Overhead	8,40,000

Computation of Costs at Activity Level 24,000 units

	Per Unit (Rs.)	Amount (Rs.)
Direct Material (12,80,000/16,000)	80.00	19,20,000
Direct Labour (17,60,000/16,000)	110.00	26,40,000
Variable Overhead (As calculated above)	85.00	20,40,000
Fixed Overhead		8,40,000
Total Cost		74,40,000

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Computation of Selling Price at activity level 24,000 units
 Profit required is 25% on selling price, hence cost will be 75%.

$$\text{Therefore desired profit} = \frac{25 \times 74,40,000}{75} = ₹ 24,80,000$$

Cost of 24,000 units	74,40,000
Desired Profit	24,80,000
Total Sales	99,20,000

Alternatively

$$\text{Total Sales} = \frac{\text{Total Cost}}{75} \times 100 = \frac{74,40,000}{75} \times 100 = ₹ 99,20,000$$

$$\text{Selling Price per unit} = \frac{\text{Total Sales}}{\text{No of Units}} = \frac{99,20,000}{24,000} = ₹ 413.33$$

(d) Bank of Surat operated for years under the assumption that profitability can be increased by increasing Rupee volume. But that has not been the case. Cost analysis has revealed the following:

Activity	Activity Cost (Rs.)	Activity Driver	Activity Capacity
Providing ATM Service	1,00,000	No. of Transactions	2,00,000
Computer Processing	10,00,000	No. of Transactions	25,00,000
Issuing Statements	8,00,000	No. of Statements	5,00,000
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000

The following annual information on three products was also made available:

Activity Driver	Checking Accounts	Personal Loans	Gold Visa
Units of Product	30,000	5,000	10,000
ATM Transactions	1,80,000	0	20,000
Computer Transactions	20,00,000	2,00,000	3,00,000
Number of Statements	3,00,000	50,000	1,50,000
Telephone Minutes	3,50,000	90,000	1,60,000

Required

(i) CALCULATE rates for each activity.

(ii) Using the rates computed in requirement (i), CALCULATE the cost of each product.

(4 × 5 = 20 Marks)

ANSWER

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(i) Statement Showing "Activity Rate"

Activity	Activity Cost [a] (Rs.)	Activity Driver	No. of Units of Activity Driver [b]	Activity Rate [a] / [b] (Rs.)
Providing ATM Service	1,00,000	No. of ATM Transactions	2,00,000	0.50
Computer Processing	10,00,000	No. of Computer Transactions	25,00,000	0.40
Issuing Statements	8,00,000	No. of Statements	5,00,000	1.60
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000	0.60

(ii) Statement Showing "Cost of Product"

Activity	Checking Accounts (Rs.)	Personal Loans (Rs.)	Gold Visa (Rs.)
Providing ATM Service	90,000 (1,80,000 tr. × Rs. 0.50)	---	10,000 (20,000 tr. × Rs. 0.50)
Computer Processing	8,00,000 (20,00,000 tr. × Rs. 0.40)	80,000 (2,00,000 tr. × Rs. 0.40)	1,20,000 (3,00,000 tr. × Rs. 0.40)
Issuing Statements	4,80,000 (3,00,000 st. × Rs. 1.60)	80,000 (50,000 st. × Rs. 1.60)	2,40,000 (1,50,000 st. × Rs. 1.60)
Customer Inquiries	2,10,000 (3,50,000 min. × Rs. 0.60)	54,000 (90,000 min. × Rs. 0.60)	96,000 (1,60,000 min. × Rs. 0.60)
Total Cost [a]	Rs. 15,80,000	Rs. 2,14,000	Rs. 4,66,000
Units of Product [b]	30,000	5,000	10,000
Cost of each Product [a] / [b]	52.67	42.80	46.60

2. (a) A store keeper has prepared the below list of items kept in the store of the factory.

Item	Units	Unit cost (Rs.)
A	12,000	30.00
B	18,000	3.00
C	6,000	35.00
D	750	220.00
E	3,800	75.00
F	400	105.00
G	600	300.00
H	300	350.00
I	3,000	250.00
J	20,000	7.50
K	11,500	27.50
L	2,100	75.00

The store keeper requires your help to classify the items for prioritization. You are required to APPLY ABC analysis to classify the store items as follows:
Store items which constitutes approx 70%, 20% and 10% of total value as A, B and C respectively.

ANSWER
(a) Statement of Total Cost and Ranking

Item	Units	% of Total units	Unit cost (Rs.)	Total cost (Rs.)	% of Total cost	Ranking
A	12,000	15.30%	30.00	3,60,000	12.97%	2
B	18,000	22.94%	3.00	54,000	1.95%	11
C	6,000	7.65%	35.00	2,10,000	7.57%	5
D	750	0.96%	220.00	1,65,000	5.95%	7
E	3,800	4.84%	75.00	2,85,000	10.27%	4
F	400	0.51%	105.00	42,000	1.51%	12
G	600	0.76%	300.00	1,80,000	6.49%	6
H	300	0.38%	350.00	1,05,000	3.78%	10
I	3,000	3.82%	250.00	7,50,000	27.03%	1
J	20,000	25.49%	7.50	1,50,000	5.41%	9
K	11,500	14.66%	27.50	3,16,250	11.40%	3
L	2,100	2.68%	75.00	1,57,500	5.68%	8
	78,450	100.00%		27,74,750	100.00%	

Statement of classification of Inventory

Ranking	Item	% of Total units	Cost (Rs.)	% of Total Cost	Category
1	I	3.82%	7,50,000	27.03%	
2	A	15.30%	3,60,000	12.97%	
3	K	14.66%	3,16,250	11.40%	
4	E	4.84%	2,85,000	10.27%	
5	C	7.65%	2,10,000	7.57%	
Total		46.27%	19,21,250	69.24%	A
6	G	0.76%	1,80,000	6.49%	
7	D	0.96%	1,65,000	5.95%	
8	L	2.68%	1,57,500	5.68%	
9	J	25.49%	1,50,000	5.41%	
Total		29.89%	6,52,500	23.53%	B
10	H	0.38%	1,05,000	3.78%	
11	B	22.94%	54,000	1.95%	
12	F	0.51%	42,000	1.51%	
Total		23.84%	2,01,000	7.24	C
	12	100%	27,74,750	100%	

(b) SK Ltd. engaged in the manufacture of tyres. Analysis of income statement indicated a profit of Rs.150 lakhs on a sales volume of 50,000 units. The fixed cost is Rs. 850 lakhs which appears to be high. Existing selling price is Rs. 3,400 per unit. The company is considering to revise the profit target to Rs. 350 lakhs. You are required to COMPUTE –

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- (i) Break-even point at existing levels in units and in rupees.
- (ii) The number of units required to be sold to earn the target profit.
- (iii) Profit with 15% increase in selling price and drop in sales volume by 10%.
- (iv) Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 8% in the variable costs and Rs. 85 lakhs in the fixed cost is envisaged. (10 Marks)

ANSWER

Sales Volume 50,000 Units

Computation of existing contribution

rticulars	Per unit (Rs.)	Total (Rs. in lakhs)
Sales	3,400	1,700
Fixed Cost	1,700	850
Profit	300	150
Contribution	2,000	1,000
Variable Cost	1,400	700

$$(i) \text{ Break even sales in units} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{8,50,00,000}{2,000} = 42,500 \text{ units}$$

$$\text{Break even sales in rupees} = 42,500 \text{ units} \times ₹ 3,400 = ₹ 1,445 \text{ lakhs}$$

OR

$$\text{P/V Ratio} = \frac{2,000}{3,400} \times 100 = 58.82\%$$

$$\text{B.E.P (in rupees)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{8,50,00,000}{58.82\%} = ₹ 1,445 \text{ lakhs (approx.)}$$

- (ii)
- Number of units sold to achieve a target profit of ₹ 350 lakhs:

$$\begin{aligned} \text{Desired Contribution} &= \text{Fixed Cost} + \text{Target Profit} \\ &= 850 \text{ lakhs} + 350 \text{ lakhs} \\ &= 1,200 \text{ lakhs} \end{aligned}$$

$$\text{Number of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{12,00,00,000}{2,000} = 60,000 \text{ units}$$

- (iii) Profit if selling price is increased by 15% and sales volume drops by 10%

Existing Selling Price per unit = Rs. 3,400

Revised selling price per unit = Rs. 3,400 × 115% = Rs. 3,910

Existing Sales Volume = 50,000 units

Revised sales volume = 50,000 units – 10% of 50,000 = 45,000 units.

Statement of profit at sales volume of 45,000 units @ Rs. 3,910 per unit

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Particulars	Per unit (Rs.)	Total (Rs. in lakhs)
Sales	3,910.00	1,759.50
Less: Variable Costs	(1,400.00)	(630.00)
Contribution	2,510.00	1,129.50
Less: Fixed Cost		(850.00)
Profit		279.50

iv) Volume to be achieved to earn target profit of Rs. 350 lakhs with revised selling price and reduction of 8% in variable costs and Rs. 85 lakhs in fixed cost.

Revised selling price per unit = Rs. 3,910

Variable costs per unit existing = Rs. 1,400

Revised Variable Costs

Reduction of 8% in variable costs = Rs. 1,400 – 8% of 1,400

= Rs. 1,400 – Rs. 112

= Rs. 1,288

Total Fixed Cost (existing) = Rs. 850 lakhs

Reduction in fixed cost = Rs. 85 lakhs

Revised fixed cost = Rs. 850 lakhs – Rs. 85 lakhs = Rs. 765 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = Rs. 3,910 – Rs. 1,288 = Rs. 2,622

Desired Contribution = Revised Fixed Cost + Target Profit

= Rs. 765 lakhs + Rs.350 lakhs= Rs.1,115 lakhs

$$\text{No. of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{\text{₹ 1,115 lakh}}{\text{₹ 2,622}} = 42,525 \text{ units}$$

3 (a) R Limited is presently operating at 50% capacity and producing 60,000 units. The entire output is sold at a price of Rs. 200 per unit. The cost structure at the 50% level of activity is as under:

	Rs.
Direct Material	75 per unit
Direct Wages	25 per unit
Variable Overheads	25 per unit
Direct Expenses	15 per unit
Factory Expenses (25% fixed)	20 per unit
Selling and Distribution Exp. (80% variable)	10 per unit
Office and Administrative Exp. (100% fixed)	5 per unit

The company anticipates that the variable costs will go up by 10% and fixed costs will go up by 15%.

You are required to PREPARE an Expense budget, on the basis of marginal cost for the company at 50% and 60% level of activity and COMPUTE profits at respective levels. (10 Marks)

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ANSWER**(a) Expense Budget of R Ltd. for the period.....**

		50% Capacity	60% Capacity
	Per unit (Rs.)	60,000 units Amount (Rs.)	72,000 units Amount (Rs.)
Sales (A)	200.00	1,20,00,000	1,44,00,000
Less: Variable Costs:			
- Direct Material	82.50	49,50,000	59,40,000
- Direct Wages	27.50	16,50,000	19,80,000
- Variable Overheads	27.50	16,50,000	19,80,000
- Direct Expenses	16.50	9,90,000	11,88,000
- Variable factory expenses (75% of Rs. 20 p.u.)	16.50	9,90,000	11,88,000
- Variable Selling & Dist. exp. (80% of Rs. 10 p.u.)	8.80	5,28,000	6,33,600
Total Variable Cost (B)	179.30	1,07,58,000	1,29,09,600
Contribution (C) = (A – B)	20.70	12,42,000	14,90,400
Less: Fixed Costs:			
- Office and Admin. exp. (100%)	--	3,45,000	3,45,000
- Fixed factory exp. (25%)	--	3,45,000	3,45,000
- Fixed Selling & Dist. exp. (20%)	--	1,38,000	1,38,000
Total Fixed Costs (D)	--	8,28,000	8,28,000
Profit (C – D)	--	4,14,000	6,62,400

(b) A machine shop cost centre contains three machines of equal capacities.

To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid Rs. 20 per hour. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period.

The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

☑ Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is Rs. 52,000.

☑ Maintenance and repairs per week per machine is Rs. 60.

☑ Consumable stores per week per machine are Rs. 75.

☑ Power : 20 units per hour per machine at the rate of 80 paise per unit.

☑ Apportionment to the cost centre : Rent per annum Rs. 5,400, Heat and Light per annum Rs.9,720, foreman's salary per annum Rs.12,960 and other miscellaneous expenditure per annum Rs. 18,000.

Required:

(i) CALCULATE the cost of running one machine for a four-week period.

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(ii) CALCULATE machine hour rate.
ANSWER

Effective Machine hour for four-week period
 = Total working hours – unproductive set-up time
 = {(48 hours × 4 weeks) – {(4 hours × 4 weeks)}
 = (192 – 16) hours = 176 hours.

(i) Computation of cost of running one machine for a four week period

	(₹)	(₹)
(A) Standing charges (per annum)		
Rent	5,400.00	
Heat and light	9,720.00	
Forman's salary	12,960.00	
Other miscellaneous expenditure	18,000.00	
Standing charges (per annum)	46,080.00	
Total expenses for one machine for four week period ($\frac{₹ 46,080}{3 \text{ machines} \times 13 \text{ four-week period}}$)		1,181.54
Wages (48 hours × 4 weeks × ₹ 20 × 3 operators)		11,520.00
Bonus {(176 hours × ₹ 20 × 3 operators) × 10%}		1,056.00
Total standing charges		13,757.54
(B) Machine Expenses		
Depreciation = $\left(₹ 52,000 \times 10\% \times \frac{1}{13 \text{ four-week period}} \right)$		400.00
Repairs and maintenance (₹ 60 × 4 weeks)		240.00
Consumable stores (₹ 75 × 4 weeks)		300.00
Power (176 hours × 20 units × ₹ 0.80)		2,816.00
Total machine expenses		3,756.00
(C) Total expenses (A) + (B)		17,513.54

$$(ii) \text{ Machine hour rate} = \frac{₹ 17,513.54}{176 \text{ hours}} = ₹ 99.51$$

4. (a) Following information have been extracted from the cost records of XYZ Pvt. Ltd.

Stores:	(Rs.)
Opening balance	1,08,000
Purchases	5,76,000
Transfer from WIP	2,88,000
Issue to WIP	5,76,000
Issue for repairs	72,000
Deficiency found in stock	21,600
Work-in-process:	(Rs.)
Opening balance	2,16,000
Direct wages applied	2,16,000
Overheads charged	8,64,000
Closing balance	1,44,000

Finished Production:	(Rs.)
Entire production is sold at a profit of 15% on cost of WIP	
Wages paid	2,52,000
Overheads incurred	9,00,000

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PREPARE Stores Ledger Control Account, Work-in-Process Control Account, Overheads Control Account and Costing Profit and Loss Account. (10 Marks)

ANSWER
(a) Stores Ledger Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	1,08,000	By Work in Process A/c	5,76,000
To General Ledger Adjustment A/c	5,76,000	By Overhead Control A/c	72,000
To Work in Process A/c	2,88,000	By Overhead Control A/c (Deficiency)	21,600*
		By Balance c/d	3,02,400
	9,72,000		9,72,000

Work in Process Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	2,16,000	By Stores Ledger Control a/c	2,88,000
To Stores Ledger Control A/c	5,76,000	By Costing P/L A/c (Balancing figures being Cost of finished goods)	14,40,000
To Wages Control A/c	2,16,000	By Balance c/d	1,44,000
To Overheads Control A/c	8,64,000		
	18,72,000		18,72,000

Overheads Control A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Stores Ledger Control A/c	72,000	By Work in Process A/c	8,64,000
To Stores Ledger Control A/c	21,600	By Balance c/d (Under absorption)	1,65,600
To Wages Control A/c (Rs. 2,52,000- Rs. 2,16,000)	36,000		
To Gen. Ledger Adjust. A/c	9,00,000		
	10,29,600		10,29,600

Costing Profit & Loss A/c

Particulars	(Rs.)	Particulars	(Rs.)
To Work in process	14,40,000	By Gen. ledger Adjust. A/c (Sales) (Rs. 14,40,000 × 115%)	16,56,000
To Gen. Ledger Adjust. A/c (Profit)	2,16,000		
	16,56,000		16,56,000

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(b) SV chemicals Limited processes 9,00,000 kgs. of raw material in a month purchased at Rs. 95 per kg in department X. The input output ratio of department X is 100 : 90. Processing of the material results in two joint products being produced 'P₁' and 'P₂' in the ratio of 60 : 40. Product 'P₁' can be sold at split off stage or can be further processed in department Y and sold as a new product 'YP₁'. The input output ratio of department Y is 100 : 95. Department Y is utilized only for further processing of product 'P₁' to product 'YP₁'. Individual departmental expenses are as follows:

	Dept. X (Rs. lakhs)	Dept. Y (Rs. lakhs)
Direct Materials	95.00	14.00
Direct Wages	80.00	27.00
Variable Overheads	100.00	35.00
Fixed Overheads	75.00	52.00
Total	350.00	128.00

Further, selling expenses to be incurred on three products are:

Particulars	Amount (Rs. in lakhs)
Product 'P ₁ '	28.38
Product 'P ₂ '	25.00
Product 'YP ₁ '	19.00

Selling price of the products 'P₁' and 'P₂' at split off point is Rs. 110 per kg and Rs. 325 per kg respectively. Selling price of new product 'YP₁' is Rs. 150 per kg.

You are required to:

- (i) PREPARE a statement showing apportionment of joint costs, in the ratio of value of sales, net of selling expenses.
- (ii) PREPARE a Statement showing profitability at split off point.
- (iii) PREPARE a Statement of profitability of 'YP₁'.
- (iv) DETERMINE that would you recommend further processing of P₁? (10 Marks)

ANSWER

Working Notes:

Input output ratio of material processed in Department X = 100:90

Particulars	Quantity (Kg)
Material input	9,00,000
Less: Loss of material in process @ 10% of 9,00,000 kgs	(90,000)
Output	8,10,000

Output of department X is product 'P₁' and 'P₂' in the ratio of 60 : 40.

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$$\text{Output 'P}_1\text{' = } \frac{60 \times 8,10,000}{100} = 4,86,000 \text{ kgs.}$$

$$\text{Output 'P}_2\text{' = } \frac{40 \times 8,10,000}{100} = 3,24,000 \text{ kgs.}$$

Statement showing ratio of net sales

Product	P ₁	P ₂	Total
Quantity (kgs)	4,86,000	3,24,000	8,10,000
Selling price per kg (Rs.)	110.00	325.00	
Sales Value (Rs. in lakhs)	534.60	1,053.00	1587.60
Less: Selling Expenses (Rs. in lakhs)	(28.38)	(25.00)	(53.38)
Net Sales (Rs. in lakhs)	506.22	1,028.00	1,534.22
Ratio	33%	67%	100.00

Computation of Joint Costs

Particulars	Amount (Rs. Lakhs)
Raw Material input 9,00,000 kgs @ Rs. 95 per kg	855.00
Direct Materials	95.00
Direct Wages	80.00
Variable Overheads	100.00
Fixed Overheads	75.00
Total	1,205.00

(i) Statement showing apportionment of joint costs in the ratio of net sales

Particulars	Amount (Rs. in lakhs)
Joint cost of P ₁ – 33% of Rs. 1,205 lakhs	397.65
Joint cost of P ₂ – 67% of Rs. 1,205 lakhs	807.35
Total	1,205.00

(ii) Statement showing profitability at split off point

Product	P ₁	P ₂	Total
Net Sales Value (Rs. in lakhs) – [A]	506.22	1,028.00	1,534.22
Less: Joint costs (Rs. in lakhs)	(397.65)	(807.35)	(1,205.00)
Profit (Rs. in lakhs) [A] – [B]	108.57	220.65	329.22

Alternative Presentation

Product	P ₁	P ₂	Total
Sales Value (Rs. in lakhs) – [A]	534.60	1,053.00	1,587.60
Less: Joint costs (Rs. in lakhs)	397.65	807.35	1,205.00
Selling Expenses	28.38	25.00	53.38
Total Cost [B]	426.03	832.35	1,258.38
Profit (Rs. in lakhs) [A] – [B]	108.57	220.65	329.22

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(iii) Statement of profitability of product 'YP₁'

Particulars		YP ₁
Sales Value (Rs. in lakhs) (Refer working note) [A]		629.55
Less: Cost of P1	397.65	
Cost of Department Y	128.00	
Selling Expenses of Product 'YP ₁ '	19.00	
Total Costs [B]		544.65
Profit (Rs. in lakhs) [A] – [B]		84.90

Working Note:

Computation of product 'YP₁'

Quantity of product P₁ input used = 4,86,000 kgs

Input output ratio of material processed in Department Y = 100 : 95

Particulars	Quantity (Kg)
Material input	4,86,000
Less: Loss of material in process @ 5% of 4,86,000	(24,300)
Output	4,61,700

Sales Value of YP₁ = 4,61,700 kgs @ Rs. 150 per kg = Rs. 692.55 lakhs

(iv) Determination of profitability after further processing of product P₁ into product YP₁:

Particulars	(Rs. in lakhs)
Profit of Product 'P ₁ ' {refer (ii) above}	108.57
Profit of Product 'YP ₁ ' {refer (iii) above}	84.90
Decrease in profit after further processing	23.67

Based on the above profitability statement, further processing of product P₁ into YP₁ should not be recommended

5. (a) The standard labour component and the actual labour component engaged in a week for a job are as follows

	Skilled Workers	Semi-skilled Workers	Un-Skilled workers
Standard number of workers in the gang	32	12	6
Standard wage rate per hour (Rs.)	30	20	10
Actual number of workers employed in the gang during the week	28	18	4
Actual wages rate per hour (Rs.)	34	23	12

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During the 40 hours working week the gang produced 1,800 standard labour hours of work.

CALCULATE:

- (i) Total labour cost variance;
- (ii) Labour yield variance;
- (iii) Labour mix variance; and
- (iv) Labour wage rate variance. (10 Marks)

ANSWER

(a) Work produced by the gang 1,800 standard labour hours, i.e.,

$\frac{1,800}{32 + 12 + 6}$ or 36 gang hours		
Standard hours of Skilled Labour	(36 × 32)	1,152 hours
Standard hours of Semi-skilled Labour	(36 × 12)	432 hours
Standard hours of Un-skilled Labour	(36 × 6)	<u>216 hours</u>
Total		<u>1,800 hours</u>
Actual hours of Skilled Labour	(40 × 28)	1,120 hours
Actual hours of Semi-skilled Labour	(40 × 18)	720 hours
Actual hours of Un-skilled Labour	(40 × 4)	<u>160 hours</u>
Total		<u>2,000 hours</u>

Revised Standard hours (actual hours worked expressed in standard ratio)

Skilled Labour	$\frac{1,152}{1,800} \times 2,000$	1,280 hours
Semi-skilled Labour	$\frac{432}{1,800} \times 2,000$	480 hours
Unskilled Labour	$\frac{216}{1,800} \times 2,000$	<u>240 hours</u>
		<u>2,000 hours</u>

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Standard Cost for Actual Output:		₹
Skilled Labour	1,152 hours @ ₹ 30	34,560
Semi-skilled Labour	432 hours @ ₹ 20	8,640
Unskilled Labour	<u>216 hours @ ₹ 10</u>	<u>2,160</u>
	<u>1,800 hours</u>	<u>45,360</u>

Actual Cost:

Skilled Labour	1,120 hours @ ₹ 34	38,080
Semi-skilled Labour	720 hours @ ₹ 23	16,560
Unskilled Labour	<u>160 hours @ ₹ 12</u>	<u>1,920</u>
	<u>2,000 hours</u>	<u>56,560</u>

(i) Total Labour Cost Variance

Standard Cost- Actual Cost	₹
₹ 45,360 - ₹ 56,560	<u>11,200 (A)</u>

(ii) Labour Yield Variance:

(Standard hours for Actual Output - Revised Standard hours) × Standard Rate

Skilled	(1,152 - 1,280) × ₹ 30	3,840 (A)	
Semi-skilled	(432 - 480) × ₹ 20	960 (A)	
Un-skilled	(216 - 240) × ₹ 10	<u>240 (A)</u>	
		<u>5,040 (A)</u>	5,040 (A)

(iii) Labour Mix Variance:

(Revised Standard Hours - Actual Hours) × Standard Rate

Skilled	(1,280 - 1,120) × ₹ 30	4,800 (F)	
Semi-skilled	(480 - 720) × ₹ 20	4,800 (A)	
Un-skilled	(240 - 160) × ₹ 10	<u>800 (F)</u>	
		<u>800 (F)</u>	800 (F)

(iv) Labour Wage Rate Variance:

(Standard Rate - Actual Rate) × Actual Hours

Skilled	(₹ 30 - ₹ 34) × 1,120	4,480 (A)	
Semi-skilled	(₹ 20 - ₹ 23) × 720	2,160 (A)	
Un-skilled	(₹ 10 - ₹ 12) × 160	<u>320 (A)</u>	
		<u>6,960 (A)</u>	<u>6,960 (A)</u>

Check : Total Labour Cost Variance = Yield + Mix + Rate 11,200 (A)

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(b) 'RP' Resorts (P) Ltd. offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to COMPUTE the tariff to be charged to the customers for different types of rooms on the basis of following information

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3 times of 'deluxe room'. Annual expenses are as follows

Particulars	Amount (Rs. lakhs)
Staff salaries	680.00
Lighting, Heating and Power	300.00
Repairs, Maintenance and Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior decoration	75.00
Sundries	30.28

An attendant for each room was provided when the room was occupied and he was paid Rs. 500 per day towards wages. Further, depreciation is to be provided on building @ 5% on Rs. 900 lakhs, furniture and fixtures @ 10% on Rs. 90 lakhs and air conditioners @ 10% on Rs. 75 lakhs. Profit is to be provided @ 25% on total taking and assume 360 days in a year. (10 Marks)

ANSWER

(b) Operating cost statement of 'RP' Resort (P) Limited

Particulars	Cost per annum (Rs. in lakhs)
Staff Salaries	680.00
Room Attendant's Wages (refer W.N-3)	286.20
Lighting, Heating & Power	300.00
Repairs, Maintenance & Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior Decoration	75.00
Sundries	30.28
Depreciation (refer W.N- 4):	
- Building	45.00
- Furniture & Fixture	9.00
- Air Conditioners	7.50
Total cost for the year	1,666.98

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Computation of profit:

Let Rs. x be the rent for deluxe room.

Equivalent deluxe room days are 90,720 (refer W.N- 2)

Total takings = Rs. 90,720x

Profit is 25% of total takings.

Profit = 25% of Rs. 90,720x = Rs. 22,680x

Total takings = Total Cost + Profit

Rs. 90,720x = Rs. 16,66,98,000 + Rs. 22,680x

Rs. 90,720x - Rs. 22,680x = Rs. 16,66,98,000

Rs. 68,040x = Rs. 16,66,98,000

$$X = \frac{\text{₹ } 116,66,98,000}{\text{₹ } 68,040} = \text{₹ } 2,450$$

Rent to be charged for Deluxe room	Rs. 2,450
Rent to be charged for Super deluxe room = Rent of deluxe room × 2 = Rs. 2,450 × 2	Rs. 4,900
Rent to be charged for Luxury suite = Rent of Super Deluxe room × 1.5 = Rs. 4,900 × 1.5	Rs. 7,350

Working Notes:

1. Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400
Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200
Luxury Suite	40 x 360 days x 60% occupancy	8,640
	Total	57,240

2. Computation of equivalent deluxe room days:

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
	Total	90,720

3. Computation of room attendant's wages:

Room occupancy days × Rs. 500 per day
= 57,240 days × Rs. 500 = Rs. 286.20 lakhs

4. Computation of Depreciation per annum:

Particulars	Cost (Rs.)	Rate of Depreciation	Depreciation (Rs.)
Building	900,00,000	5%	45,00,000

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Furniture & Fixtures	90,00,000	10%	9,00,000
Air Conditioners	75,00,000	10%	7,50,000

6. (a) DISCUSS cost classification based on variability.
ANSWER
Cost classification based on variability

(i) Fixed Costs – These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output. For example, rent, insurance of factory building etc., remain the same for different levels of production.

(ii) Variable Costs – These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.

(iii) Semi-variable Costs – These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

(b) EXPLAIN Single and Multiple Overhead Rates.
ANSWER

Single and Multiple Overhead Rates:

Single overhead rate: It is one single overhead absorption rate for the whole factory.

It may be computed as follows:

Single overhead rate = Overhead costs for the entire factory / Total quantity of the base selected

The base can be total output, total labour hours, total machine hours, etc.

The single overhead rate may be applied in factories which produces only one major product on a continuous basis. It may also be used in factories where the work performed in each department is fairly uniform and standardized.

Multiple overhead rate: It involves computation of separate rates for each production department, service department, cost center and each product for both fixed and variable overheads. It may be computed as follows:

Multiple overhead rate = Overhead allocated/ apportioned to each department/ cost centre or product / Corresponding base

Under multiple overheads rate, jobs or products are charged with varying amount of factory overheads depending on the type and number of departments through which they pass. However, the number of overheads rate which a firm may compute would depend upon two opposing factors viz. the degree of accuracy desired and the clerical cost involved

(c) DISCUSS the four different methods of costing alongwith their applicability to concerned industry?

ANSWER

Four different methods of costing along with their applicability to concerned industry have been discussed as below:

(i) Job Costing: The objective under this method of costing is to ascertain the cost of each job order. A job card is prepared for each job to accumulate costs. The cost of the job is determined by adding all costs against the job it has incurred. This method of costing is used in printing press, foundries and general engineering workshops, advertising etc.

(ii) Batch Costing: This system of costing is used where small components/ parts of the same kind are required to be manufactured in large quantities. Here batch of similar products is treated as a job and cost of such a job is ascertained as discussed under (1), above. If in a cycle manufacturing unit, rims are produced in batches of 2,500 units each, then the cost will be determined in relation to a batch of 2,500 units.

(iii) Contract Costing: If a job is very big and takes a long time for its completion, then method used for costing is known as Contract Costing. Here the cost of each contract is ascertained separately. It is suitable for firms engaged in the construction of bridges, roads, buildings etc.

(iv) Operating Costing: The method of Costing used in service rendering undertakings is known as operating costing. This method of costing is used in undertakings like transport, supply of water, telephone services, hospitals, nursing homes etc.

(d) STATE how Economic Batch Quantity is determined? (4 × 5 = 20 Marks)

ANSWER

In batch costing the most important problem is the determination of 'Economic Batch Quantity'

The determination of economic batch quantity involves two types of costs viz, (i) set up cost and (ii) carrying cost. With the increase in the batch size, there is an increase in the carrying cost but the set-up cost per unit of the product is reduced; this situation is reversed when the batch size is reduced. Thus there is one particular batch size for which both set up and carrying costs are minimum. This size of a batch is known as economic or optimum batch quantity.

Economic batch quantity can be determined with the help of a table, graph or mathematical formula. The mathematical formula usually used for its determination is as follows:

$$EBQ = \sqrt{\frac{2DC}{C}}$$

Where,

D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production per annum

MTP-I- JULY 2021

1. Answer the following:

(a) The labour turnover rates for the quarter ended 30th September, 2020 are computed as 14%, 8% and 6% under Flux method, Replacement method and Separation method respectively. If the number of workers replaced during 2nd quarter of the financial year 2020-21 is 36, COMPUTE the following:

(i) The number of workers recruited and joined; and

(ii) The number of workers left and discharged.

ANSWER

$$\text{Labour Turnover Rate (Replacement method)} = \frac{\text{No. of workers replaced}}{\text{Average No. of workers}}$$

$$\text{Or, } \frac{8}{100} = \frac{36}{\text{Average No. of workers}}$$

$$\text{Or, Average No. of workers} = 450$$

$$\text{Labour Turnover Rate (Separation method)} = \frac{\text{No. of workers separated}}{\text{Average No. of workers}}$$

$$\text{Or, } \frac{6}{100} = \frac{\text{No. of workers separated}}{450}$$

$$\text{Or, No. of workers separated} = 27$$

$$\text{Labour Turnover Rate (Flux Method)} = \frac{\text{No. of Separations} + \text{No. of accession (Joinings)}}{\text{Average No. of workers}}$$

$$\text{Or, } \frac{14}{100} = \frac{27 + \text{No. of accessions (Joinings)}}{450}$$

$$\text{Or, } 100(27 + \text{No. of Accessions}) = 6,300$$

$$\text{Or, No. of Accessions} = 36$$

$$\text{(i) The No. of workers recruited and Joined} = 36$$

$$\text{(ii) The No. of workers left and discharged} = 27$$

(b) A manufacturing company disclosed a net profit Rs. 10,20,000 as per their cost accounts for the year ended 31st March 2021. The financial accounts however disclosed a net profit of Rs. 6,94,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	(Rs.)
(i) Factory Overheads under-absorbed	80,000
(ii) Administration Overheads over-absorbed	1,20,000
(iii) Depreciation charged in Financial Accounts	6,50,000

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(iv) Depreciation charged in Cost Accounts	5,50,000
(v) Interest on investments not included in Cost Accounts	1,92,000
(vi) Income-tax provided	1,08,000
(vii) Interest on loan funds in Financial Accounts	4,90,000
(viii) Transfer fees (credit in financial books)	48,000
(ix) Stores adjustment (credit in financial books)	28,000
(x) Dividend received	64,000

PREPARE a Reconciliation statement.

ANSWER
Statement of Reconciliation

Particulars	Amount (Rs.)	Amount (Rs.)
Net profit as per Cost accounts		10,20,000
Add:		
Administration Overheads over-absorbed	1,20,000	
Interest on investments	1,92,000	
Transfer fees	48,000	
Stores adjustment	28,000	
Dividend received	64,000	4,52,000
Less:		
Factory Overheads under-absorbed	80,000	
Depreciation under charged	1,00,000	
Income-tax provided	1,08,000	
Interest on loan funds	4,90,000	(7,78,000)
Net profit as per Financial accounts		6,94,000

(c) A company manufactures 10,000 units of a product per month. The cost of placing an order is Rs. 200. The purchase price of the raw material is Rs. 20 per kg. The re-order period is 4 to 8 weeks. The consumption of raw materials varies from 200 kg to 900 kg per week, the average consumption being 550 kg. The carrying cost of inventory is 20% per annum.

You are required to CALCULATE:

- (i) Re-order quantity
- (ii) Re-order level
- (iii) Maximum level
- (iv) Minimum level
- (v) Average stock level

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ANSWER

(c) (i) **Reorder Quantity (ROQ)** = 1,691 kg. (Refer to working note)

(ii) **Reorder level (ROL)** = Maximum usage × Maximum re-order period
= 900 kg. × 8 weeks = 7,200 kg.

(iii) **Maximum level** = ROL + ROQ – (Min. usage × Min. re-order period)
= 7,200 kg. + 1,691 kg. – (200 kg. × 4 weeks)
= 8,091 kg.

(iv) **Minimum level** = ROL – (Normal usage × Normal re-order period)
= 7,200 kg. – (550 kg. × 6 weeks)
= 3,900 kg.

(v) **Average stock level** = $\frac{1}{2}$ (Maximum level + Minimum level)
= $\frac{1}{2}$ (8,091 kg. + 3,900 kg.) = 5,995.5 kg.

OR

= Minimum level + $\frac{1}{2}$ ROQ
= 3,900 kg. + $\frac{1}{2}$ × 1,691 kg.
= 4,745.5 kg.

Working Note:

Annual consumption of raw material (A) = (550 kg. × 52 weeks) = 28,600 kg.

Cost of placing an order (O) = Rs. 200

Carrying cost per kg. per annum (C) = Rs. 20 × 20% = Rs. 4

$$\begin{aligned} \text{Economic order quantity (EOQ)} &= \sqrt{\frac{2AO}{C}} \\ &= \sqrt{\frac{2 \times 28,600 \text{ kgs.} \times \text{Rs. } 200}{\text{Rs. } 4}} = 1,691 \text{ Kg. (Approx)} \end{aligned}$$

(d) **AK Ltd. has furnished the following standard cost data per unit of production:**

Material 10 kg @ Rs. 100 per kg.

Labour 6 hours @ Rs. 55 per hour

Variable overhead 6 hours @ Rs. 100 per hour.

Fixed overhead Rs.45,00,000 per month (Based on a normal volume of 30,000 labour hrs)

The actual cost data for the month of September 2020 are as follows:

Material used 50,000 kg at a cost of Rs. 52,50,000.

Labour paid Rs. 15,50,000 for 31,000 hours

Variable overheads Rs. 29,30,000

Fixed overheads Rs. 47,00,000

Actual production 4,800 units.

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CALCULATE:

(i) Material Cost Variance.

(ii) Labour Cost Variance.

(iii) Fixed Overhead Cost Variance.

(iv) Variable Overhead Cost Variance. (4 × 5 Marks = 20 Marks)

ANSWER

Budgeted Production 30,000 hours ÷ 6 hours per unit = 5,000 units

Budgeted Fixed Overhead Rate = Rs. 45,00,000 ÷ 5,000 units = Rs. 900 per unit Or
 = Rs. 45,00,000 ÷ 30,000 hours = Rs. 150 per hour.

(i) Material Cost Variance = (Std. Qty. × Std. Price) – (Actual Qty. × Actual Price)
 = (4,800 units × 10 kg. × Rs.100) - Rs. 52,50,000
 = Rs. 48,00,000 – Rs. 52,50,000
 = Rs. 4,50,000 (A)

(ii) Labour Cost Variance = (Std. Hours × Std. Rate) – (Actual Hours × Actual rate)
 = (4,800 units × 6 hours × Rs. 55) – Rs. 15,50,000
 = Rs. 15,84,000 – Rs. 15,50,000
 = Rs. 34,000 (F)

(iii) Fixed Overhead Cost Variance = (Budgeted Rate × Actual Qty) – Actual Overhead
 = (Rs. 900 × 4,800 units) – Rs.47,00,000
 = Rs. 3,80,000 (A)

OR

= (Budgeted Rate × Std. Hours) – Actual Overhead
 = (Rs. 150 × 4,800 units × 6 hours) – Rs. 47,00,000
 = Rs. 3,80,000 (A)

(iv) Variable Overhead Cost Variance = (Std. Rate × Std. Hours) – Actual Overhead
 = (4,800 units × 6 hours × Rs. 100) - Rs. 29,30,000
 = Rs. 28,80,000 - Rs. 29,30,000
 = Rs. 50,000 (A)

2. (a) MP Ltd. produces a Product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of Rs. 85 per unit, product Z is produced. The information related for the month of September 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is Rs. 2,88,000, which is absorbed as a percentage of direct wages.

The scraps are sold at Rs. 10 per unit

Product-Z can be sold at Rs. 135 per unit with a selling cost of Rs. 15 per unit
No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600
There is no stock at the beginning and end of the month.

You are required to PREPARE accounts for:

- (i) Process-I, II and III
- (ii) By-product-Z

ANSWER

(a) Total direct wages

$$= \text{Rs. } 42,000 + \text{Rs. } 54,000 + \text{Rs. } 48,000 = \text{Rs. } 1,44,000$$

Percentage absorption of production overhead on the basis of direct wages

$$= \frac{2,88,000}{1,44,000} \times 100$$

$$= 200\%$$

(i) **Process-I A/c**

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000 units)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of Rs.42,000)	-	84,000			
	7,000	3,42,000		7,000	3,42,000

$$* \text{ Cost per unit} = \frac{\text{Rs.}(3,42,000 - 3,500)}{(7,000 - 350)\text{units}} = \text{Rs. } 50.9022$$

Process-II A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600 units)	660	6,600
To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of Rs.54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

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$$\text{** Cost per unit} = \frac{\text{Rs.}(6,49,955 - 6,600)}{(6,600 - 660)\text{units}} = \text{Rs. } 108.3089$$

Process-III A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-I A/c	5,200	5,63,206	By Normal loss (5% of 5,200 units)	260	2,600
To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z# (Rs.35 × 600 units)	600	21,000
To Production OH (200% of Rs.48,000)	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

$$\text{*** Cost per unit} = \frac{\text{Rs.}(8,05,406 - 2,600 - 21,000)}{(5,200 - 260 - 600)\text{units}} = \text{Rs. } 180.1396$$

$$\text{\# Realisable value} = \text{Rs. } 135 - (85 + 15) = \text{Rs. } 35$$

(ii) By-Product Process A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			
To Selling expenses	-	9,000			
	600	81,000		600	81,000

(b) The following account balances and distribution of indirect charges are taken from the accounts of a manufacturing concern for the year ending on 31st March 2021:

Item	Total Amount	Production Departments			Service Departments	
		(Rs.)	X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)
Indirect Material	2,50,000	40,000	60,000	90,000	50,000	10,000
Indirect Labour	5,20,000	90,000	1,00,000	1,40,000	1,20,000	70,000
Supervisor's Salary	1,92,000	-	-	1,92,000	-	-
Fuel & Heat	30,000					
Power	3,60,000					
Rent & Rates	3,00,000					
Insurance	36,000					
Canteen Charges	1,20,000					
Depreciation	5,40,000					

The following departmental data are also available:

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	Production Departments			Service Departments	
	X	Y	Z	A	B
Area (Sq. ft.)	4,400	4,000	3,000	2,400	1,200
Capital Value of Assets (Rs.)	40,00,000	60,00,000	50,00,000	10,00,000	20,00,000
Kilowatt Hours	3,500	4,000	3,000	1,500	-
Radiator Sections	20	40	60	50	30
No. of Employees	60	70	120	30	20

Expenses charged to the service departments are to be distributed to other departments by the following percentages:

	X	Y	Z	A	B
Department A (%)	30	30	20	-	20
Department B (%)	25	40	25	10	-

PREPARE an overhead distribution statement to show the total overheads of production departments after re-apportioning service departments' overhead by using simultaneous equation method. Show all the calculations to the nearest rupee. (10 Marks)

ANSWER

Primary Distribution of Overheads

Item	Basis	Total Amount (Rs.)	Production Departments			Service Departments	
			X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Indirect Material	Actual	2,50,000	40,000	60,000	90,000	50,000	10,000
Indirect Labour	Actual	5,20,000	90,000	1,00,000	1,40,000	1,20,000	70,000
Supervisor's Salary	Actual	1,92,000	-	-	1,92,000	-	-
Fuel & Heat	Radiator Sections {2:4:6:5:3}	30,000	3,000	6,000	9,000	7,500	4,500
Power	Kilowatt Hours {7:8:6:3:-}	3,60,000	1,05,000	1,20,000	90,000	45,000	-
Rent & Rates	Area (Sq. ft.) {22:20:15:12:6}	3,00,000	88,000	80,000	60,000	48,000	24,000
Insurance	Capital Value of Assets {4:6:5:1:2}	36,000	8,000	12,000	10,000	2,000	4,000
Canteen Charges	No. of Employees {6:7:12:3:2}	1,20,000	24,000	28,000	48,000	12,000	8,000

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Depreciation	Capital Value of Assets {4:6:5:1:2}	5,40,000	1,20,000	1,80,000	1,50,000	30,000	60,000
Total overheads		23,48,000	4,78,000	5,86,000	7,89,000	3,14,500	1,80,500

Re-distribution of Overheads of Service Department A and B

Total overheads of Service Departments may be distributed by simultaneous equation.

Let, the total overheads of A = a and the total overheads of B = b

$$a = 3,14,500 + 0.10 b \text{ (i)}$$

$$\text{or, } 10a - b = 31,45,000 \text{ [(i) } \times 10]$$

$$b = 1,80,500 + 0.20 a \text{ (ii)}$$

$$\text{or, } -0.20a + b = 1,80,500$$

Solving equation (i) & (ii)

$$10a - b = 31,45,000$$

$$-0.20a + b = 1,80,500$$

$$9.8a = 33,25,500$$

$$a = \text{Rs. } 3,39,337$$

Putting the value of 'a' in equation (ii), we get

$$b = 1,80,500 + 0.20 \times 3,39,337$$

$$b = \text{Rs. } 2,48,367$$

Secondary Distribution of Overheads

	Production Departments		
	X (Rs.)	Y (Rs.)	Z (Rs.)
Total overhead as per primary distribution	4,78,000	5,86,000	7,89,000
Service Department A (80% of Rs.3,39,337)	1,01,801	1,01,801	67,867
Service Department B (90% of Rs.2,48,367)	62,092	99,347	62,092
Total	6,41,893	7,87,148	9,18,959

3. (a) The information of Z Ltd. for the year ended 31st March 2021 is as below:

	Amount (Rs.)
Direct materials	17,50,000
Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

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	X	Y
Output (units)	8,000	4,000
Selling price per unit (Rs.)	600	550
Direct material per unit (Rs.)	140	157.50
Direct wages per unit (Rs.)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:

Product X – Rs. 40 per unit and Product Y- Rs. 70 per unit.

For the FY 2021-22, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by 10%.

Products will be required to be sold at a discount of 20%.

You are required to:

- PREPARE profitability statement for the FY 2020-21 and
- PREPARE a budget for the FY 2021-22. (10 Marks)

ANSWER

(a) (i) Product-wise Profitability Statement for the FY 2020-21:

Particulars	Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (Rs.140 × 8,000 units)	6,30,000 (Rs.157.50 × 4,000 units)	17,50,000
Direct wages	7,20,000 (Rs.90 × 8,000 units)	5,30,000 (Rs.132.5 × 4,000 units)	12,50,000
Variable factory overheads*	5,47,200 (76% of Rs. 7,20,000)	4,02,800 (76% of Rs. 5,30,000)	9,50,000
Other variable costs	3,20,000 (Rs.40 × 8,000 units)	2,80,000 (Rs.70 × 4,000 units)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			8,50,000

* Percentage absorption of variable factory overhead on the basis of direct wages

$$= \frac{9,50,000}{12,50,000} \times 100 = 76\%$$

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(ii) Preparation of Budget for the FY 2021-22:

Particulars	Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)	6,400 (8,000 units × 80%)	3,600	(4,000 units × 90%)
Selling price per unit	480 (Rs.600 × 80%)	440	(Rs.550 × 80%)
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (Rs.140 × 6,400 units)	5,67,000 (Rs.157.50 × 3,600 units)	14,63,000
Direct wages per unit	6,91,200 (Rs.108 × 6,400 units)	5,72,400 (Rs.159 × 3,600 units)	12,63,600
Variable factory overheads	5,25,312 (76% of Rs.6,91,200)	4,35,024 (76% of Rs.5,72,400)	9,60,336
Other variable costs	2,56,000 (Rs.40 × 6,400 units)	2,52,000 (Rs.70 × 3,600 units)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110% of Rs.4,00,000)	-	-	4,40,000
Profit/ (Loss)		(11,78,936)	

(b) GMCS Ltd. collects raw milk from the farmers of Ramgarh, Pratapgarh and Devgarh panchayats and processes this milk to make various dairy products. GMCS Ltd. has its own vehicles (tankers) to collect and bring the milk to the processing plant. Vehicles are parked in the GMCS Ltd.'s garage situated within the plant compound. Following are the information related with the vehicles

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles assigned	4	3	5
No. of trips a day	3	2	4
One way distance from the processing plant	24 k.m.	34 k.m.	16 k.m.
Fess & taxes per month (Rs.)	5,600	6,400	---

All the 5 vehicles assigned to Devgarh panchayat, were purchased five years back at a cost of Rs. 9,25,000 each. The 4 vehicles assigned to Ramgarh panchayat, were purchased two years back at a cost of Rs. 11,02,000 each and the remaining vehicles assigned to Pratapgarh were purchased last year at a cost of Rs. 13,12,000 each. With the purchase of each vehicle a two years free servicing warranty is provided. A vehicle gives 10 kmpl mileage in the first two year of purchase, 8 kmpl in next two years and 6 kmpl afterwards. The vehicles are subject to depreciation of 10% p.a. on straight line basis irrespective of usage. A vehicle has the capacity to carry 10,000 litres of milk but on an average only 70% of the total capacity is utilized.

The following expenditures are related with the vehicles:

Salary of Driver (a driver for each vehicle)	Rs. 24,000 p.m.
Salary to Cleaner (a cleaner for each vehicle)	Rs. 12,000 p.m.

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Allocated garage parking fee	Rs. 4,200 per vehicle per month
Servicing cost	Rs. 15,000 for every complete 5,000 k.m. run.
Price of diesel per litre	Rs. 78.00

From the above information you are required to **CALCULATE**

(i) Total operating cost per month for each vehicle. (Take 30 days for the month)

(ii) Vehicle operating cost per litre of milk.

ANSWER

(i) Calculation of Operating Cost per month for each vehicle

	Ramgarh (Rs.)	Pratapgarh (Rs.)	Devgarh (Rs.)	Total (Rs.)
A. Running Costs:				
- Cost of diesel (Working Note- 2)	1,68,480	95,472	2,49,600	5,13,552
- Servicing cost (Working Note- 3)	45,000	-	45,000	90,000
	2,13,480	95,472	2,94,600	6,03,552
B. Fixed Costs:				
- Salary to drivers	96,000 (4 drivers × Rs. 24,000)	72,000 (3 drivers × Rs. 24,000)	1,20,000 (5 drivers × Rs. 24,000)	2,88,000
- Salary to cleaners	48,000 (4 cleaners × Rs. 12,000)	36,000 (3 cleaners × Rs. 12,000)	60,000 (5 cleaners × Rs. 12,000)	1,44,000
- Allocated garage parking fee	16,800 (4 vehicles × Rs.4,200)	12,600 (3 vehicles × Rs.4,200)	21,000 (5 vehicles × Rs.4,200)	50,400
- Depreciation (Working Note- 4)	36,733	32,800	38,542	1,08,075
- Fess & taxes	5,600	6,400	---	12,000
	2,03,133	1,59,800	2,39,542	6,02,475
Total [A + B]	4,16,613	2,55,272	5,34,142	12,06,027
Operating Cost per vehicle	1,04,153 (Rs.4,16,613 ÷ 4 vehicles)	85,091 (Rs.2,55,272 ÷ 3 vehicles)	1,06,828 (Rs.5,34,142 ÷ 5 vehicles)	1,00,502 (Rs.12,06,027 ÷ 12 vehicles)

(ii) Vehicle operating cost per litre of milk

$$\frac{\text{Total Operating Cost per month}}{\text{Total milk carried a month}} = \frac{\text{Rs.12,06,027}}{79,80,000 \text{ Litres (Working Note - 5)}} = \text{Rs. 0.15}$$

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Working Notes:

1. Distance covered by the vehicles in a month

Route	Total Distance (in K.M.)
Ramgarh (4 vehicles × 3 trips × 2 × 24 km. × 30 days)	17,280
Pratapgarh (3 vehicles × 2 trips × 2 × 34 km. × 30 days)	12,240
Devgarh (5 vehicles × 4 trips × 2 × 16 km. × 30 days)	19,200

2. Cost of diesel consumption

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Mileage per litre of diesel	8 kmpl	10 kmpl	6 kmpl
Diesel consumption (Litre)	2,160 (17,280 ÷ 8)	1,224 (12,240 ÷ 10)	3,200 (19,200 ÷ 6)
Cost of diesel consumption @ Rs. 78 per litre (Rs.)	1,68,480	95,472	2,49,600

3. Servicing Cost

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Covered under free service warranty	No	Yes	No
No. of services required	3 (17,280 k.m. ÷ 5,000 k.m.)	2 (12,240 k.m. ÷ 5,000 k.m.)	3 (19,200 k.m. ÷ 5,000 k.m.)
Total Service Cost (Rs.)	45,000 (Rs. 15,000 × 3)	---	45,000 (Rs. 15,000 × 3)

4. Calculation of Depreciation

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles	4	3	5
Cost of a vehicle (Rs.)	11,02,000	13,12,000	9,25,000
Total Cost of vehicles (Rs.)	44,08,000	39,36,000	46,25,000
Depreciation per month (Rs.)	36,733 $\left(\frac{\text{Rs. } 44,08,000 \times 10\%}{12 \text{ months}} \right)$	32,800 $\left(\frac{\text{Rs. } 39,36,000 \times 10\%}{12 \text{ months}} \right)$	38,542 $\left(\frac{\text{Rs. } 46,25,000 \times 10\%}{12 \text{ months}} \right)$

5. Total volume of Milk Carried

Route	Milk Qty. (Litre)
Ramgarh (10,000 ltr. × 0.7 × 4 vehicles × 3 trips × 30 days)	25,20,000
Pratapgarh (10,000 ltr. × 0.7 × 3 vehicles × 2 trips × 30 days)	12,60,000
Devgarh (10,000 ltr. × 0.7 × 5 vehicles × 4 trips × 30 days)	42,00,000
	79,80,000

4. (a) A Ltd. has the following expenditures for the year ended 31st March 2021:

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Sl. No.		Amount (Rs.)	Amount (Rs.)
(i)	Raw materials purchased		10,00,00,000
(ii)	Freight inward		11,20,600
(iii)	Wages paid to factory workers		29,20,000
(iv)	Royalty paid for production		1,72,600
(v)	Amount paid for power & fuel		4,62,000
(vi)	Job charges paid to job workers		8,12,000
(vii)	Stores and spares consumed		1,12,000
(viii)	Depreciation on office building		56,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	48,000	
	- Sales office building	18,000	66,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	31,200	
	- Factory building	18,100	49,300
(xi)	Expenses paid for quality control check activities		19,600
(xii)	Research & development cost paid for improvement in production process		18,200
(xiii)	Expenses paid for pollution control and engineering & maintenance		26,600
(xiv)	Salary paid to Sales & Marketing managers:		10,12,000
(xv)	Salary paid to General Manager		12,56,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	96,000	
	- For re-distribution of finished goods	1,12,000	2,08,000
(xvii)	Fee paid to independent directors		2,20,000
(xviii)	Performance bonus paid to sales staffs		1,80,000
(xix)	Value of stock as on 1 st April, 2020:		
	- Raw materials	18,00,000	
	- Work-in-process	9,20,000	
	- Finished goods	11,00,000	38,20,000
(xx)	Value of stock as on 31 st March, 2021:		
	- Raw materials	9,60,000	
	- Work-in-process	8,70,000	
	- Finished goods	18,20,000	36,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – Rs. 86,000/-

From the above data you are requested to PREPARE Statement of cost for A Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales. (10 Marks)

ANSWER

(a) Statement of Cost of A Ltd. for the year ended 31st March, 2021:

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Sl. No.	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Material Consumed:		
	- Raw materials purchased	10,00,00,000	
	- Freight inward	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		29,20,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,72,600	
	- Amount paid for power & fuel	4,62,000	
	- Job charges paid to job workers	8,12,000	14,46,600
	Prime Cost		10,63,27,200
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,12,000	
	- Repairs & Maintenance paid for plant & machinery	48,000	
	- Insurance premium paid for plant & machinery	31,200	
	- Insurance premium paid for factory building	18,100	
	- Expenses paid for pollution control and engineering & maintenance	26,600	2,35,900
	Gross factory cost		10,65,63,100
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		10,66,13,100
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		19,600
(vi)	Research & development cost paid for improvement in production process		18,200
(vii)	Less: Realisable value on sale of scrap and waste		(86,000)
(viii)	Add: Primary packing cost		96,000
	Cost of Production		10,66,60,900
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,20,000)
	Cost of Goods Sold		10,59,40,900
(ix)	Administrative overheads:		
	- Depreciation on office building	56,000	
	- Salary paid to General Manager	12,56,000	
	- Fee paid to independent directors	2,20,000	15,32,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	18,000	
	- Salary paid to Manager- Sales & Marketing	10,12,000	
	- Performance bonus paid to sales staffs	1,80,000	12,10,000
(xi)	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		1,12,000
	Cost of Sales		10,87,94,900

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(b) ABY Ltd. manufactures four products, namely A, B, C and D using the same plant and process. The following information relates to production period December, 2020:

Product	A	B	C	D
Output in units	1,440	1,200	960	1,008
Cost per unit:				
Direct Materials	Rs. 84	Rs. 90	Rs. 80	Rs. 96
Direct Labour	Rs. 20	Rs. 18	Rs. 14	Rs. 16
Machine hours per unit	4	3	2	1

The four products are similar and are usually produced in production runs of 48 units per batch and are sold in batches of 24 units. Currently, the production overheads are absorbed using machine hour rate. The production overheads incurred by the company for the period December, 2020 are as follows:

	(Rs.)
Machine department costs:	
Rent, depreciation and supervision	2,52,000
Set-up Costs	80,000
Store receiving costs	60,000
Inspection	40,000
Material handling and dispatch	10,368

During the period December, 2020, the following cost drivers are to be used for allocation of overheads cost:

Cost	Cost driver
Set-up Costs	Number of production runs (batches)
Stores receiving	Requisition raised
Inspection	Number of production runs (batches)
Material handling and dispatch	Orders executed

It is also determined that:

- (i) Machine department costs should be apportioned among set-up, stores receiving and inspection activities in proportion of 4 : 3 : 2.
- (ii) The number of requisitions raised on stores is 50 for each product. The total number of material handling and dispatch orders executed during the period are 192 and each order being for a batch size of 24 units of product.

Required:

(i) CALCULATE the total cost of each product, if all overhead costs are absorbed on machine-hour rate basis.

(ii) CALCULATE the total cost of each product using activity-based costing

ANSWER

(b) (i) Total Overhead = Rs. (2,52,000 + 80,000 + 60,000 + 40,000 + 10,368) = Rs. 4,42,368

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Total machine hours = $1,440 \times 4 + 1,200 \times 3 + 960 \times 2 + 1,008 \times 1 = 5,760 + 3,600 + 1,920 + 1,008 = 12,288$ M. Hrs.

$$\therefore \text{Overhead recovery rate / M.H.} = \frac{\text{Rs. } 4,42,368}{12,288 \text{ M.Hrs.}} = \text{Rs. } 36$$

Cost Statement when overheads are absorbed on machine hours rate basis

Product	A	B	C	D
Output in units	1,440	1,200	960	1,008
	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Cost per unit:				
Direct material	84	90	80	96
Direct labour	20	18	14	16
Overhead (@ Rs. 36)	144 (4 x Rs.36)	108 (3 x Rs.36)	72 (2 x Rs.36)	36 (1x Rs.36)
Total cost per unit	248	216	166	148
Total cost	3,57,120	2,59,200	1,59,360	1,49,184

(ii) (1) Machine department costs of Rs. 2,52,000 to be apportioned to set-up cost, store receiving and inspection in 4 : 3 : 2 i.e. Rs. 1,12,000, Rs. 84,000 and Rs. 56,000 respectively.

(2) One production run = 48 units. Hence, the number of production runs of different products:

$$A = \frac{1,440}{48} = 30, B = \frac{1,200}{48} = 25, C = \frac{960}{48} = 20, D = \frac{1,008}{48} = 21 \text{ or total 96 runs.}$$

(3) One batch order is of 24 units. So the number of batches of different products:

$$A = \frac{1,440}{24} = 60, B = \frac{1,200}{24} = 50, C = \frac{960}{24} = 40, D = \frac{1,008}{24} = 42 \text{ or total 192 batches.}$$

(4) Computation of Cost driver rates

Activity	Activity Cost (Rs.)	Cost driver	Quantity	Cost driver rate
Set-up	80,000 + 1,12,000 = 1,92,000	No. of production run	96	Rs. 2,000 per production run
Store-receiving	60,000 + 84,000 = 1,44,000	Requisition raised	50 x 4 = 200	Rs. 720 per requisition
Inspection	40,000 + 56,000 = 96,000	No. of production run	96	Rs. 1,000 per production run
Material handling	10,368	Orders executed (No. of batches)	192	Rs. 54 per batch

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(5) Cost statement under Activity Based Costing:

Product	A	B	C	D
Output in units	1,440	1,200	960	1,008
	Rs.)	(Rs.)	(Rs.)	(Rs.)
Material	1,440 x 84 = 1,20,960	1,200 x 90 = 1,08,000	960 x 80 = 76,800	1,008 x 96 = 96,768
Labour	1,440 x 20 = 28,800	1,200 x 18 = 21,600	960 x 14 = 13,440	1,008 x 16 = 16,128
	1,49,760	1,29,600	90,240	1,12,896
Overhead cost:				
Set up	2,000 x 30 = 60,000	2,000 x 25 = 50,000	2,000 x 20 = 40,000	2,000 x 21 = 42,000
Store receiving	720 x 50 = 36,000	720 x 50 = 36,000	720 x 50 = 36,000	720 x 50 = 36,000
Inspection	1,000 x 30 = 30,000	1,000 x 25 = 25,000	1,000 x 20 = 20,000	1,000 x 21 = 21,000
Material handling	54 x 60 = 3,240	54 x 50 = 2,700	54 x 40 = 2,160	54 x 42 = 2,268
Total overhead cost	1,29,240	1,13,700	98,160	1,01,268
Total cost	2,79,000	2,43,300	1,88,400	2,14,164
Total cost per unit (Total cost / Output)	193.75	202.75	196.25	212.46

5. (a) The following information has been obtained from the records of a manufacturing unit:

	Rs.	Rs.
Sales 80,000 units @ Rs. 50		40,00,000
Material consumed	16,00,000	
Variable Overheads	4,00,000	
Labour Charges	8,00,000	
Fixed Overheads	7,20,000	35,20,000
Net Profit		4,80,000

CALCULATE:

- (i) The number of units by selling which the company will neither lose nor gain anything.
- (ii) The sales needed to earn a profit of 20% on sales.
- (iii) The extra units which should be sold to obtain the present profit if it is proposed to reduce the selling price by 20% and 25%.
- (iv) The selling price to be fixed to bring down its Break-even Point to 10,000 units under present conditions. (10 Marks)

ANSWER

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(a) Workings:

$$(1) \text{ Contribution per unit} = \text{Selling price per unit} - \text{Variable cost per unit}$$

$$= \text{Rs. } 50 - \{ \text{Rs. } (16,00,000 + 4,00,000 + 8,00,000) \div 80,000 \text{ units} \}$$

$$= \text{Rs. } 50 - \text{Rs. } 35 = \text{Rs. } 15$$

$$(2) \text{ Profit-Volume (P/V) Ratio} = \frac{\text{Contribution per unit}}{\text{Selling price per unit}} \times 100 = \frac{\text{Rs. } 15}{\text{Rs. } 50} \times 100 = 30\%$$

Calculations:**(i) The number of units to be sold for neither loss nor gain i.e. Break-even units:**

$$= \frac{\text{Fixed Overheads}}{\text{Contribution per unit}} = \frac{\text{Rs. } 7,20,000}{\text{Rs. } 15} = 48,000 \text{ units}$$

(ii) The sales needed to earn a profit of 20% on sales:

As we know

$$S = V + F + P$$

(S = Sales; V = Variable Cost; F = Fixed Cost; P = Profit)

Suppose Sales units are x then

$$\text{Rs. } 50x = \text{Rs. } 35x + \text{Rs. } 7,20,000 + \text{Rs. } 10x$$

$$\text{Rs. } 50x - \text{Rs. } 45x = \text{Rs. } 7,20,000$$

$$\text{Or, } x = \frac{\text{Rs. } 7,20,000}{\text{Rs. } 5} = 1,44,000 \text{ units}$$

Therefore, Sales needed = 1,44,000 units \times Rs. 50 = Rs. 72,00,000 to earn a profit of 20% on sales.

(iii) Calculation of extra units to be sold to earn present profit of Rs.4,80,000 under the following proposed selling price:

		When selling price is reduced by	
		20% (Rs.)	25% (Rs.)
	Selling price per unit	40.00 (Rs. 50 \times 80%)	37.50 (Rs. 50 \times 75%)
	Less: Variable Cost per unit	35.00	35.00
	Contribution per unit	5.00	2.50
	Desired Contribution:		
	Fixed Overheads	7,20,000	7,20,000
	Desired Profit	4,80,000	4,80,000
		12,00,000	12,00,000
(a)	Sales unit for desired contribution	2,40,000 units	4,80,000 units
	$\left[\frac{\text{Desired Contribution}}{\text{Contribution per unit}} \right]$	$\left[\frac{\text{Rs. } 12,00,000}{\text{Rs. } 5} \right]$	$\left[\frac{\text{Rs. } 12,00,000}{\text{Rs. } 2.5} \right]$
(b)	Units presently sold	80,000 units	80,000 units
(c)	Extra units to be sold {(a) - (b)}	1,60,000 units	4,00,000 units

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(iv) Sales price to bring down BEP to 10,000 units:

$$\begin{aligned} \text{B.E.P (Units)} &= \frac{\text{Fixed Cost}}{\text{Contribution per unit}} \\ \text{Or, Contribution per unit} &= \frac{\text{Rs. 7,20,000}}{10,000 \text{ units}} = \text{Rs. 72} \\ \text{So, Sales Price (per unit)} &= \text{Variable Cost} + \text{Contribution} \\ &= \text{Rs. 35} + \text{Rs. 72} = \text{Rs. 107} \end{aligned}$$

(b) (i) A Ltd. is an engineering manufacturing company producing job orders on the basis of specifications provided by the customers. During the last month it has completed three jobs namely A, B and C. The following are the items of expenditures which are incurred in addition to direct materials and direct employee cost:

(i) Office and administration cost - Rs. 6,00,000

(ii) Product blueprint cost for job A - Rs. 2,80,000

(iii) Hire charges paid for machinery used in job work B - Rs. 80,000

(iv) Salary to office attendants - Rs. 1,00,000

(v) One time license fee paid for software used to make computerised graphics for job C - Rs. 1,00,000.

(vi) Salary paid to marketing manager - Rs. 2,40,000.

Required:

CALCULATE direct expenses attributable to each job.

ANSWER

(i) Calculation of Direct expenses

Particulars	Job A (Rs.)	Job B (Rs.)	Job C (Rs.)
Product blueprint cost	2,80,000	--	--
Hire charges paid for machinery	--	80,000	--
License fee paid for software	--	--	1,00,000
Total Direct expenses	2,80,000	80,000	1,00,000

(ii) A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is Rs. 80 per piece. From the following data COMPUTE the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces

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Month	Batch Output (Pieces)	Material cost (Rs.)	Direct wages (Rs.)	Direct labour (Hours)
January	210	6,500	1,200	240
February	200	6,400	1,400	280
March	220	6,800	1,500	280
April	180	6,300	1,400	270
May	200	7,000	1,500	300
June	220	7,200	1,600	320

The other details are:

Month	Chargeable expenses (Rs.)	Direct labour hours
January	1,20,000	4,800
February	1,05,600	4,400
March	1,20,000	5,000
April	1,05,800	4,600
May	1,30,000	5,000
June	1,20,000	4,800

ANSWER

(ii)

Particulars	Jan. (Rs.)	Feb. (Rs.)	March (Rs.)	April (Rs.)	May (Rs.)	June (Rs.)	Total (Rs.)
Batch output (in pieces)	210	200	220	180	200	220	1,230
Sale value @ Rs.80	16,800	16,000	17,600	14,400	16,000	17,600	98,400
Material cost	6,500	6,400	6,800	6,300	7,000	7,200	40,200
Direct wages	1,200	1,400	1,500	1,400	1,500	1,600	8,600
Chargeable expenses*	6,000	6,720	6,720	6,210	7,800	8,000	41,450
Total cost	13,700	14,520	15,020	13,910	16,300	16,800	90,250
Profit per batch	3,100	1,480	2,580	490	(300)	800	8,150
Total cost per piece	65.2	72.6	68.3	77.3	81.5	76.4	73.4
Profit per piece	14.8	7.4	11.7	2.7	(1.5)	3.6	6.6

Overall position of the order for 1,200 pieces

Sales value of 1,200 pieces @ Rs. 80 per piece Rs. 96,000

Total cost of 1,200 pieces @ Rs. 73.4 per piece Rs. 88,080

Profit Rs. 7,920

* Chargeable expenses / Direct labour hour for the month X Direct labour hours for batch

6. (a) DISCUSS the Net Realisable Value (NRV) method of apportioning joint costs to by-products.

ANSWER

Net Realisable Value method: The realisation on the disposal of the by-product may be deducted from the total cost of production so as to arrive at the cost of the main product. For example, the amount realised by the sale of molasses in a sugar factory goes to reduce the cost of sugar produced in the factory.

When the by-product requires some additional processing and expenses are incurred in making it saleable to the best advantage of the concern, the expenses so incurred should be deducted from the total value realised from the sale of the by-product and only the net realisations should be deducted from the total cost of production to arrive at the cost of production of the main product. Separate accounts should be maintained for collecting additional expenses incurred on:

- (i) further processing of the by-product, and
- (ii) selling, distribution and administration expenses attributable to the by-product

(b) DIFFERENTIATE between Service costing and Product costing.

ANSWER

Service costing differs from product costing (such as job or process costing) in the following ways due to some basic and peculiar nature.

- (i) Unlike products, services are intangible and cannot be stored, hence, there is no inventory for the services.
- (ii) Use of Composite cost units for cost measurement and to express the volume of outputs.
- (iii) Unlike a product manufacturing, employee (labour) cost constitutes a major cost element than material cost.
- (iv) Indirect costs like administration overheads are generally have a significant proportion in total cost of a service as unlike manufacturing sector, service sector heavily depends on support services and traceability of costs to a service may not economically feasible.

(c) DISCUSS the Controllable and un-controllable variances.

ANSWER

Controllable and un-controllable variances: The purpose of the standard costing reports is to investigate the reasons for significant variances so as to identify the problems and take corrective action.

Variances are broadly of two types, namely, controllable and uncontrollable. Controllable variances are those which can be controlled by the departmental heads whereas uncontrollable variances are those which are beyond their control. Responsibility centres are answerable for all adverse variances which are controllable and are appreciated for favourable variances. Controllability is a subjective matter and varies from situation to situation. If the uncontrollable variances are of significant nature and are persistent, the standard may need revision.

(d) DISCUSS the Standard and Discretionary Cost Centres.

ANSWER

(i) Standards Cost Centre: Cost Centre where output is measurable and input required for the output can be specified. Based on a well-established study, an estimate of standard units of input to produce a unit of output is set. The actual cost for inputs is compared with the standard cost. Any deviation (variance) in cost is measured and analysed into controllable and uncontrollable cost. The manager of the cost centre is supposed to comply with the standard and held responsible for adverse cost variances. The input-output ratio for a standard cost centre is clearly identifiable.

(ii) Discretionary Cost Centre: The cost centre whose output cannot be measured in financial terms, thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and co-related with cost incurred on inputs.

RTP- NOV 2020**Material Cost**

1. A company uses four raw materials A, B, C and D for a particular product for which the following data apply :-

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (Rs.)	Delivery period (in weeks)			Re-order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?
B	8	8,000	22	5	6	7	70,000	?
C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 units of the said product. What would be the following quantities:-

- (i) Minimum Stock of A?
- (ii) Maximum Stock of B?
- (iii) Re-order level of C?
- (iv) Average stock level of A?
- (v) Re-order level of D?
- (vi) Minimum Stock level of D?

ANSWER 1**(i) Minimum stock of A**

Re-order level – (Average consumption × Average time required to obtain delivery)
= 60,000 kg. – (900units × 12 kg. × 3 weeks) = 27,600 kg.

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(ii) Maximum stock of B

Re-order level + Re-order quantity – (Min. Consumption × Min. Re-order period)
 = 70,000 kg. + 8,000 kg – (550 units × 8 kg. × 5 weeks).
 = 78,000 – 22,000 = 56,000 kg.

(iii) Re-order level of C

Maximum re-order period × Maximum Usage
 = 7 weeks × (1,250 units × 6 kg.) = 52,500 kg.

OR

= Minimum stock of C + (Average consumption × Average delivery time)
 = 25,500 kg. + [(900 units × 6 kg.) × 5 weeks] = 52,500 kg.

(iv) Average stock level of A

= (Minimum stock + Maximum stock) / 2 (Refer to Working Note)
 = (27,600 + 58,800) / 2 = 43,200 kg.

Working note

Maximum stock of A = ROL + ROQ – (Minimum consumption × Minimum re-order period)
 = 60,000 kg. + 12,000 kg. – [(550 units × 12 kg.) × 2 weeks] = 58,800 kg.

(v) Re-order level of D

Maximum re-order period × Maximum Usage
 = 3 weeks × (1,250 units × 5 kg.) = 18,750 kg

(vi) Minimum stock of D

Re-order level – (Average consumption × Average time required to obtain delivery)
 = 18,750 kg. – (900 units × 5 kg. × 2 weeks) = 9,750 kg.

Employee Cost

2. GZ Ld. pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee:

(a)	Basic salary per day	Rs.1,000
(b)	Dearness allowance (DA)	20% of basic salary
(c)	House rent allowance	16% of basic salary
(d)	Transport allowance	Rs.50 per day of actual work
(e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8th hours.

(f)	Work of holiday and Sunday	Double of per day basic rate provided works atleast 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.
(h)	Earned leave & Casual leave	These are paid leave.
(h)	Employer's contribution to Provident fund	12% of basic and DA
(i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr.Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked for 5 and 6 hours respectively without lunch break.

On 5th and 13th August he worked for 10 and 9 hours respectively.

During the month Mr. Z worked for 100 hours on Job no.HT200.

You are required to CALCULATE:

- (i) Earnings per day
- (ii) Effective wages rate per hour of Mr. Z.
- (iii) Wages to be charged to Job no.HT200.

ANSWER 2

Workings:

$$1. \text{ Normal working hours in a month} = (\text{Daily working hours} - \text{lunch break}) \times \text{no. of days} \\ = (8 \text{ hours} - 0.5 \text{ hours}) \times 26 \text{ days} = 195 \text{ hours}$$

$$2. \text{ Hours worked by Mr.Z} = \text{No. of normal days worked} + \text{Overtime} + \text{holiday/ Sunday worked} \\ = (21 \text{ days} \times 7.5 \text{ hours}) + (9.5 \text{ hours} + 8.5 \text{ hours}) + (5 \text{ hours} + 6 \text{ hours}) \\ = 157.5 \text{ hours} + 18 \text{ hours} + 11 \text{ hours} = 186.50 \text{ hours.}$$

(i) Calculation of earnings per day

Particulars	Amount (Rs.)
Basic salary (Rs.1,000 × 26 days)	26,000
Dearness allowance (20% of basic salary)	5,200
	31,200
House rent allowance (16% of basic salary)	4,160
Employer's contribution to Provident fund (12% × Rs.31,200)	3,744
Employer's contribution to Pension fund (7% ×	2,184

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Rs.31,200)	
	41,288
No. of working days in a month (days)	26
Rate per day	1,588
Transport allowance per day	50
Earnings per day	1,638

(ii) Calculation of effective wage rate per hour of Mr. Z:

Particulars	Amount (Rs.)
Basic salary (Rs.1,000 × 26 days)	26,000
Additional basic salary for Sunday & holiday (Rs.1,000 × 2 days)	2,000
Dearness allowance (20% of basic salary)	5,600
	33,600
House rent allowance (16% of basic salary)	4,480
Transport allowance (Rs.50 × 23 days)	1,150
Overtime allowance (Rs.160 × 2 × 2 hours)*	640

Employer's contribution to Provident fund (12% × Rs.33,600)	4,032
Employer's contribution to Pension fund (7% × Rs.33,600)	2,352
Total monthly wages	46,254
Hours worked by Mr. Z (hours)	186.5
Effective wage rate per hour	248

*(Daily Basic + DA) ÷ 7.5 hours
 = (1,000+200) ÷ 7.5 = Rs.160 per hour

(iii) Calculation of wages to be charged to Job no. HT200

= Rs. 248 × 100 hours = Rs. 24,800

Overheads: Absorption Costing Method

3. You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
	Total (Rs.)	Machines		
		A (Rs.)	B (Rs.)	C (Rs.)
Depreciation	2,00,000	75,000	75,000	50,000
Spare parts	1,00,000	40,000	40,000	20,000
Power	4,00,000			

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Consumable stores	80,000	30,000	25,000	25,000
Insurance of machinery	80,000			
Indirect labour	2,00,000			
Building maintenance expenses	2,00,000			
Annual interest on capital outlay	1,00,000	40,000	40,000	20,000
Monthly charge for rent and rates	20,000			
Salary of foreman (per month)	42,000			
Salary of Attendant (per month)	12,000			

(The foreman and the attendant control all the three machines and spend equal time on them.)

The following additional information is also available:

	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to :

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates.

ANSWER 3

(a) Computation of Machine Hour Rate

Basis of apportionment		Total (Rs.)	Machines		
			A (Rs.)	B (Rs.)	C (Rs.)
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	80,000	30,000	30,000	20,000
Indirect Labour	Direct Labour (2:3:3)	2,40,000	60,000	90,000	90,000
Building maintenance expenses	Floor Space (2:2:1)	2,00,000	80,000	80,000	40,000

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Rent and Rates	Floor Space (2:2:1)	2,40,000	96,000	96,000	48,000
Salary of foreman	Equal	5,04,000	1,68,000	1,68,000	1,68,000
Salary of attendant	Equal	1,44,000	48,000	48,000	48,000
Total standing charges		14,08,000	4,82,000	5,12,000	4,14,000
Hourly rate for standing charges			247.43	262.83	212.53
(B) Machine Expenses:					
Depreciation	Direct	2,00,000	75,000	75,000	50,000
Spare parts	Final estimates	1,32,250	46,000	57,500	28,750
Power	K.W. rating (3:2:3)	4,00,000	1,50,000	1,00,000	1,50,000
Consumable Stores	Direct	80,000	30,000	25,000	25,000
Total Machine expenses		8,12,250	3,01,000	2,57,500	2,53,750
Hourly Rate for Machine expenses			154.52	132.19	130.26
Total (A + B)		22,20,250	7,83,000	7,69,500	6,67,750
Machine Hour rate			401.95	395.02	342.79

Working Notes:

(i) Calculation of effective working hours:

No. of full off-days = No. of Sunday + No. of holidays

= 52 + 12 = 64 days

No. of half working days = 52 days – 2 holidays = 50 days

No. of full working days = 365 days – 64 days – 50 days = 251 days

Total working Hours = {(251 days × 8 hours) + (50 days × 4 hours)}

= 2,008 hours + 200 = 2,208 hours.

Total effective hours = Total working hours × 90% - 2% for break-down

= 2,208 hours × 90% - 2% (2,208 hours × 90%)

= 1,987.2 hours – 39.74 hours

= 1947.46 or Rounded up to 1948 hours.

(ii) Amount of spare parts is calculated as under:

	A(Rs.)	B (Rs.)	C (Rs.)
Preliminary estimates	40,000	40,000	20,000
Add: Increase in price @ 15%	6,000	6,000	3,000
	46,000	46,000	23,000
Add: Increase in consumption @ 25%	–	11,500	5,750
Estimated cost	46,000	57,500	28,750

(iii) Amount of Indirect Labour is calculated as under:

	(Rs.)
Preliminary estimates	2,00,000
Add: Increase in wages @ 20%	40,000
	2,40,000

(iv) Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

Activity Based Costing

4. KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (Rs.)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. or orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was Rs.24,62,000 and wages Rs.4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours
Set-ups	60
No. of inspections	18

ANSWER 4

(i) Calculation of cost driver rate:

Cost pool	Budgeted overheads (Rs.)	Cost driver	Cost driver rate (Rs.)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

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(ii) Calculation of cost for the batch:

Particulars	Amount (Rs.)	Amount (Rs.)
Material cost	24,62,000.00	
Wages	4,68,500.00	
Overheads:		
- Material procurement (Rs.1,535×56 orders)	85,960.00	
- Material handling (Rs.685.48×84 movements)	57,580.32	
- Maintenance (Rs.139.94×1,420 hours)	1,98,714.80	
- Set-up (Rs.628.97×60 set-ups)	37,738.20	
- Quality control (Rs.242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per units		436.17

Cost Sheet

5. The following details are available from the books of R Ltd. for the year ending 31st March 2020:

Particulars	Amount (Rs.)
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600
Wages to foreman and store keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	7,20,000
Cost of power & fuel	28,00,000
Production planning office expenses	12,60,000
Salary to delivery staffs	14,30,000
Income tax for the assessment year 2019-20	2,80,000
Fees to statutory auditor	1,80,000
Fees to cost auditor	80,000
Fees to independent directors	9,40,000

Donation to PM-national relief fund	1,10,000
Value of sales	2,82,60,000
Position of inventories as on 01-04-2019:	

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- Raw Material	6,20,000
- W-I-P	7,84,000
- Finished goods	14,40,000
Position of inventories as on 31-03-2020:	
- Raw Material	4,60,000
- W-I-P	6,64,000
- Finished goods	9,80,000

From the above information PREPARE a cost sheet for the year ended 31st March 2020.

ANSWER 5

Statement of Cost of R Ltd. for the year ended 31st March, 2020:

Sl. No. Particulars	Amount (Rs.)	Amount (Rs.)
(i) Material Consumed:		
- Raw materials purchased	84,00,000	
- Carriage inward	1,72,600	
Add: Opening stock of raw materials	6,20,000	
Less: Closing stock of raw materials	(4,60,000)	87,32,600
(ii) Direct employee (labour) cost:		
- Direct wages	60,00,000	
- Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
(iii) Direct expenses:		
- Consumable materials	4,80,000	
- Cost of power & fuel	28,00,000	32,80,000
Prime Cost		1,87,32,600
(iv) Works/ Factory overheads:		
- Wages to foreman and store keeper	8,40,000	
- Other indirect wages to factory staffs	1,35,000	9,75,000
Gross factory cost		1,97,07,600
Add: Opening value of W-I-P		7,84,000
Less: Closing value of W-I-P		(6,64,000)
Factory Cost		1,98,27,600

(v) Research & development cost paid for improvement in production process		9,60,000
(vi) Production planning office expenses		12,60,000
Cost of Production		2,20,47,600
Add: Opening stock of finished goods		14,40,000
Less: Closing stock of finished goods		(9,80,000)
Cost of Goods Sold		2,25,07,600

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(vii) Administrative overheads:		
- Salary to accountants	7,20,000	
- Fees to statutory auditor	1,80,000	
- Fees to cost auditor	80,000	
- Fee paid to independent directors	9,40,000	19,20,000
(viii) Selling overheads & Distribution overheads:		
- Salary to delivery staffs		14,30,000
Cost of Sales		2,58,57,600
Profit (balancing figure)		24,02,400
Sales		2,82,60,000

Note: Income tax and Donation to PM National Relief Fund is avoided in the cost sheet.

Cost Accounting System

6. A manufacturing company disclosed a net loss of Rs.6,94,000 as per their cost accounts for the year ended March 31,2020. The financial accounts however disclosed a net loss of Rs.10,20,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

(i) Factory Overheads under-absorbed	80,000
(ii) Administration Overheads over-absorbed	1,20,000
(iii) Depreciation charged in Financial Accounts	6,50,000
(iv) Depreciation charged in Cost Accounts	5,50,000
(v) Interest on investments not included in Cost Accounts	1,92,000
(vi) Income-tax provided	1,08,000
(vii) Interest on loan funds in Financial Accounts	4,90,000
(viii) Transfer fees (credit in financial books)	48,000
(ix) Stores adjustment (credit in financial books)	28,000
(x) Dividend received	64,000

PREPARE a memorandum Reconciliation Account.

ANSWER 6

Memorandum Reconciliation Accounts

Dr.		Cr.	
To Net Loss as per Costing books	6,94,000	By Administration overheads over recovered in cost accounts	1,20,000
To Factory overheads under absorbed in Cost Accounts	80,000	By Interest on investment not included in Cost Accounts	1,92,000
To Depreciation under charged in Cost Accounts	1,00,000	By Transfer fees in Financial books	48,000
To Income-Tax not provided in Cost Accounts	1,08,000	By Stores adjustment (Credit in financial books)	28,000
To Interest on Loan Funds in Financial Accounts	4,90,000	By Dividend received in financial books	64,000
		By Net loss as per Financial books	10,20,000
	1472000		1472000

Batch Costing

7. A Ltd. manufactures mother boards used in smart phones. A smart phone requires one mother board. As per the study conducted by the Indian Cellular Association, there will be a demand of 180 million smart phones in the coming year. A Ltd. is expected to have a market share of 5.5% of the total market demand of the mother boards in the coming year. It is estimated that it costs Rs.6.25 as inventory holding cost per board per month and that the set-up cost per run of board manufacture is Rs.33,500.

(i) COMPUTE the optimum run size for board manufacturing?

(ii) Assuming that the company has a policy of manufacturing 80,000 boards per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

ANSWER 7

(i) Computation of optimum run size

$$\text{Optimum run size or Economic Batch Quantity (EBQ)} = \sqrt{\frac{2 \times D \times S}{C}}$$

Where, D = Annual demand i.e. 5.5% of 18,00,00,000 = 99,00,000 units

S = Set-up cost per run = ₹33,500

C = Inventory holding cost per unit per annum
= ₹6.25 × 12 months = ₹75

$$\text{EBQ} = \sqrt{\frac{2 \times 99,00,000 \text{ units} \times ₹33,500}{₹75}} = 94,042.5 \text{ units or } 94,043 \text{ units}$$

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (₹)	Inventory holding cost (₹)	Total Cost (₹)
A	80,000 units	124 $\left(\frac{99,00,000}{80,000}\right)$	41,54,000 (124 × ₹33,500)	30,00,000 $\left(\frac{80,000 \times ₹75}{2}\right)$	71,54,000
B	94,043 units	106 $\left(\frac{99,00,000}{94,043}\right)$	35,51,000 (106 × ₹33,500)	35,26,612.5 $\left(\frac{94,043 \times ₹75}{2}\right)$	70,77,612.50
Extra Cost (A – B)					76,387.50

Job Costing

8. AP Ltd. received a job order for supply and fitting of plumbing materials. Following are the details related with the job work:

Direct Materials

AP Ltd. uses a weighted average method for the pricing of materials issues.

Opening stock of materials as on 12th August 2020:

- 15mm GI Pipe, 12 units of (15 feet size) @ Rs.600 each
- 20mm GI Pipe, 10 units of (15 feet size) @ Rs. 660 each
- Other fitting materials, 60 units @ Rs. 26 each
- Stainless Steel Faucet, 6 units @ Rs. 204 each
- Valve, 8 units @ Rs. 404 each

Purchases:

On 16th August 2020:

- 20mm GI Pipe, 30 units of (15 feet size) @ Rs. 610 each
- 10 units of Valve @ Rs. 402 each

On 18th August 2020:

- Other fitting materials, 150 units @ Rs. 28 each
- Stainless Steel Faucet, 15 units @ Rs. 209 each

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On 27th August 2020:

- 15mm GI Pipe, 35 units of (15 feet size) @ Rs. 628 each
- 20mm GI Pipe, 20 units of (15 feet size) @ Rs. 660 each
- Valve, 14 units @ Rs. 424 each

Issues for the hostel job:

On 12th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units

On 17th August 2020:

- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units

On 28th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- 15mm GI Pipe, 10 units of (15 feet size)
- Other fitting materials, 34 units
- Valve, 6 units

On 30th August 2020:

- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ Rs.100 per hour (includes 12 hours overtime)

Helper: 192 hours @ Rs.70 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ Rs.26 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

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You are required to

- (a) CALCULATE the total cost of the job.
- (b) CALCULATE the price to be charged from the customer.

ANSWER 8

(a) Calculation of Total Cost for the Job:

Particulars	Amount (Rs.)	Amount (Rs.)
Direct Material Cost:		
- 15mm GI Pipe (Working Note- 1)	11,051.28	
- 20mm GI Pipe (Working Note- 2)	2,588.28	
- Other fitting materials (Working Note- 3)	3,866.07	
- Stainless steel faucet	3,113.57	
- Valve	2,472.75	23,091.95
Direct Labour:		
- Plumber [(180 hours × Rs.100) + (12 hours × Rs.50)]	18,600.00	
- Helper [(192 hours × Rs.70) + (24 hours × Rs.35)]	14,280.00	32,880.00
- Overheads[Rs.26 × (180 + 192) hours]		9,672.00
Total Cost		65,643.95

(b) Price to be charged for the job work:

	Amount (Rs.)
Total Cost incurred on the job	65,643.95
Add: 25% Profit on Job Price	21,881.32
	87,525.27

Working Note:

1. Cost of 15mm GI Pipe

Date		Amount (₹)
17-08-2020	8 units × ₹ 600	4,800.00
28-08-2020	10 units × $\left(\frac{4 \times ₹ 600 + 35 \times ₹ 628}{39 \text{ units}} \right)$	6,251.28
		11,051.28

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2. Cost of 20mm GI Pipe

Date		Amount (₹)
12-08-2020	2 units × ₹ 660	1,320.00
28-08-2020	2 units × $\left(\frac{8 \times ₹ 660 + 30 \times ₹ 610 + 20 \times ₹ 660}{58 \text{ units}} \right)$	1,268.28
		2,588.28

3. Cost of Other fitting materials

Date		Amount (₹)
12-08-2020	18 units × ₹ 26	468.00
17-08-2020	30 units × ₹ 26	780.00
28-08-2020	34 units × $\left(\frac{12 \times ₹ 26 + 150 \times ₹ 28}{162 \text{ units}} \right)$	946.96
30-08-2020	60 units × $\left(\frac{12 \times ₹ 26 + 150 \times ₹ 28}{162 \text{ units}} \right)$	1,671.11
		3,866.07

Process Costing

9. M Ltd. produces a product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of Rs.85 per unit, product Z is produced. The information related for the month of August 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Other materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is Rs.2,88,000, which is absorbed as a percentage of direct wages.

The scrapes are sold at Rs.10 per unit

Product-Z can be sold at Rs.135 per unit with a selling cost of Rs.15 per unit

No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600

There is not stock at the beginning and end of the month.

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You are required to PREPARE accounts for:

- (i) Process-I, II and III
 (ii) By-product process.

ANSWER 9

(i) **Process-I A/c**

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of Rs.42,000)	-	84,000			
	7,000		3,42,000	7,000	3,42,000

$$* \frac{\text{₹}(3,42,000 - 3,500)}{(7,000 - 350)\text{units}} = \text{₹}50.9022$$

Process-II A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600)	660	6,600
To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of Rs.54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

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$$** \frac{\text{₹}(6,49,955 - 6,600)}{(6,600 - 660)\text{units}} = \text{₹}108.3089$$

Process-III A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-I A/c	5,200	5,63,206	By Normal loss (5% of 5,200)	260	2,600
To Other materials	-	84,200	By Product- X***	4,800	8,64,670
To Direct wages		-		48,000	
To Direct expenses	-	14,000	By Product-Z# (Rs.35×600)	600	21,000
To Production OH (200% of Rs.48,000)	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

$$*** \frac{\text{₹}(8,05,406 - 2,600 - 21,000)}{(5,200 - 260 - 600)\text{units}} = \text{₹}180.1396$$

$$\# \text{ Realisable value} = \text{₹}135 - (85+15) = \text{₹}35$$

(ii) By-Product Process A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51000			
To Selling expenses	-	9000			
	600	81000		600	81000

Joint Products & By Products

10. ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2019-20, the selling prices of the items and the total amounts sold were:

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X – 186 tons sold for Rs.3,000 per ton

Y – 527 tons sold for Rs.2,250 per ton

Z – 736 tons sold for Rs.1,500 per ton

The total joint manufacturing costs for the year were Rs.12,50,000. An additional Rs. 6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2020, using Net realizable value (NRV) method of joint cost allocation.

ANSWER 10

(i) (a) Statement of Joint Cost allocation of inventories of X, Y and Z
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(Rs.)	(Rs.)		
Final sales value of total production (Working Note 1)	10,98,000 (366 × Rs.3,000)	13,20,750 (587 × Rs.2,250)	11,41,500 (761 × Rs.1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

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Cost of goods sold as on March 31, 2020
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(Rs.)	(Rs.)	(Rs.)	
Allocated joint cost	4,66,797	5,61,496	2,21,707	1250000
Additional costs	--	--	6,20,000	6200000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	1870000
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18 %)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	314648
Cost of goods sold	2,37,226	5,04,111	8,14,015	1555352

Working Notes
1. Total production of three products for the year 2019-2020

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)]	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. Joint cost apportioned to each product:

$$\frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

$$\text{Total cost of Product X} = \frac{\text{₹ } 12,50,000}{\text{₹ } 29,40,250} \times \text{₹ } 10,98,000 = \text{₹ } 4,66,797$$

$$\text{Total cost of Product Y} = \frac{\text{₹ } 12,50,000}{\text{₹ } 29,40,250} \times \text{₹ } 13,20,750 = \text{₹ } 5,61,496$$

$$\text{Total cost of Product Z} = \frac{\text{₹ } 12,50,000}{\text{₹ } 29,40,250} \times \text{₹ } 5,21,500 = \text{₹ } 2,21,707$$

Service Costing

11. A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT
2	20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 per cent of vehicles are laid up for repairs every day.

The following information is related to the month of August, 2020:

Salary of Transport Manager	Rs. 60,000
Salary of 30 drivers	Rs. 20,000 each driver
Wages of 25 Helpers	Rs. 12,000 each helper
Loading and unloading charges	Rs. 850 each trip
Consumable stores (depends on running of vehicles)	Rs. 1,35,000
Insurance (Annual)	Rs. 8,40,000
Road Licence (Annual)	Rs. 6,00,000
Cost of Diesel per litre	Rs. 78
Kilometres run per litre each vehicle	5 Km.
Lubricant, Oil etc.	Rs. 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	Rs. 4,25,000
Garage rent (Annual)	Rs. 9,00,000
Routine mechanical services	Rs. 3,00,000
Electricity charges (for office, garage and washing station)	Rs. 55,000
Depreciation of vehicles (on time basis)	Rs. 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 per cent of transport manager's salary is debited to the workshop. The transport department has been apportioned Rs.88,000 by the workshop during the month. During the month operation was for 25 days.

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You are required:

(i) CALCULATE per ton-km operating cost.

(ii) DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight.

ANSWER 11

(i) Operating Cost Sheet for the month of August, 2020

Particulars	Amount (Rs.)
A. Fixed Charges:	
Manager's salary (Rs.60,000 × 60%)	36,000
Drivers' Salary (Rs.20,000 x 30 drivers)	6,00,000
Helpers' wages (Rs.12,000 x 25 helpers)	3,00,000
Insurance (Rs.8,40,000 ÷ 12 months)	70,000
Road licence (Rs.6,00,000 ÷ 12 months)	50,000
Garage rent (Rs.9,00,000 ÷ 12 months)	75,000
Routine mechanical services	3,00,000
Electricity charges (for office, garage and washing station)	55,000
Depreciation of vehicles	6,00,000
Apportioned workshop expenses	88,000
Total (A)	21,74,000
B. Variable Charges:	
Loading and unloading charges (Working Note 1)	7,65,000
Consumable Stores	1,35,000
Cost of diesel (Working Note 2)	14,04,000
Lubricant, Oil etc.	1,15,000
Replacement of Tyres, Tubes & other parts	4,25,000
Total (B)	28,44,000
C. Total Cost (A + B)	50,18,000
D. Total Ton-Kms. (Working Note 3)	9,43,200
E. Cost per ton-km. (C ÷ D)	5.32

(ii) Calculation of Chargeable Freight

Cost per ton-km.	Rs. 5.32
Add: Profit @ 25% on freight or 33⅓% on cost	Rs. 1.77
Chargeable freight per ton-km.	Rs. 7.09

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Working Notes:**1. Wages paid to loading and unloading labours**

Numbers of vehicles available per day × No. of days × trips × wages per trip
 (20 vehicles × 90%) × 25 days × 2 trips × Rs.850
 18 × 25 × 2 × 850 = Rs.7,65,000

2. Cost of Diesel:

Distance covered by each vehicle during August, 2020
 = 100 k.m. X 2 X 25 days X 90% = 4,500 km.

$$\text{Consumption of diesel} = \frac{4,500 \text{ k.m.} \times 20 \text{ vehicles}}{5 \text{ k.m.}} = 18,000 \text{ litres.}$$

3. Calculation of total ton-km:

Total Ton-Km. = Total Capacity X Distance covered by each vehicle X Average Capacity Utilization ratio.

$$= \left[(5 \times 9 \text{ MT}) + (6 \times 12 \text{ MT}) + (7 \times 15 \text{ MT}) + (2 \times 20 \text{ MT}) \right] \times 4,500 \text{ k.m.} \times \frac{(90\% + 70\%)}{2}$$

$$= (45 + 72 + 105 + 40) \times 4,500 \text{ k.m.} \times 80\%$$

$$= 262 \times 4,500 \times 80\%$$

$$= 9,43,200 \text{ ton-km.}$$

Standard Costing**12. Following are the standard cost for a product-X:**

Direct materials 10 kg @ Rs. 90 per kg	900
Direct labour 8 hours @ Rs.100 per hour	800
Variable Overhead 8 hours @ Rs.15 per hour	120
Fixed Overhead	400
	2,220

Budgeted output for the year was 2,000 units. Actual output is 1,800 units.
 Actual cost for year is as follows:

	(Rs.)
Direct Materials 17,800 Kg @ Rs. 92 per Kg.	16,37,600
Direct Labour 14,000 hours @ Rs. 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

- (i) Material Usage Variance
- (ii) Material Price Variance
- (iii) Material Cost Variance
- (iv) Labour Efficiency Variance
- (v) Labour Rate Variance
- (vi) Labour Cost Variance
- (vii) Variable Overhead Cost Variance
- (viii) Fixed Overhead Cost Variance.

ANSWER 12

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
= Rs. 90 (18,000 kg. – 17,800 kg.)
= Rs. 18,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
= 17,800 kg. (Rs. 90 – Rs. 92) = Rs. 35,600 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
= (SQ × SP) – (AQ × AP)
= (18,000 kg. × Rs. 90) – (17,800 kg. × Rs. 92)
= Rs. 16,20,000 – Rs. 16,37,600
= Rs. 17,600 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= Rs. 100 (1,800 units × 8 – 14,000 hrs.)
= Rs. 100 (14,400 hrs. – 14,000 hrs.)
= Rs. 40,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 14,000 hrs. (Rs. 100 – Rs. 104)
= Rs. 56,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
 = (SH × SR) – (AH × AR)
 = (14,400 hrs. × Rs. 100) – (14,000 hrs. × Rs. 104)
 = Rs. 14,40,000 – Rs. 14,56,000
 = Rs.16,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
 = (14,400 hrs. × Rs. 15) – Rs. 2,17,500
 = Rs. 1,500 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
 = (1,800 units × Rs.400) - Rs. 7,68,000
 = Rs. 7,20,000 – Rs. 7,68,000 = Rs. 48,000 (Adverse)

Marginal Costing

13. J Ltd. manufactures a Product-Y. Analysis of income statement indicated a profit of Rs. 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are Rs.1,000 lakhs which appears to be high. Existing selling price is Rs.680 per unit. The company is considering revising the profit target to Rs. 700 lakhs. You are required to COMPUTE –

- Break- even point at existing levels in units and in rupees.
- The number of units required to be sold to earn the target profit.
- Profit with 10% increase in selling price and drop in sales volume by 10%.
- Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and Rs. 170 lakhs in the fixed cost is envisaged.

ANSWER 13

Sales Volume 5,00,000 Units

Computation of existing contribution

Particulars	Per unit (Rs.)	Total (Rs. In lakhs)
Sales	680	3,400
Fixed Cost	200	1,000
Profit	50	250
Contribution	250	1,250
Variable Cost (Sales – Contribution)	430	2,150

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$$(i) \text{ Break even sales in units} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{\text{₹}10,00,00,000}{\text{₹}250} = 4,00,000 \text{ units}$$

$$\text{Break even sales in rupees} = 4,00,000 \text{ units} \times \text{₹} 680 = \text{₹} 2,720 \text{ lakhs}$$

OR

$$\text{P/V Ratio} = \frac{250}{680} \times 100 = 36.76\%$$

$$\text{B.E.P (Rupees)} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} = \frac{10,00,00,000}{36.76\%} = \text{₹} 2,720 \text{ lakhs (approx.)}$$

(ii) Number of units sold to achieve a target profit of ₹700 lakhs:

$$\begin{aligned} \text{Desired Contribution} &= \text{Fixed Cost} + \text{Target Profit} \\ &= 1,000 \text{ L} + 700 \text{ L} = 1,700 \text{ L} \end{aligned}$$

$$\text{Number of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{17,00,00,000}{250} = 6,80,000 \text{ units}$$

(iii) Profit if selling price is increased by 10% and sales volume drops by 10%:

Existing Selling Price per unit = Rs. 680

Revised selling price per unit = Rs. 680 × 110% = Rs.748

Existing Sales Volume = 5,00,000 units

Revised sales volume = 5,00,000 units – 10% of 5,00,000 = 4,50,000 units.

Statement of profit at sales volume of 4,50,000 units @ Rs. 748 per unit

Particulars	Per unit (Rs.)	Total (Rs. In lakhs)
Sales	748	3,366
Less: Variable Costs	430	1,935
Contribution	318	1,431
Less: Fixed Cost		1,000
Profit		431

(iv) Volume to be achieved to earn target profit of Rs.700 lakhs with revised selling price and reduction of 10% in variable costs and Rs.170 lakhs in fixed cost:

Revised selling price per unit = Rs.748

Variable costs per unit existing = Rs.430

Revised Variable Costs

Reduction of 10% in variable costs = Rs. 430 – 10% of 430

= Rs. 430 – Rs.43

= Rs.387

Total Fixed Cost (existing) = Rs. 1,000 lakhs

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Reduction in fixed cost = Rs. 170 lakhs

Revised fixed cost = Rs. 1,000 lakhs – Rs. 170 lakhs = Rs.830 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = Rs. 748 – Rs. 387 = Rs. 361

Desired Contribution = Revised Fixed Cost + Target Profit

= Rs. 830 lakhs + Rs.700 lakhs = Rs.1,530 lakhs

No. of units to be sold = Desired Contribution / Contribution per unit

= 15,30,00,000 / 361

= 4,23,823 units

Budget and Budgetary Control

14. The information of Z Ltd. for the year ended 31st March 2020 is as below:

Direct materials	17,50,000
Direct wages	12,50,000
Variable factory overhead	9,50,000
Fixed factory overhead	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

	X	Y
Output (units)	8,000	4,000
Selling price per unit (Rs.)	600	550
Direct material per unit (Rs.)	140	157.50
Direct wages per unit (Rs.)	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:

Product X – Rs.40 per unit and Product Y- Rs.70 per unit.

For the FY 2020-21, due to a pandemic, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by 10%. Products will be required to be sold at a discount of 20%.

You are required to:

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- (i) PREPARE product- wise profitability statement on marginal costing method for the FY 2019-20 and
(ii) PREPARE a budget for the FY 2020-21.

ANSWER 14

- (i)
- Product-wise Profitability Statement for the FY 2019-20:**

Particulars	Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (Rs.140×8,000)	6,30,000 (Rs.157.50×4,000)	17,50,000
Direct wages	7,20,000 (Rs.90×8,000)	5,30,000 (Rs.132.5×4,000)	12,50,000
Variable factory overheads	5,47,200 (76%of 7,20,000)	4,02,800 (76%of 5,30,000)	9,50,000
Other variable costs	3,20,000 (Rs.40×8,000)	2,80,000 (Rs.70×4,000)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			8,50,000

- (ii)
- Preparation of Budget for the FY 2020-21:**

Particulars	Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)	6,400 (8,000×80%)	3,600 (4,000×90%)	
Selling price per unit	480 (600×80%)	440 (550×80%)	
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (Rs.140×6,400)	5,67,000 (Rs.157.50×3,600)	14,63,000
Direct wages per unit	6,91,200 (Rs.108×6,400)	5,72,400 (Rs.159×3,600)	12,63,600
Variable factory overheads	5,25,312 (76%of 6,91,200)	4,35,024 (76%of 5,72,400)	9,60,336

Other variable costs	2,56,000 (Rs.40×6,400)	2,52,000 (Rs.70×3,600)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110%of Rs.4,00,000)	-	-	4,40,000
Profit/ (Loss)			(11,78,936)

Miscellaneous

15. (a) DISCUSS short notes on (i) Discretionary Cost Centre and (ii) Investment Centre
 (b) DESCRIBE the three advantages of Cost-plus contract.
 (c) STATE the advantages of Zero-based budgeting.
 (d) DESCRIBE Operation costing with two examples of industries where operation costing is applied.

ANSWER 15

(a) (i) Discretionary Cost Centre: The cost centre whose output cannot be measured in financial terms, thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and co-related with cost incurred on inputs.

(ii) Investment Centres: These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.

(b) Advantages of Cost plus contracts are as follows:

- (i) The Contractor is assured of a fixed percentage of profit. There is no risk of incurring any loss on the contract.
- (ii) It is useful specially when the work to be done is not definitely fixed at the time of making the estimate.
- (iii) Contractee can ensure himself about 'the cost of the contract', as he is empowered to examine the books and documents of the contractor to ascertain the veracity of the cost of the contract.

(c) The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the evaluation of different activities and ranks them in order of preference for the allocation of scarce resources.
- It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
- It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of wasteful expenditure can be easily identified and eliminated.
- Departmental budgets are closely linked with corporation objectives.
- The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

(d) This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. This means conversion activities are similar for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batch wise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

The two examples of industries are Ready made garments and Jewellery making.

RTP- MAY 2020**Material Cost**

1. Arnav Electronics manufactures electronic home appliances. It follows weighted average Cost method for inventory valuation. Following are the data of component X:

Date	Particulars	Units	Rate per unit (Rs.)
15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order-008)	10,000	-
05-01-20	MRN**-003 (against the Purchase Order-008)	500	-
06-01-20	Material Requisition-011	3,000	-
07-01-20	Purchase Order- 010	10,000	9,750
10-01-20	Material Requisition-012	4,500	-
12-01-20	GRN-009 (against the Purchase Order-009)	10,000	-
12-01-20	MRN-004 (against the Purchase Order-009)	400	-
15-01-20	Material Requisition-013	2,200	-
24-01-20	Material Requisition-014	1,500	-
25-01-20	GRN-010 (against the Purchase Order-010)	10,000	-
28-01-20	Material Requisition-015	4,000	-
31-01-20	Material Requisition-016	3,200	-

*GRN- Goods Received Note; **MRN- Material Returned Note

Based on the above data, you are required to CALCULATE:

(i) Re-order level

(ii) Maximum stock level

(iii) Minimum stock level

(iv) PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.

(v) Value of components used during the month of January, 2020.

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(vi) Inventory turnover ratio.

ANSWER 1

Workings:

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-20)

Minimum component usage = 1,500 units (Material requisition on 24-01-20)

Lead time is calculated from purchase order date to material received date

Maximum lead time = 21 days (15-12-2019 to 05-01-2020)

Minimum lead time = 14 days (30-12-2019 to 12-01-2020)

Calculations:

(i) Re-order level

= Maximum usage × Maximum lead time

= 4,500 units × 21 days = 94,500 units

(ii) Maximum stock level

= Re-order level + Re-order Quantity – (Min. Usage × Min. lead time)

= 94,500 units + 10,000 units – (1,500 units × 14 days)

= 1,04,500 units – 21,000 units = 83,500 units

(iii) Minimum stock level

= Re-order level – (Avg. consumption × Avg. lead time)

= 94,500 units – (3,000 units × 17.5 days)

= 94,500 units – 52,500 units

= 42,000 units

(iv) Store Ledger for the month of January 2020:

Date	Receipts			Issue			Balance				
	GRN/ MRN	Units	Rate ₹	Amt. (₹ '000)	MRN/ MR	Units	Rate ₹	Amt. (₹ '000)	Units	Rate ₹	Amt. (₹ '000)
01-01-20	-	-	-	-	-	-	-	-	3,500	9,810	34,335
05-01-20	008	10,000	9,930	99,300	003	500	9,930	4,965	13,000	9,898	1,28,670
06-01-20	-	-	-	-	011	3,000	9,898	29,694	10,000	9,898	98,980
10-01-20	-	-	-	-	012	4,500	9,898	44,541	5,500	9,898	54,439
12-01-20	009	10,000	9,780	97,800	004	400	9,780	3,912	15,100	9,823	1,48,327
15-01-20	-	-	-	-	013	2,200	9,823	21,611	12,900	9,823	1,26,716
24-01-20	-	-	-	-	014	1,500	9,823	14,734	11,400	9,823	1,11,982
25-01-20	010	10,000	9,750	97,500	-	-	-	-	21,400	9,789	2,09,482
28-01-20	-	-	-	-	015	4,000	9,789	39,156	17,400	9,789	1,70,326
31-01-20	-	-	-	-	016	3,200	9,789	31,325	14,200	9,789	1,39,001

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[Note: Decimal figures may be rounded-off to the nearest rupee value wherever required]
 Value of stock as on 31-01-2020 ('000) = Rs.1,39,001

(v) Value of components used during the month of January 2020:

Sum of material requisitions 011 to 016 ('000)

= Rs. 29,694 + Rs. 44,541 + Rs. 21,611 + Rs. 14,734 + Rs. 39,156 + Rs. 31,325 = Rs. 1,81,061

(vi) Inventory Turnover Ratio

$$= \frac{\text{Value of materials used}}{\text{Average stock value}}$$

$$= \frac{₹ 1,81,061}{₹ (1,39,001 + 34,335) / 2} = \frac{₹ 1,81,061}{₹ 86,668} = 2.09$$

Employee Cost

2. From the following information, CALCULATE employee turnover rate using – (i) Separation Method, (ii) Replacement Method, (iii) New Recruitment Method, and (iv) Flux Method:

No. of workers as on 01.01.2019 = 3,600

No. of workers as on 31.12.2019 = 3,790

During the year, 40 workers left while 120 workers were discharged. 350 workers were recruited during the year, of these 150 workers were recruited because of exits and the rest were recruited in accordance with expansion plans.

ANSWER 2

Employee turnover rate using:

(i) Separation Method:

$$= \frac{\text{No. of workers left} + \text{No. of workers discharged}}{\text{Average number of workers}} \times 100$$

$$= \frac{(40 + 120)}{(3,600 + 3,790) / 2} \times 100 = \frac{160}{3,695} \times 100 = 4.33\%$$

(ii) Replacement Method:

$$= \frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100 = \frac{150}{3,695} \times 100 = 4.06\%$$

(iii) New Recruitment Method:

$$= \frac{\text{No. of workers newly recruited}}{\text{Average number of workers}} \times 100$$

$$= \frac{\text{No. Recruitments} - \text{No. of Replacements}}{\text{Average number of workers}} \times 100$$

$$= \frac{350 - 150}{3,695} \times 100 = \frac{200}{3,695} \times 100 = 5.41\%$$

(iv) Flux Method:

$$= \frac{\text{No. of separations} + \text{No. of accessions}}{\text{Average number of workers}} \times 100$$

$$= \frac{(160 + 350)}{(3,600 + 3,790) / 2} \times 100 = \frac{510}{3,695} \times 100 = 13.80\%$$

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Overheads: Absorption Costing Method

3. ABC Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of January, 2020:

Rent and rates	6,25,000
General lighting	7,50,000
Indirect wages	1,87,500
Power	25,00,000
Depreciation on machinery	5,00,000
Insurance of machinery	2,00,000

Other Information:

	P1	P2	P3	S1	S2
Direct wages (Rs.)	3,75,000	2,50,000	3,75,000	1,87,500	62,500
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (Rs.)	30,00,000	40,00,000	50,00,000	2,50,000	2,50,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	-	-

Expenses of the service departments S1 and S2 are reapportioned as below:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	?	10%
S2	40%	20%	30%	10%	?

Required:

- (i) COMPUTE overhead absorption rate per production hour for each production department.
- (ii) DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is Rs.6,250 and direct labour cost is Rs.3,750.

ANSWER 3
Primary Distribution Summary

Item of cost	Basis of apportionment	Total (Rs.)	P1 (Rs.)	P2 (Rs.)	P3 (Rs.)	S1 (Rs.)	S2 (Rs.)
Direct wages	Actual	2,50,000	--	--	--	1,87,500	62,500

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Rent and rates	Floor area (4 : 5 : 6 : 4 : 1)	6,25,000	1,25,000	1,56,250	1,87,500	1,25,000	31,250
General lighting	Light points (2 : 3 : 4 : 2 : 1)	7,50,000	1,25,000	1,87,500	2,50,000	1,25,000	62,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	1,87,500	56,250	37,500	56,250	28,125	9,375

Power	Horse Power of machines used (6 : 3 : 5 : 1)	25,00,000	10,00,000	5,00,000	8,33,333	1,66,667	₹
Depreciation of machinery	Value of machinery (12:16:20:1:1)	5,00,000	1,20,000	1,60,000	2,00,000	10,000	10,000
Insurance of machinery	Value of machinery (12:16:20:1:1)	2,00,000	48,000	64,000	80,000	4,000	4,000
		5012500	1474250	1105250	1607083	646292	179625

Overheads of service cost centres:

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

$$S1 = 6,46,292 + 0.10 S2$$

$$S2 = 1,79,625 + 0.10 S1$$

Substituting the value of S2 in S1 we get

$$S1 = 6,46,292 + 0.10 (1,79,625 + 0.10 S1)$$

$$S1 = 6,46,292 + 17,962.5 + 0.01 S1$$

$$0.99 S1 = 6,64,254.5$$

$$- S1 = \text{Rs.} 6,70,964$$

$$- S2 = 1,79,625 + 0.10 \times 6,70,964$$

$$= \text{Rs.} 2,46,721.4$$

Secondary Distribution Summary

Particulars	Total (Rs.)	P1 (Rs.)	P2 (Rs.)	P3 (Rs.)
Allocated and Apportioned overheads as per primary distribution	41,86,583	14,74,250	11,05,250	16,07,083
S1	6,70,964	1,34,192.8	2,01,289.2	2,68,385.6
S2	2,46,721.4	98,688.6	49,344.3	74,016.5
		1707131.40	1355883.50	1949485.10

(i) Overhead rate per hour

	P1	P2	P3
Total overheads cost (Rs.)	17,07,131.4	13,55,883.5	19,49,485.1
Production hours worked	6,225	4,050	4,100
Rate per hour (Rs.)	274.24	334.79	475.48

(ii) Cost of Product X

	(Rs.)
Direct material	6,250.00
Direct labour	3,750.00
Prime cost	10,000.00
Production on overheads	
P1 5 hours X Rs. 274.24 =	
1,371.20	
P2 3 hours X Rs. 334.79 =	
1,004.37	
P3 4 hours X Rs. 475.48 =	
1,901.92	4,277.49
Factory cost	14,277.49

Activity Based Costing

4. Following are the data of three product lines of a departmental store for the year 2019-20:

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	Soft drinks	Fresh produce	Packaged food
Revenues	Rs. 39,67,500	Rs. 1,05,03,000	Rs. 60,49,500
Cost of goods sold	Rs. 30,00,000	Rs. 75,00,000	Rs. 45,00,000
Cost of bottles returned	Rs. 60,000	Rs. 0	Rs. 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Additional information related with the store are as follows:

Activity	Description of activity	Total Cost	Cost-allocation base
Bottles returns	Returning of empty bottles	Rs. 60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	Rs. 7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	Rs. 12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on-going restocking	Rs. 8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	Rs. 15,36,000	15,36,000 items sold

Required:

CALCULATE the total cost and operating income using Activity Based Costing method.

ANSWER 4

Working notes:

(i) Total support cost:

Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

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(ii) Cost for each activity cost driver:

Activity (1)	Total cost (Rs.) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	Rs.500 per purchase order
Delivery	12,60,000	3,150 deliveries	Rs.400 per delivery
Shelf-stocking	8,64,000	8,640 hours	Rs.100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	Rs.1 per item sold

Statement of Total cost and Operating income

	Soft drinks (Rs.)	Fresh Produce (Rs.)	Packaged Food (Rs.)	Total (Rs.)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5400:2700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income C: {(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000

* Refer to working note (ii)

Cost Sheet

5. From the following data of Arnav Metallic Ltd., CALCULATE Cost of production:

(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for plant & machinery	96,000
(iii)	Raw materials purchased	64,00,000
(iv)	Opening stock of raw materials	2,88,000
(v)	Closing stock of raw materials	4,46,000
(vi)	Wages paid	23,20,000
(vii)	Value of opening Work-in-process	4,06,000
(viii)	Value of closing Work-in-process	6,02,100
(ix)	Quality control cost for the products in manufacturing	86,000

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	process	
(x)	Research & development cost for improvement in production process	92,600
Administrative cost for:		
	- Factory & production	9,00,000
	- Others	11,60,000
(xii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiii)	Packing cost necessary to preserve the goods for further processing	10,200
(xiv)	Salary paid to Director (Technical)	8,90,000

ANSWER 5

Calculation of Cost of Production of Arnav Metallic Ltd. for the period.....

Particulars	Amount (Rs.)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000

	1,07,17,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,21,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,22,000

Notes:

- (i) Other administrative overhead does not form part of cost of production.
(ii) Salary paid to Director (Technical) is an administrative cost.

Cost Accounting System

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6. The following are the balances existed in the books of JPG Ltd. for the year ended, 31st March, 2019:

Particulars	Dr.	Cr.
	(₹)	(₹)
Stores Ledger Control A/c	30,00,000	
WIP Control A/c	15,00,000	
Finished Goods Control A/c	25,00,000	
Manufacturing Overheads Control A/c		1,50,000
Cost Ledger Control A/c		68,50,000

During the year 2019-20, the following transactions took place:

Particulars	Amount (Rs.)
Finished product (at cost)	22,50,000
Manufacturing Overhead incurred	8,50,000
Raw material purchased	12,50,000
Factory wages	4,00,000
Indirect labour	2,00,000
Cost of sales	17,50,000
Materials issued to production	13,50,000
Sales returned (at cost)	90,000
Material returned to suppliers	1,30,000
Manufacturing overhead charged to production	8,50,000

Required:

PREPARE the following control accounts and Trial balance at the end of the year: Cost Ledger, Stores Ledger, Work-in-process, Finished Stock, Manufacturing Overhead, Wages and Cost of Sales.

ANSWER 6

Cost Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Stores Ledger control A/c	1,30,000	By Balance b/d	68,50,000
To Costing Profit & Loss A/c	17,10,000	By Stores Ledger control A/c	12,50,000
		By Wages Control A/c	6,00,000
To Balance c/d	77,10,000	By Manufacturing overhead control A/c	8,50,000
	95,50,000		95,50,000

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Store Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Balance b/d	30,00,000	By WIP Control A/c	13,50,000
To Cost Ledger control A/c	12,50,000	By Cost Ledger control A/c (return)	1,30,000
		By Balance c/d	27,70,000
	42,50,000		42,50,000

WIP Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	15,00,000	By Finished Stock Control A/c	22,50,000
To Wages Control A/c	4,00,000		
To Stores Ledger control A/c	13,50,000		
To Manufacturing overhead control A/c	8,50,000	By Balance c/d	18,50,000
	41,00,000		41,00,000

Finished Stock Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,00,000	By Cost of Sales A/c	17,50,000
To WIP Control A/c	22,50,000		
To Cost of Sales A/c (sales return)	90,000	By Balance c/d	30,90,000
	48,40,000		48,40,000

Manufacturing Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	8,50,000	By Balance b/d	1,50,000
To Wages Control A/c	2,00,000	By WIP Control A/c	8,50,000
		By Costing P&L A/c (under recovery)	50,000
	10,50,000		10,50,000

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	6,00,000	By WIP Control A/c	4,00,000
		By Manufacturing overhead control A/c	2,00,000
	6,00,000		6,00,000

Cost of Sales Account

Particulars	(₹)	Particulars	(₹)
To Finished Stock Control A/c	17,50,000	By Finished Stock Control A/c (sales return)	90,000

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		By Costing Profit & Loss A/c	16,60,000
	17,50,000		17,50,000

Trial Balance

Particulars	Dr.	Cr.
	(₹)	(₹)
Stores Ledger Control A/c	27,70,000	
WIP Control A/c	18,50,000	
Finished Goods Control A/c	30,90,000	
Cost Ledger Control A/c		77,10,000
	77,10,000	77,10,000

Working:
Costing P&L Account

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	16,60,000	By Cost Ledger control A/c	17,10,000
To Manufacturing overhead control A/c	50,000		
	17,10,000		17,10,000

Job Costing

7. A factory uses job costing system. The following data are obtained from its books for the year ended 31st March, 2020:

Direct materials	18,00,000
Direct wages	15,00,000
Selling and distribution overheads	10,50,000
Administration overheads	8,40,000
Factory overheads	9,00,000
Profit	12,18,000

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2019-20, the factory received an order for a job. It is estimated that direct materials required will be Rs.4,80,000 and direct labour will cost Rs.3,00,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

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ANSWER 7**(i) Production Statement**

For the year ended 31st March, 2020

	Amount (Rs.)
Direct materials	18,00,000
Direct wages	15,00,000
Prime Cost	33,00,000
Factory overheads	9,00,000
Cost of Production	42,00,000
Administration overheads	8,40,000
Selling and distribution overheads	10,50,000
Cost of Sales	60,90,000
Profit	12,18,000
Sales value	73,08,000

Calculation of Rates:

- Percentage of factory overheads to direct wages = $\frac{₹9,00,000}{₹15,00,000} \times 100 = 60\%$
- Percentage of administration overheads to Cost of production
 $= \frac{₹8,40,000}{₹42,00,000} \times 100 = 20\%$
- Selling and distribution overheads = $₹10,50,000 \times 115\% = ₹12,07,500$
 Selling and distribution overhead % to Cost of production
 $= \frac{₹12,07,500}{₹42,00,000} \times 100 = 28.75\%$
- Percentage of profit to sales = $\frac{₹12,18,000}{₹73,08,000} \times 100 = 16.67\%$ or, $1/6$

(ii) Calculation of price for the job received in 2019-20

	Amount (Rs.)
Direct materials	4,80,000
Direct wages	3,00,000
Prime Cost	7,80,000
Factory overheads (60% of Rs.3,00,000)	1,80,000
Cost of Production	9,60,000
Administration overheads (20% of Rs.9,60,000)	1,92,000
Selling and distribution overheads (28.75% of Rs.9,60,000)	2,76,000
Cost of Sales	14,28,000
Profit (1/5 of Rs.14,28,000)	2,85,600
Sales value	17,13,600

Process Costing

8. Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of papers containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 1,600 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at Rs. 1,06,560.
- Closing work-in-process at the end of the month was 320 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,200 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 8,400 litres.
- Losses have a scrap value of Rs.15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is Rs.78 for the month made up as follows:

	(Rs.)
Raw Material	46
Labour	14
Overheads	18
	78

Required:

- (i) CALCULATE the quantity (in litres) of raw material inputs during the month.
- (ii) CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.
- (iii) CALCULATE the values of raw material, labour and overheads added to the process during the month.
- (iv) PREPARE the process account for the month.

ANSWER 8

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	1,600	Transfer to Finished Goods	8,400
Raw material input (balancing figure)	8,320	Process Losses	1,200
		Closing WIP	320
	9,920		9,920

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,200
Normal Loss (10% input)	832
Abnormal Loss (balancing figure)	368

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	Rs.46.00	Rs.14.00	Rs.18.00
Equivalent units (litre) (refer the working note)	7,488	7,744	7,872
Cost of equivalent units	Rs.3,44,448	Rs.1,08,416	Rs.1,41,696
Add: Scrap value of normal loss (832 units × Rs.15)	Rs.12,480	--	--
Total value added	Rs.3,56,928	Rs.1,08,416	Rs.1,41,696

Workings:

Statement of Equivalent Units (litre):

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Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	1,600	Units completed:							
Units introduced	8,320	- Opening WIP	1,600	--	--	480	30	640	40
		- Fresh inputs	6,800	6,800	100	6,800	100	6,800	100
		Normal loss	832	--	--	--	--	--	--
		Abnormal loss	368	368	100	368	100	368	100
		Closing WIP	320	320	100	96	30	64	20
	9,920		9,920	7,488		7,744		7,872	

(iv) Process Account for the month

	Litres	Amount (Rs.)	Litres	Amount (Rs.)	
To Opening WIP	1,600	1,06,560	By Finished goods [8400 x Rs. 78]	8,400	6,55,200
To Raw Materials	8,320	3,56,928	By Normal loss [832 x Rs. 15]	832	12,480
To Wages	--	1,08,416	By Abnormal loss [368 x Rs. 78]	368	28,704
To Overheads	--	1,41,696	By Closing WIP [(320 x Rs. 46) + (320 x .30 x Rs. 14) + (320 x .20 x Rs. 18)]	320	17,216
	9,920	7,13,600		9,920	7,13,600

Service Costing

9. AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes alongwith primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

Amount (Rs.)	
Teachers' salary (15 teachers × Rs.35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × Rs.15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × Rs.10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000

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Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	-

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One person is fully dedicated for higher secondary section. Other persons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participate in annual functions and sports activities.

Requirement:

(a) CALCULATE cost per student per annum for all three streams.

(b) If the management decides to take uniform fee of Rs. 1,000 per month from all higher secondary students,

CALCULATE stream wise profitability.

(c) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

ANSWER 9**Calculation of Cost per annum**

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
Re-apportionment of Economics & Mathematics teachers' salary (W.N- 2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(a) Calculation of cost per student per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(b) Calculation of profitability

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(c) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:
(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (Rs.)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091
	$\left(\frac{₹4,20,000}{1,040} \times 208 \right)$		$\left(\frac{₹4,20,000}{1,100} \times 160 \right)$	

Total addition to Commerce stream = Rs. 84,000 + Rs. 61,091 = Rs. 1,45,091

(3) Principal's salary has been apportioned on the basis of time spent by him for administration of classes.

(4) Lab attendants' salary has been apportioned on the basis of lab classes attended by the students.

(5) Salary of library staffs are apportioned on the basis of time spent by the students in library.

(6) Salary of Peons are apportioned on the basis of number of students. The peons' salary allocable to higher secondary classes is calculated as below:

	Amount (Rs.)
Peon dedicated for higher secondary (1 peon × Rs.10,000 × 12 months)	1,20,000
Add: 15% of other peons' salary {15% of (3 peons × Rs.10,000 × 12 months)}	54,000
	1,74,000

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(7) Salary to other staffs, office & administration cost, Annual day expenses and sports expenses are apportioned on the basis of number of students.

(8) Examination Expenses has been apportioned taking number of students and number of examinations into account.

Standard Costing

10. ABC Ltd. had prepared the following estimation for the month of January:

	Quantity	Rate (Rs.)	Amount (Rs.)
Material-A	800 kg.	90.00	72,000
Material-B	600 kg.	60.00	36,000
Skilled labour	1,000 hours	75.00	75,000
Unskilled labour	800 hours	44.00	35,200

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (Rs.)	Amount (Rs.)
Material-A	900 kg.	86.00	77,400
Material-B	650 kg.	65.00	42,250
Skilled labour	1,200 hours	71.00	85,200
Unskilled labour	860 hours	46.00	39,560

You are required to CALCULATE:

- Material Cost Variance;
- Material Price Variance;
- Material Mix Variance;
- Material Yield Variance;
- Labour Cost Variance;
- Labour Efficiency Variance and
- Labour Yield Variance.

ANSWER 10

Material Variances:

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Mate rial	SQ (WN-1)	SP (Rs.)	SQ × SP (Rs.)	RSQ (WN-2)	RSQ × SP (Rs.)	AQ	AQ × SP (Rs.)	AP (Rs.)	AQ × AP (Rs.)
A	940 kg.	90.00	84,600	886 kg.	79,740	900 kg.	81,000	86.00	77,400
B	705 kg.	60.00	42,300	664 kg.	39,840	650 kg.	39,000	65.00	42,250
	1645 KG		126900	1550KG	119580	1550KG	120000		119650

WN-1: Standard Quantity (SQ):

$$\text{Material A- } \left(\frac{800\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 939.68 \text{ or } 940 \text{ kg.}$$

$$\text{Material B- } \left(\frac{600\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 704.76 \text{ or } 705 \text{ kg.}$$

WN- 2: Revised Standard Quantity (RSQ):

$$\text{Material A- } \left(\frac{800\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} \right) = 885.71 \text{ or } 886 \text{ kg.}$$

$$\text{Material B- } \left(\frac{600\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} \right) = 664.28 \text{ or } 664 \text{ kg.}$$

- (a) Material Cost Variance (A + B) = {(SQ × SP) – (AQ × AP)}
= {1,26,900 – 1,19,650} = 7,250 (F)
- (b) Material Price Variance (A + B) = {(AQ × SP) – (AQ × AP)}
= {1,20,000 – 1,19,650} = 350 (F)
- (c) Material Mix Variance (A + B) = {(RSQ × SP) – (AQ × SP)}
= {1,19,580 – 1,20,000} = 420 (A)
- (d) Material Yield Variance (A + B) = {(SQ × SP) – (RSQ × SP)}
= {1,26,900 – 1,19,580} = 7,320 (F)

Labour Variances:

Labour	SH (WN-3)	SR (Rs.)	SH × SR (Rs.)	RSH (WN-4)	RSH × SR (Rs.)	AH	AH × SR (Rs.)	AR (Rs.)	AH × AR (Rs.)
Skilled	1,116 hrs	75.00	83,700	1144	85,800	1,200	90,000	71.00	85,200
Unskilled	893 hrs	44.00	39,292	916	40,304	860	37,840	46.00	39,560
	209hrs		122992	2060	126104	2060	127840		124760

WN- 3: Standard Hours (SH):

$$\text{Skilled labour- } \left(\frac{0.95 \times 1,000\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 1,115.87 \text{ or } 1,116 \text{ hrs.}$$

$$\text{Unskilled labour- } \left(\frac{0.95 \times 800\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 892.69 \text{ or } 893 \text{ hrs.}$$

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WN- 4: Revised Standard Hours (RSH):

$$\text{Skilled labour} - \left(\frac{1,000\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} \right) = 1,144.44 \text{ or } 1,144 \text{ hrs.}$$

$$\text{Unskilled labour} - \left(\frac{800\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} \right) = 915.56 \text{ or } 916 \text{ hrs.}$$

- (e) Labour Cost Variance (Skilled + Unskilled) = $\{(SH \times SR) - (AH \times AR)\}$
 = $\{1,22,992 - 1,24,760\} = 1,768 \text{ (A)}$
- (f) Labour Efficiency Variance (Skilled + Unskilled) = $\{(SH \times SR) - (AH \times SR)\}$
 = $\{1,22,992 - 1,27,840\} = 4,848 \text{ (A)}$
- (g) Labour Yield Variance (Skilled + Unskilled) = $\{(SH \times SR) - (RSH \times SR)\}$
 = $\{1,22,992 - 1,26,104\} = 3,112 \text{ (A)}$

Marginal Costing

11. A Ltd. manufacture and sales its product R-9. The following figures have been collected from cost records of last year for the product R-9:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	Rs. 2,30,000
Administration Overhead	2% of Cost of Goods Sold	Rs. 71,000
Selling & Distribution Overhead	4% of Cost of Sales	Rs. 68,000

Last Year 5,000 units were sold at Rs.185 per unit. From the given DETERMINE the followings:

- (i) Break-even Sales (in rupees)
 (ii) Profit earned during last year
 (iii) Margin of safety (in %)
 (iv) Profit if the sales were 10% less than the actual sales.
 (Assume that Administration Overhead is related with production activity)

ANSWER 11

Working Notes:

(1) Calculation of Cost of Goods Sold (COGS):

$$\begin{aligned} \text{COGS} &= \text{DM} + \text{DL} + \text{FOH} + \text{AOH} \\ \text{COGS} &= \{0.3 \text{ COGS} + 0.15 \text{ COGS} + (0.10 \text{ COGS} + ₹ 2,30,000) + (0.02 \text{ COGS} + ₹ 71,000)\} \\ \text{Or, COGS} &= 0.57 \text{ COGS} + ₹ 3,01,000 \\ \text{Or, COGS} &= \frac{₹ 3,01,000}{0.43} = ₹ 7,00,000 \end{aligned}$$

(2) Calculation of Cost of Sales (COS):

$$\begin{aligned} \text{COS} &= \text{COGS} + \text{S\&DOH} \\ \text{COS} &= \text{COGS} + (0.04 \text{ COS} + ₹ 68,000) \\ \text{Or, COS} &= ₹ 7,00,000 + (0.04 \text{ COS} + ₹ 68,000) \\ \text{Or, COS} &= \frac{₹ 7,68,000}{0.96} = ₹ 8,00,000 \end{aligned}$$

(3) Calculation of Variable Costs:

Direct Material-	$(0.30 \times ₹ 7,00,000)$	₹ 2,10,000
Direct Labour-	$(0.15 \times ₹ 7,00,000)$	₹ 1,05,000
Factory Overhead-	$(0.10 \times ₹ 7,00,000)$	₹ 70,000
Administration OH-	$(0.02 \times ₹ 7,00,000)$	₹ 14,000
Selling & Distribution OH	$(0.04 \times ₹ 8,00,000)$	₹ 32,000
		<u>₹ 4,31,000</u>

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(4) Calculation of total Fixed Costs:

Factory Overhead-	₹ 2,30,000
Administration OH-	₹ 71,000
Selling & Distribution OH	₹ 68,000
	₹ 3,69,000

(5) Calculation of P/V Ratio:

$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100 \\ &= \frac{(\text{₹}185 \times 5,000 \text{ units}) - \text{₹}4,31,000}{\text{₹}185 \times 5,000 \text{ units}} \times 100 = 53.41\% \end{aligned}$$

(i) Break-Even Sales

$$= \frac{\text{Fixed Costs}}{\text{P/V Ratio}} = \frac{\text{₹}3,69,000}{53.41\%} = \text{₹}6,90,882$$

(ii) Profit earned during the last year

$$\begin{aligned} &= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs} \\ &= (\text{₹}9,25,000 - \text{₹}4,31,000) - \text{₹}3,69,000 \\ &= \text{₹}1,25,000 \end{aligned}$$

(iii) Margin of Safety (%)

$$\begin{aligned} &= \frac{\text{Sales} - \text{Breakeven sales}}{\text{Sales}} \times 100 \\ &= \frac{\text{₹}9,25,000 - \text{₹}6,90,882}{\text{₹}9,25,000} \times 100 = 25.31\% \end{aligned}$$

(iv) Profit if the sales were 10% less than the actual sales:

$$\begin{aligned} \text{Profit} &= 90\% (\text{₹}9,25,000 - \text{₹}4,31,000) - \text{₹}3,69,000 \\ &= \text{₹}4,44,600 - \text{₹}3,69,000 = \text{₹}75,600 \end{aligned}$$

Budget and Budgetary Control

12. A Vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of Rs.11,42,800 is incurred and sold through dealers at a uniform selling price of Rs.17,14,200 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle.

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Apart from other materials, four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October. There are 9,500 nos. of completed vehicles in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.

You are required to -

(i) PREPARE Production budget (in nos.) for the month of October, November, December and January.

(ii) PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.

(iii) CALCULATE the budgeted gross profit for the quarter October to December.

ANSWER 12

(i) Preparation of Production Budget (in units)

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000
Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

(ii) Preparation of Purchase budget for Part-X

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)
	52,300	56,200	72,400
No. of units required for production	2,09,200 (52,300 × 4 units)	2,24,800 (56,200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14,800 × 4 units)	(76,800) (19,200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(iii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000
Net Selling Price per unit* (Rs.)	14,57,070	14,57,070	14,57,070	
Sales Revenue (Rs. in lakh)	5,82,828	5,09,974.50	6,55,681.50	17,48,484
Less: Cost of Sales (Rs. in lakh) (Sales unit × Cost per unit)	4,57,120	3,99,980	5,14,260	13,71,360
Gross Profit (Rs. in lakh)	1,25,708	1,09,994.50	1,41,421.50	3,77,124

* Net Selling price unit = Rs.17,14,200 – 15% commission on Rs.17,14,200 = Rs.14,57,070.

Miscellaneous

13. (a) DIFFERENTIATE between Cost Accounting and Management Accounting.

(b) DISCUSS the impact of Information Technology (IT) on cost accounting system.

(c) DISCUSS the Escalation Clause in a Contract.

(d) DISCUSS the treatment of by-product cost in cost accounting.

ANSWER 13

(a) Difference between Cost Accounting and Management Accounting

	Basis	Cost Accounting	Management Accounting
(i)	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
(ii)	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
(iii)	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
(iv)	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
(v)	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
(vi)	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations

(b) The impact of IT in cost accounting system may include the following:

(i) After the introduction of ERPs, different functional activities get integrated and as a consequence a single entry into the accounting system provides custom made reports for every purpose and saves an organisation from preparing different sets of documents. Reconciliation process of results of both cost and financial accounting systems become simpler and less sophisticated.

(ii) A move towards paperless environment can be seen where documents like Bill of Material, Material Requisition Note, Goods Received Note, labour utilisation report etc. are no longer required to be prepared in multiple copies, the related department can get e-copy from the system.

(iii) Information Technology with the help of internet (including intranet and extranet) helps in resource procurement and mobilisation. For example, production department can get materials from the stores without issuing material requisition note physically. Similarly, purchase orders can be initiated to the suppliers with the help of extranet. This enables an entity to shift towards Just-in-Time (JIT) approach of inventory management and production.

(iv) Cost information for a cost centre or cost object is ascertained with accuracy in timely manner. Each cost centre and cost object is codified and all related costs are assigned to the cost object or cost centre. This process automates the cost accumulation and ascertainment process. The cost information can be customised as per the requirement. For example, when an entity manufacture or provide services, it can know information job-wise, batch-wise, process-wise, cost centre wise etc.

(v) Uniformity in preparation of report, budgets and standards can be achieved with the help of IT. ERP software plays an important role in bringing uniformity irrespective of location, currency, language and regulations.

(vi) Cost and revenue variance reports are generated in real time basis which enables the management to take control measures immediately.

(vii) IT enables an entity to monitor and analyse each process of manufacturing or service activity closely to eliminate non value added activities.

The above are examples of few areas where Cost Accounting is done with the help of IT.

(c) Escalation clause in a contract empowers a contractor to revise the price of the contract in case of increase in the prices of inputs due to some macro-economic or other agreed reasons. A contract takes longer period to complete and the factors based on which price negotiation is done at the time of entering into the contract may change till the contract completes. This protect the contractor from adverse financial impacts and empowers the contractor to recover the increased prices. As per this clause, the contractor increases the contract price if the cost of materials, employees and other expenses increase beyond a certain limit. Inclusion of such a clause in a contract deed is called an "Escalation Clause".

(d) By-product cost can be dealt in cost accounting in the following ways:

(i) When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

(ii) When the by-products are of considerable total value: Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

(iii) Where they require further processing: In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products.

If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (i).

In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (ii).

RTP- NOV 2019**Material Cost**

1. HBL Limited produces product 'M' which has a quarterly demand of 20,000 units. Each product requires 3 kg. and 4 kg. of material X and Y respectively. Material X is supplied by a local supplier and can be procured at factory stores at any time, hence, no need to keep inventory for material X. The material Y is not locally available, it requires to be purchased from other states in a specially designed truck container with a capacity of 10 tons.

The cost and other information related with the materials are as follows:

Particulars	Material –X	Material-Y
Purchase price per kg. (excluding GST)	Rs.140	Rs.640
Rate of GST	18%	18%
Freight per trip (fixed, irrespective of quantity)	-	Rs.28,000
Loss of materials in transit*	-	2%
Loss in process*	4%	5%

**On purchased quantity*

Other information:

- The company has to pay 15% p.a. to bank for cash credit facility.
- Input credit is available on GST paid on materials.

Required:

- (i) CALCULATE cost per kg. of material X and Y
- (ii) CALCULATE the Economic Order quantity for both the materials.

ANSWER 1

Working Notes:

(a) Annual purchase quantity for material X and Y:

Annual demand for product M- 20,000 units × 4 = 80,000 units

Particulars	Mat-X	Mat-Y
Quantity required for per unit of product M	3 kg.	4 kg.
Net quantity for materials required	2,40,000 kg.	3,20,000 kg.
Add: Loss in transit	-	6,881 kg.
Add: Loss in process	10,000 kg.	17,204 kg.
Purchase quantity	2,50,000 kg.	3,44,085 kg.

Note - Input credit on GST paid is available; hence, it will not be included in cost of material.

(i) Calculation of cost per kg. of material X and Y:

Particulars	Mat-X	Mat-Y
Purchase quantity	2,50,000 kg.	3,44,085 kg.
Rate per kg.	Rs.140	Rs.640
Purchase price	Rs.3,50,00,000	Rs.22,02,14,400
Add: Freight	0	Rs.9,80,000*
Total cost	Rs.3,50,00,000	Rs.22,11,94,400
Net Quantity	2,40,000 kg.	3,20,000 kg
Cost per kg.	Rs.145.83	Rs.691.23

$$\text{*No. of trucks} = \frac{3,44,085 \text{ kg.}}{10 \text{ ton} \times 1,000} = 34.40 \text{ trucks or } 35 \text{ trucks}$$

Therefore, total freight = 35 trucks × ₹28,000 = ₹9,80,000

(ii) Calculation of Economic Order Quantity (EOQ) for Mat.-X and Y:

$$\text{EOQ} = \sqrt{\frac{2 \times \text{Annual Requirement} \times \text{Order cost}}{\text{Carrying cost per unit p.a.}}}$$

Particulars	Mat-X	Mat-Y
Annual Requirement	2,50,000 kg.	3,44,085 kg.
Ordering cost	0	Rs.28,000
Cost per unit	Rs.145.83	Rs.691.23
Carrying cost	15%	15%
Carrying cost per unit p.a.	0*	Rs.103.68
EOQ	0	13,632.62 kg.

Overheads- Absorption Costing Method

3. PLR Ltd. manufactures a single product and recovers the overheads by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory for the FY 2019-20 are Rs.50,40,000 and budgeted machine hours are 6,000.

For a period of first six months of the financial year 2019-20, following information were extracted from the books:

Actual production overheads	Rs.34,08,000
Amount included in the production overheads:	
Paid as per court's order	Rs.4,50,000

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Expenses of previous year booked in current year	Rs.1,00,000
Paid to workers for strike period under an award	Rs.4,20,000
Obsolete stores written off	Rs.36,000

Production and sales data of the concern for the first six months are as under:

Production:	
Finished goods	1,10,000 units
Works-in-progress	
(50% complete in every respect)	80,000 units
Sale:	
Finished goods	90,000 units

The actual machine hours worked during the period were 3,000 hours. It is revealed from the analysis of information that 40% of the over/under-absorption was due to defective production policies and the balance was attributable to increase in costs.

You are required:

- (i) to determine the amount of over/ under absorption of production overheads for the period,
- (ii) to show the accounting treatment of over/ under-absorption of production overheads, and
- (iii) to apportion the over/ under-absorbed overheads over the items.

ANSWER 3

(i) Amount of over/ under absorption of production overheads during the period of first six months of the year 2019-20:

	Amount (Rs.)	Amount (Rs.)
Total production overheads actually incurred during the period		34,08,000
Less: Amount paid to worker as per court order	4,50,000	
Expenses of previous year booked in the current year	1,00,000	
Wages paid for the strike period under an award	4,20,000	
Obsolete stores written off	36,000	10,06,000
		24,02,000
Less: Production overheads absorbed as per machine hour rate (3,000 hours × Rs.840*)		25,20,000
Amount of over absorbed production overheads		1,18,000

$$\text{*Budgeted Machine hour rate (Blanket rate)} = \frac{\text{₹ } 50,40,000}{6,000 \text{ hours}} = \text{₹}840 \text{ per hour}$$

(ii) Accounting treatment of over absorbed production overheads: As, 40% of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account
 = Rs.1,18,000 × 40% = Rs.47,200.

Balance of over absorbed production overheads should be distributed over Works in progress, Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = Rs.1,18,000 × 60% = Rs.70,800

$$\text{Supplementary rate} = \frac{\text{₹ } 70,800}{1,50,000 \text{ units}} = \text{₹ } 0.472 \text{ per unit}$$

iii) Apportionment of over absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (Rs.)
Work-in-Progress (80,000 units × 50% × 0.472)	40,000	18,880
Finished goods (20,000 units × 0.472)	20,000	9,440
Cost of sales (90,000 units × 0.472)	90,000	42,480
Total	1,50,000	70,800

Overheads- Activity Based Costing (ABC) Method

4. SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the month of September 2019, using the absorption costing method has been prepared:

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Production units	45,000	52,500	30,000
Material cost per unit (Rs.)	350	460	410
Wages per unit @ Rs.80 per hour	240	400	560
Overhead cost per unit (Rs.)	240	400	560
Total cost per unit (Rs.)	830	1,260	1,530
Selling price (Rs.)	1,037.50	1,575	1,912.50

The following additional information is available relating to overhead cost drivers.

Cost driver	Product X	Product Y	Product Z	Total
No. of machine set-ups	40	160	400	600
No. of purchase orders	400	800	1,200	2,400
No. of customers	1,000	2,200	4,800	8,000

Actual production and budgeted production for the month is same. Workers are paid at standard rate. Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material ordering.

Required:

(i) COMPUTE overhead cost per unit using activity based costing method.

(ii) DETERMINE the selling price of each product based on activity-based costing with the same profit mark-up on cost.

ANSWER 4

Workings:

Total labour hours and overhead cost:

Particulars	Product X	Product Y	Product Z	Total
Production units	45,000	52,500	30,000	1,27,500
Hour per unit	3	5	7	
Total hours	1,35,000	2,62,500	2,10,000	6,07,500
Rate per hour				₹80.00
Total overhead				₹4,86,00,000

Cost per activity and driver

Activity	Machine Set-up	Customer order processing	Customer complaint management	Total
Total overhead (₹)	1,45,80,000	1,45,80,000	1,94,40,000	4,86,00,000
No. of drivers	600	2,400	8,000	
Cost per driver (₹)	24,300	6,075	2,430	

(i) Computation of Overhead cost per unit:

Particulars	Product X	Product Y	Product Z
No. of machine set-ups	40	160	400

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Cost per driver (₹)	24,300	24,300	24,300
Total Machine set-up cost (₹) [A]	9,72,000	38,88,000	97,20,000
No. of purchase orders	400	800	1,200
Cost per driver (₹)	6,075	6,075	6,075
Total order processing cost (₹) [B]	24,30,000	48,60,000	72,90,000
No. of customers	1,000	2,200	4,800
Cost per driver (₹)	2,430	2,430	2,430
Total customer complaint management cost (₹) [C]	24,30,000	53,46,000	1,16,64,000
Total Overhead cost (₹) [A+B+C]	58,32,000	1,40,94,000	2,86,74,000
Production units	45,000	52,500	30,000
Cost per unit (₹)	129.60	268.46	955.80

ii) Determination of Selling price per unit

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Material cost per unit (₹)	350.00	460.00	410.00
Wages per unit @ ₹80 per hour	240.00	400.00	560.00
Overhead cost per unit (₹)	129.60	268.46	955.80
Total cost per unit (₹)	719.60	1,128.46	1,925.80
Profit (25% profit mark-up) (₹)	179.90	282.11	481.45
Selling price (₹)	899.50	1,410.57	2,407.25

Cost Sheet

5. DFG Ltd. manufactures leather bags for office and school purpose. The following information is related with the production of leather bags for the month of September 2019.

(i) Leather sheets and cotton cloths are the main inputs, and the estimated requirement per bag is two meters of leather sheets and one meter of cotton cloth. 2,000 meter of leather sheets and 1,000 meter of cotton cloths are purchased at Rs.3,20,000 and Rs.15,000 respectively. Freight paid on purchases is Rs.8,500.

(ii) Stitching and finishing need 2,000 man hours at Rs.80 per hour.

(iii) Other direct cost of Rs.10 per labour hour is incurred.

(iv) DFG has 4 machines at a total cost of Rs.22,00,000. Machine has a life of 10 years with a scrap value of 10% of the original cost. Depreciation is charged on straight line method.

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(v) The monthly cost of administrative and sales office staffs are Rs.45,000 and Rs.72,000 respectively. DFG pays Rs.1,20,000 per month as rent for a 2400 sq. feet factory premises. The administrative and sales office occupies 240 sq. feet and 200 sq. feet respectively of factory space.

(vi) Freight paid on delivery of finished bags is Rs.18,000.

(vii) During the month 35 kg. of leather and cotton cuttings are sold at Rs.150 per kg.

(viii) There is no opening and closing stocks for input materials. There is 100 bags in stock at the end of the month.

Required:

PREPARE a cost sheet following functional classification for the month of September 2019.

ANSWER 5

No. of bags manufactured = 1,000 units

Cost sheet for the month of September 2019

Particulars	Total Cost (Rs.)	Cost per unit (Rs.)
1. Direct materials consumed:		
- Leather sheets	3,20,000	320.00
- Cotton cloths	15,000	15.00
Add: Freight paid on purchase	8,500	8.50
2. Direct wages (Rs.80 × 2,000 hours)	1,60,000	160.00
3. Direct expenses (Rs.10 × 2,000 hours)	20,000	20.00
4. Prime Cost	5,23,500	523.50
5. Factory Overheads: Depreciation on machines {(Rs.22,00,000×90%)÷120 months}	16,500	16.50
Apportion cost of factory rent	98,000	98.00
6. Works/ Factory Cost	6,38,000	638.00
7. Less: Realisable value of cuttings (Rs.150×35 kg.)	(5,250)	(5.25)
8. Cost of Production	6,32,750	632.75
9. Add: Opening stock of bags		0
10. Less: Closing stock of bags (100 bags × Rs.632.75)		(63,275)
11. Cost of Goods Sold	5,69,475	632.75
12. Add: Administrative Overheads:		
- Staff salary	45,000	45.00

- Apportioned rent for administrative office	12,000	12.00
Add: Selling and Distribution Overheads		
- Staff salary	72,000	80.00
- Apportioned rent for sales office	10,000	11.11
- Freight paid on delivery of bags	18,000	20.00
14. Cost of Sales (18+19+20)	7,26,475	800.86

Apportionment of Factory rent:

To factory building $\{(Rs.1,20,000 \div 2400 \text{ sq. feet}) \times 1,960 \text{ sq. feet}\} = Rs.98,000$

To administrative office $\{(Rs.1,20,000 \div 2400 \text{ sq. feet}) \times 240 \text{ sq. feet}\} = Rs.12,000$

To sale office $\{(Rs.1,20,000 \div 2400 \text{ sq. feet}) \times 200 \text{ sq. feet}\} = Rs.10,000$

Cost Accounting Systems

6. As of 30th September, 2019, the following balances existed in a firm's cost ledger, which is maintained separately on a double entry basis:

	Debit(Rs.)	Credit(Rs.)
Stores Ledger Control A/c	15,00,000	-
Work-in-progress Control A/c	7,50,000	-
Finished Goods Control A/c	12,50,000	-
Manufacturing Overhead Control A/c	-	75,000
Cost Ledger Control A/c	-	34,25,000
	35,00,000	35,00,000

During the next quarter, the following items arose:

Finished Product (at cost)	11,25,000
Manufacturing overhead incurred	4,25,000
Raw material purchased	6,25,000
Factory wages	2,00,000
Indirect labour	1,00,000
Cost of sales	8,75,000
Materials issued to production	6,75,000
Sales returned (at cost)	45,000
Materials returned to suppliers	65,000
Manufacturing overhead charged to production	4,25,000

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Required:

PREPARE the Cost Ledger Control A/c, Stores Ledger Control A/c, Work-in-progress Control A/c, Finished Stock Ledger Control A/c, Manufacturing Overhead Control A/c, Wages Control A/c, Cost of Sales A/c and the Trial Balance at the end of the quarter.

ANSWER 6

Cost Ledger Control Account

Dr.

Cr

To Store Ledger Control A/c	65,000	By Opening Balance	34,25,000
To Balance c/d	47,10,000	By Store ledger control A/c	6,25,000
		By Manufacturing Overhead Control A/c	425000
		By Wages Control A/c	300000
	4775000		4775000

Stores Ledger Control Account

Dr.

Cr.

	(₹)		(₹)
To Opening Balance	15,00,000	By WIP Control A/c	6,75,000
To Cost ledger control A/c	6,25,000	By Cost ledger control A/c (Returns)	65,000
		By Balance c/d	13,85,000
	21,25,000		21,25,000

WIP Control Account

Dr.

Cr.

	(₹)		(₹)
To Opening Balance	7,50,000	By Finished Stock Ledger Control A/c	11,25,000
To Wages Control A/c	2,00,000	By Balance c/d	9,25,000
To Stores Ledger Control A/c	6,75,000		
To Manufacturing Overhead Control A/c	4,25,000		
	20,50,000		20,50,000

Finished Stock Ledger Control Account

Dr.

Cr.

	(₹)		(₹)
To Opening Balance	12,50,000	By Cost of Sales	8,75,000
To WIP Control A/c	11,25,000	By Balance c/d	15,45,000
To Cost of Sales A/c (Sales Return)	45,000		
	24,20,000		24,20,000

Manufacturing Overhead Control Account

Dr.		Cr.	
	(₹)		(₹)
To Cost Ledger Control A/c	4,25,000	By Opening Balance	75,000
To Wages Control A/c	1,00,000	By WIP Control A/c	4,25,000
		By Under recovery c/d	25,000
	5,25,000		5,25,000

Wages Control Account

Dr.		Cr.	
	(₹)		(₹)
To Transfer to Cost Ledger Control A/c	3,00,000	By WIP Control A/c	2,00,000
		By Manufacturing Overhead Control A/c	1,00,000
	3,00,000		3,00,000

Cost of Sales Account

Dr.		Cr.	
	(₹)		(₹)
To Finished Stock Ledger Control A/c	8,75,000	By Finished Stock Ledger Control A/c (Sales return)	45,000
		By Balance c/d	8,30,000
	8,75,000		8,75,000

Trial Balance

	(₹)	(₹)
Stores Ledger Control A/c	13,85,000	
WIP Control A/c	9,25,000	
Finished Stock Ledger Control A/c	15,45,000	
Manufacturing Overhead Control A/c	25,000	
Cost of Sales A/c	8,30,000	
Cost ledger control A/c	---	47,10,000
	47,10,000	47,10,000

Contract Costing

7. GVL Ltd. commenced a contract on April 1, 2018. The total contract was for Rs. 1,08,50,000. It was decided to estimate the total profit and to take to the credit of Costing P & L A/c the proportion of estimated profit on cash basis which work completed bear to the total contract. Actual expenditure in 2018-19 and estimated expenditure in 2019-20 are given below:

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	2018-19	2019-20
	Actual (Rs.)	Estimated (Rs.)
Material issued	18,24,000	32,56,000
Labour : Paid	12,20,000	15,20,000
: Outstanding at end	96,000	1,50,000
Plant purchased	9,00,000	-
Expenses : Paid	4,00,000	7,00,000
: Outstanding at the end	-	1,00,000
: Prepaid at the end	90,000	-
Plant returned to stores (a historical stores)	3,00,000	6,00,000 (on Sep. 30, 2019)
Material at site	1,20,000	3,00,000
Work-in progress certified	51,00,000	Full
Work-in-progress uncertified	1,60,000	----
Cash received	40,00,000	Full

The plant is subject to annual depreciation @ 20% of WDV cost. The contract is likely to be completed on September 30, 2019.

Required:

(i) PREPARE the Contract A/c for the year 2018-19.

(ii) ESTIMATE the profit for the contract.

ANSWER 7

GVL Ltd.
Contract A/c
(April 1, 2018 to March 31, 2019)

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Materials Issued	18,24,000	By Plant returned to Stores (Working Note 1)	2,40,000
To Labour 12,20,000		By Materials at Site	1,20,000
Add: Outstanding 96,000	13,16,000	By W.I.P.	
To Plant Purchased	9,00,000	Certified 51,00,000	
To Expenses 4,00,000		Uncertified 1,60,000	52,60,000
Less: Prepaid 90,000	3,10,000	By Plant at Site (Working Note 2)	4,80,000
To Notional Profit	1750000		
	6100000		6100000

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GVL Ltd.
Contract A/c
(April 1, 2018 to September 30, 2019)
(For Computing estimated profit)

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Materials Issued (Rs. 18,24,000 + Rs.32,56,000)	50,80,000	By Material at Site	3,00,000
To Labour Cost (Rs.12,20,000 + Rs.96,000 + Rs.14,24,000* + Rs.1,50,000)	28,90,000	By Plant returned to Stores on 31.03.2019.	2,40,000
To Plant purchased	9,00,000	By Plant returned to Stores on 30.09.2019 (Working Note 3)	4,32,000
To Expenses (Rs.3,10,000 + Rs.7,90,000 + Rs.1,00,000)	12,00,000	By Contractee A/c	1,08,50,000
To Estimated profit	1752000		
	11822000		11822000

* Labour paid in 2019-20: Rs.15,20,000 – Rs.96,000 = Rs.14,24,000

Working Notes

1. Value of the Plant returned to Stores on 31.03.2019	
Historical Cost of the Plant returned	3,00,000
Less: Depreciation @ 20% of WDV for one year	(60,000)
	2,40,000
2. Value of Plant at Site 31.03.2019	
Historical Cost of Plant at Site (Rs.9,00,000 – Rs.3,00,000)	6,00,000
Less: Depreciation @ 20% on WDV for one year	(1,20,000)
	4,80,000
3. Value of Plant returned to Stores on 30.09.2019	
Value of Plant (WDV) on 31.3.2019	4,80,000
Less: Depreciation @ 20% of WDV for a period of 6 months	(48,000)
	4,32,000
4. Expenses Paid for the year 2018-19	
Total expenses paid	4,00,000
Less: Pre-paid at the end	(90,000)
	3,10,000

Batch Costing

8. BTL LLP. manufactures glass bottles for HDL Ltd., a pharmaceutical company, which is in ayurvedic medicines business..

BTL can produce 2,00,000 bottles in a month. Set-up cost of each production run is Rs. 5,200 and the cost of holding one bottle for a year is Rs. 1.50.

As per an estimate HDL Ltd. can order as much as 19,00,000 bottles in a year spreading evenly throughout the year.

At present the BTL manufactures 1,60,000 bottles in a batch.

Required:

(i) COMPUTE the Economic Batch Quantity for bottle production.

(ii) COMPUTE the annual cost saving to BTL by adopting the EBQ of a production.

ANSWER 8

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the product
 S = Setting up cost per batch
 C = Carrying cost per unit of production

(i) Computation of EBQ :

$$= \sqrt{\frac{2 \times 19,00,000 \times ₹5,200}{₹1.5}}$$

$$= 1,14,775 \text{ bottles}$$

(ii) Computation of savings in cost by adopting EBQ:

Batch Size	No. of Batch	Set-up cost	Carrying cost	Total Cost
1,60,000 bottles	12	62,400 (₹5,200 × 12)	1,20,000 (₹1.5 × ½ × 1,60,000)	1,82,400
1,14,775 bottles	17	88,400 (₹5,200 × 17)	86,081.25 (₹1.5 × ½ × 1,14,775)	1,74,481.25
Saving				7,918.75

Job Costing

9. Ispat Engineers Limited (IEL) undertook a plant manufacturing work for a client. It will charge a profit mark up of 20% on the full cost of the jobs. The following are the information related to the job:

Direct materials utilised – Rs.1,87,00,000

Direct labour utilised – 2,400 hours at Rs.80 per hour

Budgeted production overheads are Rs. 48,00,000 for the period and are recovered on the basis of 24,000 labour hours.

Budgeted selling and administration overheads are Rs.18,00,000 for the period and recovered on the basis of total budgeted total production cost of Rs.36,00,00,000.

Required:

CALCULATE the price to be charged for the job.

ANSWER 9

Calculation of job price

Particulars	Amount (Rs.)
Direct materials	1,87,00,000
Direct wages (Rs.80 × 2,400 hours)	1,92,000
Production overheads	4,80,000
Production cost	1,93,72,000
Selling and administration overheads	96,860
Total cost of sales	1,94,68,860
Profit mark-up @ 20%	38,93,772
Price for the job	2,33,62,632

Service Costing

10. A transport company has a fleet of four trucks of 10 tonne capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

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The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost Rs.
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the year under review:

Diesel	Rs. 60 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	Rs. 22,000 per truck per month
Licence and taxes	Rs. 15,000 per annum per truck
Insurance	Rs. 80,000 per annum for all the four trucks
Purchase Price per truck	Rs.30,00,000, Life 10 years. Scrap value at the end of life is Rs.1,00,000.
Oil and sundries	Rs. 525 per 100 km run.
General Overhead	Rs. 1,10,840 per annum

The trucks operate 24 days per month on an average.

Required

- (i) PREPARE an Annual Cost Statement covering the fleet of four trucks.
 - (ii) CALCULATE the cost per km. run.
 - (iii) DETERMINE the freight rate per tonne km. to yield a profit of 30% on freight.
- ANSWER 10

(i) Annual Cost Statement of four vehicles

Diesel $\{(4,21,632 \text{ km.} \div 4 \text{ km}) \times \text{Rs. } 60\}$ (Refer to Working Note 1)	63,24,480
Oil & sundries $\{(4,21,632 \text{ km.} \div 100 \text{ km.}) \times \text{Rs. } 525\}$	22,13,568
Maintenance $\{(4,21,632 \text{ km.} \times \text{Rs. } 0.75) + \text{Rs. } 18,000\}$ (Refer to Working Note 2)	3,34,224
Drivers' salary $\{(\text{Rs.}22,000 \times 12 \text{ months}) \times 4 \text{ trucks}\}$	10,56,000
Licence and taxes (Rs. 15,000 \times 4 trucks)	60,000
Insurance	80,000
Depreciation $\{(\text{Rs.}29,00,000 \div 10 \text{ years}) \times 4 \text{ trucks}\}$	11,60,000
General overhead	1,10,840
Total annual cost	1,13,39,112

(ii) Cost per km. run

$$\begin{aligned} \text{Cost per kilometer run} &= \frac{\text{Total annual cost of vehicles}}{\text{Total kilometre travelled annually}} \quad (\text{Refer to Working Note 1}) \\ &= \frac{\text{₹1,13,39,112}}{4,21,632 \text{ Kms}} = \text{₹ 26.89} \end{aligned}$$

(iii) Freight rate per tonne km (to yield a profit of 30% on freight)

$$\begin{aligned} \text{Cost per tonne km.} &= \frac{\text{Total annual cost of three vehicles}}{\text{Total effective tonnes kms. per annum}} \quad (\text{Refer to Working Note 1}) \\ &= \frac{\text{₹1,13,39,112}}{16,10,496 \text{ kms}} = \text{₹ 7.04} \end{aligned}$$

$$\text{Freight rate per tonne km.} \left(\frac{\text{₹7.04}}{0.7} \right) \times 1 = \text{₹ 10.06}$$

Working Notes:

1. Total kilometre travelled and tonnes kilometre (load carried) by four trucks in one year

Truck number	One way distance in kms	No. of trips	Total distance covered in km per day	Load carried per trip / day in tonnes	Total effective tonnes km
1	48	4	384	6	1,152
2	120	1	240	9	1,080
3	90	2	360	8	1,440
4	60	4	480	8	1,920
Total		1464			5592

Total kilometre travelled by four trucks in one year

$$(1,464 \text{ km.} \times 24 \text{ days} \times 12 \text{ months}) = 4,21,632$$

Total effective tonnes kilometre of load carried by four trucks during one year

$$(5,592 \text{ tonnes km.} \times 24 \text{ days} \times 12 \text{ months}) = 16,10,496$$

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2. Fixed and variable component of maintenance cost:

$$\begin{aligned} \text{Variable maintenance cost per km} &= \frac{\text{Difference in maintenance cost}}{\text{Difference in distance travelled}} \\ &= \frac{\text{₹ } 1,38,150 - \text{₹ } 1,35,525}{1,60,200 \text{ kms} - 1,56,700 \text{ kms}} \\ &= \text{₹ } 0.75 \\ \text{Fixed maintenance cost} &= \text{Total maintenance cost} - \text{Variable maintenance cost} \\ &= \text{₹ } 1,38,150 - 1,60,200 \text{ kms} \times \text{₹ } 0.75 = \text{₹ } 18,000 \end{aligned}$$

Process Costing

11. A product is manufactured in two sequential processes, namely Process-1 and Process-2. The following information relates to Process-1. At the beginning of June 2019, there were 1,000 WIP goods (60% completed in terms of conversion cost) in the inventory, which are valued at Rs.2,86,020 (Material cost: Rs.2,55,000 and Conversion cost: Rs.31,020). Other information relating to Process-1 for the month of June 2019 is as follows;

Cost of materials introduced- 40,000 units (Rs.)	96,80,000
Conversion cost added (Rs.)	18,42,000
Transferred to Process-2 (Units)	35,000
Closing WIP (Units) (60% completed in terms of conversion cost)	1,500

100% of materials are introduced to Process-1 at the beginning. Normal loss is estimated at 10% of input materials (excluding opening WIP).

Required:

(i) PREPARE a statement of equivalent units using the weighted average cost method and thereby calculate the following:

(ii) CALCULATE the value of output transferred to Process-2 and closing WIP.

ANSWER 11**(i) Statement of Equivalent Production**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Conversion cost	
				%	Units	%	Units
Opening WIP	1,000	Completed and transferred to Process-2	35,000	100	35,000	100	35,000
Units introduced	40,000	Normal Loss (10% of 40,000)	4,000	-	-	-	-
		Abnormal loss (Balancing figure)	500	100	500	60	300
		Closing WIP	1,500	100	1,500	60	900
	41,000		41,000		37,000		36,200

(ii) Calculation of value of output transferred to Process-2 & Closing WIP

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (35,000 units × ₹ 320.25) (Refer working note)		1,12,08,750
3. Value of Closing W-I-P:		
- Materials (1,500 units × ₹ 268.51)	4,02,765	
- Conversion cost (900 units × ₹ 51.74)	46,566	4,49,331

Workings:

Cost for each element

Particulars	Materials (Rs.)	Conversion (Rs.)	Total (Rs.)
Cost of opening work-in-process	2,55,000	31,020	2,86,020
Cost incurred during the month	96,80,000	18,42,000	1,15,22,000
Total cost: (A)	99,35,000	18,73,020	1,18,08,020
Equivalent units: (B)	37,000	36,200	
Cost per equivalent unit: (C) = (A ÷ B)	268.51	51.74	320.25

Standard Costing

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12. JVG Ltd. produces a product and operates a standard costing system and value material and finished goods inventories at standard cost. The information related with the product is as follows:

Particulars	Cost per unit (Rs.)
Direct materials (30 kg at Rs.350 per kg)	10,500
Direct labour (5 hours at Rs.80 per hour)	400

The actual information for the month just ended is as follows:

(a) The budgeted and actual production for the month of September 2019 is 1,000 units.

(b) Direct materials –5,000 kg at the beginning of the month. The closing balance of direct materials for the month was 10,000 kg. Purchases during the month were made at Rs. 365 per kg. The actual utilization of direct materials was 7,200 kg more than the budgeted quantity.

(c) Direct labour – 5,300 hours were utilised at a cost of Rs. 4,34,600.

Required:

CALCULATE (i) Direct material price and usage variances (ii) Direct labour rate and efficiency variances.

ANSWER 12

Working:

Quantity of material purchased and used.

No. of units produced	1,000 units
Std. input per unit	30kg.
Std. quantity (Kg.)	30,000 kg.
Add: Excess usage	7,200 kg.
Actual Quantity	37,200 kg.
Add: Closing Stock	10,000 kg.
Less: Opening stock	5,000 kg.
Quantity of Material purchased	42,200 kg

(i) Direct Material Price Variance:

= Actual Quantity purchased (Std. Price – Actual Price)

= 42,200 kg.(Rs.350 – Rs.365) = 6,33,000 (Adverse)

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Direct Material Usage Variance:

= Std. Price (Std. Quantity – Actual Quantity)

= Rs.350 (30,000 kg. – 37,200 kg.) = Rs.25,20,000 (Adverse)

(ii) Direct Labour Rate Variance:

= Actual hours (Std. Rate – Actual Rate)

= 5,300 hours (Rs.80 – Rs.82) = Rs.10,600 (Adverse)

Direct Labour Efficiency Variance:

= Std. Rate (Std. hours – Actual hours)

= Rs.80 (1,000 units × 5 hours – 5,300 hours) = Rs.24,000 (Adverse)

Marginal Costing

13. PVC Ltd sold 55,000 units of its product at Rs.375 per unit. Variable costs are Rs.175 per unit (manufacturing costs of Rs.140 and selling cost Rs.35 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs.65,00,000 (including depreciation of Rs.15,00,000). There is no beginning or ending inventories.

Required:

(i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

(ii) COMPUTE the P/V ratio.

(iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of Rs.5,00,000.

(iv) COMPUTE the sales level achieve an after-tax income (PAT) of Rs.5,00,000, assume 40% corporate tax rate..

ANSWER 13

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(i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 65,00,000}{\text{₹ } 200} = 32,500 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 50,00,000}{\text{₹ } 200} = 25,000 \text{ units.}$$

(ii) P/V ratio = $\frac{\text{Contribution/unit}}{\text{Selling Price/unit}} \times 100 = \frac{\text{₹ } 200}{\text{₹ } 375} \times 100 = 53.33\%$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹5,00,000

$$\frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{65,00,000 + 5,00,000}{200} = 35,000 \text{ units}$$

(iv) After Tax Income (PAT) = ₹5,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{\text{₹ } 5,00,000}{60} \times 100 = \text{₹ } 8,33,333$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$\text{Or, } \left(\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \times \text{Selling Price per unit} \right)$$

$$= \frac{\text{₹ } 65,00,000 + \text{₹ } 8,33,333}{53.33\%} = \text{₹ } 1,37,50,859$$

Budget and Budgetary Control

14. KLM Limited has prepared its expense budget for 50,000 units in its factory for the year 2019-20 as detailed below:

	(Rs. per unit)
Direct Materials	125
Direct Labour	50
Variable Overhead	40
Direct Expenses	15
Selling Expenses (20% fixed)	25
Factory Expenses (100% fixed)	15
Administration expenses (100% fixed)	8
Distribution expenses (85% variable)	20
Total	298

PREPARE an expense budget for the production of 35,000 units and 70,000 units.

ANSWER 14

Expense Budget of KLM Ltd.

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Particulars	50,000 Units (Rs.)	35,000 Units (Rs.)	70,000 Units (Rs.)
Direct Material	62,50,000 (50,000 x 125)	43,75,000 (35,000 x 125)	87,50,000 (70,000 x 125)
Direct Labour	25,00,000 (50,000 x 50)	17,50,000 (35,000 x 50)	35,00,000 (70,000 x 50)
Variable Overhead	20,00,000 (50,000 x 40)	14,00,000 (35,000 x 40)	28,00,000 (70,000 x 40)
Direct Expenses	7,50,000 (50,000 x 15)	5,25,000 (35,000 x 15)	10,50,000 (70,000 x 15)
Selling Expenses (Variable)*	10,00,000 (50,000 x 20)	7,00,000 (35,000 x 20)	14,00,000 (70,000 x 20)
Selling Expenses (Fixed)* (5 x 50,000)	2,50,000	2,50,000	2,50,000
Factory Expenses (Fixed) (15 x 50,000)	7,50,000	7,50,000	7,50,000
Administration Expenses (Fixed) (8 x 50,000)	4,00,000	4,00,000	4,00,000
Distribution Expenses (Variable)**	8,50,000 (17 x 50,000)	5,95,000 (17 x 35,000)	11,90,000 (17 x 70,000)
Distribution Expenses (Fixed)** (3 x 50,000)	1,50,000	1,50,000	1,50,000
	14900000	10895000	20240000

*Selling Expenses: Fixed cost per unit = Rs.25 x 20% = Rs.5

Fixed Cost = Rs.5 x 50,000 units = Rs.2,50,000

Variable Cost Per unit = Rs.25 – Rs.5 = Rs.20

**Distribution Expenses: Fixed cost per unit = Rs.20 x 15% = Rs.3

Fixed Cost = Rs.3 x 50,000 units = Rs.1,50,000

Variable cost per unit = Rs.20 – Rs.3 = Rs.17

Miscellaneous

15. (i) DIFFERENTIATE between Cost Accounting and Management Accounting.

(ii) EXPLAIN the meaning of Budget Manual.

(iii) EXPLAIN the term Equivalent units used in process industries.

ANSWER 15

(i) Difference between Cost Accounting and Management Accounting

Basis	Cost Accounting	Management Accounting
(i) Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
(ii) Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
(iii) Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
(iv) Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
(v) Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
(vi) Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.

(ii) Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results.
- A form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- A timetable for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A list of the organization's account codes, with full explanations of how to use them.

Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

(iii) Equivalent Units: Equivalent units or equivalent production units, means converting the incomplete production units into their equivalent completed units. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, labour and overheads. It is important that the estimate of percentage of completion should be as accurate as possible.



RTP- MAY 2019**Material Cost**

1. Ananya Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will be able to sell 10,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

- (i) The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).
- (ii) Maximum consumption per day is 20 kg. more than the average consumption per day.
- (iii) There is an opening stock of 1,000 kg.
- (iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
- (v) The purchase price is Rs.125 per kg.

There is an opening stock of 900 units of the finished product Exe.

The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur Rs. 720 on paper and documentation work.

From the above information FIND OUT the followings in relation to raw material Dee:

- (a) Re-order Quantity
- (b) Maximum Stock level
- (c) Minimum Stock level
- (d) CALCULATE the impact on the profitability of the company by not ordering the EOQ. [Take 364 days for a year]

ANSWER 1

Working Notes:

- (i) **Computation of Annual consumption & Annual Demand for raw material 'Dee':**

Sales forecast of the product 'Exe'	10,000 units
Less: Opening stock of 'Exe'	900 units
Fresh units of 'Exe' to be produced	9,100 units
Raw material required to produce 9,100 units of 'Exe' (9,100 units × 2 kg.)	18,200 kg.
Less: Opening Stock of 'Dee'	1,000 kg.
Annual demand for raw material 'Dee'	17,200 kg.

- (ii) **Computation of Economic Order Quantity (EOQ):**

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$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times \text{Annual demand of 'Dee'} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}} \\ &= \sqrt{\frac{2 \times 17,200 \text{ kg.} \times ₹ 720}{₹ 125 \times 13.76\%}} = \sqrt{\frac{2 \times 17,200 \text{ kg.} \times ₹ 720}{₹ 17.2}} = 1,200 \text{ kg.} \end{aligned}$$

(iii) Re- Order level:

$$\begin{aligned} &= (\text{Maximum consumption per day} \times \text{Maximum lead time}) \\ &= \left\{ \left(\frac{\text{Annual Consumption of 'Dee'}}{364 \text{ days}} + 20 \text{ kg.} \right) \times 8 \text{ days} \right\} \\ &= \left\{ \left(\frac{18,200 \text{ kg.}}{364 \text{ days}} + 20 \text{ kg.} \right) \times 8 \text{ days} \right\} = 560 \text{ kg.} \end{aligned}$$

(iv) Minimum consumption per day of raw material 'Dee':

Average Consumption per day = 50 Kg.

Hence, Maximum Consumption per day = 50 kg. + 20 kg. = 70 kg.

So Minimum consumption per day will be

$$\begin{aligned} \text{Average Consumption} &= \frac{\text{Min. consumption} + \text{Max. consumption}}{2} \\ \text{Or, } 50 \text{ kg.} &= \frac{\text{Min. consumption} + 70 \text{ kg.}}{2} \end{aligned}$$

Or, Min. consumption = 100 kg – 70 kg. = 30 kg.

(a) Re-order Quantity :

$$\text{EOQ} - 200 \text{ kg.} = 1,200 \text{ kg.} - 200 \text{ kg.} = 1,000 \text{ kg.}$$

(b) Maximum Stock level:

$$\begin{aligned} &= \text{Re-order level} + \text{Re-order Quantity} - (\text{Min. consumption per day} \times \text{Min. lead time}) \\ &= 560 \text{ kg.} + 1,000 \text{ kg.} - (30 \text{ kg.} \times 4 \text{ days}) \\ &= 1,560 \text{ kg.} - 120 \text{ kg.} = 1,440 \text{ kg.} \end{aligned}$$

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(c) Minimum Stock level:

= Re-order level – (Average consumption per day × Average lead time)
= 560 kg. – (50 kg. × 6 days) = 260 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
	Order quantity	1,000 kg.	1,200 kg.
II	No. of orders a year	17,200kg. / 1000kg = 17.2 or 18orders	17,200kg. / 12000 kg = 14.33 or 15orders
III	Ordering Cost	18 orders × Rs. 720 = Rs.12,960	15 orders × Rs. 720 = Rs.10,800
IV	Average Inventory	1,000kg. / 2 = 500kg.	1,200kg. / 2 = 600kg.
V	Carrying Cost	500 kg. × Rs. 17.2 = Rs. 8,600	600 kg. × Rs. 17.2 = Rs. 10,320
VI	Total Cost	Rs. 21,560	Rs. 21,120

Extra Cost incurred due to not ordering EOQ = Rs. 21,560 - Rs. 21,120 = Rs.440

Employee (Labour) Cost

2. A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers. Which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in Rs.)	40	50	60
Productions in units:			
- Product A	210	-	600
- Product B	360	-	1350
- Product C	460	250	-

Standard time allowed per unit of each product is:

	A	B	C
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at Rs. 1/-

You are required to CALCULATE the wages of each worker under:

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(i) Guaranteed hourly rate basis

(ii) Piece work earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

(iii) Premium bonus basis where the worker received bonus based on Rowan scheme.

ANSWER 2

(i) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked (Hours)	Hourly wage rate (Rs.)	Wages (Rs.)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(ii) Computation of Wages of each worker under piece work earning basis

Product	Piece rate per unit	Worker-I		Worker-II		Worker-III	
		Units	Wages (Rs.)	Units	Wages (Rs.)	Units	Wages (Rs.)
A	15	210	3,150	-	-	600	9,000
B	20	360	7,200	-	-	1,350	27,000
C	30	460	13,800	250	7,500	-	-
Total			24,150		7,500		36,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker -I, II and III will be paid the wages as computed i.e. Rs. 24,150, Rs. 7,500 and Rs. 36,000 respectively.

Working Notes:

1. Piece rate per unit

Product	Standard time per unit in minute	Piece rate each minute (Rs.)	Piece rate per unit (Rs.)
A	15	1	15
B	20	1	20
C	30	1	30

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2. Time allowed to each worker

Worker	Product-A	Product-B	Product-C	Total Time (H ours)
I	210 units × 15 = 3,150	360 units × 20 = 7,200	460 units × 30 = 13,800	24,150/60 = 402.50
II	-	-	250 units × 30 = 7,500	7,500/60 = 125
III	600 units × 15 = 9,000	1,350 units × 20 = 27,000	-	36,000/60 = 600

(iii) Computation of wages of each worker under Premium bonus basis (where each worker receives bonus based on Rowan Scheme)

Worker	Time Allowed (Hr.)	Time Taken (Hr.)	Time saved (Hr.)	Wage Rate per hour (Rs.)	Earnings (Rs.)	Bonus (Rs.)*	Total Earning (Rs.)
I	402.5	380	22.5	40	15,200	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

$$\text{* } \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Wage Rate}$$

$$\text{Worker-I} = \frac{380}{402.5} \times 22.5 \times 40 = 850$$

$$\text{Worker-II} = \frac{100}{125} \times 25 \times 50 = 1,000$$

$$\text{Worker-III} = \frac{540}{600} \times 60 \times 60 = 3,240$$

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Overheads- Absorption Costing Method

3. The Union Ltd. has the following account balances and distribution of direct charges on 31st March, 2019.

	Total	Production Depts		Service Depts	
		Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Indirect labour	29,000	8,000	6,000	4,000	11,000
Maintenance Material	9,900	3,400	1,600	2,100	2,800
Misc. supplies	5,900	1,500	2,900	900	600
Supervisor's salary	16,000	--	--	16,000	--
Cost & payroll salary	80,000	--	--	80,000	--

Overheads to be apportioned:

Power	78,000
Rent	72,000
Fuel and Heat	60,000
Insurance	12,000
Taxes	8,400
Depreciation	1,20,000

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space	Radiator Section	No. of employees	Investment	H.P. hours
Machine Shop	2,000 Sq. ft.	45	20	8,00,000	3,500
Packing	800 Sq. ft.	90	12	2,40,000	500
General Plant	400 Sq. ft.	30	4	80,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	1,60,000	1,000

Expenses charged to the stores departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%;

General Plant overheads is distributed on the basis of number of employees.

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(a) PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution.

(b) DETERMINE the service department distribution by simultaneous equation method.

ANSWER 3
(a) Overhead Distribution Statement

	Production Depts		Service Depts	
	Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Indirect labour	8,000	6,000	4,000	11,000
Maintenance Material	3,400	1,600	2,100	2,800
Misc. supplies	1,500	2,900	900	600
Supervisor's salary	--	--	16,000	--
Cost & payroll salary	--	--	80,000	--
Total allocated overheads	12,900	10,500	1,03,000	14,400
Add: Apportioned Overheads (As per Schedule below)	1,84,350	70,125	22,775	73,150
	192,250	80,625	1,25,775	87,550

Schedule of Apportionment of Overheads

Items of cost	Basis	Production Depts		Service Depts	
		Machine Shop	Packing	General Plant	Stores
Power	HP hours (7 : 1 : - : 2)	54,600	7,800	--	15,600
Rent	Floor space (5 : 2 : 1 : 4)	30,000	12,000	6,000	24,000
Fuel & Heat	Radiator sec. (3 : 6 : 2 : 4)	12,000	24,000	8,000	16,000
Insurance	Investment (10 : 3 : 1 : 2)	7,500	2,250	750	1,500
Taxes	Investment (10 : 3 : 1 : 2)	5,250	1,575	525	1,050
Depreciation	Investment (10 : 3 : 1 : 2)	75,000	22,500	7,500	15,000
		184,350	70,125	22,775	73,150

(b) Re-distribution of Overheads of Service Departments to Production Departments:

Let, the total overheads of General Plant = 'a' and the total overheads of Stores = 'b'

$$a = 1,25,775 + 0.3b \dots\dots\dots(i)$$

$$b = 87,550 + 0.2a \dots\dots\dots(ii)$$

Putting the value of 'b' in equation no. (i)

$$a = 1,25,775 + 0.3 (87,550 + 0.2a)$$

$$\text{Or } a = 1,25,775 + 26,265 + 0.06a$$

$$\text{Or } 0.94a = 1,52,040 \text{ Or } a = 1,61,745 \text{ (appx.)}$$

Putting the value of a = 1,61,745 in equation no. (ii) to get the value of 'b'

$$b = 87,550 + 0.2 \times 1,61,745 = 1,19,899$$

Secondary Distribution Summary

Particulars	Total (₹)	Machine Shops (₹)	Packing (₹)
Allocated and Apportioned overheads as per Primary distribution	2,77,875	1,97,250.00	80,625.00
- General Plant	1,61,745	80,872.50 $(1,61,745 \times \frac{5}{10})$	48,523.50 $(1,61,745 \times \frac{3}{10})$
- Stores	1,19,899	59,949.50 $(1,19,899 \times 50\%)$	23,979.80 $(1,19,899 \times 20\%)$
		3,38,072.00	1,53,128.30

Overheads- Activity Based Costing (ABC) Method

4. MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost (Rs.)
Power	Kilowatt hours	50,000 kilowatt hours	40,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	60,00,000

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The company makes three products M, S and T. For the year ended March 31, 20X9, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

- (i) PREPARE a statement showing cost allocation to each product from each activity.
- (ii) CALCULATE the cost of unused capacity for each activity.
- (iii) STATE the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

ANSWER 4

(i) Statement of cost allocation to each product from each activity

	Product			
	M	S	T	Total
Power (Refer to working note)	8,00,000 (10,000 kWh × Rs.80)	16,00,000 (20,000 kWh × Rs.80)	12,00,000 (15,000 kWh × Rs.80)	36,00,000
Quality Inspections (Refer to working note)	21,00,000 (3,500 inspections × Rs.600)	15,00,000 (2,500 inspections × Rs.600)	18,00,000 (3,000 inspections × Rs.600)	54,00,000

Working Note:

Rate per unit of cost driver:

Power : (Rs.40,00,000 ÷ 50,000 kWh) = Rs.80/kWh

Quality Inspection : (Rs.60,00,000 ÷ 10,000 inspections) = Rs.600 per inspection

(ii) Calculation of cost of unused capacity for each activity:

Power (Rs.40,00,000 – Rs.36,00,000)	4,00,000
Quality Inspections (Rs.60,00,000 – Rs.54,00,000)	6,00,000
Total cost of unused capacity	10,00,000

(iii) Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate:

- Effect on product costing & capacity management
- Effect on pricing decisions.
- Effect on performance evaluation
- Effect on financial statements
- Regulatory requirements.
- Difficulties in forecasting for any capacity level.

Cost Sheet

5. Following information relate to a manufacturing concern for the year ended 31st March, 2019:

Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	42,25,000
Freight Inwards	1,00,000
Direct wages paid	12,56,000
Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Work-in-progress (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	Rs.16 per unit
Finished Stock (opening)- 1,217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14,000 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14,153 units at a price of Rs.618 per unit during the year.
PREPARE cost sheet of the firm.

ANSWER 5

Cost sheet for the year ended 31st March, 2019.

Units produced - 14,000 units

Units sold - 14,153 units

Particulars	Amount (Rs.)
Raw materials purchased	42,25,000

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Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	42,48,000
Less: Sale of scrap of material	(8,000)
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock [Rs. 500(70,00,000/14,000) × 1,064] (1,217+ 14,000 – 14,153 = 1,064 units)	(5,32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (Rs.16 × 14,153 units)	2,26,448
Cost of Sales	73,02,948
Profit (Balancing figure)	14,43,606
Sales (Rs. 618 × 14,153 units)	87,46,554

Non-integrated Accounting

6. The following is the summarised Trading and Profit and Loss Account of XYZ Ltd. for the year ended 31st March 2019:

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
Direct Material	14,16,000	Sales (30,000 units)	30,00,000
Direct wages	7,42,000	Finished stock (2,000 units)	1,67,500
Works overheads	4,26,000	Work-in-progress:	
Administration overheads	1,50,000	- Materials 34,000	
Selling and distribution overheads	1,65,000	- Wages 16,000	
Net profit for the year	3,22,500	- Works overhead 4,000	54,000
	32,21,500		32,21,500

The company's cost records show that in course of manufacturing a standard unit (i) works overheads have been charged @ 20% on prime cost, (ii) administration overheads are related with production activities and are recovered at Rs.5 per finished unit, and (iii) selling and distribution overheads are recovered at Rs.6 per unit sold.

You are required to PREPARE:

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(i) Costing Profit and Loss Account indicating the net profits,

(ii) A Statement showing reconciliation between profit as disclosed by the Cost Accounts and Financial Accounts.

ANSWER 6

(i) Costing Profit and Loss Account for the year ended 31st March 2019:

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
Material consumed	14,16,000	Sales (30,000 units)	30,00,000
Direct wages	7,42,000		
Prime Cost	21,58,000		
Works overheads (20% of Prime cost)	4,31,600		
	25,89,600		
Less: Work in progress	(54,000)		
Factory cost	25,35,600		
Administration overheads (Rs.5 × 32,000 units)	1,60,000		
Cost of production	26,95,600		
Less: Finished stock	(1,68,475)		
Cost of goods sold	25,27,125		
Selling and distribution overheads (Rs.6 × 30,000 unit)	1,80,000		
Cost of sales	27,07,125		
Profit (balancing figure)	2,92,875		
	30,00,000		30,00,000

(ii) Statement reconciling the profit as per costing profit and loss account with the profit as per financial accounts

Particulars	Amount (Rs.)	Amount (Rs.)
Profit as per cost records		2,92,875
<i>Add: Overheads over-absorbed:</i>		
- Works overheads (Rs. 4,31,600 – Rs. 4,26,000)	5,600	
- Administration OH (Rs. 1,60,000 – Rs. 1,50,000)	10,000	
- Selling and Distribution (Rs. 1,80,000 – Rs. 1,65,000)	15,000	30,600
Less: Closing stock overvalued (Rs. 1,68,475 – Rs. 1,67,500)		(975)
Profit as per financial accounts		3,22,500

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*It is assumed that the number of units Produced
 = Number of units sold + Finished stock = 30,000 + 2,000 = 32,000 units.

Contract Costing

7. Dream house (P) Ltd. is engaged in building two residential housing projects in the city. Particulars related to two housing projects are as below:

	HP-1	HP-2
Work in Progress on 1st April 2018	7,80,000	2,80,000
Materials Purchased	6,20,000	8,10,000
Land purchased near to the site to open an office	-	12,00,000
Brokerage and registration fee paid on the above purchase	-	60,000
Wages paid	85,000	62,000
Wages outstanding as on 31st March, 2019	12,000	8,400
Donation paid to local clubs	5,000	2,500
Plant hire charges paid for three years effecting from 1st April 2018	72,000	57,000
Value of materials at site as on 31st March, 2019	47,000	52,000
Contract price of the projects	48,00,000	36,00,000
Value of work certified	20,50,000	16,10,000
Work not certified	1,90,000	1,40,000

A concrete mixture machine was bought on 1st April 2018 for Rs.8,20,000 and used for 180 days in HP-1 and for 100 days in HP-2. Depreciation is provided @ 15% p.a. (this machine can be used for any other projects)

PREPARE contract account for the two housing projects showing the notional profit or loss on each project for the year ended 31st March, 2019.

ANSWER 7

Dr. **Contract Account for the year ended 31st March, 2019** Cr.

Particulars	HP-1 (Rs.)	HP-2 (Rs.)	Particulars	HP-1 (Rs.)	HP-2 (Rs.)
To Balance b/d: W-I-P	7,80,000	2,80,000	By Closing material at site	47,000	52,000
To Material purchased	6,20,000	8,10,000	By W-I-P:		
To Wages: (Rs.85,000+Rs.12,000) (Rs.62,000+Rs.8,400)	97,000	70,400	Value of work certified	20,50,00	16,10,00
To Donation to local club*	5,000	2,500	Cost of work not certified	0	0
To Plant hire charges: (Rs.72,000x1/3) (Rs.57,000x1/3)	24,000	19,000		1,90,000	1,40,000

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To Depreciation on concrete mixture**: (Rs.8,20,000x15%x180/365) (Rs.8,20,000x15%x100/365)	60,658	33,699			
To Notional profit	7,00,342	5,86,401			
	2287000	1802000		2287000	1802000

* Assuming donation paid to local club was exclusively for the above projects, hence included in the contract account.

** Depreciation on concrete mixture machine is charged on the basis of number of days used for the projects, as it is clearly mentioned in the question that this machine can be used for other projects also.

(Land purchased and brokerage and registration fee paid for this purpose cannot be charged to contract account, hence not included in the contract account)

Process Costing

8. Following information is available regarding process A for the month of February, 20X9:

Production Record:

Units in process as on 01.02.20X9 4,000
 (All materials used, 25% complete for labour and overhead)

New units introduced 16,000
 Units completed 14,000
 Units in process as on 28.02.20X9 6,000
 (All materials used, 33-1/3% complete for labour and overhead)

Cost Records:

Work-in-process as on 01.02.20X9 (Rs.)
 Materials 6,00,000
 Labour 1,00,000
 Overhead 1,00,000
8,00,000

Cost during the month
 Materials 25,60,000
 Labour 15,00,000
 Overhead 15,00,000
55,60,000

Presuming that average method of inventory is used, PREPARE:

(i) Statement of Equivalent Production.

(ii) Statement showing Cost for each element.

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(iii) Statement of Apportionment of cost.

(iv) Process Cost Account for Process A.

ANSWER 8**(i) Statement of Equivalent Production (Average cost method)**

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%*)	Units**	(%)*	Units**	(%)*	Units**
20,000	Completed	14,000	100	14,000	100	14,000	100	14,000
	WIP	6,000	100	6,000	33-1/3	2,000	33-1/3	2,000
20,000		20,000		20,000		16,000		16,000

*Percentage of completion ** Equivalent units

(ii) Statement showing Cost for each element

Particulars	Materials	Labour	Overhead	Total
Cost of opening work-in-progress (Rs.)	6,00,000	1,00,000	1,00,000	8,00,000
Cost incurred during the month (Rs.)	25,60,000	15,00,000	15,00,000	55,60,000
Total cost (Rs.) : (A)	31,60,000	16,00,000	16,00,000	63,60,000
Equivalent units : (B)	20,000	16,000	16,000	
Cost per equivalent unit (Rs.) : C= (A ÷ B)	158	100	100	358

(iii) Statement of Apportionment of cost

	(Rs.)	(Rs.)
Value of output transferred: (A) (14,000 units × Rs. 358)		50,12,000
Value of closing work-in-progress: (B)		
Material (6,000 units × Rs.158)	9,48,000	
Labour (2,000 units × Rs. 100)	2,00,000	
Overhead (2,000 units × Rs. 100)	2,00,000	13,48,000
Total cost : (A + B)		63,60,000

(iv) Process- A Account

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Opening WIP	4,000	8,00,000	By Complete units	14,000	50,12,000
To Materials	16,000	25,60,000	By Closing WIP	6,000	13,48,000
To Labour		15,00,000			
To Overhead		15,00,000			
	20,000	63,60,000		20,000	63,60,000

Joint Product and By Product

9. A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of Rs. 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of Rs.1,80,000 and Rs.1,50,000 respectively. X was further processed in Department 3 at a cost of Rs.1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (Rs.)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been Rs. 50, Rs. 40 and Rs. 10 per kg respectively.

Required:

- (i) PREPARE a statement showing the apportionment of joint costs to A, B and X.
- (ii) PRESENT a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.
- (iii) PREPARE a statement showing the product wise and total profit for the period.
- (iv) STATE with supporting calculations as to whether any or all the products should be further processed or not

ANSWER 9

(i) Statement showing the apportionment of joint costs to A, B and X

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 × 18,000)	4,00,000 (₹ 40 × 10,000)	5,40,000 (₹ 10 × 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (₹)	6,30,000 $\left(\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 9,00,000 \right)$	2,80,000 $\left(\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 4,00,000 \right)$	3,78,000 $\left(\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 5,40,000 \right)$	12,88,000

(ii) Statement showing the cost per kg. of each product (indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (Rs.) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000
Joint cost per kg (Rs.): (I ÷ II)	35	28	7
Further processing Cost per kg. (Rs.)	10 1,80,000 /18,000 kg	15 1,50,000 /10,000 kg	2 1,08,000 /54,000 kg
Total cost per kg (Rs.)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (Rs.)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (Rs.) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (Rs.)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (Rs.)	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (Rs.)	1,80,000	1,50,000	1,08,000	
Total cost (Rs.)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (Rs.)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

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Products	A	B	X
Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹/kg	72	50	18
	$\left(\frac{₹ 12,24,000}{17,000 \text{ kg}} \right)$	$\left(\frac{₹ 2,50,000}{5,000 \text{ kg}} \right)$	$\left(\frac{₹ 7,92,000}{44,000 \text{ kg}} \right)$

2. Valuation of closing stock:

Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (Rs.)	45	43	9	
Closing stock value (Rs.)	45,000 (Rs. 45 x 1,000 kg)	2,15,000 (Rs. 43 x 5,000 kg)	90,000 (Rs. 9 x 10,000 kg)	3,50,000

(iv) Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (Rs.)	50	40	10
Selling price per kg after further processing (Rs.) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (Rs.)	22	10	8
Less: Further processing cost per kg (Rs.)	(10)	(15)	(2)
Incremental profit (loss) per kg (Rs.)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

Service Costing

10. A company runs a holiday home. For this purpose, it has hired a building at a rent of Rs.10,00,000 per month alongwith 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite.

The other expenses for the year 20X9 are as follows:

Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite.

ANSWER 10

(i) Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms X 360 days X 100%)	36,000 (36,000 X 1)
Double rooms suites	14,400 (50 rooms X 360 days X 80%)	36,000 (14,400 X 2.5)
Triple rooms suites	6,480 (30 rooms X 360 days X 60%)	32,400 (6,480 X 5)
		104400

(ii) Statement of total cost:

Staff salaries	14,25,00,000
Room attendant's wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000
	25,21,00,000

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Building rent {(Rs.10,00,000 X 12 months) + 5% on total taking}	1,20,00,000+ 5% on total takings
Total cost	26,41,00,000 + 5% on total takings

Profit is 20% of total takings

Total takings = Rs. 26,41,00,000 + 25% (5% +20%) of total takings

Let x be rent for single room suite

Then $1,04,400x = 26,41,00,000 + 0.25 \times 1,04,400x$

Or, $1,04,400x = 26,41,00,000 + 26,100x$

Or, $78,300x = 26,41,00,000$

Or, $x = 3,373$

(iii) Rent to be charged for single room suite = Rs. 3,373

Rent for double rooms suites Rs. $3,373 \times 2.5 = \text{Rs. } 8,432.5$

Rent for triple rooms suites Rs. $3,373 \times 5 = \text{Rs. } 16,865$

Standard Costing

11. ABC Ltd. had prepared the following estimation for the month of April:

	Quantity	Rate (Rs.)	Amount (Rs.)
Material-A	800 kg.	45.00	36,000
Material-B	600 kg.	30.00	18,000
Skilled labour	1,000 hours	37.50	37,500
Unskilled labour	800 hours	22.00	17,600

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (Rs.)	Amount (Rs.)
Material-A	900 kg.	43.00	38,700
Material-B	650 kg.	32.50	21,125
Skilled labour	1,200 hours	35.50	42,600
Unskilled labour	860 hours	23.00	19,780

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You are required to CALCULATE:

- (a) Material Cost Variance;
- (b) Material Price Variance;
- (c) Material Mix Variance;
- (d) Material Yield Variance;
- (e) Labour Cost Variance;
- (f) Labour Efficiency Variance and
- (g) Labour Yield Variance.

ANSWER 11

Material Variances:

Material	SQ (WN-1)	SP (Rs.)	SQ × SP (Rs.)	RSQ (WN-2)	RSQ × SP (Rs.)	AQ	AQ × SP (Rs.)	AP (Rs.)	AQ × AP (Rs.)
A	940 kg.	45.00	42,300	886 kg.	39,870	900 kg.	40,500	43.00	38,700
B	705 kg.	30.00	21,150	664 kg.	19,920	650 kg.	19,500	32.50	21,125
	1645 kg		63,450	1550 kg	59,790	1550 kg	60,000		59,825

WN-1: Standard Quantity (SQ):

$$\text{Material A-} \left(\frac{800 \text{ kg.}}{0.9 \times 1,400 \text{ kg.}} \times 1,480 \text{ kg.} \right) = 939.68 \text{ or } 940 \text{ kg.}$$

$$\text{Material B-} \left(\frac{600 \text{ kg.}}{0.9 \times 1,400 \text{ kg.}} \times 1,480 \text{ kg.} \right) = 704.76 \text{ or } 705 \text{ kg.}$$

WN- 2: Revised Standard Quantity (RSQ):

$$\text{Material A-} \left(\frac{800 \text{ kg.}}{1,400 \text{ kg.}} \times 1,550 \text{ kg.} \right) = 885.71 \text{ or } 886 \text{ kg.}$$

$$\text{Material B-} \left(\frac{600 \text{ kg.}}{1,400 \text{ kg.}} \times 1,550 \text{ kg.} \right) = 664.28 \text{ or } 664 \text{ kg.}$$

$$\begin{aligned} \text{(a) Material Cost Variance (A + B)} &= \{(SQ \times SP) - (AQ \times AP)\} \\ &= \{63,450 - 59,825\} = 3,625 \text{ (F)} \end{aligned}$$

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$$(b) \text{ Material Price Variance (A + B)} = \{(AQ \times SP) - (AQ \times AP)\}$$

$$= \{60,000 - 59,825\} = 175 \text{ (F)}$$

$$(c) \text{ Material Mix Variance (A + B)} = \{(RSQ \times SP) - (AQ \times SP)\}$$

$$= \{59,790 - 60,000\} = 210 \text{ (A)}$$

$$(d) \text{ Material Yield Variance (A + B)} = \{(SQ \times SP) - (RSQ \times SP)\}$$

$$= \{63,450 - 59,790\} = 3,660 \text{ (F)}$$

Labour Variances:

Labour	SH (WN-3)	SR (Rs.)	SH × SR (Rs.)	RSH (WN-4)	RSH × SR (Rs.)	AH	AH × SR (Rs.)	AR (Rs.)	AH × AR (Rs.)
Skilled	1,116 hrs	37.50	41,850	1144	42,900	1,200	45,000	35.50	42,600
Unskilled	893 hrs	22.00	19,646	916	20,152	860	18,920	23.00	19,780
	2,009 hrs		61,496	2,060	63,052	2,060	63,920		62,380

WN- 3: Standard Hours (SH):

$$\text{Skilled labour- } \left(\frac{0.95 \times 1,000 \text{ hr.}}{0.90 \times 1,400 \text{ kg.}} \times 1,480 \text{ kg.} \right) = 1,115.87 \text{ or } 1,116 \text{ hrs.}$$

$$\text{Unskilled labour- } \left(\frac{0.95 \times 800 \text{ hr.}}{0.90 \times 1,400 \text{ kg.}} \times 1,480 \text{ kg.} \right) = 892.69 \text{ or } 893 \text{ hrs.}$$

WN- 4: Revised Standard Hours (RSH):

$$\text{Skilled labour- } \left(\frac{1,000 \text{ hr.}}{1,800 \text{ hr.}} \times 2,060 \text{ hr.} \right) = 1,144.44 \text{ or } 1,144 \text{ hrs.}$$

$$\text{Unskilled labour- } \left(\frac{800 \text{ hr.}}{1,800 \text{ hr.}} \times 2,060 \text{ hr.} \right) = 915.56 \text{ or } 916 \text{ hrs.}$$

$$(e) \text{ Labour Cost Variance (Skilled + Unskilled)} = \{(SH \times SR) - (AH \times AR)\}$$

$$= \{61,496 - 62,380\} = 884 \text{ (A)}$$

$$(f) \text{ Labour Efficiency Variance (Skilled + Unskilled)} = \{(SH \times SR) - (AH \times SR)\}$$

$$= \{61,496 - 63,920\} = 2,424 \text{ (A)}$$

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$$(g) \text{ Labour Yield Variance (Skilled + Unskilled) } = \{(SH \times SR) - (RSH \times SR)\}$$

$$= \{61,496 - 63,052\} = 1,556 \text{ (A)}$$

Marginal Costing

12. MNP Ltd sold 2,75,000 units of its product at Rs. 375 per unit. Variable costs are Rs. 175 per unit (manufacturing costs of Rs.140 and selling cost Rs.35 per unit). Fixed costs are incurred uniformly throughout the year and amount to Rs.3,50,00,000 (including depreciation of Rs. 1,50,00,000). there are no beginning or ending inventories.

Required:

(i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

(ii) COMPUTE the P/V ratio.

(iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of Rs. 25,00,000.

(iv) COMPUTE the sales level achieve an after-tax income (PAT) of Rs. 25,00,000. Assume 40% corporate Income Tax rate.

ANSWER 12

(i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 3,50,00,000}{\text{₹ } 200} = 1,75,000 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 2,00,00,000}{\text{₹ } 200} = 1,00,000 \text{ units.}$$

$$(ii) \text{ P/V ratio } = \frac{\text{Contribution/unit}}{\text{Selling Price/unit}} \times 100 = \frac{\text{₹ } 200}{\text{₹ } 375} \times 100 = 53.33\%$$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹ 25,00,000

$$\frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{3,50,00,000 + 25,00,000}{200} = 1,87,500 \text{ units}$$

(iv) After Tax Income (PAT) = ₹25,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{\text{₹ } 25,00,000}{60} \times 100 = \text{₹ } 41,66,667$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$\text{Or, } \left(\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \times \text{Selling Price per unit} \right)$$

$$= \frac{\text{₹ } 3,50,00,000 + \text{₹ } 41,66,667}{53.33\%} = \text{₹ } 7,34,42,091$$

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Budget and Budgetary Control

13. S Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (Rs.)	Product B (Rs.)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

- (a) Before marketing efforts
(b) After marketing efforts.

ANSWER 13

(a) Flexible Budget before marketing efforts:

	Product A 6000 units		Product B 9000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

(b) Flexible Budget after marketing efforts:

	Product A 7500 units		Product B 9500 units	
	Per unit	Total	Per unit	Total
Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Miscellaneous

14. (a) **DISTINGUISH** between Cost Control and Cost Reduction.

(b) **DISCUSS** the accounting treatment of Idle time and overtime wages.

(c) **DISCUSS** cost classification based on variability and controllability

ANSWER 14

(a) **Difference between Cost Control and Cost Reduction**

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	1. Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to better them continuously
2. Cost control seeks to attain lowest possible cost under existing conditions.	2. Cost reduction recognises no condition as permanent, since a change will result in lower cost.
3. In case of cost control, emphasis is on past and present	3. In case of cost reduction, it is on present and future.
4. Cost control is a preventive function	4. Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	5. Cost reduction has no visible end.

(b) **Accounting treatment of idle time wages & overtime wages in cost accounts:** Normal idle time is treated as a part of the cost of production. Thus, in the case of direct workers, an allowance for normal idle time is built into the labour cost rates. In the case of indirect workers, normal idle time is spread over all the products or jobs through the process of absorption of factory overheads.

Under Cost Accounting, the overtime premium is treated as follows:

- If overtime is resorted to at the desire of the customer, then the overtime premium may be charged to the job directly.
- If overtime is required to cope with general production program or for meeting urgent orders, the overtime premium should be treated as overhead cost of particular department or cost center which works overtime.

- Overtime worked on account of abnormal conditions should be charged to costing Profit & Loss Account.

- If overtime is worked in a department due to the fault of another department the overtime premium should be charged to the latter department.

(c) Cost classification based on variability

(a) **Fixed Costs** – These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output. For example, rent, insurance of factory building etc., remain the same for different levels of production.

(b) **Variable Costs** – These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.

(c) **Semi-variable Costs** – These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

Cost classification based on controllability

(a) **Controllable Costs** - Cost that can be controlled, typically by a cost, profit or investment centre manager is called controllable cost. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre. For example, direct costs comprising direct labour, direct material, direct expenses and some of the overheads are generally controllable by the shop level management.

(b) **Uncontrollable Costs** - Costs which cannot be influenced by the action of a specified member of an undertaking are known as uncontrollable costs. For example, expenditure incurred by, say, the tool room is controllable by the foreman in-charge of that section but the share of the tool-room expenditure which is apportioned to a machine shop is not to be controlled by the machine shop foreman.

MTP- II – JULY 2021

1. Answer the following:

(a) From the following information, CALCULATE employee turnover rate using –

- (i) Separation Method,
- (ii) Replacement Method,
- (iii) New Recruitment Method, and
- (iv) Flux Method :

No. of workers as on 01.04.2020 = 3,800

No. of workers as on 31.03.2021 = 4,200

During the year, 40 workers left while 160 workers were discharged and 600 workers were recruited during the year; of these, 150 workers were recruited because of exits and the rest were recruited in accordance with expansion plans.

ANSWER

(a) Employee turnover rate using:

(i) Separation Method:

$$= \frac{\text{No. of workers left} + \text{No. of workers discharged}}{\text{Average number of workers}} \times 100$$

$$= \frac{(40+160)}{(3,800+4,200) \div 2} \times 100 = \frac{200}{4,000} \times 100 = 5\%$$

(ii) Replacement Method:

$$= \frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100 = \frac{150}{4,000} \times 100 = 3.75\%$$

(iii) New Recruitment Method:

$$= \frac{\text{No. of workers newly recruited}}{\text{Average number of workers}} \times 100$$

$$= \frac{\text{No. of Recruitments} - \text{No. of Replacements}}{\text{Average number of workers}} \times 100$$

$$= \frac{600-150}{4,000} \times 100 = \frac{450}{4,000} \times 100 = 11.25\%$$

(iv) Flux Method:

$$= \frac{\text{No. of separations} + \text{No. of accessions}}{\text{Average number of workers}} \times 100$$

$$= \frac{(200+600)}{(3,800+4,200) \div 2} \times 100 = \frac{800}{4,000} \times 100 = 20\%$$

(b) A company uses three raw materials Pi, Qu and Ar for a particular product for which the following data applies

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Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (Rs.)	Delivery period (in weeks)			Re-order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
Pi	5	10,000	0.10	1	2	3	8,000	?
Qu	2	5,000	0.30	3	4	5	4,750	?
Ar	3	10,000	0.15	2	3	4	?	2,000

Weekly production varies from 350 to 450 units, averaging 400 units of the said product. WHAT would be the following quantities:

(i) Minimum Stock of Pi?

(ii) Maximum Stock of Qu?

(iii) Re-order level of Ar?

(iv) Average stock level of Pi?

ANSWER

(i) Minimum stock of Pi

Re-order level – (Average consumption × Average time required to obtain delivery)
 = 8,000 kg. – (400 units × 5 kg. × 2 weeks) = 4,000 kg.

(ii) Maximum stock of Qu

Re-order level – (Min. Consumption × Min. delivery period) + Re-order quantity
 = 4,750 kg. – (350 units × 2 kg. × 3 weeks) + 5,000 kg.
 = 9,750 - 2,100 = 7,650 kg.

(iii) Re-order level of Ar

Maximum delivery period × Maximum Usage
 = 4 weeks × (450 units × 3 kg.) = 5,400 kg.

OR

= Minimum stock of Ar + (Average consumption × Average delivery time)
 = 2,000 kg. + [(400 units × 3 kg.) × 3 weeks] = 5,600 kg.

(iv) Average stock level of Pi

= Minimum stock level of Pi + $\frac{1}{2}$ Re-order quantity
 = 4,000 kg. + $\frac{1}{2}$ 10,000 kg. = 4,000 + 5,000 = 9,000 kg.

OR

= $\frac{\text{Minimum stock} + \text{Maximum stock}}{2}$ (Refer to Working Note)
 = $\frac{4,000 + 16,250}{2}$ = 10,125 kg.

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Working note

Maximum stock of Pi = ROL + ROQ – (Minimum consumption × Minimum delivery period)
 = 8,000 kg. + 10,000 kg. – [(350 units × 5 kg.) × 1 week] = 16,250 kg.

(c) The following particulars refer to process used in the treatment of material subsequently, incorporated in a component forming part of an electrical appliance:

(i) The original cost of the machine used (Purchased in June 2013) was Rs. 1,00,000. Its estimated life is 10 years, the estimated scrap value at the end of its life is Rs.1 0,000, and the estimated working time per year (50 weeks of 44 hours) is 2,200 hours of which machine maintenance etc., is estimated to take up 200 hours. No other loss of working time expected, setting up time, estimated at 100 hours, is regarded as productive time. (Holiday to be ignored).

(ii) Electricity used by the machine during production is 16 units per hour at cost of a 90 paise per unit. No current is taken during maintenance or setting up.

(iii) The machine required a chemical solution which is replaced at the end of week at a cost of Rs. 200 each time.

(iv) The estimated cost of maintenance per year is Rs.12,000.

(v) Two attendants control the operation of machine together with five other identical machines. Their combined weekly wages, insurance and the employer's contribution to holiday pay amount Rs. 1,200.

(vi) Departmental and general works overhead allocated to this machine for the current year amount to Rs. 20,000.

You are required to CALCULATE the machine hour rate of operating the machine.

ANSWER**Working Notes:**

(i) Total Productive hours = Estimated Working hours – Machine Maintenance hours
 = 2,200 hours – 200 hours = 2,000 hours

(ii) Depreciation per annum = $\frac{\text{Rs. } 1,00,000 - \text{Rs. } 10,000}{10 \text{ years}}$ = Rs. 9000

(iii) Chemical solution cost per annum = Rs. 200 × 50 weeks = Rs.10,000

(iv) Wages of attendants (per annum) = $\frac{\text{Rs. } 1,200 \times 50 \text{ weeks}}{6 \text{ machines}}$ = Rs.10,000

Calculation of Machine hour rate

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Particulars	Amount (Rs.) (per annum)	Amount (Rs.) (per hour)
A. Standing Charge		
(i) Wages of attendants	10,000	
(ii) Departmental and general works overheads	20,000	
Total Standing Charge	30,000	
Standing Charges per hour $\left(\frac{30,000}{2,000}\right)$		15.00
B. Machine Expense		
(iii) Depreciation	9,000	4.50
(iv) Electricity $\left(\frac{\text{Rs. } 0.9 \times 16 \text{ units} \times 1,900 \text{ hours}}{2,000 \text{ hours}}\right)$	-	13.68
(v) Chemical solution	10,000	5.00
(vi) Maintenance cost	12,000	6.00
Machine operating cost per hour (A + B)		44.18

(d) An article passes through three successive operations from raw materials stage to the finished product stage. The following data are available from the production records for the month of March, 2021:

Operation	No. of pieces (Input)	No. of pieces (Rejected)	No. of pieces (Output)
1	1,80,000	60,000	1,20,000
2	1,98,000	18,000	1,80,000
3	1,44,000	24,000	1,20,000

(i) DETERMINE the input required to be introduced in the first operation in no. of pieces in order to obtain finished output of 500 pieces after the last operation.

(ii) CALCULATE the cost of raw material required to produce one piece of finished product, if the weight of the finished piece is 0.5 kg. and the price of raw material is Rs. 80 per kg.

ANSWER
Statement of production

Operation	Input	Rejections		Output
		Total	% of output	
1	1,80,000	60,000	50	1,20,000
2	1,98,000	18,000	10	1,80,000
3	1,44,000	24,000	20	1,20,000

(i) Determination of input required to obtain 500 pieces of finished output:

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Particulars	No. of pieces
Output required after operation 3	500
Add: Rejection in operation 3 (20%)	100
Output required after operation 2	600
Add: Rejection in operation 2 (10%)	60
Output required after operation 1	660
Add: Rejection in operation 1 (50%)	330
Input required in operation 1	990

(ii) Calculation of cost of raw material:

To produce 500 pieces of final output, 990 pieces of inputs are required at operation 1. Thus, to get a finished piece of 0.5 kg. of output, the weight of input required is:

$$= \frac{0.5}{500} \times 990 = 0.99 \text{ kg.}$$

The cost of raw material would be Rs. 80 × 0.99 kg. = Rs.79.20

2. (a) RVP Cinema provides the following data for the year 2020-21:

Particulars	Premium Hall (Rs.)	Recliner Hall (Rs.)	7D Hall (Rs.)	Cafeteria (Rs.)
Revenue	11,55,000	18,75,000	9,30,000	5,25,000
Cost of Goods sold	-	-	-	4,51,125
Digital media cost	6,19,800	9,46,875	4,02,900	-
Number of Credit Card transactions	75,000	90,000	60,000	45,000
Number of Tests	12,000	18,000	15,000	7,500
Number of Setups	225	450	150	75
Area in Square feet	3,000	4,500	2,250	750
Number of Customer contacts	2,62,500	3,00,000	1,50,000	37,500
Number of Customer online orders	2,10,000	2,47,500	1,20,000	22,500

Cost analysis has revealed the following

Activity	Activity Cost (Rs.)	Activity Driver	Activity Capacity
Marketing Expenses	2,25,000	Number of Customer contacts	7,50,000
Website Maintenance Expenses	1,50,000	Number of Customer online orders	6,00,000
Credit Card Processing Fees	1,35,000	Number of Credit Card transactions	2,70,000
Cleaning Equipment Cost	3,15,000	Number of square feet	10,500
Inspecting and testing costs	2,62,500	Number of tests	52,500
Setting up machine's costs	4,50,000	Number of set-ups	900

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Required:

(i) If RVP Cinema allocates all costs (other than Cost of Goods sold and Digital Media costs) to the departments on the basis of Activity Based Costing system, CALCULATE the operating income and percentage of operating income of each department.

(ii) RVP Cinema operated for years under the assumption that profitability can be increased by increasing net revenue from Cafeteria. However, the Supervisor of RVP Cinema wants to shut down Cafeteria. On the basis of (i) above, STATE whether the contention of the Supervisor is valid or not.

ANSWER

(a) Computation showing Rates for each Activity

Activity	Activity Cost (Rs.) (A)	Activity driver	Activity Capacity (B)	Activity Rate (A/B)
Marketing Expenses	2,25,000	Number of Customer Contacts	7,50,000	0.30
Website Maintenance Expenses	1,50,000	Number of Customer Online orders	6,00,000	0.25
Credit Card Processing Fees	1,35,000	Number of Credit card transactions	2,70,000	0.50
Cleaning Equipment Cost	3,15,000	Number of Square Feet	10,500	30.00
Inspecting and Testing Cost	2,62,500	Number of Tests	52,500	5.00
Setting up machine's cost	4,50,000	Number of set-ups	900	500.00

Activity based Cost for each Department

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Activity	Premium Hall (Rs.)	Recliner Hall (Rs.)	7D Hall (Rs.)	Cafeteria (Rs.)
Marketing Expenses	78,750 (2,62,500 x 0.3)	90,000 (3,00,000 x 0.3)	45,000 (1,50,000 x 0.3)	11,250 (37,500 x 0.3)
Website Maintenance Expenses	52,500 (2,10,000 x 0.25)	61,875 (2,47,500 x 0.25)	30,000 (1,20,000 x 0.25)	5,625 (22,500 x 0.25)
Credit Card Processing Fees	37,500 (75,000 x 0.5)	45,000 (90,000 x 0.5)	30,000 (60,000 x 0.5)	22,500 (45,000 x 0.5)
Cleaning Equipment Cost	90,000 (3,000 x 30)	1,35,000 (4,500 x 30)	67,500 (2,250 x 30)	22,500 (750 x 30)
Inspecting and Testing Cost	60,000 (12,000 x 5)	90,000 (18,000 x 5)	75,000 (15,000 x 5)	37,500 (7,500 x 5)
Setting up machine's cost	1,12,500 (225 x 500)	2,25,000 (450 x 500)	75,000 (150 x 500)	37,500 (75 x 500)
Total	4,31,250	6,46,875	3,22,500	1,36,875

(i) Statement of Operating Income and Operating Income percentage for each Department

Particulars	Premium Hall (Rs.)	Recliner Hall (Rs.)	7D Hall (Rs.)	Cafeteria (Rs.)
Revenues (Given) (A)	11,55,000	18,75,000	9,30,000	5,25,000
Cost of Goods Sold (given) (B1)	-	-	-	4,51,125
Digital Media Cost (given) (B2)	6,19,800	9,46,875	4,02,900	-
Activity Based Cost (as per Workings) (B3)	4,31,250	6,46,875	3,22,500	1,36,875
Operating Cost (B) (B1+ B2 + B3)	10,51,050	15,93,750	7,25,400	5,88,000
Operating Income/(Loss) (C = A - B)	1,03,950	2,81,250	2,04,600	(63,000)
Percentage of profit/(loss) on sales	9%	15%	22%	(12%)

(ii) Contention of Supervisor is valid as operating income of Cafeteria is negative i.e. (Rs.63,000) or percentage of profit/loss is (12%).

(b) Zed Limited obtained a contract No. 1551 for Rs. 150 lacs. The following details are available in respect of this contract for the year ended March 31, 2021:

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	Rs.
Materials purchased	4,80,000
Materials issued from stores	15,00,000
Wages paid	21,00,000
Drawing and maps	1,80,000
Sundry expenses	45,000
Electricity charges	75,000
Plant hire expenses	1,80,000
Sub-contract cost	60,000
Materials returned to stores	90,000
Materials returned to suppliers	60,000

The following balances relating to the contract No. 1551 for the year ended on March 31, 2020 and March 31, 2021 are available:

	as on 31 st March, 2020	as on 31 st March, 2021
Work certified	36,00,000	1,05,00,000
Work uncertified	60,000	1,20,000
Materials at site	45,000	90,000
Wages outstanding	30,000	60,000

The contractor receives 70% of work certified in cash.

PREPARE Contract Account and Contractee's Account

ANSWER

Contract No. 1551 Account for the year ended 31st March, 2021

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Dr.		Cr.	
Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Work in progress b/d:		By Material returned to stores	90,000
- Work certified	36,00,000	By Material returned to suppliers	60,000
- Work uncertified	60,000	By Stock (Materials) c/d	90,000
To Stock (Materials) b/d	45,000	By Work in progress c/d:	
To Material purchased	4,80,000	- Work certified	1,05,00,000
To Material issued	15,00,000	- Work uncertified	1,20,000
To Wages paid	21,00,000		
Less: Opening O/s	(30,000)		
Add: Closing O/s	60,000		
	21,30,000		
To Drawing and maps	1,80,000		
To Sundry expenses	45,000		
To Electricity charges	75,000		
To Plant hire expenses	1,80,000		
To Sub-contract cost	60,000		
To Notional profit c/d (balancing figure)	25,05,000		
	1,08,60,000		1,08,60,000

Dr.		Contractee's Account		Cr.	
Particulars	Amount (Rs.)	Particulars	Amount (Rs.)		
To Balance c/d (Rs. 1,05,00,000 × 70%)	73,50,000	By Balance b/d (70% of Rs. 36,00,000)	25,20,000		
		By Bank A/c	<u>48,30,000</u>		
	73,50,000		73,50,000		

3. (a) The following figures have been taken from the financial accounts of a manufacturing firm for the year ended 31st March, 2021:

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	(Rs.)
Direct material consumption	20,00,000
Direct wages	12,00,000
Factory overheads	6,40,000
Administrative overheads	2,80,000
Selling and distribution overheads	3,84,000
Bad debts	32,000
Preliminary expenses written off	16,000
Legal charges	4,000
Dividend received	40,000
Interest on fixed deposit	8,000
Sales - 48,000 units	48,00,000
Closing stock:	
- Finished stock - 4,000 units	3,20,000
- Work-in-process	96,000

The cost accounts for the same period reveal that the Direct Material consumption was Rs. 22,40,000; Factory overhead is recovered at 20% on prime cost; Administration overhead is recovered @ Rs. 4.8 per unit of production; and Selling and Distribution overheads are recovered at Rs. 6.40 per unit sold.

Required:

PREPARE Costing and Financial Profit & Loss Accounts and RECONCILE the difference in the profit as arrived at in the two sets of accounts. (10 Marks)

ANSWER

(a) Costing Profit and Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Direct Material consumed	22,40,000	By Sales	48,00,000
To Direct Wages	12,00,000	By Closing Work-in-process	96,000
Prime Cost	34,40,000	By Closing Finished stock	3,10,154
		$\left(\frac{\text{Rs. } 41,28,000 - \text{Rs. } 96,000}{52,000 \text{ units}} \times 4,000 \right)$	
To Factory overheads (20% of prime cost)	6,88,000		
	41,28,000		
To Administrative overheads (Rs. 4.80 × 52,000* units)	2,49,600		
To Selling & distribution overheads (Rs. 6.40 × 48,000 units)	3,07,200		
To Net profit (balancing figure)	5,21,354		
	52,06,154		52,06,154

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* Units produced = Units sold + Closing stock - Opening stock
= 48,000 + 4,000 - 0 = 52,000 units

Financial Profit and Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Direct Material consumed	20,00,000	By Sales	48,00,000
To Direct Wages	12,00,000	By Dividend received	40,000
To Factory overheads	6,40,000	By Interest on fixed deposit	8,000
To Administrative overheads	2,80,000	By Closing Work-in-process	96,000
To Selling & distribution overheads	3,84,000	By Closing Finished stock	3,20,000
To Bad debts	32,000		
To Preliminary expenses	16,000		
To Legal charges	4,000		
To Net profit (balancing figure)	7,08,000		
	52,64,000		52,64,000

Reconciliation Statement

Particulars	Amount (Rs.)	Amount (Rs.)
Net profit as per Financial Profit & Loss A/c		7,08,000
Add: Administrative overheads (2,80,000 - 2,49,600)	30,400	
Selling & Distribution overheads (3,84,000 - 3,07,200)	76,800	
Bad debts	32,000	
Preliminary expenses	16,000	
Legal charges	4,000	1,59,200
		8,67,200
Less: Difference in value of materials consumed (22,40,000 - 20,00,000)	2,40,000	
Factory overheads (6,88,000 - 6,40,000)	48,000	
Dividend received	40,000	
Interest on fixed deposit	8,000	
Closing stock (3,20,000 - 3,10,154)	9,846	(3,45,846)
Profit as per Costing Profit & Loss A/c		5,21,354

(b) Mix Soap Pvt. Ltd., manufactures three brands of soap – Luxury, Herbal and Beauty. The following information has been obtained for the period from June 1 to June 30, 2021 relating to three brands:

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	Luxury	Herbal	Beauty
Actual Production (units)	6,750	14,000	77,500
Wages paid (Rs.)	7,500	18,750	1,15,000
Raw materials consumed (Rs.)	20,000	47,000	2,40,000
Selling price per unit (Rs.)	25	15	8

Other data are:

Factory overheads	Rs. 80,000
General & administration overheads (equal for all)	Rs. 48,000
Selling overheads	20% of Works cost

If the company limits the manufacture to just one brand of soap adopting a single brand production, then monthly production will be:

	Units
Luxury	5,000
Herbal	15,000
Beauty	30,000

Further, factory overheads are to be allocated to each brand on the basis of the units which could have been produced when single brand production was in operation.

You are required to:

- (i) FIND out the Factory overhead rate for all the brands.
- (ii) PREPARE a cost statement for the month of June showing the various elements of cost and also the profit earned.

ANSWER

(i) Calculation of Factory overhead rate.

If the single brand production was in operation, then
 1 unit of Luxury = 3 units of Herbal = 6 units of Beauty. Therefore, the factory overhead ratio in the reverse order would be 5,000:15,000:30,000 or 1:3:6.

The overhead rate will be lowest in case of brand which will be produced in high number.

Therefore, in case of Beauty soap brand, the overhead rate will be:

$$\begin{aligned}
 &= \frac{80,000}{6 \times 6,750 + 3 \times 14,000 + 1 \times 77,500} \\
 &= \frac{80,000}{40,500 + 42,000 + 77,500} \\
 &= \frac{80,000}{1,60,000} = 0.5
 \end{aligned}$$

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So, the overhead rate will be:

Luxury = $0.5 \times 6 = \text{Rs. } 3$

Herbal = $0.5 \times 3 = \text{Rs. } 1.5$

Beauty = $0.5 \times 1 = \text{Rs. } 0.5$

ii) Statement of Cost of Mix Soap Pvt. Ltd. for the month of June 2021:

	Luxury (Rs.)	Herbal (Rs.)	Beauty (Rs.)	Total (Rs.)
Raw material consumed	20,000	47,000	2,40,000	3,07,000
Add: Wages paid	7,500	18,750	1,15,000	1,41,250
Prime cost	27,500	65,750	3,55,000	4,48,250
Add: Factory overheads	20,250	21,000	38,750	80,000
	(Rs. 3 x 6,750)	(Rs. 1.5 x 14,000)	(Rs. 0.5 x 77,500)	
Works cost	47,750	86,750	3,93,750	5,28,250
Add: General & administration overheads (1:1:1)	16,000	16,000	16,000	48,000
Add: Selling expenses	9,550	17,350	78,750	1,05,650
	(Rs. 47,750 x 0.20)	(Rs. 86,750 x 0.20)	(Rs. 3,93,750 x 0.20)	
Cost of sales	73,300	1,20,100	4,88,500	6,81,900
Profit (Balancing figure)	95,450	89,900	1,31,500	3,16,850
Sales	1,68,750	2,10,000	6,20,000	9,98,750
	(Rs. 25 x 6,750)	(Rs. 15 x 14,000)	(Rs. 8 x 77,500)	

4. (a) Harry Transport Service is a Delhi based national goods transport service provider, owning five trucks for this purpose. The cost of running and maintaining these trucks are as follows:

Particulars	Amount
Diesel cost	Rs. 15 per km.
Engine oil	Rs. 4,200 for every 14,000 km.
Repair and maintenance	Rs. 12,000 for every 10,000 km.
Driver's salary	Rs. 20,000 per truck per month
Cleaner's salary	Rs. 7,000 per truck per month
Supervision and other general expenses	Rs. 15,000 per month
Cost of loading of goods	Rs. 200 per Metric Ton (MT)

Each truck was purchased for Rs. 20 lakhs with an estimated life of 7,20,000 km. During the next month, it is expecting 6 bookings, the details of which are as follows:

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Sl. No.	Journey	Distance (in km)	Weight - Up (in MT)	Weight - Down (in MT)
1.	Delhi to Kochi	2,700	15	7
2.	Delhi to Guwahati	1,890	13	0
3.	Delhi to Vijayawada	1,840	16	0
4.	Delhi to Varanasi	815	11	0
5.	Delhi to Asansol	1,280	13	5
6.	Delhi to Chennai	2,185	11	9
	Total	10,710	79	21

Required:

(i) CALCULATE the total absolute Ton-km for the next month.

(ii) CALCULATE the cost per ton-km. (10 Marks)

ANSWER

(a) (i) Calculation of Absolute Ton-km for the next month:

Journey	Distance (in km)	Weight-Up (in MT)	Ton-km	Weight-Down (in MT)	Ton-km	Total
	(a)	(b)	(c) = (a)×(b)	(d)	(e) = (a)×(d)	(f) = (c)+(e)
Delhi to Kochi	2,700	15	40,500	7	18,900	59,400
Delhi to Guwahati	1,890	13	24,570	0	0	24,570
Delhi to Vijayawada	1,840	16	29,440	0	0	29,440
Delhi to Varanasi	815	11	8,965	0	0	8,965
Delhi to Asansol	1,280	13	16,640	5	6,400	23,040
Delhi to Chennai	2,185	11	24,035	9	19,665	43,700
Total	10,710	79	1,44,150	21	44,965	1,89,115

Total absolute Ton-Km = 1,89,115 ton-km

(ii) Calculation of cost per ton-km:

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Particulars	Amount (Rs.)	Amount (Rs.)
A. Running cost:		
- Diesel Cost {Rs.15 × (10,710 × 2)}	3,21,300	
- Engine oil cost $\left(\frac{\text{Rs. } 4,200}{14,000 \text{ km}} \times 21,420 \text{ km}\right)$	6,426	
- Cost of loading of goods {Rs.200 × (79 + 21)}	20,000	
- Depreciation $\left(\frac{\text{Rs. } 20,00,000}{7,20,000 \text{ km}} \times 21,420 \text{ km}\right)$	59,500	4,07,226
B. Repair & Maintenance Cost $\left(\frac{\text{Rs. } 12,000}{10,000 \text{ km}} \times 21,420 \text{ km}\right)$		25,704
C. Standing Charges		
- Drivers' salary (Rs.20,000 × 5 trucks)	1,00,000	
- Cleaners' salary (Rs.7,000 × 5 trucks)	35,000	
- Supervision and other general expenses	15,000	1,50,000
Total Cost (A + B + C)		5,82,930
Total absolute ton-km		1,89,115
Cost per ton-km		3.08

(b) The following information relates to Process Q:

(i)	Opening Work-in-Progress	16,000 units at Rs. 1,50,000
	Degree of Completion:	
	Material	100%
	Labour and Overhead	60%
(ii)	Input - 3,64,000 units	Rs. 14,75,000
(iii)	Wages paid	Rs. 6,81,200
(iv)	Overheads paid	Rs. 3,40,600
(v)	Units scrapped	28,000

	Degree of Completion:	
	Material	100%
	Labour and Overhead	80%
(vi)	Closing Work - in- Progress	36,000 units
	Degree of Completion:	
	Material	100%
	Labour and Overhead	70%
(vii)	Units completed and transferred to next process	3,16,000
(viii)	Normal loss is 5% of total input including opening WIP	
(ix)	Scrap value is Rs. 5 per unit to be adjusted out of direct material cost	

You are required to COMPUTE on the basis of FIFO:

(i) Equivalent production

(ii) Cost per unit

(iii) Value of units transferred to next process (10 Marks)

ANSWER**(b) (i) Statement of Equivalent Production (FIFO Method)**

Input		Output		Equivalent Production			
Particulars	Units	Particulars	Units	Material		Labour & Overhead	
				(%)	Units	(%)	Units
Opening WIP	16,000	Transfer to next Process:					
Introduced	3,64,000	Opening WIP completed	16,000	--	--	40	6,400
		Introduced & completed	3,00,000	100	3,00,000	100	3,00,000
		Normal loss 5% (16,000 + 3,64,000)	19,000	--	--	--	--
		Abnormal loss	9,000	100	9,000	80	7,200
		Closing WIP	36,000	100	36,000	70	25,200
	3,80,000		3,80,000		3,45,000		3,38,800

(ii) Computation of Cost per unit

Particulars	Material (Rs.)	Labour (Rs.)	Overhead (Rs.)
Input of Materials	14,75,000	--	--
Expenses	--	6,81,200	3,40,600
Total	14,75,000	6,81,200	3,40,600
Less: Sale of Scrap (19,000 units x Rs. 5)	(95,000)	--	--
Net cost (A)	13,80,000	6,81,200	3,40,600
Equivalent Units (B)	3,45,000	3,38,800	3,38,800
Cost Per Unit (A/B)	4.0000	2.0106	1.0053

Total cost per unit = Rs. (4.0000 + 2.0106 + 1.0053) = Rs. 7.0159

(iii) Value of units transferred to next process:

	Amount (Rs.)	Amount (Rs.)
Opening W-I-P	1,50,000	
Add: Labour (6,400 units x Rs. 2.0106)	12,868	
Overhead (6,400 units x Rs. 1.0053)	6,434	1,69,302
New introduced (3,00,000 units x Rs. 7.0159)		21,04,770
		22,74,072

5. (a) Following data is available from the costing department of Aarya Ltd. which manufactures and markets a single product:

Material	Rs. 32 per unit	Fixed Cost (Rs.)	Rs. 10,00,000
Conversion Cost (Variable)	Rs. 24 per unit	Present Sales (units)	90,000
Dealer's Margin (10% of Sales)	Rs. 8 per unit	Capacity Utilization	60 %
Selling Price	Rs. 80 per unit		

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There is acute competition in the market, thus extra efforts are necessary to enhance the sales.

For this, following suggestions have been proposed:

- (i) Reducing selling price by 5 per cent.
- (ii) Increasing dealer's margin by 20 per cent over the existing rate.

Which of these two suggestions would you RECOMMEND, if the company desires to maintain the present profit? GIVE REASONS. (10 Marks)

ANSWER

(a) Workings:

Statement Showing Profit on Sale of 90,000 units

	(Rs.)	(Rs.)
Selling Price per unit		80
Less: Variable Cost per unit		
Material	32	
Conversion Cost	24	
Dealers' Margin	8	64
Contribution per unit		16
Total Contribution (90,000 units × Rs. 16)		14,40,000
Less: Fixed Cost		10,00,000
Profit		4,40,000

In both the proposed suggestions, the fixed costs remain unchanged. Therefore, the present profit of Rs. 4,40,000 can be maintained by maintaining the total contribution at the present level i.e. Rs. 14,40,000.

(i) Reducing Selling Price by 5%

New Selling Price (Rs. 80 – 5% of Rs. 80) = Rs. 76

New Dealer's Margin (10% of Rs. 76) = Rs. 7.60

New Variable Cost (Rs. 32 + Rs. 24 + Rs. 7.60) = Rs. 63.60

New Contribution per unit (Rs. 76 – Rs. 63.60) = Rs. 12.40

$$\begin{aligned} \text{Level of sales required for present level of Profits} &= \frac{\text{Total Contribution Required}}{\text{New Contribution per unit}} \\ &= \frac{\text{Rs. } 14,40,000}{\text{Rs. } 12.40} \\ &= 1,16,129 \text{ units} \end{aligned}$$

(ii) Increasing Dealer's Margin by 20%

New Dealer's Margin after increasing it by 20% = Rs. 8 + (20% of Rs. 8)

= Rs. 9.60

New Variable Cost (Rs. 32 + Rs. 24 + Rs. 9.60) = Rs. 65.60

Contribution (Rs. 80 – Rs. 65.60) = Rs. 14.40

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$$\begin{aligned} \text{Level of sales required for present level of Profits} &= \frac{\text{Total Contribution Required}}{\text{New Contribution per unit}} \\ &= \frac{\text{Rs. } 14,40,000}{\text{Rs. } 14.40} \\ &= 1,00,000 \text{ units} \end{aligned}$$

Conclusion:

The second proposal, i.e., increasing the Dealer's Margin is recommended because:

1. The contribution per unit is higher which is Rs. 14.40 in comparison to Rs. 12.40 in the first proposal; and

2. The sales (in units) required to earn the same level of profit are lower. They are at 1,00,000 units as against 1,16,129 units in the first proposal. This means a lower sales effort and less finance would be required for implementing proposal (ii) as against proposal (i). Of course, under proposal (ii) the company can earn higher profits than at present level if it can increase its sales beyond 1,00,000 units.

(b) Tricon Co. furnishes the following information for the month of September, 2020

Particulars	Budget Details	Static Budget	Actual
Units produced & Sold		4,000	3,200
		(Rs.)	(Rs.)
Direct Material	3 kg p.u. @ Rs. 30 per kg.	3,60,000	3,10,000
Direct Labour	1 hr. p.u. @ Rs. 72 per hr.	2,88,000	2,25,600
Variable Overhead	1 hr. p.u. @ Rs. 44 per hr.	1,76,000	1,47,200
Fixed Overhead		1,80,000	1,68,000
Total Cost		10,04,000	8,50,800
Sales		12,00,000	8,96,000
Profit		1,96,000	45,200

During the month 10,000 kg. of materials and 3,100 direct labour hours were utilized.

Required:

(i) PREPARE a flexible budget for the month.

(ii) DETERMINE the material usage variance and the direct labour rate variance for the actual vs the flexible budget. (10 Marks)

ANSWER

i) Statement Showing "Flexible Budget for 3,200 units Activity Level"

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Particulars	Amount (Rs.)	Amount (Rs.)
Sales $\left(\frac{\text{Rs. } 12,00,000}{4,000 \text{ units}} \times 3,200 \text{ units}\right)$		9,60,000
Less: Variable Cost		
Direct Material (3,200 units \times 3 kg. p.u. \times Rs. 30 per kg.)	2,88,000	
Direct Labour (3,200 units \times 1 hr. p.u. \times Rs. 72 per hr.)	2,30,400	
Variable Overhead (3,200 units \times 1 hr. p.u. \times Rs. 44 per hr.)	1,40,800	(6,59,200)
Contribution		3,00,800
Less: Fixed Overhead		1,80,000
Profit		1,20,800

ii) Computation of Variances

Material Usage Variance = Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity

$$= (SQ \times SP) - (AQ \times SP)$$

Or

$$= (SQ - AQ) \times SP$$

$$= [(3,200 \text{ units} \times 3 \text{ kg.}) - 10,000 \text{ kg.}] \times \text{Rs. } 30.00$$

$$= \text{Rs. } 12,000 \text{ (A)}$$

Labour Rate Variance = Standard Cost of Actual Time – Actual Cost

$$= (SR \times AH) - (AR \times AH)$$

Or

$$= (SR - AR) \times AH$$

$$= \left[\left(\text{Rs. } 72 - \frac{\text{Rs. } 2,25,600}{3,100 \text{ hrs.}} \right) \times 3,100 \text{ hrs.} \right]$$

$$= \text{Rs. } 2,400 \text{ (A)}$$

6. (a) DISTINGUISH between cost control and cost reduction.
ANSWER
Difference between Cost Control and Cost Reduction

Cost Control	Cost Reduction
1. Cost control aims at maintaining the costs in accordance with the established standards.	1. Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to improve them continuously
2. Cost control seeks to attain lowest possible cost under existing conditions.	2. Cost reduction recognises no condition as permanent, since a change will result in lower cost.
3. In case of cost control, emphasis is on past and present	3. In case of cost reduction, it is on present and future.
4. Cost control is a preventive function	4. Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5. Cost control ends when targets are achieved.	5. Cost reduction has no visible end and is a continuous process.

(b) EXPLAIN the advantages that would accrue in using the LIFO method of pricing for the valuation of raw material stock.

ANSWER

The advantages that would accrue in using the LIFO method of pricing for the valuation of raw material stock are as follows:

☒☒ The cost of materials issued will be either nearer to and or will reflect the current market price. Thus, the cost of goods produced will be related to the trend of the market price of materials. Such a trend in price of materials enables the matching of cost of production with current sales revenues.

☒☒ The use of the method during the period of rising prices does not reflect undue high profit in the income statement as it was under the first-in-first-out or average method. In fact, the profit shown here is relatively lower because the cost of production takes into account the rising trend of material prices.

☒☒ In the case of falling prices profit tends to rise due to lower material cost, yet the finished products appear to be more competitive and are at market price.

☒☒ Over a period, the use of LIFO helps to iron out the fluctuations in profits.

☒☒ In the period of inflation LIFO will tend to show the correct profit and thus avoid paying undue taxes to some extent

(c) DISCUSS basic assumptions of Cost Volume Profit analysis.

ANSWER

Assumptions of Cost Volume Profit analysis:

1. Changes in the levels of revenues and costs arise only because of changes in the number of product (or service) units produced and sold – for example, the number of television sets produced and sold by Sony Corporation or the number of packages delivered by Overnight Express. The number of output units is the only revenue driver and the only cost driver. Just as a cost driver is any factor that affects costs, a revenue driver is a variable, such as volume, that causally affects revenues.

2. Total costs can be separated into two components; a fixed component that does not vary with output level and a variable component that changes with respect to output level. Furthermore, variable costs include both direct variable costs and indirect variable costs of a product. Similarly, fixed costs include both direct fixed costs and indirect fixed costs of a Product

3. When represented graphically, **the behaviours of total revenues and total costs are linear** (meaning they can be represented as a straight line) in relation to output level within a relevant range (and time period).

4. **Selling price, variable cost per unit, and total fixed costs (within a relevant range and time period) are known and constant.**

5. The analysis either covers a single product or assumes that **the proportion of different products when multiple products are sold will remain constant** as the level of total units sold changes.

6. All revenues and costs can be added, subtracted, and compared **without taking into account the time value of money.**

(d) DESCRIBE the steps necessary for establishing a good budgetary control system.

ANSWER

The following steps are necessary for establishing a good budgetary control system:

1. Determining the objectives to be achieved, over the budget period, and the policy or policies that might be adopted for the achievement of these objectives.
2. Determining the activities that should be undertaken for the achievement of the objectives.
3. Drawing up a plan or a scheme of operation in respect of each class of activity, in quantitative as well as monetary terms for the budget period.
4. Laying out a system of comparison of actual performance by each person, or department with the relevant budget and determination of causes for the variation, if any.
5. Ensuring that corrective action will be taken where the plan has not been achieved and, if that is not possible, for the revision of the plan

PAST EXAM – MAY 2018**Question 1**

Answer the following:

(a) M/s. X Private Limited is manufacturing a special product which requires a component "SKY BLUE". The following particulars are available for the year ended 31st March, 2018

Annual demand of "SKY BLUE"	12000 Units
Cost of placing an order	Rs. 1,800
Cost per unit of "SKY BLUE"	Rs. 640
Carrying cost per annum	18.75%

The company has been offered a quantity discount of 5 on the purchases of "SKY BLUE" provided the order size is 3000 components at a time.

You are required to:

- (i) Compute the Economic Order Quantity.
(ii) Advise whether the quantity discount offer can be accepted.

ANSWER**(a) (i) Calculation of Economic Order Quantity**

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 12,000 \text{ units} \times ₹ 1,800}{₹ 640 \times 18.75 / 100}} = 600 \text{ units}$$

(ii) Evaluation of Profitability of Different Options of Order Quantity

When EOQ is ordered

		(₹)
Purchase Cost	(12,000 units × ₹ 640)	76,80,000
Ordering Cost $[\frac{A}{Q} \times O -$	(12,000 units/ 600 units) × ₹ 1,800]	36,000
Carrying Cost $(\frac{Q}{2} \times C \times i -$	600 units × ₹ 640 × $\frac{1}{2}$ × 18.75/100)	36,000
Total Cost		77,52,000

(b) When Quantity Discount is accepted

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		(₹)
Purchase Cost	(12,000 units × ₹ 608)	72,96,000
Ordering Cost $[\frac{A}{Q} \times O]$	(12,000 units/3,000 units) × ₹ 1,800]	7,200
Carrying Cost $[\frac{Q}{2} \times C \times i]$	(3,000 units × ₹ 608 × $\frac{1}{2}$ × 18.75/100)]	1,71,000
Total Cost		74,74,200

Advise – The total cost of inventory is higher if EOQ is adopted. If M/s. X Private Limited gets a discount of 5% on the purchases of “SKY BLUE” (if order size is 3,000 components at a time), there will be financial benefit of Rs. 2,77,800 (77,52,000 - 74,74,200). However, order size of big quantity will increase volume of average inventory to 5 times. There may be risk of shrinkage, pilferage and obsolescence etc., of inventory due to increase in the average volume of inventory holding. This aspect also has to be taken into consideration before opting the discount offer and taking final decision.

(b) A worker takes 15 hours to complete a piece of work for which time allowed is 20 hours. His wage rate is Rs. 5 per hour. Following additional information are also available:

Material cost of work Rs. 50

Factory overheads 100% of wages

Calculate the factory cost of work under the following methods of wage payments:

(i) Rowan Plan

(ii) Halsey Plan

ANSWER

(b)

	₹
(i) Rowan Plan : Normal time wage = 15 hours @ ₹ 5=	75
Bonus = Time saved /Time allowed × (Time taken × Time rate)	
= $\frac{5}{20} \times (15 \times 5) =$	<u>18.75</u>
	93.75
(ii) Halsey Plan: Normal time wage = 15 hours @ ₹ 5 =	75
Bonus = 50% of (Time saved x Time rate) = 50% of (5x5) =	<u>12.5</u>
	87.5

Statement of Comparative Factory cost of work

	Rowan Plan	Halsey Plan
	Rs.	Rs.
Materials	50	50
Direct Wages	93.75	87.5
Prime Cost	143.75	137.5
Factory Overhead (100% of Direct wages)	93.75	87.5
Factory Cost	237.5	225

(c) Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (Rs.)	Profit/Loss (Rs.)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:

- (i) Profit Volume Ratio*
- (ii) Fixed Costs*
- (iii) Break Even Point*
- (iv) Sales required to earn a profit of Rs. 45,000.*
- (v) Margin of Safety in Financial Year 2017-18.*

ANSWER

	Sales (Rs.)	Profit (Rs.)
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

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- (i) P/V Ratio = $\frac{\text{Difference in profit}}{\text{Difference in Sales}} \times 100 = \frac{30,000}{1,00,000} \times 100 = 30\%$
- (ii)
- | | (₹) |
|---------------------------------------|-------------------------|
| Contribution in 2016 (4,00,000 × 30%) | 1,20,000 |
| Add: Loss | <u>15,000</u> |
| Fixed Cost* | <u>1,35,000</u> |
| *Contribution | = Fixed cost + Profit |
| ∴ Fixed cost | = Contribution – Profit |
- (iii) Break-even point = $\frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{1,35,000}{30\%} = ₹ 4,50,000$
- (iv) Sales to earn a profit of ₹ 45,000
- $$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V ratio}} = \frac{1,35,000 + 45,000}{30\%} = ₹ 6,00,000$$
- (v) Margin of safety in 2017 –18
- $$\text{Margin of safety} = \text{Actual sales} - \text{Break-even sales}$$
- $$= 5,00,000 - 4,50,000 = ₹ 50,000.$$

(d) GK Ltd. showed net loss of Rs. 2,43,300 as per their financial accounts for the year ended 31st March, 2018. However, cost accounts disclosed net loss of Rs. 2,48,300 for the same period. On scrutinizing both the set of books of accounts, the following information were revealed:

	Rs.
<i>(i) Works overheads over recovered 30,400</i>	<i>30,000</i>
<i>(ii) Selling overheads under recovered</i>	<i>20,300</i>
<i>(iii) Administrative overheads under recovered</i>	<i>27,700</i>
<i>(iv) Depreciation over charged in cost accounts</i>	<i>35,100</i>
<i>(v) Bad debts w/off in financial accounts</i>	<i>15,000</i>
<i>(vi) Preliminary Exp. w/off in financial accounts</i>	<i>5,000</i>
<i>(vii) Interest credited during the year in financial accounts</i>	<i>7,500</i>

Prepare a reconciliation statement reconciling losses shown by financial and cost accounts by taking costing net loss as base. (4 x 5 = 20 Marks)

Answer

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Reconciliation Statement

Particulars	₹	₹
Loss as per Cost Accounts		(2,48,300)
Add: Works overheads over recovered	30,400	
Depreciation over charged in cost accounts	35,100	
Interest credited during the year in financial accounts	7,500	73,000
Less: Selling overheads under recovered	20,300	
Administrative overheads under recovered	27,700	
Bad debts w/off in financial accounts	15,000	
Preliminary Exp. w/off in financial accounts	5,000	(68,000)
Loss as per Financial Accounts		(2,43,300)

Question 2

(a) Following information relate to a manufacturing concern for the year ended 31st March, 2018:

	Rs.
Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	42,25,000
Freight Inwards	1,00,000
Direct wages paid	12,56,000
Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Work-in-progress (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	Rs. 16 per unit
Finished Stock (opening)-1217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14000 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14153 units at a price of Rs. 618 per unit during the year.

Prepare cost sheet of the firm. (10 Marks)

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ANSWER**(a) Cost sheet for the year ended 31st March, 2018.**

Units produced - 14,000 units

Units sold - 14,153 units

Particulars	Amount (Rs.)
Raw materials purchased	42,25,000
Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	42,48,000
Less: Sale of scrap of material	8,000
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of Rs. Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock [Rs. 500(70,00,000/14,000) × 1,064] (1,217+ 14,000 – 14,153 = 1,064 units)	(5,32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (Rs. 16 × 14,153 units)	2,26,448
Cost of Sales	73,02,948
Profit (Balancing figure)	14,43,606
Sales (Rs. 618 × 14,153 units)	87,46,554

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(b) XYZ Construction Company took a contract for construction of a stadium on 1st April, 2017 at a price of Rs. 160 lakhs. The relevant information for the year ended 31st March, 2018 are as under:

	Amount (Rs. In '000)
Material purchased for the contract	6,800
Direct wages paid	3,450
Salaries	200
Direct wages prepaid at the end of the year	50
Salaries outstanding at the end of the year	100
Material returned to stores	150
Material at site as on 31 st March, 2018	175
Payment received from the contractee (80% of work certified)	9,440
Work done but not certified	500

A plant was purchased for Rs. 12,00,000 on 1st November, 2017 and was in use at the site upto 31st March, 2018. Depreciation is to be charged on plant @ 15% per annum on straight line basis.

Material costing Rs. 50,000 was stolen from the site.

You are required to:

- (i) Prepare contract account for the year ended 31st March, 2018 showing the profit to be taken to Profit & Loss Account.
- (ii) Prepare Balance Sheet showing the relevant items. (10 Marks)

ANSWER

(b) (i) Contract Account

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Particulars	(₹'000)	(₹'000)	Particulars	(₹'000)	(₹'000)
To Material purchased		6,800	By Material returned		150
" Direct wages	3,450		" Work-in-progress:		
Less: Prepaid wages	(50)	3,400	Value of work certified (₹9,440 ÷ 0.8)	11,800	
" Salaries	200		Cost of work uncertified	500	
Add: Outstanding	<u>100</u>				12,300
		300	" Material stolen at Site		50
" Depreciation on Plant {(₹1,200 × 15%) × (5 ÷ 12)}		75	" Material at site		175
" Costing P&L A/c (Notional profit) (bal. figure)		2,100			
		12,675			12,675

(ii) Balance Sheet (extract) as on 31st March, 2018

Liabilities	(₹'000)	Assets	(₹'000)
Capital		Plant at site	1,125
Add: Notional Profit	2,100	Work in Progress	
Outstanding Salary	100	Work certified	11,800
		Work uncertified	<u>500</u>
			<u>12,300</u>
		Cash & Bank (in transit)	<u>9,440</u>
			2,860
		Prepaid Direct wages	50
		Material at site	175

Question 3

(a) The information regarding number of employees on roll in a shopping mall for the month of December 2017 are given below:

Number of employees as on 01-12-2017 - 900

Number of employees as on 31-12-2017 - 1100

During December, 2017, 40 employees resigned and 60 employees were discharged. 300 employees were recruited during the month. Out of these 300 employees, 225 employees were recruited for an expansion project of the mall and rest were recruited due to exit of employees. Assuming 365 days in a year, calculate Employee Turnover Rate and Equivalent Annual' Employee Turnover Rate by applying the following:

(i) Replacement Method

(ii) Separation Method

(iii) Flux Method (10 Marks)

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ANSWER**(a) Labour turnover rate:**

It comprises of computation of labour turnover by using following methods:

(i) Replacement Method

$$\begin{aligned}\text{Labour turnover rate} &= \frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100 \\ &= \frac{75}{1,000} \times 100 = 7.5\%\end{aligned}$$

$$\text{Equivalent Annual Turnover Rate} = \frac{7.5 \times 365}{31} = 88.31\%$$

(ii) Separation Method:

$$\begin{aligned}\text{Labour turnover rate} &= \frac{\text{No. of workers left} + \text{No. of workers discharged}}{\text{Average number of workers}} \times 100 \\ &= \frac{(40 + 60)}{(900 + 1100) \div 2} \times 100 = \frac{100}{1,000} \times 100 = 10\%\end{aligned}$$

$$\text{Equivalent Annual Turnover Rate} = \frac{10 \times 365}{31} = 117.74\%$$

(iii) Flux Method:

$$\begin{aligned}\text{Labour turnover rate} &= \frac{\text{No. of separations} + \text{No. of accessions}}{\text{Average number of workers}} \times 100 \\ &= \frac{(100 + 300)}{(900 + 1,100) \div 2} \times 100 = \frac{400}{1,000} \times 100 = 40\%\end{aligned}$$

$$\text{Equivalent Annual Turnover Rate} = \frac{40 \times 365}{31} = 470.97\%$$

OR**(iii) Flux Method:**

$$\begin{aligned}\text{Labour turnover rate} &= \frac{\text{No. of separation} + \text{No. of replaced}}{\text{Average number of workers}} \times 100 \\ &= \frac{100 + 75}{1000} \times 100 = 17.5\%\end{aligned}$$

$$\text{Equivalent Annual Turnover Rate} = \frac{17.5 \times 365}{31} = 206.05\%$$

(b) Alpha Ltd. is engaged in the production of a product A which passes through 3 different process - Process P, Process Q and Process R. The following data relating to cost and output is obtained from the books of accounts for the month of April 2017:

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Particulars	Process P	Process Q	Process R
Direct Material	38,000	42,500	42,880
Direct Labour	30,000	40,000	50,000

Production overheads of Rs. 90,000 were recovered as percentage of direct labour. 10,000 kg of raw material @ Rs. 5 per kg. was issued to Process P. There was no stock of materials or work in process. The entire output of each process passes directly to the next process and finally to warehouse. There is normal wastage, in processing, of 10%. The scrap value of wastage is Rs. 1 per kg. The output of each process transferred to next process and finally to warehouse are as under:

Process P = 9,000 kg

Process Q = 8,200 kg

Process R = 7,300 kg

The company fixes selling price of the end product in such a way so as to yield a profit of 25% selling price.

Prepare Process P, Q and R accounts. Also calculate selling price per unit of end product. (10 Marks)

Answer

(b) Process- P Account

Particulars	Kg.	Amount (Rs.)	Particulars	Kg.	Amount (Rs.)
To Input	10,000	50,000	By Normal wastage (1,000 kg. × Rs. 1)	1,000	1,000
To Direct Material	---	38,000	By Process- Q (9,000 kg. × Rs. 15.50)	9,000	1,39,500
To Direct Labour	---	30,000			
To Production OH (Rs. 90,000 × 3/12)	---	22,500			
	10,000	1,40,500		10,000	1,40,500

$$\text{Cost per unit} = \frac{\text{₹}1,40,500 - \text{₹}1,000}{10,000\text{kg.} - 1,000\text{kg.}} = \text{₹} 15.50$$

Process- Q Account

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Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-P A/c	9,000	1,39,500	By Normal wastage (900 kg. × ₹ 1)	900	900
To Direct Material	---	42,500	By Process- Q (8,200 kg. × ₹ 31)	8,200	2,54,200
To Direct Labour	---	40,000			
To Production OH (₹ 90,000 × 4/12)	---	30,000			
To Abnormal Gain (100 kg. × ₹ 31)	100	3,100			
	9,100	2,55,100		9,100	2,55,100

$$\text{Cost per unit} = \frac{\text{₹ } 2,52,000 - \text{₹ } 900}{9,000\text{kg.} - 900\text{kg.}} = \text{₹ } 31$$

Process- R Account

Particulars	Kg.	Amount (Rs.)	Particulars	Kg.	Amount (Rs.)
To Process-Q A/c	8,200	2,54,200	By Normal wastage (820 kg. × Re.1)	820	820
To Direct Material	---	42,880	By Abnormal loss (80 kg. × Rs. 52)	80	4,160
To Direct Labour	---	50,000	By Finished Goods (7,300 kg. × Rs.52)	7,300	3,79,600
To Production OH (Rs. 90,000 × 5/12)	---	37,500			
	8,200	3,84,580		8,200	3,84,580

$$\text{Cost per unit} = \frac{\text{₹ } 3,84,580 - \text{₹ } 820}{8,200\text{kg.} - 820\text{kg.}} = \text{₹ } 52$$

Calculation of Selling price per unit of end product:

Cost per unit Rs. 52.00

Add: Profit 25% on selling price i.e. 1/3rd of cost Rs. 17.33

Selling price per unit Rs. 69.33

Question 4

(a) PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

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The annual overheads are as under

Particulars	Rs.
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of:

(i) Traditional method of charging overheads

(ii) Activity based costing method and

(iii) Find out the difference in cost per unit between both the methods. (10 Marks)

ANSWER

(a) (i) Statement Showing Overhead Cost per unit "Traditional Method"

	Gel Pen (Rs.)	Ball Pen (Rs.)
Units	5,500	24,000
Overheads (Rs.) (Refer to W.N.)	4,80,000 (20 x 24,000 hrs.)	10,80,000 (20 x 54,000 hrs.)
Overhead Rate per unit (Rs.)	87.27 (Rs. 4,80,000 / 5,500 units)	45 (Rs. 10,80,000 / 24,000 units)

Working Notes:

Overhead Rate per Machine Hour

$$= \frac{\text{Total Overhead incurred by the Company}}{\text{Total Machine Hours}}$$

$$= \frac{\text{₹ } 4,75,020 + 5,79,988 + 5,04,992}{24,000 \text{ hours} + 54,000 \text{ hours}} = \frac{\text{₹ } 15,60,000}{78,000 \text{ hours}}$$

$$= \text{₹ } 20 \text{ per machine hour}$$

(ii) Statement Showing "Activity Based Overhead Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (Rs.)	Gel Pen (Rs.)	Ball Pen (Rs.)
Volume Related Activity Costs	Machine hours	24:54	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

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(iii)

	Gel Pen (Rs.)	Ball Pen (Rs.)
Overheads Cost per unit (Rs.) (Traditional Method)	87.27	45
Overheads Cost per unit (Rs.) (ABC)	95.39	43.13
Difference <i>per unit</i>	-8.12	+1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

(b) A group of 'Health Care Services' has decided to establish a Critical Care Unit in a metro city with an investment of Rs. 85 lakhs in hospital equipments. The unit's capacity shall be of 50 beds and 10 more beds, if required, can be added. Other information for a year are as under

	(Rs.)
Building Rent	2,25,000 per month
Manager Salary (Number of Manager-03)	50,000 per month to each one
Nurses Salary (Number of Nurses-24)	18,000 per month to each Nurse
Ward boy's Salary (Number of ward boys' -24)	9,000 per month per person
Doctor's payment (Paid on the basis of number of patients attended and time spent by them)	5,50,000 per month
Food and laundry services (variable)	39,53,000
Medicines to patients (variable)	22,75,000 per year
Administrative Overheads	28,00,000 per year
Depreciation on equipments	15% per annum on original cost

It was reported that for 200 days in a year 50 beds were occupied, for 105 days 30 beds were occupied and for 60 days 20 beds were occupied.

The hospital hired 250 beds at a charge of Rs. 950 per bed to accommodate the flow of patients. However, this never exceeded the normal capacity of 50 beds on any day.

Find out:

- (i) Profit per patient day, if hospital charges on an average Rs. 2,500 per day from each patient.
(ii) Break even point per patient day (Make calculation on annual basis) (10 Marks)

Answer

Number of Patient Days = (200x50) + (105x30) + (60x20)
=14,350 patient days + 250 = 14,600

Statement Showing Profit

Elements of Cost and Revenue	Total (Rs.)
A. Revenue (14,600 x Rs. 2,500)	3,65,00,000
B. Variable Costs	
Food and Laundry Service	39,53,000
Medicines to Patients	22,75,000

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Doctor's Payment	66,00,000
Hire Charges of Bed (250 x Rs. 950)	2,37,500
Total Variable Cost	1,30,65,500
C. Fixed Costs	
Building Rent	27,00,000
Manager's Salary (Rs. 50,000 x 3 x 12)	18,00,000
Nurse's Salary (Rs. 18,000 x 12 x 24)	51,84,000
Ward boy's Salary (Rs. 9,000 x 12 x 24)	25,92,000
Administrative Overheads	28,00,000
Depreciation on Equipment's	12,75,000
	1,63,51,000
D. Total Cost (B+C)	2,94,16,500
E. Profit (A-D)	70,83,500

Profit per patient day = Rs. 70,83,500/14,600 = Rs. 485.17

(i) Contribution (per patient day) = (Rs. 3,65,00,000 – Rs. 1,30,65,500)/ 14,600 = Rs. 1,605.10

BEP = 1,63,51,000/1,605.10 = 10,186.90 or say 10,187 patient days

Notes:

1. Higher Charges for extra beds are a semi variable cost; still, for the sake of convenience it has been considered a variable cost.

2. Assumed, the hospital hired 250 beds at a charge of Rs. 950 per bed to accommodate the flow of patients. However, this never exceeded the 10 beds above the normal capacity of 50 beds on any day.

3. The fees were paid based on the number of patients attended to and the time spent by them, which on an average worked out to Rs. 5,50,000 p.m.

Question 5

(a) (i) The following details are provided by M/s. SKU Enterprises for the year ended 31st March, 2018:

Particulars	Material-M (Rs.)	Material-N (Rs.)
Stock as on 01-04-2017	6,00,000	10,00,000
Stock as on 31-03-2018	4,50,000	7,25,000
Purchases during the year	9,50,000	18,40,000

You are required to:

(i) Calculate Turnover Ratio of both the materials.

(ii) Advise which of the two materials is fast moving. (Assume 360 days in a year).

(5 Marks)

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ANSWER**5. (a) (i)**

Material M	Material N
Turnover ratio = $\frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$ = $\frac{₹6,00,000 + ₹9,50,000 - ₹4,50,000}{(6,00,000 + 4,50,000) / 2} = 2.09$ Average number of days for which the average inventory is held = $\frac{360}{\text{Inventory turnover ratio}}$ = $\frac{360 \text{ days}}{2.09}$ = 172.25 days	Turnover ratio = $\frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$ = $\frac{₹10,00,000 + ₹18,40,000 - ₹7,25,000}{(10,00,000 + 7,25,000) / 2} = 2.45$ Average number of days for which the average inventory is held = $\frac{360}{\text{Inventory turnover ratio}}$ = $\frac{360 \text{ days}}{2.45}$ = 146.94 days

(ii) Advice

Comparatively Material M is slower than Material N since Inventory holding period of 'M' is 172.25 days in Comparison to 'N' i.e. 146.94 days. Infact, both materials have slow inventory turnover. Though, different business has their own expected rates for inventory turnover like food shops have fast inventory turnover, shop selling furniture etc. will have slower inventory turnover while manufacturers of large items of plant will have very long inventory turnover. If it is not as per the Industry Standard, then a slow turnover may indicate that excessive inventory is held and risk of obsolete or spoiled inventory will increase. Large quantity of slow moving material means that capital is locked up in business and not earning revenue. It is advisable to make proper investigations into slow moving materials and take steps to minimize the loss arises therefrom as it may impact overall financial health of the organisation.

(ii) Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely

Material P and Material Q. The Standard Cost of Mixture is as under:

Material P 150 ltrs. @ Rs. 40 per ltr.

Material Q 100 ltrs. @ Rs. 60 per ltr.

Standard loss @ 20 of total input is expected during production.

The cost records for the period exhibit following consumption:

Material P 140 ltrs. @ Rs. 42 per ltr,

Material Q 110 ltrs. @ Rs. 56 per ltr,

Quantity produced was 195 ltrs.

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Calculate:

(i) Material Cost Variance

(ii) Material Usage Variance.

(iii) Material Price Variance (5 Marks)

ANSWER

ii) Workings:

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. of output is
 $= 195/80 \times 100 = 243.75$ ltr.

Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity	Rate	Amount	Quantity	Rate	Amount
	[SQ] (Kg.)	[SP] (₹)	[SQ × SP] (₹)	[AQ] (Kg.)	[AP] (₹)	[AQ × AP] (₹)
A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note: SQ = Standard Quantity = Expected Consumption for Actual Output

AQ = Actual Quantity of Material Consumed

SP = Standard Price Per Unit

AP = Actual Price Per Unit

Computation of Variances:

Material Cost Variance = $SQ \times SP - AQ \times AP$

A = Rs. 146.25 ltr. × Rs. 40 – 140 ltr. × Rs. 42 = Rs. 30.00 (A)

B = Rs. 97.50 ltr. × Rs. 60 – 110 ltr. × Rs. 56 = Rs. 310.00 (A)

Total = Rs. 30.00 (A) + Rs. 310.00 (A)

= Rs. 340.00 (A)

Material Usage Variance = $SP \times (SQ - AQ)$

A = Rs. 40 × (146.25 ltr. – 140 ltr.) = Rs. 250.00 (F)

B = Rs. 60 × (97.50 ltr. – 110 ltr.) = Rs. 750.00 (A)

Total = Rs. 250.00 (F) + Rs. 750.00 (A)

= Rs. 500.00 (A)

Material Price Variance = $AQ \times (SP - AP)$

A = 140 Kg. × (Rs. 40 – Rs. 42) = Rs. 280 (A)

B = 110 Kg. × (Rs. 60 – Rs. 56) = Rs. 440 (F)

Total = Rs. 280 (A) + Rs. 440 (F)

= Rs. 160 (F)

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(b) PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management

Particulars	Amount (Rs.)	Amount (Rs.)
Sales 1,500 pieces @ Rs. 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

(i) If selling price is increased by Rs. 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?

(ii) The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is Rs. 18. Calculate the sales to earn a profit of 20% on sales. (10 Marks)

Answer

(b) (i) Evaluation of Option (i)

Selling Price = Rs. 1800 + Rs. 200 = Rs. 2,000

Sales = 2000 x 60% = 1200 Pieces

	(₹)
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material $\left(\frac{₹ 5,94,200}{1,500 \text{ units}} \times 1,200 \right)$	4,75,360
Direct Labour $\left(\frac{₹ 4,42,600}{1,500 \text{ units}} \times 1,200 \right)$	3,54,080
Variable Overhead $\left(\frac{₹ 11,97,000 \times 60\%}{1,500 \text{ units}} \times 1,200 \right)$	5,74,560
Contribution	9,96,000
Less: Fixed cost (Rs. 11,97,000 x 40%)	4,78,800
Profit	5,17,200

If price has been increased by 11.11% (increases by 200 on 1,800) sales goes down by 20% (decreased by 300 on 1,500). Change in demand is greater than change in price. Since the variable costs are still same profit has been arose to Rs. 5,17,200 in spite of high elasticity of demand. PH gems would not be able to sustain this policy on account of change if any in variable costs.

(b) (ii) Evaluation of Option (ii)

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	(₹)
Sales	1,800.00
Less: Direct Material $\left(\frac{₹ 5,94,200}{1,500}\right)$	396.13
Cost of Tie PIN	18.00
Direct Labour $\left(\frac{₹ 4,42,600}{1,500}\right)$	295.07
Variable Overheads $\left(\frac{₹11,97,000 \times 60\%}{1,500}\right)$	478.80
Contribution	612.00
P/V Ratio $(₹ 612/1800 \times 100)$	34.0%

Sales to required earn a profit of 20%

$$\text{Sales} = \frac{₹ 4,78,800 + 0.20 \text{ of Sales}}{34.00\%}$$

Sales = Rs. 34,20,000 or 1,900 units (Rs. 34,20,000/1800)

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e. 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

Question 6

Answer any four of the following:

(a) Why are cost and management accounting information are required by the staff at operational level? Describe.

ANSWER

Operational level staffs- The operational level staffs like supervisors, foreman, team leaders are requiring information

- (i) to know the objectives and performance goals for them
- (ii) to know product and service specifications like volume, quality and process etc.
- (iii) to know the performance parameters against which their performance is measured and evaluated.
- (iv) to know divisional (responsibility centre) profitability etc.

(b) Explain 'Just In Time' (JIT) approach of inventory management

ANSWER

Just in Time (JIT) Inventory Management

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JIT is a system of inventory management with an approach to have a zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

- (i) Produce goods only when it is required and
- (ii) the products should be delivered to customers at the time only when they want.

It is also known as 'Demand pull' or 'Pull through' system of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:



(c) Why is 'Zero Base Budgeting' (ZBB) considered superior to 'Traditional Budgeting'? Explain.

ANSWER

Zero based budgeting is superior to traditional budgeting: Zero based budgeting is superior to traditional budgeting in the following manner:

- It provides a systematic approach for evaluation of different activities.

It ensures that the function undertaken are critical for the achievement of the objectives.

- It provides an opportunity for management to allocate resources to various activities after a thorough – cost benefit analysis.
- It helps in the identification of wasteful expenditure and then their elimination. It facilitates the close linkage of departmental budgets with corporate objectives.
- It helps in the introduction of a system of Management by Objectives

(d) Explain 'Job Costing' and 'Batch Costing'.

ANSWER

Job costing: In this method of costing, cost of each job is ascertained separately. It is suitable in all cases where work is undertaken on receiving a customer's order like a printing press, motor workshop, etc. This method of costing is used for non- standard and non- repetitive products produced

as per customer specifications and against specific orders. Jobs are different from each other and independent of each other. Each Job is unique.

Batch Costing: It is the extension of Job costing. Homogeneous products are produced in a continuous production flow in lots. A batch may represent a number of small orders passed through the factory in batch. Each batch here is treated as a unit of cost and thus separately costed. Here cost per unit is determined by dividing the cost of the batch by number of units produced in the batch.

(e) Explain:

(i) Opportunity Cost

(ii) FIFO and LIFO method of stores issue.

ANSWER

(i) Opportunity Cost - This cost refers to the value of sacrifice made or benefit of opportunity foregone in accepting an alternative course of action. For example, a firm financing its expansion plan by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.

(ii) First-in First-out (FIFO) method: It is a method of pricing the issues of materials, in the order in which they are purchased. In other words, the materials are issued in the order in which they arrive in the store or the items longest in stock are issued first. Thus each issue of material only recovers the purchase price which does not reflect the current market price. This method is considered suitable in times of falling price because the material cost charged to production will be high while the replacement cost of materials will be low.

Last-in-First-out (LIFO) method: It is a method of pricing the issues of materials. This method is based on the assumption that the items of the last batch (lot) purchased are the first to be issued. herefore, under this method the prices of the last batch (lot) are used for pricing the issues, until it s exhausted, and so on.

If however, the quantity of issue is more than the quantity of the latest lot than earlier (lot) and its price will also be taken into consideration.

During inflationary period or period of rising prices, the use of LIFO would help to ensure that the cost of production determined on the above basis is approximately the current one.

PAST EXAM- NOV 2018**Question 1**

Answer the following:

(a) M/s. SJ Private Limited manufactures 20000 units of a product per month. The cost of placing an order is Rs. 1,500. The purchase price of the raw material is Rs. 100 per kg. The re-order period is 5 to 7 weeks. The consumption of raw materials varies from 200 kg to 300 kg per week, the average consumption being 250 kg. The carrying cost of inventory is 9.75% per annum. You are required to calculate:

- (i) Re-order quantity
- (ii) Re-order level
- (iii) Maximum level
- (iv) Minimum level
- (v) Average stock level

ANSWER

(a) Annual consumption 250 kg × 52 weeks = 13,000 kg.

$$(i) \text{ Re-order Quantity or EOQ} = \sqrt{\frac{2 \times A \times O}{c \times i}}$$

A = Annual Consumption = 13,000 kg

O = Ordering Cost = Rs.. 1,500

C = Cost per kg = Rs.. 100

i = carrying cost rate = 9.75%

Carrying cost per kg per annum (c × i) = 100 × 9.75% = Rs.. 9.75

$$\begin{aligned} \therefore \text{EOQ} &= \sqrt{\frac{2 \times 13,000 \times 1,500}{9.75}} \\ &= \sqrt{\frac{39000000}{9.75}} = 2000 \text{ kg.} \end{aligned}$$

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- (ii) Re-order level = Max. re-order period × Max, Consumption
 = 7 weeks × 300 kg = 2,100 kg
- (iii) Maximum level = Re-order level + Re-order Qty – (Min re-order Period × Min. Consumption)
 = 2100 kg + 2000 kg – (5 × 200) kg = 3100 kg.
- (iv) Minimum level = Re-order level – (Avg. re-order period × Avg. Consumption)
 = 2,100 kg – (6 × 250) kg = 600 kg.

$$(v) \text{ Avg. stock level} = \frac{1}{2}(\text{Max. level} + \text{Min. level})$$

$$= \frac{1}{2}(3100 + 600) = 1850 \text{ kg}$$

OR

$$= \text{Minimum level} + \frac{1}{2} \text{ ROQ}$$

$$= 600 \text{ kg.} + \frac{1}{2} \times 2000 \text{ kg.} = 1600 \text{ kg.}$$

(b) A manufacturing concern has provided following information related to fixed overheads:

	Standard	Actual
Output in a month	5000 units	4800 units
Working days in a month	25 days	23 days
Fixed overheads	Rs. 5,00,000	Rs. 4,90,000

Compute:

- (i) Fixed overhead variance
 (ii) Fixed overhead expenditure variance
 (iii) Fixed overhead volume variance
 (iv) Fixed overhead efficiency variance

ANSWER
Calculation of Variances:

(i) Fixed Overhead Variance: Standard fixed overhead – Actual fixed overhead
 = Rs. [(5,00,000 ÷ 5000) × 4800] – Rs. 4,90,000 = Rs. 10,000 (A)

(ii) Fixed Overhead Expenditure Variances:
 Budgeted fixed overhead – Actual fixed overhead
 = Rs. 5,00,000 – Rs. 4,90,000 = Rs. 10,000 (F)

(iii) Fixed Overhead Volume Variance: Standard fixed overhead – Budgeted fixed overhead
 Rs. 4,80,000 – Rs. 5,00,000 = Rs. 20,000 (A)

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(iv) Fixed Overhead efficiency Variance: Standard fixed overhead – Budgeted fixed overhead for Actual days
= Rs. 4,80,000 – [(Rs. 5,00,000 ÷ 25) × 23] = Rs. 20,000 (F)

(c) Following details have been provided by M/s AR Enterprises:

(i) Opening works-in-progress - 3000 units (70% complete)

(ii) Units introduced during the year - 17000 units

(iii) Cost of the process (for the period) - Rs. 33,12,720

(iv) Transferred to next process - 15000 units

(v) Closing works-in-progress - 2200 units (80% complete)

(vi) Normal loss is estimated at 12% of total input (including units in process in the beginning). Scraps realise Rs. 50 per unit. Scraps are 100% complete.

Using FIFO method, compute:

(i) Equivalent production

(ii) Cost per equivalent unit

ANSWER

Statement of Equivalent Production Units (Under FIFO Method)

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P	3,000	From opening W-I-P	3,000	30	900
Units introduced	17,000	From fresh inputs	12,000	100	12,000
		Units completed (Transferred to next process)	15,000		
		Normal Loss {12% (3,000 + 17,000 units)}	2,400	--	--
		Closing W-I-P	2,200	80	1760
		Abnormal loss (Balancing figure)	400	100	400
	20,000		11,000		15,060

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Computation of cost per equivalent production unit : Cost of the Process (for the period)	Rs. 33,12,720
Less: Scrap value of normal loss (Rs. 50 × 2,400 units)	(Rs. 1,20,000)
Total process cost	Rs. 31,92,720

(d) M/s. SD Private Limited commenced a contract on 1st July 2017 and the company closes its account for the year on 31st March every year. The following information relates to the contract as on 31st March 2018.

(i)	Material issued	Rs.9,48,000
(ii)	Direct wages	Rs.4,57,200
(iii)	Prepaid direct wages as on 31.3.2018	Rs.1,08,000
(iv)	Administration charges	Rs.7,20,000
(v)	A supervisor, who is paid Rs. 50,000 per month, has devoted two-third of his time to this contract	
(vi)	A plant costing Rs.7,85,270 has been on the site for 185 days, its working life is estimated at 9 years and its scrap value is Rs. 75,000	

The contract price is Rs. 42 lakhs. On 31st March 2018 two-third of the contract was completed. The Architect issued certificate covering 50% of the contract price and the contractor had been paid Rs. 15.75 lakhs on account. Assuming 365 days in a year, you are required to:

- (i) Prepare a Contract Account showing work cost
(ii) Calculate Notional Profit or Loss as on 31st March 2018 (4 x 5 = 20 Marks)

Answer
Contract Account

Particulars	(₹)	Particulars	(₹)
To Material issued	9,48,000	By Machine (Working note 1)**	7,45,270
" Direct Wages (4,57,200 – 1,08,000)	3,49,200		
" Administrative charges	7,20,000		
" Supervisor's salary (₹ 50,000 × 9 × 2/3)	3,00,000		
" Machine**	7,85,270	" Works cost (balancing figure)	23,57,200
	31,02,470		31,02,470
" Works cost	23,57,200	" Value of work certified (50%×42,00,000)	21,00,000
" Costing P&L A/c (Notional profit)	3,32,100	" Cost of work uncertified (Working Note 2)	5,89,300
	26,89,300		26,89,300



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** Alternatively Depreciation on machine can be shown debit side of Contract Account.

Working notes:

1. Written down value of Machine

$$\text{Depreciation} = \frac{\text{₹}7,85,270 - \text{₹}75,000}{9 \text{ years}} \times \frac{185 \text{ days}}{365 \text{ days}} = \text{₹} 40,000$$

Hence the value of machine after the period of 185 days = Rs. 7,85,270 – Rs. 40,000 = Rs. 7,45,270

2. The cost of 2/3rd of the contract is Rs. 23,57,200

$$\therefore \text{Cost of 100\% " " " " " } \frac{\text{₹} 23,57,200}{2} \times 3 = \text{₹} 35,35,800$$

Cost of 50% of the contract which has been certified by the architect is Rs.. 17,67,900. Also, the cost of 1/3rd of the contract, which has been completed but not certified by the architect is Rs.. 5,89,300.

Question 2

(a) Following details are provided by M/s ZIA Private Limited for the quarter ending 30 September, 2018:

(i)	Direct expenses	Rs. 1,80,000
(ii)	Direct wages being 175% of factory overheads	Rs. 2,57,250
(iii)	Cost of goods sold	Rs. 18,75,000
(iv)	Selling & distribution overheads	Rs. 60,000
(v)	Sales	Rs. 22,10,000
(vi)	Administration overheads are 10% of factory overheads	

Stock details as per Stock Register

Particulars	30.06.2018 Rs.	30.09.2018 Rs.
Raw material	2,45,600	2,08,000
Work-in-progress	1,70,800	1,90,000
Finished goods	3,10,000	2,75,000

You are required to prepare a cost sheet showing:

- (i) Raw material consumed
- (ii) Prime cost
- (iii) Factory cost
- (iv) Cost of goods sold
- (v) Cost of sales and profit (10 Marks)

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ANSWER**(a) Cost Sheet****(for the quarter ending 30 September 2018)**

	Amount (Rs.)
(i) Raw materials consumed	
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,22,650*
Less: Closing stock of raw materials	(2,08,000)
Raw materials consumed	12,60,250
Add: Direct wages (1,47,000×175%)	2,57,250
Direct Expenses	1,80,000

(ii) Prime cost	16,97,500
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,44,500
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1,90,000)

(iii) Factory cost	18,25,300
Add: Administration overheads (10% of factory overheads)	14,700
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2,75,000)

(iv) Cost of goods sold	18,75,000
Add: Selling & distribution overheads	60,000
Cost of sales	19,35,000

(v) Net Profit	2,75,000
Sales	22,10,000

$$*(18,75,000 + 2,75,000 - 3,10,000 - (1,47,000 \times 10\%) + 1,90,000 - 1,70,800 - (2,57,250 \times 100/175\%) - 1,80,000 - 2,57,250 + 2,08,000 - 2,45,600) = 12,22,650$$

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = $2,57,250 \times 100/175$

Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods – Administrative overheads

Net Profit = Sales - Cost of sales



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Alternative solution

Cost Sheet

(for the quarter ending 30 September 2018)

	Amount (Rs.)
(i) Raw materials consumed	
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,37,350*
Less: Closing stock of raw materials	(2,08,000)
Raw Material consumed	12,74,950
Add: Direct wages (1,47,000×175%	2,57,250
Direct Expenses	1,80,000

(ii) Prime cost	17,12,,200
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,59,200
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1,90,000)

(iii) Factory cost/works cost/cost of production	18,40,000
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2,75,000)

(iv) Cost of goods sold	18,75,000
Add: Administration overheads (10% of factory overheads)	14,700
Add: Selling & distribution overheads	60,000
Cost of sales	19,49,700

(v) Net Profit	2,60,300
Sales	22,10,000

* $(18,75,000 + 2,75,000 - 3,10,000 + 1,90,000 - 1,70,800 - 1,47,500 - 1,80,000 - 2,57,250 + 2,08,000 - 2,45,600) = 12,37,350$

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = $257250 \times 100 / 175$



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Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods

Net Profit = Sales - Cost of sales

(b) A manufacturing company is producing a product 'A' which is sold in the market at Rs.45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

	Rs.
Materials	12
Wages	9
Overheads	6

Margin of safety is Rs. 4,12,500.

You are required to:

(i) calculate fixed cost and break-even point.

(ii) calculate the volume of sales to earn profit of 20% on sales.

(iii) if management is willing to invest Rs. 10,00,000 with an expected return of 20%, calculate units to be sold to earn this profit.

(iv) Management expects additional sales if the selling price is reduced to Rs. 44. Calculate units to be sold to achieve the same profit as desired in above (iii). (10 Marks)

ANSWER



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$$\begin{aligned} \text{Margin of Safety} &= \frac{\text{Profit}}{\text{P/V ratio}} = ₹ 4,12,500 \\ &= \frac{\text{Profit}}{45 - (12 + 9 + 6)} = ₹ 4,12,500 \\ &= \frac{\text{Profit}}{\frac{18}{45}} = 4,12,500 \end{aligned}$$

$$\text{Profit} = 1,65,000 \quad \text{OR P/V} = (18/45) \times 100 = 40\%$$

(i) Fixed Cost

$$\text{Profit} = (\text{Sales} \times \text{P/V Ratio}) - \text{Fixed Cost}$$

$$1,65,000 = \left((30,000 \times 45) \times \frac{18}{45} \right) - \text{Fixed Cost}$$

$$\begin{aligned} \text{Or Fixed Cost} &= 5,40,000 - 1,65,000 \\ &= ₹ 3,75,000 \end{aligned}$$

OR

$$\text{Profit} = \text{Contribution} - \text{Fixed Cost} = ₹ 5,40,000 - ₹ 3,75,000 = ₹ 1,65,000$$

$$\text{P/V Ratio} = \frac{18}{45} = 40\%$$

$$\text{Break-even Point} = \text{Total Sales} - \text{Margin of Safety}$$

$$= \text{Rs. } (30,000 \times 45) - 4,12,500$$

$$= 13,50,000 - 4,12,500 = \text{Rs. } 9,37,500$$

Or

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{3,75,000}{\frac{18}{45}} = \frac{3,75,000}{40\%} = ₹ 9,37,500 \quad \text{OR } 20833.33 \text{ Units}$$

(ii) Let's assume, Sales Volume = S unit so total sales value is 45 S and

Contribution is 45 S - 27 S = 18 S

Now, Contribution = Fixed Cost + Desired Profit

$$18 S = 3,75,000 + 9 S \quad (20\% \text{ of } 45 S)$$

$$\text{Or, } 9S = 3,75,000$$

$$\text{So, } S = \frac{3,75,000}{9} \text{ Units}$$

$$\text{Volume of sales} = \frac{3,75,000 \times 45}{9} = ₹ 18,75,000 \quad \text{OR } 41666.67 \text{ Units}$$

So, Rs. 18,75,000 sales are required to earn profit on 20% of sales



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(iii) Contribution = Fixed Cost + Desired Profit
 $18S = 3,75,000 + \text{Return on Investment}$
 $18S = 3,75,000 + 2,00,000$

$$S = \frac{5,75,000}{18} \text{ Units} = 31,945 \text{ Units (approx.)}$$

So, 31,945 Units to be sold to earn a return of Rs. 2,00,000.

(iv) Revised Contribution = Fixed Cost + Desired Profit
 $17S = 3,75,000 + 2,00,000$

$$S = \frac{5,75,000}{17} \text{ Units}$$

$$S = 33,824 \text{ units (approx.)}$$

∴ Additional Sales to be sold to achieve the same profit is 33,824 Units.

Question 3

(a) XYZ Ltd. has obtained an order to supply 48000 bearings per year from a concern. On a steady basis, it is estimated that it costs Rs. 0.20 as inventory holding cost per bearing per month and the set-up cost per run of bearing manufacture is Rs. 384.

You are required to:

- (i) compute the optimum run size and number of runs for bearing manufacture.
- (ii) compute the interval between two consecutive runs.
- (iii) find out the extra costs to be incurred, if company adopts a policy to manufacture 8000 bearings per run as compared to optimum run size.
- (iv) give your opinion regarding run size of bearing manufacture.
 Assume 365 days in a year. (10 Marks)

(b) M/s. HMB Limited is producing a product in 10 batches each of 15000 units in a year and incurring following overheads their on:

	Amount (Rs.)
Material procurement	22,50,000
Maintenance	17,30,000
Set-up	6,84,500
Quality control	5,14,800



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The prime costs for the year amounted to Rs. 3,01,39,000.

The company is using currently the method of absorbing overheads on the basis of prime cost. Now it wants to shift to activity-based costing. Information relevant to Activity drivers for a year are as under:

Activity Driver	Activity Volume
No. of purchase orders	1500
Maintenance hours	9080
No. of set-ups	2250
No. of inspections	2710

The company has produced a batch of 15000 units and has incurred Rs. 26,38,700 and Rs. 3,75,200 on materials and wages respectively.

The usage of activities of the said batch are as follows:

Materials orders	48 orders
Maintenance hours	810 hours
No. of set-ups	40
No. of inspections	25

You are required to:

(i) find out cost of product per unit on absorption costing basis for the said batch.

(ii) determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity based costing. (10 Marks)

Answer

(a) (i) Optimum batch size or Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48,000 \times 384}{2.4}} = 3919.18 \text{ or } 3,920 \text{ units}$$

Number of Optimum runs = $48,000 \div 3,920 = 12.245$ or **13 run**

(ii) Interval between 2 runs (in days) = $365 \text{ days} \div 13 = 28 \text{ days}$

Or $365 \div 12.24 = 29.82 \text{ days}$

(iii) If 8,000 bearings are manufactures in a run:

Total cost = Set-up cost + Inventory holding cost

= Rs. $384 \times (48,000 \div 8,000) + (8,000 \div 2) \times \text{Rs. } 2.4$

= **2304+9,600 = 11,904**

Extra cost = Rs. $(11,904 - 9,406^*) = \text{Rs. } 2,498/-$

OR

Extra cost = Rs. $(11,904 - 9,696^*) = \text{Rs. } 2,208/-$

* Minimum Inventory Cost = Average Inventory \times Inventory Carrying Cost per unit per annum

Average Inventory = $3,920 \text{ units} \div 2 = 1,960 \text{ units}$

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Carrying Cost per unit per annum = Rs.0.2 × 12 months = Rs.2.4
 Minimum Inventory Holding Costs = 1,960 units × Rs.2.4 = Rs.4,704
 Total cost = Set-up cost + Inventory holding cost = (12.245×384) + 4704 = Rs. **9,406** (approx.)

OR

Total cost = Set-up cost + Inventory holding cost = (13×384) + 4704 = Rs. **9,696** (approx.)

(iv) To save cost the company should run at optimum batch size i.e. 3,920 Units. **It saves Rs. 2,498 or 2208.** Run size should match with the Economic production run of bearing manufacture. When managers of a manufacturing operation make decisions about the number of units to produce for each production run, they must consider the costs related to setting up the production process and the costs of holding inventory

Alternative presentation to part 3(a) (iii)

Statement showing Total Cost at Production Run size of 3,600 and 8,000 bearings

A.	Annual requirement	48,000	48,000
B.	Run Size	3,920	8,000
C.	No. of runs (A/B)	12.245	6
D.	Set up cost per run	Rs. 384	Rs. 384
E.	Total set up cost (CxD)	Rs. 4,702	Rs. 2,304
F.	Average inventory (B/2)	1,960	4,000
G.	Carrying cost per unit p.a.	2.40	2.40
H.	Total Carrying cost (FxG)	4,704	9,600
I.	Total cost (E+H)	9,406	11,904

Extra cost incurred, if run size is of 8,000= Rs.11,904-9,406= Rs. **2,498**

(b) Working Note:

$$\text{Overhead Absorption Rate} = \frac{51,79,300}{3,01,39,000} \times 100 = 17.18\%$$

(i) Cost of Product Under Absorption Costing

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Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Overheads: $\frac{51,79,300}{3,01,39,000} \times 30,13,900$	5,17,930
Total Cost	35,31,830
Units	15,000
Cost per unit	235.46

(ii) Cost driver rate, total cost and cost per unit on the basis of activity-based costing method Absorption Costing
Calculation of Cost Driver rate

Activity	Rs..	Activity Volume	Cost Driver Rate
Material Procurement	22,50,000	1500	1500
Maintenance	17,30,000	9080	190.53
Setup	6,84,500	2250	304.22
Quality Control	5,14,800	2710	189.96

Calculation of total Cost and cost per unit:

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Material Purchase $\left(\frac{22,50,000}{1,500} \times 48 \right)$	72,000
Maintenance $\left(\frac{17,30,000}{9,080} \times 810 \right)$	1,54,328
Setup $\left(\frac{6,84,500}{2,250} \times 40 \right)$	12,169
Quality Control $\left(\frac{5,14,800}{2,710} \times 25 \right)$	4,749
Total Cost	32,57,146
Unit	15,000
Cost per unit	217.14

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Question 4

(a) The following balances were extracted from a Company's ledger as on 30th June, 2018:

Particulars	Debit (₹)	Credit (₹)
Raw material control a/c	2,82,450	
Work-in-progress control a/c	2,38,300	
Finished stock control a/c	3,92,500	
General ledger adjustment a/c		9,13,250
Total	9,13,250	9,13,250

The following transactions took place during the quarter ended 30th September, 2018:

(i)	Factory overheads - allocated to work-in-progress	1,36,350
(ii)	Goods furnished - at cost	13,76,200
(iii)	Raw materials purchased	12,43,810
(iv)	Direct wages - allocated to work-in-progress	2,56,800
(v)	Cost of goods sold	14,56,500
(vi)	Raw materials - issued to production	13,60,430
(vii)	Raw materials - credited by suppliers	27,200
(viii)	Raw materials losses - inventory audit	6,000
(ix)	Work-in-progress rejected (with no scrap value)	12,300
(x)	Customer's returns (at cost) of finished goods	45,900

You are required to prepare:

- (i) Raw material control a/c
- (ii) Work-in-progress control a/c
- (iii) Finished stock control a/c
- (iv) General ledger adjustment a/c (10 Marks)

ANSWER

(a) (i) Raw Material Control A/c

	(₹)		(₹)
To Balance b/d	2,82,450	By General Ledger Adjustment A/c	27,200
" General Ledger Adjustment A/c	12,43,810	" Work-in-progress Control A/c	13,60,430
		" Costing P&L A/c	6,000

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		(Loss) (OR GLA)	
		" Balance c/d	1,32,630
	15,26,260		15,26,260

(ii) Work-in-Progress Control A/c

	(₹)		(₹)
To Balance b/d	2,38,300		
" Raw Material Control A/c	13,60,430	" Finished Goods Control A/c	13,76,200
" Wages Control A/c	2,56,800	Costing P&L A/c (OR GLA)	12,300
" Factory OH Control A/c	1,36,350	" Balance c/d	6,03,380
	19,91,880		19,91,880

(iii) Finished Goods Control A/c

	(₹)		(₹)
To Balance b/d	3,92,500	By Cost of goods sold A/c (OR GLA)	14,56,500
General Ledger Adjustment A/c	45,900		
" Work-in-process Control A/c	13,76,200	" Balance c/d	3,58,100
	18,14,600		18,14,600

(iv) General Ledger Adjustment A/c

	(₹)		(₹)
To Costing P&L A/c (sales) (Balancing figure)	25,68,910	By Balance b/d	9,13,250
" Raw Material Control A/c	27,200	" Raw Material Control A/c	12,43,810
		" Wages Control A/c	2,56,800
		" Factory OH Control A/c	1,36,350
		" Finished Goods Control A/c	45,900
	25,96,110		25,96,110

OR
General ledger adjustment account

	(₹)		(₹)
To Raw Material Control A/c	27,200	By Balance b/d	9,13,250
" Raw Material control account(loss)	6,000	" Raw Material Control A/c	12,43,810
" WIP control Account (rejection)	12,300	" Wages Control A/c	2,56,800
" Finished stock Control Account	14,56,500	" Factory OH Control A/c	1,36,350
" Balance c/d	10,94,110	" Finished Goods Control A/c	45,900
	25,96,110		25,96,110

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Working:

Factory Overhead Control A/c

	(₹)		(₹)
To General Ledger Adjustment A/c	1,36,350	By Work-in-progress A/c	1,36,350
	1,36,350		1,36,350

(b) M/s XY Travels has been given a 25 km. long route to run an air- conditioned Mini Bus. The cost of bus is Rs. 20,00,000. It has been insured @3% premium per annum while annual road tax amounts to Rs. 36,000. Annual repairs will be Rs. 50,000 and the bus is likely to last for 5 years. The driver's salary will be Rs.2,40,000 per annum and the conductor's salary will be Rs. 1,80,000 per annum in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally). Office and administration overheads will be Rs. 18,000 per annum. Diesel and oil will be Rs. 1,500 per 100 km. The bus will make 4 round trips carrying on an average 40 passengers on each trip.

Assuming 25% profit on takings and considering that the bus will run on an average 25 days in a month, you are required to:

- (i) prepare operating cost sheet (for the month).
- (ii) calculate fare to be charged per passenger km. (10 Marks)

ANSWER

i) Statement showing the Operating Cost per Passenger-km.

	Yearly (₹.)	Monthly (₹.)
(A) Standing Charges:		
Insurance Charge ₹. 20,00,000 × 3%	60,000	5,000
Road Tax	36,000	3,000
Depreciation (20,00,000/5)	4,00,000	33,333.33
Total	4,96,000	41,333.33
(B) Maintenance Charges:		
Annual Repairs	50,000	4166.67
Office and administration overheads	3,18,000	26,500
Total	3,68,000	30666.67
(C) Running Cost/Charges:		
Driver's Salary	2,40,000	20,000
Conductor's Salary	1,80,000	15,000



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Diesel & Oil $\left(60,000 \times \frac{1,500}{100}\right)$	9,00,000	75,000
Total	13,20,000	41,333.33
Total (A+B+C) Cost before commission and profit	21,84,000	1,82,000
Commission $(33,60,000 \times 10\%)$ (working note 2)	3,36,000	28,000
Profit $(33,60,000 \times 25\%)$ (working note 2)	8,40,000	70,000
Takings (working note 1)	33,60,000	2,80,000

$$(ii) \text{ Fare per Passenger-km.} = \frac{\text{Total Collection/Takings}}{\text{Total Passenger-km (Working note 3)}}$$

$$= \frac{33,60,000}{24,00,000} = ₹. 1.40$$

OR

$$\text{Fare per Passenger-km. (monthly)} = \frac{2,80,000}{2,00,000} = ₹. 1.40$$

Working note:

- Cost before commission (10%) and profit (25%) is 21,84,000 which is 65% of total takings. So total takings is $(21,84,000 \div 65) \times 100 = \text{Rs. } 33,60,000$
- Commission is 10% of Rs. 33,60,000 = Rs. 3,36,000 and Profit is 25% of Rs. 33,60,000 = Rs. 8,40,000
- Total Km is $(4 \text{ Round Trips} \times \text{Days in a month} \times \text{Month}) = (4 \times 2 \times 25 \times 25 \times 12) = 60,000 \text{ km}$
Passenger km is $60,000 \text{ km} \times 40 \text{ passenger} = 24,00,000$

Question 5

(a) An electronic gadget manufacturer has prepared sales budget for the next few months. In this respect, following figures are available:

Months	Electronic gadgets' sales
January	5000 units
February	6000 units
March	7000 units
April	7500 units
May	8000 units

To manufacture an electronic gadget, a standard cost of Rs. 1,500 is incurred and it is sold through dealers at an uniform price of Rs. 2,000 per gadget to customers. Dealers are given a discount of 15% on selling price. Apart from other materials, two units of batteries are required to manufacture a gadget. The company wants to hold stock of batteries at the end of each month to cover 30% of next month's production and to hold stock of manufactured gadgets to cover 25% of the next month's sale.

3250 units of batteries and 1200 units of manufactured gadgets were in stock on 1st January.

Required:



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- (i) Prepare production budget (in units) for the month of January, February, March and April.
(ii) Prepare purchase budget for batteries (in units) for the month of January, February and March and calculate profit for the quarter ending on March. (10 Marks)

(b) (i) Following data have been extracted from the books of M/s. ABC Private Limited:

(i)	Salary (each employee, per month)	Rs. 30,000
(ii)	Bonus	25% of salary
(iii)	Employer's contribution to PF, ESI etc.	15% of salary
(iv)	Total cost at employees' welfare activities	Rs. 6,61,500 per annum
(v)	Total leave permitted during the year	30 days
(v)	No. of employees	175
(vii)	Normal idle time	70 hours per annum
(viii)	Abnormal idle time (due to failure of power supply)	50 hours
(ix)	Working days per annum	310 days of 8 hours

You are required to calculate:

1. Annual cost of each employee
2. Employee cost per hour
3. Cost of abnormal idle time, per employee

(ii) M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows

	Production Dept.		Service Dept.	
	A	B	X	Y
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the quarter ended September 2018	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to Rs. 12.60 lakhs out of which Rs. 4.20 lakhs was considered as fixed cost.

Service department X renders services to departments A, B, and Y in the ratio of 6:4:2 whereas department Y renders services to department A and B in the ratio of 4: 1. The direct labour hours of department A and B are 67500 hours and 48750 hours respectively.

Required:

- 1 Prepare overheads distribution sheet.
 - 2 Calculate factory overhead per labour hour for the dept. A and dept. B.
- (5 Marks)

Answer

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(a) (i) Preparation of Production Budget (in Units)

	January	February	March	April	May
Sales	5,000	6,000	7,000	7,500	8,000
Add: Closing stock (25% of next month's sales)	1,500	1,750	1,875	2,000	
Less: Opening Stock	(1200)	(1500)	(1750)	(1875)	
Production of electronic Gadgets	5,300	6,250	7,125	7,625	

(ii) Preparation of Purchase budget

	January	February	March	April
Consumption/production of Batteries (@ 2 per Gadget)	10,600	12,500	14,250	15,250
Add: Closing Stock (30% of next month's production)	3750	4275	4575	
Less: Opening Stock	3,250	3,750	4275	
Purchase of Batteries	11,100	13,025	14,550	

Statement Showing Profit

	Jan.	Feb.	March	Total
Sales (A)	5,000	6,000	7,000	18,000
Selling Price per unit*	₹. 2,000	₹. 2,000	₹. 2,000	₹. 2,000
Less: Discount @15% of selling price	300	300	300	300
Less: Standard cost of Manufacturing per gadget Cost	1500	1500	1500	1500
Profit (B) (selling Price-discount-cost)	200	200	200	200
Total Profit (A × B)	₹.10,00,000	₹.12,00,000	₹.14,00,000	₹.36,00,000



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(b) (i) 1.

	Annual cost of each employee	₹.
1.	Salary (30,000×12)	3,60,000
2.	Bonus (25% of Salary)	90,000
3.	Employees Contribution to PF (15% of Salary)	54,000
4.	Employers welfare (661500/175)	3,780
	Total Annual Cost	5,07,780

2.

Effective Working hours (310 days × 8 hours)	2480 hours
Less: Leave days (30 days × 8 hours)	240 hours*
Available Working hours	2240 hours
Less: Normal Loss @	70 hours
	2170 hours

Employee Cost per hour = $507780 / 2170 = 234$

*It is assumed 310 working days are without taking leave permitted into consideration

3. Cost of abnormal idle time per employee = Rs. 234 × 50 hours = Rs. 11700

Alternative solution for Part (2) and (3) (2)

Calculation of Employee cost per hour:	
Working hours per annum	2,480 *
Less: Normal Idle time hours	70
Effective hours	2,410
Employee cost	5,07,780
Employee cost per hour	210.70

*It is assumed 310 working days are after adjusting leave permitted during the year.

(3) Cost of Abnormal idle time per employee:	
Abnormal Idle time hours	50
Employee cost per hour	210.70
Cost of Abnormal idle time (210.70 × 50)	10,534.85



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(ii)

(1) Overheads distribution Sheet

Item	Basis	Total Amount (Rs.)	Production Departments		Service Departments	
			A (Rs.)	B (Rs.)	X (Rs.)	Y (Rs.)
Variable overheads (Rs. 12.60 lakhs - Rs. 4.20 lakhs)	Horse Power hours used	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
Fixed Overheads	Horse power for Capacity production	4,20,000	1,20,000	1,50,000	90,000	60,000
Total Overheads		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Service dept X allocated to A, B & Y	As per the ratio given 6:4:2	(2,70,000)	1,35,000	90,000		45,000
Service dept Y allocated to A & B	As per the ratio of 4:1	(1,80,000+45000 = 2,25,000)	1,80,000	45,000		
Total Overheads of Production departments			6,75,000	5,85,000		

(2) Calculation of Factory overhead per labour hour

	Item	Production Departments
	A (Rs.)	B (Rs.)
Total overheads	6,75,000	5,85,000
Direct labour hours	67,500	48,750
Factory overheads per hour	10	12

Question 6

Answer any four of the following:

(a) Mention and explain types of responsibility centres.

ANSWER

(a) There are four types of responsibility centres:

(i) Cost Centres: The responsibility centre which is held accountable for incurrence of costs which are under its control. The performance of this responsibility centre is measured against pre-determined standards or budgets. The cost centres are of two types:

(a) Standard Cost Centre and (b) Discretionary Cost Centre

(ii) Revenue Centres: The responsibility centres which are accountable for generation of revenue for the entity. Sales Department for example, is the responsible for achievement of sales target and revenue generation. Though, revenue centres does not have control on the all expenditures it incurs but some time expenditures related with selling activities like commission to sales person etc. are incurred by revenue centres.



iii) Profit Centres: These are the responsibility centres which have both responsibility of generation of revenue and incurrance of expenditures. Since, managers of profit centres are accountable for both costs as well as revenue, profitability is the basis for measurement of performance of these responsibility centres. Examples of profit centres are decentralised branches of an organisation.

(iv) Investment Centres: These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres is measured based on Return on Investment (ROI) besides profit.

(b) Explain obsolescence and circumstances under which materials become obsolete. State the steps to be taken for its treatment.

ANSWER

(b) Obsolescence: Obsolescence is defined as “the loss in the intrinsic value of an asset due to its supersession”. Materials may become obsolete under any of the following **circumstances:**

- (i) where it is a spare part, or a component of a machinery used in manufacture and that machinery becomes obsolete;
- (ii) where it is used in the manufacture of a product which has become obsolete;
- (iii) where the material itself is replaced by another material due to either improved quality or fall in price.

Treatment: In all three cases, the value of the obsolete material held in stock is a total loss and immediate steps **should be taken to dispose it off** at the best available price. The loss arising out of obsolete materials on **abnormal loss does not form part of the cost** of manufacture.

(c) State the bases of apportionment of following overhead costs:

- (i) Air-conditioning
- (ii) Time keeping
- (iii) Depreciation of plant and machinery
- (iv) Power/steam consumption
- (v) Electric power (Machine operation)

ANSWER

Overhead Cost	Bases of Apportionment
(i) Air- conditioning	Floor area, or volume of department
(ii) Time keeping	Number of workers
(iii) Depreciation of plant and machinery	Capital values
(iv) Power/steam consumption	Technical estimates
(v) Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed. Kilo-watt hours

(d) How are By-products treated in Costing?

Answer

Treatment of by-product cost in Cost Accounting:

By-product cost can be dealt in cost accounting in the following ways:

(a) **When they are of small total value:** When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.

2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

(b) **When the by-products are of considerable total value:** Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis.

(c) **Where they require further processing:** In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products



(e) Explain 'Activity Based Budgeting'. (4 x 5 = 20 Marks)

ANSWER

Activity Based Budgeting (ABB)

- Activity based budgeting analyse the resource input or cost for each activity.
- It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity.
- Actual results can be compared with budgeted results to highlight both in financial and non-financial terms those activities with major discrepancies from budget for potential reduction in supply of resources.
- It is a planning and control system which seeks to support the objectives of continuous improvement.
- It means planning and controlling the expected activities of the organization to derive a cost-effective budget that meet forecast workload and agreed strategic goals.
- ABB is the reversing of the ABC process to produce financial plans and budgets.



PAST EXAM-NOV 2020**Question 1**

Answer the following:

(a) G Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of Rs. 6,00,000 utilises only 60% capacity of the plant. The following data are available:

- (1) Selling price : Rs. 100 per unit
- (2) Variable cost : Rs. 30 per unit
- (3) Semi-variable expenses : Rs. 60,000 fixed + Rs. 5 per unit
- (4) Fixed expenses : Rs. 1,00,000 at present level, estimated to increase by 25% at and above 80% capacity.

You are required to prepare a flexible budget so as to arrive at the operating profit at 60%, 80% and 100% levels.

ANSWER**(a) Flexible Budget**

Activity Level	60%	80%	100%
Production (units)	6,000	8,000	10,000
	(Rs.)	(Rs.)	(Rs.)
Sales @ Rs. 100 per unit	6,00,000	8,00,000	10,00,000
Variable Cost (@ Rs. 35 (Rs. 30 + Rs. 5) per unit)	2,10,000	2,80,000	3,50,000
Contribution (A)	3,90,000	5,20,000	6,50,000
Fixed Cost (part of semi-variable cost)	60,000	60,000	60,000
Other Fixed Cost	1,00,000	1,25,000	1,25,000
Total Fixed Cost (B)	1,60,000	1,85,000	1,85,000
Operating Profit (A – B)	2,30,000	3,35,000	4,65,000

(b) Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse its production mix in respect of these three products - 'X', 'Y' and 'Z'.

You have the following information

	X	Y	Z
Direct Materials Rs. (per unit)	160	120	80
Variable Overheads Rs. (per unit)	8	20	12

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Direct labour :

Departments:	Rate per Hour (Rs.)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below :

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (Rs.)	312	400	240
Sales departments estimate of possible sales in the coming year (in units)	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

- (i) Identify the best possible product mix of Moon Ltd.
- (ii) Calculate the total contribution from the best possible product mix.

ANSWER

(b) (i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X (Rs.)	Y (Rs.)	Z (Rs.)
Selling Price (A)	312	400	240
Variable Cost:			
Direct Material	160	120	80
Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	72	100	40
Hours in Dept. A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = 10,000 x 6hrs. + 12,000 x 10 hrs. + 20,000 x 5 hrs. = 2,80,000 hrs.

Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X' = 12,000 units

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Hours Required = 72,000 hrs (12,000 units × 6 hrs.)
 Balance Hours Available = 2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)
 Produce 'Y' (the Next Best) = 16,000 units
 Hours Required = 1,60,000 hrs (16,000 units × 10 hrs.)

Balance Hours Available = 48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)
 Produce 'Z' (balance) = 9,600 units (48,000 hrs./ 5 hrs.)

(ii) Statement Showing "Contribution"

Product	Units	Contribution/ Unit (Rs.)	Total Contribution (Rs.)
X	12,000	72	8,64,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
Total			28,48,000

(c) A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'.

The process yield is as under:

Product M 80%

Product N 12%

Process Loss 8%

The cost of raw material is Rs. 80 per unit.

Processing cost is Rs. 2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100:80.

Prepare a Comprehensive Cost Statement for each product showing:

(i) Apportionment of joint cost among products 'M' and 'N' and

(ii) Total cost of the products 'M' and 'N'.

ANSWER

Comprehensive Cost Statement

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Particulars	Total Cost (₹)	Product-M (₹)	Product-N (₹)
No. of units produced *		5,400 units	810 units
Cost of raw material (₹ 80 × 6,750 units)	5,40,000		
Processing cost:			
- Labour cost (₹ 2,25,000 × 66%)	1,48,500		
- Other costs (₹ 2,25,000 - 1,48,500)	76,500		
Total joint cost	7,65,000		
(i) Apportionment of joint costs between the joint products			
Labour cost in the ratio of 100:80	1,48,500	82,500	66,000
		$\left(\frac{1,48,500 \times 100}{180} \right)$	$\left(\frac{1,48,500 \times 80}{180} \right)$
Other joint costs (including material) in the ratio of output (5,400:810)	6,16,500	5,36,087	80,413
		$\left(\frac{6,16,500 \times 5,400}{6,210} \right)$	$\left(\frac{6,16,500 \times 810}{6,210} \right)$
(ii) Total product cost	7,65,000	6,18,587	1,46,413

No. of units produced of Product M = 6750 units × 80% = 5400 units

No. of units produced of Product N = 6750 units × 12% = 810 units

(d) W Limited undertook a contract for Rs. 5,00,000 on 1st July, 2019. On 30th June, 2020 when the accounts were closed, the following details about the contract were gathered:

	Amount (Rs.)
Materials purchased	1,00,000
Wages paid	45,000
General expenses	10,000
Materials on hand (30-6-2020)	25,000
Wages accrued (30-6-2020)	5,000
Work certified	2,00,000
Cash received	1,50,000
Work uncertified	15,000

The above contract contained "Escalation clause" which read as follows :

"In the event of increase in the prices of materials and rates of wages by more than 5%, the contract price would be increased accordingly by 25% of the rise in the cost of materials and wages beyond 5% in each case."



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It was found that since the date of signing the agreement, the prices of materials and wage rates increased by 25%. The value of the work certified does not take into account the effect of the above clause.

Calculate the 'value of work certified' after taking the effect of 'Escalation Clause' as on 30th June, 2020. (4 x 5 = 20 Marks)

Answer

(d) Workings:

(i) Percentage of work certified:

$$\frac{\text{Value of work certified}}{\text{Contract price}} \times 100 = \frac{\text{₹ 2,00,000}}{\text{₹ 5,00,000}} \times 100 = 40\%$$

(ii) Value of material and labour used in the contract:

Particulars	Amount (₹)	Amount (₹)
Material purchased	1,00,000	
Less: Material on hand (30-06-2020)	(25,000)	75,000
Wages paid	45,000	
Add: Wages accrued (30-06-2020)	5,000	50,000
		1,25,000

Price of materials and wages has been increased by 25%, the value before price increase is:

$$\text{Rs. } 125000 / 125 \times 100 = \text{Rs. } 100000$$

(iii) Calculation of Value of work certified:

The value of the contract would be increased by 25% of the price increased beyond 5%.

Price increased beyond 5% = Rs. 25,000 – 5% of Rs. 1,00,000 = Rs. 20,000

Value of contract would be increased by 25% of Rs. 20,000 = Rs. 5,000

Therefore, the revised contract value = Rs. 5,00,000 + Rs. 5,000 = Rs. 5,05,000

Calculation of the Value of work certified after taking the effect of escalation clause:

Revised contract value × Percentage of work certified

$$= \text{Rs. } 5,05,000 \times 40\% = \text{Rs. } 2,02,000$$

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Question 2

(a) X Ltd. manufactures two types of pens 'Super Pen' and 'Normal Pen'. The cost data for the year ended 30th September, 2019 is as follows:

Direct Materials	8,00,000
Direct Wages	4,48,000
Production Overhead	1,92,000
Total	14,40,000

It is further ascertained that :

- (1) Direct materials cost in Super Pen was twice as much of direct material in Normal Pen.
- (2) Direct wages for Normal Pen were 60% of those for Super Pen.
- (3) Production overhead per unit was at same rate for both the types.
- (4) Administration overhead was 200% of direct labour for each.
- (5) Selling cost was Rs. 1 per Super pen.
- (6) Production and sales during the year were as follow :

Production		Sales	
	No. of units		No. of units
Super Pen	40,000	Super Pen	36,000
Normal Pen	1,20,000		

- (7) Selling price was Rs. 30 per unit for Super Pen.

Prepare a Cost Sheet for 'Super Pen' showing:

- (i) Cost per unit and Total Cost
- (ii) Profit per unit and Total Profit (10 Marks)

ANSWER**(a) Preparation of Cost Sheet for Super Pen**

No. of units produced = 40,000 units

No. of units sold = 36,000 units

Particulars	Per unit (Rs.)	Total (Rs.)
Direct materials (Working note- (i))	8.00	3,20,000
Direct wages (Working note- (ii))	4.00	1,60,000
Prime cost	12.00	4,80,000

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Production overhead (Working note- (iii))	1.20	48,000
Factory Cost	13.20	5,28,000
Administration Overhead* (200% of direct wages)	8.00	3,20,000
Cost of production	21.20	8,48,000
Less: Closing stock (40,000 units – 36,000 units)	-	(84,800)
Cost of goods sold i.e. 36,000 units	21.20	7,63,200
Selling cost	1.00	36,000
Cost of sales/ Total cost	22.20	7,99,200
Profit	7.80	2,80,800
Sales value (Rs. 30 × 36,000 units)	30.00	10,80,000

Working Notes:

(i) Direct material cost per unit of Normal pen = M

Direct material cost per unit of Super pen = 2M

Total Direct Material cost = 2M × 40,000 units + M × 1,20,000 units

Or, Rs. 8,00,000 = 80,000 M + 1,20,000 M

$$\text{Or, } M = \frac{\text{₹ } 8,00,000}{2,00,000} = \text{₹ } 4$$

Therefore, Direct material Cost per unit of Super pen = 2 × Rs. 4 = Rs. 8

(ii) Direct wages per unit for Super pen = W

Direct wages per unit for Normal Pen = 0.6W

So, (W × 40,000) + (0.6W × 1,20,000) = Rs. 4,48,000

W = Rs. 4 per unit

$$\text{(iii) Production overhead per unit} = \frac{\text{₹ } 1,92,000}{(40,000 + 1,20,000)} = \text{₹ } 1.20$$

Production overhead for Super pen = Rs. 1.20 × 40,000 units = Rs. 48,000

* Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the question and hence to be considered in cost of production only.

Assumption: It is assumed that in point (1) and (2) of the Question, direct materials cost and direct wages respectively is related to per unit only.

Note: Direct Material and Direct wages can be calculated in alternative ways.

(b) TEE Ltd. is a manufacturing company having three production departments 'P', 'Q' and 'R' and two service departments 'X' and 'Y' details pertaining to which are as under :

	P	Q	R	X	Y
Direct wages (Rs.)	5,000	1,500	4,500	2,000	800
Working hours	13,191	7,598	14,995	-	-
Value of machine (Rs.)	1,00,000	80,000	1,00,000	20,000	50,000
H.P. of machines	100	80	100	20	50
Light points (Nos.)	20	10	15	5	10
Floor space (sq. ft.)	2,000	2,500	3,500	1,000	1,000



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The expenses are as follows:

	(Rs.)
Rent and Rates	10,000
General Lighting	600
Indirect Wages	3,450
Power	3,500
Depreciation on Machines	70,000
Sundries (apportionment on the basis of direct wages)	13,800

The expenses of Service Departments are allocated as under :

	P	Q	R	X	Y
X	45%	15%	30%	-	10%
Y	35%	25%	30%	10%	-

Product 'A' is processed for manufacture in Departments P, Q and R for 6, 5 and 2 hours respectively.

Direct Costs of Product A are :

Direct material cost is Rs. 65 per unit and Direct labour cost is Rs. 40 per unit.

You are Required to:

(i) Prepare a statement showing distribution of overheads among the production and service departments.

(ii) Calculate recovery rate per hour of each production department after redistributing the service departments costs.

(iii) Find out the Total Cost of a 'Product A'. (10 Marks)

Answer

(i) Statement showing distribution of Overheads

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (Rs.)	P (Rs.)	Q (Rs.)	R (Rs.)	X (Rs.)	Y (Rs.)
Direct wages	Actual	2,800	--	--	--	2,000	800
Rent and Rates	Floor area (4:5:7:2:2)	10,000	2,000	2,500	3,500	1,000	1,000
General lighting	Light points (4:2:3:1:2)	600	200	100	150	50	100
Indirect wages	Direct wages (50:15:45:20:8)	3,450	1,250	375	1,125	500	200
Power	Horse Power of machines used (10:8:10:2:5)	3,500	1,000	800	1,000	200	500
Depreciation of machinery	Value of machinery (10:8:10:2:5)	70,000	20,000	16,000	20,000	4,000	10,000
Sundries	Direct wages (50:15:45:20:8)	13,800	5,000	1,500	4,500	2,000	800
Total		1,04,150	29,450	21,275	30,275	9,750	13,400

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Secondary Distribution using simultaneous equation method:

Overheads of service cost centres

Let, X be the overhead of service cost centre X

Y be the overhead of service cost centre Y

$$X = 9,750 + 0.10 Y$$

$$Y = 13,400 + 0.10 X$$

Substituting the value of Y in X we get

$$X = 9,750 + 0.10 (13,400 + 0.10 X)$$

$$X = 9,750 + 1,340 + 0.01 X$$

$$0.99 X = 11,090$$

$$\boxed{X} = \text{Rs. } 11,202$$

$$\boxed{Y} = 13,400 + 0.10 \boxed{X} = 11,202$$

$$= \text{Rs. } 14,520.20$$

Secondary Distribution Summary

Particulars	Total (₹)	P (₹)	Q (₹)	R (₹)
Allocated and Apportioned over-heads as per primary distribution		29,450.00	21,275.00	30,275.00
X	11,202.00	5,040.90	1,680.30	3,360.60
Y	14,520.20	5,082.07	3,630.05	4,356.06
Total		39,572.97	26,585.35	37,991.66

(ii) Calculation of Overhead recovery rate per hour

	P (Rs.)	Q (Rs.)	R (Rs.)
Total overheads cost	39,572.97	26,585.35	37,991.66
Working hours	13,191	7,598	14,995
Rate per hour (Rs.)	3	3.50	2.53

(iii) Cost of Product A

	(Rs.)
Direct material	65.00
Direct labour	40.00
Prime cost	105.00
Production on overheads	
P 6 hours x Rs. 3 = Rs. 18	
Q 5 hours x Rs. 3.50 = Rs. 17.50	
R 2 hours x Rs. 2.53 = Rs. 5.06	40.56
Total cost	145.56

Note: Secondary Distribution can also be done using repeated distribution Method



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Question 3

(a) ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020 :

(i)	Fixed Overhead Cost Variance	Rs. 2,800 (Adverse)
(ii)	Fixed Overhead Volume Variance	Rs. 2,000 (Adverse)
(iii)	Budgeted Hours for June, 2020	2,400 hours
(iv)	Budgeted Overheads for June,2020	Rs. 12,000
(v)	Actual rate of recovery of overheads	Rs. 8 Per Hour

From the above given information

Calculate:

- (1) Fixed Overhead Expenditure Variance
- (2) Actual Overheads Incurred
- (3) Actual Hours for Actual Production
- (4) Fixed Overhead Capacity Variance
- (5) Standard hours for Actual Production
- (6) Fixed Overhead Efficiency Variance (10 Marks)

(b) An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is Rs. 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs Rs. 50.

At present, the order size is 3,000 spare parts.

(Assume that number of days in a year = 360 days)

Find out:

- (i) How much the company's cost would be saved by opting EOQ model?
- (ii) The Re-order point under EOQ model if lead time is 12 days.
- (iii) How frequently should orders for procurement be placed under EOQ model? (10 Marks)

Answer

(a) (1) Fixed Overhead Expenditure Variance

= Budgeted Fixed Overheads – Actual Fixed Overheads

= Rs. 12,000 – Rs. 12,800 (as calculated below) = Rs. **800 (A)**

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(2) Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads
2,800 (A) = Rs. 10,000 – Actual Overheads
Actual Overheads = Rs. **12,800**

(3) Actual Hours for Actual Production = Rs. 12,800/ Rs.8 = **1,600 hrs.**

(4) Fixed Overhead capacity Variance

= Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Overheads
= Rs. 5 x 1600 hrs. – Rs. 12,000 = Rs. **4,000 (A)**

(5) Standard Hours for Actual Production

= Absorbed Overheads/ Std. Rate
= Rs. 10,000/ Rs. 5 = **2,000 hrs.**

(6) Fixed Overhead Efficiency Variance

= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours
= Rs. 10,000 – Rs. 5 x 1,600 hrs. = Rs. **2,000 (F)**

Working Note:

(i) Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads
2,000 (A) = Absorbed Fixed Overheads – Rs.12,000
Absorbed Fixed Overheads = Rs. 10,000
(ii) Standard Rate/ Hour = Rs. 5 (Rs. 12,000/2,400 hrs.)

(b) Working Notes:

Annual requirement (A) = 27,000 units
Cost per order (O) = Rs. 240
Inventory carrying cost (i) = 12.5%
Cost per unit of spare (c) = Rs. 50
Carrying cost per unit (i x c) = Rs. 50 x 12.5% = Rs. **6.25**

$$\begin{aligned} \text{Economic Order Quantity (EOQ)} &= \sqrt{\frac{2 \times A \times O}{i \times c}} \\ &= \sqrt{\frac{2 \times 27,000 \times 240}{6.25}} = 1440 \text{ units} \end{aligned}$$

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(i) Calculation of saving by opting EOQ:

	Existing Order policy	EOQ Model
No. of orders	9 $\left(\frac{27,000}{3,000}\right)$	18.75 or 19 $\left(\frac{27,000}{1,440}\right)$
A. Ordering Cost (₹)	2,160 (₹ 240 × 9)	4,500 $\left\{ ₹ 240 \times \left(\frac{27,000}{1,440}\right) \right\}$
B. Carrying cost (₹)	9,375 $\left(\frac{3,000 \times ₹ 6.25}{2}\right)$	4,500 $\left(\frac{1,440 \times ₹ 6.25}{2}\right)$
Total cost (A+B) (₹)	11,535	9,000

Savings of Cost by opting EOQ Model = Rs. 11,535 – Rs. 9,000 = Rs. 2,535

(ii) Re-order point under EOQ:

Re-order point/ Re-order level = Maximum consumption × Maximum lead time

$$\text{Consumption per day} = \frac{27,000 \text{ units}}{360 \text{ days}} = 75 \text{ units}$$

Re-order point/ Re-order level = 75 units × 12 days = **900 units**

(iii) Frequency of Orders (in days):

$$\frac{360 \text{ days}}{\text{No. of orders a year}} = \frac{360 \text{ days}}{19} = 18.95 \text{ days or } 19 \text{ days}$$

Question 4

(a) Following details are related to the work done in Process-I by ABC Ltd. during the month of May 2019 :

	(Rs.)
Opening work in process (3,000 units)	
Materials	1,80,500
Labour	32,400
Overheads	90,000
Materials introduced in Process-I (42,000 units)	36,04,000
Labour	4,50,000
Overheads	15,18,000

Units Scrapped : 4,800 units

Degree of completion :

Materials : 100%

Labour & overhead : 70%



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Closing Work-in-process : 4,200 units

Degree of completion :

Materials : 100%

Labour & overhead : 50%

Units finished and transferred to Process-II : 36,000 units

Normal loss:

4% of total input including opening work-in-process

Scrapped units fetch Rs. 62.50 per piece.

Prepare:

(i) Statement of equivalent production.

(ii) Statement of cost per equivalent unit.

(iii) Process-I A/c

(iv) Normal Loss Account and

(v) Abnormal Loss Account (10 Marks)

ANSWER

(a) (i) Statement of Equivalent Production (Weighted Average method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	3,000	Completed and transferred to Process-II	36,000	100	36,000	100	36,000
Units introduced	42,000	Normal Loss (4% of 45,000 units)	1,800	--	--	--	--
		Abnormal loss (Balancing figure)	3,000	100	3,000	70	2,100
		Closing WIP	4,200	100	4,200	50	2,100
	45,000		45,000		43,200		40,200

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(ii) Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	1,80,500	32,400	90,000	3,02,900
Cost incurred during the month	36,04,000	4,50,000	15,18,000	55,72,000
Less: Realisable Value of normal scrap (₹ 62.50 × 1,800 units)	(1,12,500)	--	--	(1,12,500)
Total cost: (A)	36,72,000	4,82,400	16,08,000	57,62,400
Equivalent units: (B)	43,200	40,200	40,200	
Cost per equivalent unit: (C) = (A ÷ B)	85.00	12.00	40.00	137.00

Statement of Distribution of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred: (36,000 units × ₹ 137)		49,32,000
2. Value of Abnormal Loss:		
- Materials (3,000 units × ₹ 85)	2,55,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	3,64,200
3. Value of Closing W-I-P:		
- Materials (4,200 units × ₹ 85)	3,57,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	4,66,200

(iii) Process-I A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To			Opening W.I.P:		
- Materials	3,000	1,80,500	By Normal Loss (Rs. 62.5 × 1,800 units)	1,800	1,12,500
- Labour	--	32,400			
- Overheads	--	90,000			
To Material introduced s	42,000	36,04,000	By Abnormal loss	3,000	3,64,200
To Labour		4,50,000	By Process-I A/c	36,000	49,32,000
To Overheads		15,18,000	By Closing WIP	4,200	4,66,200
	45,000	58,74,900		45,000	58,74,900

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(iv) Normal Loss A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process-I A/c	1,800	1,12,500	By Cost Ledger Control A/c	1,800	1,12,500
	1,800	1,12,500		1,800	1,12,500

v) Abnormal Loss A/c

Particulars	Units	(Rs.)	Particulars	Units	(Rs.)
To Process-I A/c	3,000	3,64,200	By Cost Ledger Control A/c (Rs. 62.5 × 3,000 units)	3,000	1,87,500
			By Costing Profit & Loss A/c (Bal. Figure)		1,76,700
	3,000	3,64,200		3,000	3,64,200

(b) Following are the particulars of two workers 'R' and 'S' for a month:

Particulars	R	S
(i) Basic Wages (Rs.)	15,000	30,000
(ii) Dearness Allowance	50%	50%
(iii) Contribution to EPF (on basic wages)	7%	7.5%
(iv) Contribution to ESI (on basic wages)	2%	2%
(v) Overtime (hours)	20	-

The normal working hours for the month are 200 hrs. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to State Insurance and Provident Fund are at equal rates with employees' contributions.

Both workers were employed on jobs A, B and C in the following proportions :

Jobs	A	B	C
R	75%	10%	15%
S	40%	20%	40%

Overtime was done on job 'A'.

You are required to :

- Calculate ordinary wage rate per hour of 'R' and 'S'.
- Allocate the worker's cost to each job 'A', 'B' and 'C'. (6 Marks)

Answer

i) Calculation of Net Wages paid to Worker 'R' and 'S'

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Particulars	R (Rs.)	S (Rs.)
Basic Wages	15,000.00	30,000.00
Dearness Allowance (DA) (50% of Basic Wages)	7,500.00	15,000.00
Overtime Wages (Refer to Working Note 1)	4,500.00	----
Gross Wages earned	27,000.00	45,000.00
Less: Provident Fund (7% × Rs. 15,000); (7.5% × Rs. 30,000)	(1,050.00)	(2,250.00)
Less: ESI (2% × Rs. 15,000); (2% × Rs. 30,000)	(300.00)	(600.00)
Net Wages paid	25,650.00	42,150.00

Calculation of ordinary wage rate per hour of Worker 'R' and 'S'

	R (Rs.)	S (Rs.)
Gross Wages (Basic Wages + DA) (excluding overtime)	22,500.00	45,000.00
Employer's contribution to P.F. and E.S.I.	1,350.00	2,850.00
	23,850.00	47,850.00
Ordinary wages Labour Rate per hour (Rs. 23,850 ÷ 200 hours); (Rs. 47,850 ÷ 200 hours)	119.25	239.25

(ii) Statement Showing Allocation of workers cost to each Job

	Total Wages	Jobs		
		A	B	C
Worker R				
Ordinary Wages (15:2:3)	23,850.00	17,887.50	2,385.00	3,577.50
Overtime	4,500.00	4,500.00	-	--
Worker S				
Ordinary Wages (2:1:2)	47,850.00	19,140.00	9,570.00	19,140.00
	76,200.00	41,527.50	11,955.00	22,717.50

Working Note:

Normal Wages are considered as basic wages.

$$\begin{aligned}
 \text{Over time} &= \frac{2 \times (\text{Basic wage} + \text{D.A.}) \times 20 \text{ hour}}{200 \text{ hours}} \\
 &= 2 \times \frac{\text{₹}22,500}{200} \times 20 \text{ hours} \\
 &= \text{₹}4,500
 \end{aligned}$$



(c) Discuss any four objectives of 'Time keeping' in relation to attendance and payroll procedures. (4 Marks)
ANSWER

The objectives of time-keeping in relation to attendance and payroll procedures are as follows:

- (i) For the preparation of payrolls.
- (ii) For calculating overtime.
- (iii) For ascertaining and controlling employee cost.
- (iv) For ascertaining idle time.
- (v) For disciplinary purposes.
- (vi) For overhead distribution

Question 5

(a) SEZ Ltd. built a 120 km. long highway and now operates a toll road to collect tolls. The company has invested Rs. 900 crore to build the road and has estimated that a total of 120 crore vehicles will be using the highway during the 10 years toll collection tenure. The other costs for the month of "June 2020" are as follows:

(i) Salary:

- Collection personnel (3 shifts and 5 persons per shift) - Rs. 200 per day per person.
- Supervisor (3 shifts and 2 persons per shift) - Rs. 350 per day per person.
- Security personnel (2 shifts and 2 persons per shift) - Rs. 200 per day per person.
- Toll Booth Manager (3 shifts and 1 person per shift) - Rs. 500 per day per person.

(ii) Electricity - Rs. 1,50,000

(iii) Telephone - Rs. 1,00,000

(iv) Maintenance cost - Rs. 50 lakhs

(v) The company needs 30% profit over total cost.

Required:

- (1) Calculate cost per kilometre.
- (2) Calculate the toll rate per vehicle. (10 Marks)

ANSWER



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(a) Statement of Cost

Particulars	(₹)
A. Apportionment of capital cost $\left(\frac{₹ 900 \text{ crore}}{10 \text{ years}} \times \frac{1}{12 \text{ months}} \right)$	7,50,00,000
B. Other Costs	
Salary to Collection Personnel (3 Shifts × 5 persons per shift × 30 days × ₹ 200 per day)	90,000
Salary to Supervisor (3 Shifts × 2 persons per shift × 30 days × ₹ 350 per day)	63,000
Salary to Security Personnel (2 Shifts × 2 persons per shift × 30 days × ₹ 200 per day)	24,000
Salary to Toll Booth Manager (3 Shifts × 1 person per shift × 30 days × ₹ 500 per day)	45,000
Electricity	1,50,000
Telephone	1,00,000
	4,72,000
C. Maintenance cost	50,00,000
Total (A + B + C)	8,04,72,000

(1) Calculation of cost per kilometre:

$$= \frac{\text{Total Cost}}{\text{Total km.}} = \frac{₹ 8,04,72,000}{120 \text{ km.}} = ₹ 6,70,600$$

(2) Calculation of toll rate per vehicle:

$$= \frac{\text{Total Cost} + 25\% \text{ profit}}{\text{Vehicles per month}} = \frac{₹ 8,04,72,000 + ₹ 2,41,41,600}{1,00,00,000 \text{ vehicles}} = ₹ 10.46$$

Working:

$$\begin{aligned} \text{Vehicles per month} &= \frac{\text{Total estimated vehicles}}{10 \text{ years}} \times \frac{1 \text{ month}}{12 \text{ months}} \\ &= \frac{120 \text{ crore}}{10 \text{ years}} \times \frac{1 \text{ month}}{12 \text{ months}} = 1 \text{ Crore vehicles} \end{aligned}$$



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(b) ABC Ltd. is engaged in production of three types of Fruit Juices: Apple, Orange and Mixed Fruit.

The following cost data for the month of March 2020 are as under

Particulars	Apple	Orange	Mixed Fruit
Units produced and sold	10,000	15,000	20,000
Material per unit (Rs.)	8	6	5
Direct Labour per unit (Rs.)	5	4	3
No. of Purchase Orders	34	32	14
No. of Deliveries	110	64	52
Shelf Stocking Hours	110	160	170

Overheads incurred by the company during the month are as under :

	(Rs.)
Ordering costs	64,000
Delivery costs	1,58,200
Shelf Stocking costs	87,560

Required:

(i) Calculate cost driver's rate.

(ii) Calculate total cost of each product using Activity Based Costing. (6 Marks)

ANSWER

(i) Calculation Cost-Driver's rate

Activity	Overhead cost (Rs.)	Cost-driver level	Cost driver rate (Rs.)
(A)	(B)	(C) = (A)/(B)	
Ordering	64,000	34 + 32 + 14 = 80 no. of purchase orders	800
Delivery	1,58,200	110 + 64 + 52 = 226 no. of deliveries	700
Shelf stocking	87,560	110 + 160 + 170 = 440 shelf stocking hours	199

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(ii) Calculation of total cost of products using Activity Based Costing

Particulars	Fruit Juices		
	Apple (₹)	Orange (₹)	Mixed Fruit (₹)
Material cost	80,000 (10,000 x ₹ 8)	90,000 (15,000 x ₹ 6)	1,00,000 (20,000 x ₹ 5)
Direct labour cost	50,000 (10,000 x ₹ 5)	60,000 (15,000 x ₹ 4)	60,000 (20,000 x ₹ 3)
Prime Cost (A)	1,30,000	1,50,000	1,60,000
Ordering cost	27,200 (800 x 34)	25,600 (800 x 32)	11,200 (800 x 14)
Delivery cost	77,000 (700 x 110)	44,800 (700 x 64)	36,400 (700 x 52)
Shelf stocking cost	21,890 (199 x 110)	31,840 (199 x 160)	33,830 (199 x 170)
Overhead Cost (B)	1,26,090	1,02,240	81,430
Total Cost (A + B)	2,56,090	2,52,240	2,41,430

Question 6

Answer any four of the following:

(a) Differentiate between "Cost Accounting and Management Accounting".

ANSWER

(a) Difference between Cost Accounting and Management Accounting

	Basis	Cost Accounting	Management Accounting
(i)	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
(ii)	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
(iii)	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
(iv)	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
(v)	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
(vi)	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.



(b) What are the important points an organization should consider if it wants to adopt Performance Budgeting?

ANSWER

For an enterprise that wants to adopt Performance Budgeting, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal constraints.
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralised responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets

(c) Explain what are the pre-requisites of integrated accounting.

ANSWER

The essential pre-requisites for integrated accounts include the following steps:

- The management's decision about the extent of integration of the two sets of books. Some concerns find it useful to integrate up to the stage of prime cost or factory cost while other prefer full integration of the entire accounting records.
- A suitable coding system must be made available so as to serve the accounting purposes of financial and cost accounts.
- An agreed routine, with regard to the treatment of provision for accruals, prepaid expenses, other adjustment necessary for preparation of interim accounts.
- Perfect coordination should exist between the staff responsible for the financial and cost aspects of the accounts and an efficient processing of accounting documents should be ensured.
- Under this system there is no need for a separate cost ledger. Of course, there will be a number of subsidiary ledgers; in addition to the useful Customers' Ledger and the Bought Ledger, there will be: (a) Stores Ledger; (b) Stock Ledger and (c) Job Ledger

(d) State the Method of Costing to be used in the following industries:

(i) Real Estate

(ii) Motor repairing workshop

(iii) Chemical Industry

(iv) Transport service

(v) Assembly of bicycles

(vi) Biscuits manufacturing Industry

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(vii) Power supply Companies

(viii) Car manufacturing Industry

(ix) Cement Industry

(x) Printing Press

ANSWER

Method of costing used in different industries:

S. No.	Industries	Method of Costing
(i)	Real Estate	Contract Costing
(ii)	Motor Repairing Workshop	Job Costing
(iii)	Chemical Industry	Process Costing
(iv)	Transport Service	Service/Operating Costing
(v)	Assembly of Bicycles	Unit/ Single/Output/Multiple Costing
(vi)	Biscuits Manufacturing Industry	Batch Costing
(vii)	Power Supply Companies	Service/Operating Costing
(viii)	Car Manufacturing Industry	Multiple Costing
(ix)	Cement Industry	Unit/Single/Output Costing
(x)	Printing Press	Job Costing

(e) Differentiate between "Marginal and Absorption Costing". (4 x 5 = 20 Marks)

Answer

S. No.	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio.	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.
3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production.	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.



PAST EXAM- JAN 2021

Question 1

Answer the following:

(a) During a particular period ABC Ltd has furnished the following data:

Sales Rs. 10,00,000

Contribution to sales ratio 37% and

Margin of safety is 25% of sales.

A decrease in selling price and decrease in the fixed cost could change the "contribution to sales ratio" to 30% and "margin of safety" to 40% of the revised sales. Calculate:

(i) Revised Fixed Cost.

(ii) Revised Sales and

(iii) New Break-Even Point.

ANSWER

(a) Contribution to sales ratio (P/V ratio) = 37%

Variable cost ratio = 100% - 37% = 63%

Variable cost = Rs. 10,00,000 x 63% = Rs. 6,30,000

After decrease in selling price and fixed cost, sales quantity has not changed. Thus, variable cost is Rs. 6,30,000.

Revised Contribution to sales = 30%

Thus, Variable cost ratio = 100% - 30% = 70%

Thus, Revised sales = 6,30,000 / 70%

= Rs. 9,00,000

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety) = 60%

(i) **Revised fixed cost** = revised breakeven sales x revised contribution to sales ratio

= Rs. 5,40,000 (Rs. 9,00,000 x 60%) x 30%

= Rs. 1,62,000

(ii) **Revised sales** = Rs. 9,00,000 (as calculated above)

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(iii) **Revised Break-even point** = Revised sales x Revised break-even sales ratio
 = Rs. 9,00,000 x 60%
 = Rs. 5,40,000

(b) A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to Rs. 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator	208
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20
Normal unavoidable idle time-hours per operator	10
Average rate of wages per day of 8 hours per operator	Rs. 100
Production bonus estimated 10% on wages	
Power consumed	Rs. 40,250
Supervision and Indirect Labour	Rs. 16,500
Lighting and Electricity	Rs. 6,000

The following particulars are given for a year:

Insurance	Rs. 3,60,000
Sundry work Expenses	Rs. 50,000
Management Expenses allocated	Rs. 5,00,000
Depreciation 10% on the original cost	
Repairs and Maintenance (including consumables): 5% of the value of all the machines.	

Prepare a statement showing the comprehensive machine hour rate for the machine shop.

ANSWER
Workings:

Particulars	Six months 6 operators (Hours)
Normal available hours per month (208 x 6 months x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours (A)	7,380
Less: Leave hours (20 x 6 operators)	(120)
Less: Normal idle time (10 x 6 operators)	(60)
Effective working hours	7,200

Computation of Comprehensive Machine Hour Rate

Particulars	Amount for six months (₹)
Operators' wages (7,380/8 x100)	92,250
Production bonus (10% on wages)	9,225
Power consumed	40,250
Supervision and indirect labour	16,500
Lighting and Electricity	6,000
Repair and maintenance $\{(5\% \times ₹ 32,00,000)/2\}$	80,000
Insurance (₹ 3,60,000/2)	1,80,000
Depreciation $\{(₹ 32,00,000 \times 10\%)/2\}$	1,60,000
Sundry Work expenses (₹ 50,000/2)	25,000
Management expenses (₹ 5,00,000/2)	2,50,000
Total Overheads for 6 months	8,59,225
Comprehensive Machine Hour Rate = ₹ 8,59,225/7,200 hours	₹ 119.33

(Note: Machine hour rate may be calculated alternatively. Further, presentation of figures may also be done on monthly or annual basis.)

(c) MNO Ltd has provided following details:

- ☑ Opening work in progress is 10,000 units at Rs. 50,000 (Material 100%, Labour and overheads 70% complete).
 - ☑ Input of materials is 55,000 units at Rs. 2,20,000. Amount spent on Labour and Overheads is Rs. 26,500 and Rs. 61,500 respectively.
 - ☑ 9,500 units were scrapped; degree of completion for material 100% and for labour & overheads 60%.
 - ☑ Closing work in progress is 12,000 units; degree of completion for material 100% and for labour & overheads 90%.
 - ☑ Finished units transferred to next process are 43,500 units.
- Normal loss is 5% of total input including opening work in progress. Scrapped units would fetch Rs. 8.50 per unit.

You are required to prepare using FIFO method:

- (i) Statement of Equivalent production
- (ii) Abnormal Loss Account

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ANSWER**(i) Statement of Equivalent Production (Using FIFO method)**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	10,000	Completed and transferred to Process-II					
Units introduced	55,000	- From opening WIP	10,000	-		30	3,000
		- From fresh inputs	33,500	100	33,500	100	33,500
			43,500		33,500		36,500
		Normal Loss {5% (10,000 + 55,000 units)}	3,250	-			-
		Abnormal loss (9,500 - 3,250)	6,250	100	6,250	60	3,750
		Closing WIP	12,000	100	12,000	90	10,800
	65,000		65,000		51,750		51,050

(ii) Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c (Refer Working Note-2)	6,250	29,698	By Cost Ledger Control A/c (6,250 units × ₹ 8.5)	6,250	53,125
To Costing Profit & Loss A/c	-	23,427			
	6,250	53,125		6,250	53,125

Working Notes:**1. Computation of Cost per unit**

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)
Input costs	2,20,000	26,500	61,500
Less: Realisable value of normal scrap (3,250 units × ₹ 8.5)	(27,625)	--	--
Net cost	1,92,375	26,500	61,500
Equivalent Units	51,750	51,050	51,050
Cost Per Unit	3.7174	0.5191	1.2047

Total cost per unit = Rs. (3.7174 + 0.5191 + 1.2047) = Rs. 5.4412



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2. Valuation of Abnormal Loss

	(₹)
Materials (6,250 units × ₹ 3.7174)	23,233.75
Labour (3,750 units × ₹ 0.5191)	1,946.63
Overheads (3,750 units × ₹ 1.2047)	4,517.62
	29,698

(d) GHI Ltd. manufactures 'Stent' that is used by hospitals in heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 40 Million 'Stents' in the coming year. GHI Ltd. is expected to have a market share of 2.5% of the total market demand of the Stents in the coming year. It is estimated that it costs Rs. 1.50 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is Rs. 225.

Required:

(i) What would be the optimum run size for Stent manufacture?

(ii) What is the minimum inventory holding cost?

(iii) Assuming that the company has a policy of manufacturing 4,000 stents per run, how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above? (4 x 5 = 20 Marks)

ANSWER

(i) Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the Stents

$$= 4,00,00,000 \times 2.5\% = 10,00,000 \text{ units}$$

S = Set-up cost per run

$$= \text{Rs. } 225$$

C = Carrying cost per unit per annum

$$= \text{Rs. } 1.50 \times 12 = \text{Rs. } 18$$

$$\text{EBQ} = \sqrt{\frac{2 \times 10,00,000 \times \text{₹ } 225}{\text{₹ } 18}}$$

5,000 units of Stents

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(ii) Minimum inventory holding cost

Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum

$$= (5,000 \div 2) \times \text{Rs. } 18$$

$$= \text{Rs. } 45,000$$

(iii) Calculation of the extra cost due to manufacturing policy

	When run size is 4,000 units	When run size is 5,000 units i.e. at EBQ
Total set up cost	$= \frac{10,00,000}{4,000} \times \text{₹ } 225$ = ₹ 56,250	$\frac{10,00,000}{5,000} \times \text{₹ } 225$ = ₹ 45,000
Total Carrying cost	$\frac{1}{2} \times 4,000 \times \text{₹ } 18$ = ₹ 36,000	$\frac{1}{2} \times 5,000 \times \text{₹ } 18$ = ₹ 45,000
Total Cost	₹ 92,250	₹ 90,000

Extra cost = Rs. 92,250 - Rs. 90,000 = Rs. **2,250**

Question 2

(a) Z Ltd is working by employing 50 skilled workers. It is considering the introduction of an incentive scheme - either Halsey Scheme (with 50% Bonus) or Rowan Scheme - of wage payment for increasing the labour productivity to adjust with the increasing demand for its products by 40%. The company feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and the company has accordingly given assurance to the workers. Because of this assurance, an increase in productivity has been observed as revealed by the figures for the month of April, 2020:

Hourly rate of wages (guaranteed) Rs. 50

Average time for producing one unit by one worker at the previous performance (this may be taken as time allowed) 1.975 hours

Number of working days in a month 24

Number of working hours per day of each worker 8

Actual production during the month 6,120 units

Required:

(i) Calculate the effective increase in earnings of workers in percentage terms under Halsey and Rowan scheme.

(ii) Calculate the savings to Z Ltd in terms of direct labour cost per unit under both the schemes.

(iii) Advise Z Ltd about the selection of the scheme that would fulfil its assurance of incentivising workers and also to adjust with the increase in demand. (10 Marks)

ANSWER**(a) Working Notes:**

1. Total time wages of 50 workers per month:
 = No. of working days in the month × No. of working hours per day of each worker
 × Hourly rate of wages × No. of workers
 = 24 days × 8 hrs. × Rs. 50 × 50 workers = Rs. 4,80,000

2. Time saved per month:
 Time allowed per unit to a worker 1.975 hours
 No. of units produced during the month by 50 workers 6,120 units
 Total time allowed to produce 6,120 units (6,120 × 1.975 hrs) 12,087 hours
 Actual time taken to produce 6,120 units (24 days × 8 hrs. × 50 workers) 9,600 hours
 Time saved (12,087 hours – 9,600 hours) 2,487 hours

3. Bonus under Halsey scheme to be paid to 50 workers:
 Bonus = (50% of time saved) × hourly rate of wages
 = 50/100 × 2,487 hours × Rs. 50 = Rs. 62,175

Total wages to be paid to 50 workers are (Rs. 4,80,000 + Rs. 62,175) Rs. 5,42,175, if Z Ltd. considers the introduction of Halsey Incentive Scheme to increase the worker productivity.

4. Bonus under Rowan Scheme to be paid to 50 workers:

$$\begin{aligned} \text{Bonus} &= \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{hourly rate} \\ &= \frac{9,600 \text{ hours}}{12,087 \text{ hours}} \times 2,487 \text{ hours} \times ₹ 50 = ₹ 98,764 \end{aligned}$$

Total wages to be paid to 50 workers are (Rs. 4,80,000 + Rs. 98,764) Rs. 5,78,764, if Z Ltd. considers the introduction of Rowan Incentive Scheme to increase the worker productivity.

(i) (a) Effective hourly rate of earnings under Halsey scheme:
 (Refer to Working Notes 1, 2 and 3)

(Refer to Working Notes 1, 2 and 3)

$$\begin{aligned} &= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Halsey scheme}}{\text{Total hours worked}} \\ &= \frac{₹ 4,80,000 + ₹ 62,175}{9,600 \text{ hours}} = ₹ 56.48 \end{aligned}$$

$$\text{Effective increase in earnings of worker (in \%)} = \frac{₹ 56.48 - ₹ 50}{₹ 50} \times 100 = 2.96\%$$



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(b) Effective hourly rate of earnings under Rowan scheme:

(Refer to Working Notes 1, 2 and 4)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Rowan scheme}}{\text{Total hours worked}}$$

$$= \frac{\text{₹ 4,80,000} + \text{₹ 96,875}}{9,600 \text{ hours}} = \text{₹ 60.29}$$

$$\text{Effective increase in earnings of worker (in \%)} = \frac{\text{₹ 60.29} - \text{₹ 50}}{\text{₹ 50}} \times 100 = 20.58\%$$

(ii) (a) Saving in terms of direct labour cost per unit under Halsey scheme:

(Refer to Working Note 3)

Labour cost per unit (under time wage scheme)

$$= 1.975 \text{ hours} \times \text{Rs. } 50 = \text{Rs. } 98.75$$

Labour cost per unit (under Halsey scheme)

$$= \frac{\text{Total wages paid under the scheme}}{\text{Total number of units produced}} = \frac{\text{₹ 5,42,175}}{6,120} = \text{₹ 88.60}$$

$$\text{Saving per unit} = \text{Rs. } 98.75 - \text{Rs. } 88.60 = \text{Rs. } 10.15$$

(b) Saving in terms of direct worker cost per unit under Rowan Scheme:

(Refer to Working Note 4)

$$\text{Labour cost per unit under Rowan scheme} = \text{Rs. } 5,78,764 / 6,120 \text{ units} = \text{Rs. } 94.57$$

$$\text{Saving per unit} = \text{Rs. } 98.75 - \text{Rs. } 94.57 = \text{Rs. } 4.18$$

(iii) Calculation of Productivity:

Normal Production Hours worked/Unit per Hour (9,600/1.975)	4,861
Actual Production Units	6,120
Increase in labour productivity	1,259
% Productivity i.e. increase in production/Normal production	25.9%

Advice: Rowan plan fulfils the company's assurance of 20% increase over the present earnings of workers. This would increase productivity by 25.9% only. It will not adjust with the increase in demand by 40%.



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(b) The following data are available from the books and records of Q Ltd. for the month of April 2020:

Direct Labour Cost = Rs. 1,20,000 (120% of Factory Overheads)

Cost of Sales = Rs. 4,00,000

Sales = Rs. 5,00,000

Accounts show the following figures:

	1 st April, 2020 (₹)	30 th April, 2020 (₹)
<i>Inventory:</i>		
Raw material	20,000	25,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
<i>Other details:</i>		
Selling expenses		22,000
General & Admin. expenses		18,000

You are required to prepare a cost sheet for the month of April 2020 showing:

(i) Prime Cost

(ii) Works Cost

(iii) Cost of Production

(iv) Cost of Goods sold

(v) Cost of Sales and Profit earned. (10 Marks)

Answer

(b) Cost Sheet for the Month of April 2020

Particulars	(₹)
Opening stock of Raw Material	20,000
Add: Purchases [Refer Working Note-2]	1,65,000
Less: Closing stock of Raw Material	(25,000)
Raw material consumed	1,60,000
Add: Direct labour cost	1,20,000
Prime cost	2,80,000
Add: Factory overheads	1,00,000
Gross Works cost	3,80,000
Add: Opening work-in-progress	20,000
Less: Closing work-in-progress	(30,000)
Works Cost	3,70,000
Cost of Production	3,70,000
Add: Opening stock of finished goods	50,000
Less: Closing stock of finished goods	(60,000)
Cost of goods sold	3,60,000
Add: General and administration expenses*	18,000
Add: Selling expenses	22,000
Cost of sales	4,00,000
Profit {Balancing figure (₹ 5,00,000 – ₹ 4,00,000)}	1,00,000
Sales	5,00,000

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*General and administration expenses have been assumed as not relating to the production activity.

Working Note:
1. Computation of the raw material consumed

Particulars	(₹)
Cost of Sales	4,00,000
Less: General and administration expenses	(18,000)
Less: Selling expenses	(22,000)
Cost of goods sold	3,60,000
Add: Closing stock of finished goods	60,000
Less: Opening stock of finished goods	(50,000)
Cost of production/Gross works cost	3,70,000
Add: Closing stock of work-in-progress	30,000
Less: Opening stock of work-in-progress	(20,000)
Works cost	3,80,000
Less: Factory overheads $\left(\frac{₹ 1,20,000}{120} \times 100\right)$	(1,00,000)
Prime cost	2,80,000
Less: Direct labour	(1,20,000)
Raw material consumed	1,60,000

2. Computation of the raw material purchased

Particulars	(₹)
Closing stock of Raw Material	25,000
Add: Raw Material consumed	1,60,000
Less: Opening stock of Raw Material	(20,000)
Raw Material purchased	1,65,000

Question 3

(a) Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

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Assuming that the proposal is implemented, calculate:

- (i) Break-Even sales of the merged plant and the capacity utilization at that stage.
- (ii) Profitability of the merged plant at 80% capacity utilization.
- (iii) Sales Turnover of the merged plant to earn a profit of Rs. 60,00,000.
- (iv) When the merged plant is working at a capacity to earn a profit of Rs. 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads. (10 Marks)

ANSWER

(a) Workings:

1. Statement showing computation of Breakeven of merged plant and other required information

S. No.	Particulars	Plan A		Plant B		Merged Plant (100%) (₹)
		Before (90%) (₹)	After (100%) (₹)	Before (60%) (₹)	After (100%) (₹)	
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

$$2. \text{ PV ratio of merged plant} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{\text{₹ } 68,50,000}{\text{₹ } 1,50,00,000} \times 100 = 45.67 \%$$

$$(i) \text{ Break even sales of merged plant} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{\text{₹ } 28,00,000}{45.67\%}$$

$$= \text{₹ } 61,30,939.34 \text{ (approx.)}$$

$$\text{Capacity utilisation} = \frac{\text{₹ } 61,30,939.34}{\text{₹ } 1,50,00,000} \times 100 = 40.88\%$$

ii) Profitability of the merged plant at 80% capacity utilisation

$$= (\text{Rs. } 1,50,00,000 \times 80\%) \times \text{P/v ratio} - \text{fixed cost}$$

$$= \text{Rs. } 1,20,00,000 \times 45.67\% - \text{Rs. } 28,00,000$$

$$= \text{Rs. } 26,80,400$$

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(iii) Sales to earn a profit of Rs. 60,00,000

$$\begin{aligned} \text{Desired sales} &= \frac{\text{Fixed Cost} + \text{desired profit}}{\text{P/V Ratio}} \\ &= \frac{\text{₹ } 28,00,000 + \text{₹ } 60,00,000}{45.67\%} \\ &= \text{₹ } 1,92,68,666 \text{ (approx.)} \end{aligned}$$

(iv) Increase in fixed cost

$$= \text{₹ } 28,00,000 \times 5\% = \text{₹ } 1,40,000$$

Therefore, percentage increase in sales price

$$= \frac{\text{₹ } 1,40,000}{\text{₹ } 1,92,68,666} \times 100 = 0.726\% \text{ (approx.)}$$

(b) XYZ Ltd. is engaged in the manufacturing of toys. It can produce 4,20,000 toys at its 70% capacity on per annum basis. Company is in the process of determining sales price for the financial year 2020-21. It has provided the following information:

Direct Material Rs. 60 per unit

Direct Labour Rs. 30 per unit

Indirect Overheads:

Fixed Rs. 65,50,000 per annum

Variable Rs. 15 per unit

Semi-variable Rs. 5,00,000 per annum up to 60% capacity and Rs. 50,000 for every 5% increase in capacity or part thereof up to 80% capacity and thereafter Rs. 75,000 for every 10% increase in capacity or part thereof.

Company desires to earn a profit of Rs. 25,00,000 for the year. Company has planned that the factory will operate at 50% of capacity for first six months of the year and at 75% of capacity for further three months and for the balance three months, factory will operate at full capacity.

You are required to :

(1) Determine the average selling price at which each of the toy should be sold to earn the desired profit.

(2) Given the above scenario, advise whether company should accept an offer to sell each Toy at:

(a) Rs. 130 per Toy

(b) Rs. 129 per Toy (10 Marks)

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ANSWER**(b) (1) Statement of Cost**

	For first 6 months	For further 3 months	For remaining 3 months	Total
	6,00,000 x 6/12 x 50% = 1,50,000 units	6,00,000 x 3/12 x 75% = 1,12,500 units	6,00,000 x 3/12 = 1,50,000 units	4,12,500 units
Direct Material	90,00,000	67,50,000	90,00,000	2,47,50,000
Direct labour	45,00,000	33,75,000	45,00,000	1,23,75,000
Indirect – Variable Expenses	22,50,000	16,87,500	22,50,000	61,87,500
Indirect – Fixed Expenses	32,75,000	16,37,500	16,37,500	65,50,000
Indirect Semi-variable expenses				
- For first six months @ 5,00,000 per annum	2,50,000			
- For further three months @ 6,50,000* per annum		1,62,500		
- For further three months @ 8,50,000** per annum			2,12,500	6,25,000
Total Cost	1,92,75,000	1,36,12,500	1,76,00,000	5,04,87,500
Desired Profit				25,00,000
Sales value				5,29,87,500
Average Sales price per Toy				128.45

* Rs. 5,00,000+ [3 times (from 60% to 75%) x 50,000] = Rs. 6,50,000

** Rs. 6,50,000+ [1 time (from 75% to 80%) x 50,000] + [2 times (from 80% to 100%) x 75,000] = Rs. 8,50,000

(2) (a) Company Should accept the offer as it is above its targeted sales price of Rs. 128.45 per toy.

(b) Company Should accept the offer as it is above its targeted sales price of Rs. 128.45 per toy.

Question 4

(a) Mayura Chemicals Ltd buys a particular raw material at Rs. 8 per litre. At the end of the processing in Department- I, this raw material splits-off into products X, Y and Z. Product X is sold at the split-off point, with no further processing. Products Y and Z require further processing before they can be sold. Product Y is processed in Department-2, and Product Z is processed in Department-3. Following is a summary of the costs and other related data for the year 2019-20:



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Particulars	Department		
	1	2	3
Cost of Raw Material	₹ 4,80,000	-	-
Direct Labour	₹ 70,000	₹ 4,50,000	₹ 6,50,000
Manufacturing Overhead	₹ 48,000	₹ 2,10,000	₹ 4,50,000
	Products		
	X	Y	Z
Sales (litres)	10,000	15,000	22,500
Closing inventory (litres)	5,000	-	7,500
Sale price per litre (₹)	30	64	50

There were no opening and closing inventories of basic raw materials at the beginning as well as at the end of the year. All finished goods inventory in litres was complete as to processing. The company uses the Net-realizable value method of allocating joint costs.

You are required to prepare:

- (i) Schedule showing the allocation of joint costs.
- (ii) Calculate the Cost of goods sold of each product and the cost of each item in Inventory.
- (iii) A comparative statement of Gross profit. (10 Marks)

ANSWER

(a) (i) Statement of Joint Cost allocation of inventories of X, Y and Z

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Final sales value of total production (Working Note 1)	4,50,000 (15,000 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	15,00,000 (30,000 x ₹ 50)	29,10,000
Less: Additional cost	--	6,60,000	11,00,000	17,60,000
Net realisable value (at split-off point)	4,50,000	3,00,000	4,00,000	11,50,000
Joint cost allocated (Working Note 2)	2,34,000	1,56,000	2,08,000	5,98,000

(ii) Calculation of Cost of goods sold and Closing inventory



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	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Allocated joint cost	2,34,000	1,56,000	2,08,000	5,98,000
Add: Additional costs	--	6,60,000	11,00,000	17,60,000
Cost of goods sold (COGS)	2,34,000	8,16,000	13,08,000	23,58,000
Less: Cost of closing inventory (Working Note 1)	78,000 (COGS × 100/3%)	--	3,27,000 (COGS × 25%)	4,05,000
Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000

(iii) Comparative Statement of Gross Profit

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Sales revenue	3,00,000 (10,000 × ₹ 30)	9,60,000 (15,000 × ₹ 64)	11,25,000 (22,500 × ₹ 50)	23,85,000
Less: Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000
Gross Profit	1,44,000	1,44,000	1,44,000	4,32,000

Working Notes:

1. Total production of three products for the year 2019-2020

Products	Quantity sold in litres	Quantity of closing inventory in litres	Total production	Closing inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)]	(5) = (3) / (4)
X	10,000	5,000	15,000	100/3
Y	15,000	--	15,000	--
Z	22,500	7,500	30,000	25

2. Joint cost apportioned to each product:

$$= \frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

$$\text{Joint cost of product X} = \frac{₹ 5,98,000}{₹ 11,50,000} \times ₹ 4,50,000 = ₹ 2,34,000$$

$$\text{Joint cost of product Y} = \frac{₹ 5,98,000}{₹ 11,50,000} \times ₹ 3,00,000 = ₹ 1,56,000$$

$$\text{Joint cost of product Z} = \frac{₹ 5,98,000}{₹ 11,50,000} \times ₹ 4,00,000 = ₹ 2,08,000$$



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(b) ABC Ltd. manufactures three products X, Y and Z using the same plant and resources. It has given the following information for the year ended on 31st March, 2020:

	X	Y	Z
Production Quantity (units)	1200	1440	1968
Cost per unit:			
Direct Material (₹)	90	84	176
Direct Labour (₹)	18	20	30

Budgeted direct labour rate was Rs. 4 per hour and the production overheads, shown in table below, were absorbed to products using direct labour hour rate. Company followed Absorption Costing Method. However, the company is now considering adopting Activity Based Costing Method.

	Budgeted Overheads (₹)	Cost Driver	Remarks
Material Procurement	50,000	No. of orders	No. of orders was 25 units for each product.
Set-up	40,000	No. of production Runs	All the three products are produced in production runs of 48 units.
Quality Control	28,240	No. of Inspections	Done for each production run.
Maintenance	1,28,000	Maintenance hours	Total maintenance hours were 6,400 and was allocated in the ratio of 1:1:2 between X, Y & Z.

Required:

1. Calculate the total cost per unit of each product using the Absorption Costing Method.
2. Calculate the total cost per unit of each product using the Activity Based Costing Method. (10 Marks)

Answer

1. Traditional Absorption Costing

	X	Y	Z	Total
(a) Quantity (units)	1,200	1,440	1,968	4608
(b) Direct labour per unit (₹)	18	20	30	-
(c) Direct labour hours (a × b)/₹ 4	5,400	7,200	14,760	27,360

Overhead rate per direct labour hour:

$$= \text{Budgeted overheads} \div \text{Budgeted labour hours}$$

$$= (\text{Rs. } 50,000 + \text{Rs. } 40,000 + \text{Rs. } 28,240 + \text{Rs. } 1,28,000) \div 27,360 \text{ hours}$$

$$= \text{Rs. } 2,46,240 \div 27,360 \text{ hours}$$

$$= \text{Rs. } 9 \text{ per direct labour hour}$$

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Unit Costs:

	X	Y	Z
Direct Costs:			
- Direct Labour (₹)	18.00	20.00	30.00
- Direct Material (₹)	90.00	84.00	176.00
Production Overhead: (₹)	40.50	45.00	67.50
	$\left(\frac{9 \times 18}{4}\right)$	$\left(\frac{9 \times 20}{4}\right)$	$\left(\frac{9 \times 30}{4}\right)$
Total cost per unit (₹)	148.50	149.00	273.50

2. Calculation of Cost-Driver level under Activity Based Costing

	X	Y	Z	Total
Quantity (units)	1,200	1,440	1,968	-
No. of orders (to be rounded off for fraction)	48 (1200 / 25)	58 (1440 / 25)	79 (1968 / 25)	185
No. of production runs	25 (1200 / 48)	30 (1440 / 48)	41 (1968 / 48)	96
No. of Inspections (done for each production run)	25	30	41	96
Maintenance hours	1,600	1,600	3,200	6400

Calculation of Cost-Driver rate

Activity	Budgeted Cost (₹) (a)	Cost-driver level (b)	Cost Driver rate (₹) (c) = (a) / (b)
Material procurement	50,000	185	270.27
Set-up	40,000	96	416.67
Quality control	28,240	96	294.17
Maintenance	1,28,000	6,400	20.00

Calculation of total cost of products using Activity Based Costing

Particulars	Product		
	X (₹)	Y (₹)	Z (₹)
Direct Labour	18.00	20.00	30.00
Direct Material	90.00	84.00	176.00
Prime Cost per unit (A)	108.00	104.00	206.00
Material procurement	10.81 [(48 x 270.27)/1200]	10.89 [(58 x 270.27)/1440]	10.85 [(79 x 270.27)/1968]
Set-up	8.68 [(25 x 416.67)/1200]	8.68 [(30 x 416.67)/ 1440]	8.68 [(41 x 416.67)/ 1968]
Quality control	6.13 [(25 x 294.17)/1200]	6.13 [(30 x 294.17)/ 1440]	6.13 [(41 x 294.17)/ 1968]
Maintenance	26.67 [(1,600 x 20)/1200]	22.22 [(1,600 x 20)/ 1440]	32.52 [(3,200 x 20)/ 1968]

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Overhead Cost per unit (B)	52.29	47.92	58.18
Total Cost per unit (A + B)	160.29	151.92	264.18

Note: Question may also be solved assuming no. of orders for material procurement to be 25 for each product.

Question 5

(a) ABC Health care runs an Intensive Medical Care Unit. For this purpose, it has hired a building at a rent of Rs. 50,000 per month with the agreement to bear the repairs and maintenance charges also.

The unit consists of 100 beds and 5 more beds can comfortably be accommodated when the situation demands. Though the unit is open for patients all the 365 days in a year, scrutiny of accounts for the year 2020 reveals that only for 120 days in the year, the unit had the full capacity of 100 patients per day and for another 80 days, it had, on an average only 40 beds occupied per day. But, there were occasions when the beds were full, extra beds were hired at a charge of Rs. 50 per bed per day.

This did not come to more than 5 beds above the normal capacity on any one day. The total hire charges for the extra beds incurred for the whole year amounted to Rs. 20,000. The unit engaged expert doctors from outside to attend on the patients and the fees were paid on the basis of the number of patients attended and time spent by them which on an average worked out to Rs. 30,000 per month in the year 2020.

The permanent staff expenses and other expenses of the unit were as follows:

	₹
2 Supervisors each at a per month salary of	5,000
4 Nurses each at a per month salary of	3,000
2 Ward boys each at a per month salary of	1,500
Other Expenses for the year were as under:	
Repairs and Maintenance	28,000
Food supplied to patients	4,40,000
Caretaker and Other services for patients	1,25,000
Laundry charges for bed linen	1,40,000
Medicines supplied	2,80,000
Cost of Oxygen etc. other than directly borne for treatment of patients	75,000
General Administration Charges allocated to the unit	71,000

Required:

(i) What is the profit per patient day made by the unit in the year 2020, if the unit recovered an overall amount of Rs. 200 per day on an average from each patient.

(ii) The unit wants to work on a budget for the year 2021, but the number of patients requiring medical care is a very uncertain factor. Assuming that same revenue and expenses prevail in the year 2021 in the first instance, work out the number of patient days required by the unit to break even. (10 Marks)

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ANSWER**(a) Workings:****Calculation of number of Patient days**

100 Beds × 120 days = 12000

40 Beds × 80 days = 3,200

Extra beds = 400

Total = 15,600

(i) Statement of Profitability

Particulars	Amount (₹)	Amount (₹)
Income for the year (₹ 200 per patient per day × 15,600 patient days)		31,20,000
Variable Costs:		
Doctor Fees (₹ 30,000 per month × 12)	3,60,000	
Food to Patients (Variable)	4,40,000	
Caretaker Other services to patients (Variable)	1,25,000	
Laundry charges (Variable)	1,40,000	
Medicines (Variable)	2,80,000	
Bed Hire Charges (₹ 50 × 400 Beds)	20,000	
Total Variable costs		(13,65,000)
Contribution		17,55,000
Fixed Costs:		
Rent (₹ 50,000 per month × 12)	6,00,000	
Supervisor (2 persons × ₹ 5,000 × 12)	1,20,000	
Nurses (4 persons × ₹ 3,000 × 12)	1,44,000	
Ward Boys (2 persons × ₹ 1500 × 12)	36,000	
Repairs (Fixed)	28,000	
Cost of Oxygen	75,000	
Administration expenses allocated	71,000	
Total Fixed Costs		(10,74,000)
Profit		6,81,000

Calculation of Contribution and profit per Patient day

Total Contribution = Rs. 17,55,000

Total Patient days = 15,600 days

Contribution per Patient day = Rs. 17,55,000 / 15,600 days = Rs. 112.50

Total Profit = Rs. 6,81,000

Total Patient days = 15,600 days

Profit per Patient day = Rs. 6,81,000 / 15,600 days = Rs. 43.65



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(ii) **Breakeven Point** = Fixed Cost / Contribution per Patient day
 = Rs. 10,74,000 / Rs. 112.50
 = 9,547 patient days

(b) Premier Industries has a small factory where 52 workers are employed on an average for 25 days a month and they work 8 hours per day. The normal down time is 15%. The firm has introduced standard costing for cost control. Its monthly budget for November, 2020 shows that the budgeted variable and fixed overhead are Rs. 1,06,080 and Rs. 2,21,000 respectively.

The firm reports the following details of actual performance for November, 2020, after the end of the month:

Actual hours worked	8,100 hrs.
Actual production expressed in standard hours	8,800 hrs.
Actual Variable Overheads	₹ 1,02,000
Actual Fixed Overheads	₹ 2,00,000

You are required to calculate:

(i) **Variable Overhead Variances:**

(a) **Variable overhead expenditure variance.**

(b) **Variable overhead efficiency variance.**

ANSWER

(b) **Workings:**

Calculation of budgeted hours

Budgeted hours = (52 x 25 x 8) x 85% = 8,840 hours

(i) **Variable overheads variance**

(a) Variable overhead expenditure variance

= Std. overhead for Actual hours – Actual variable Overhead

$$= \left(\frac{₹ 1,06,080}{8,840} \times 8,100 \right) - ₹ 1,02,000$$

= 4800 A

(b) Variable overhead efficiency variance

Std. rate per hour × (Std. hours for actual production – Actual hours)

$$= \frac{₹ 1,06,080}{8,840} (8,800 \text{ hours} - 8,100 \text{ hours})$$

= 8400 F

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(ii) Fixed Overhead Variances:

(a) Fixed overhead budget variance.

(b) Fixed overhead capacity variance.

(c) Fixed overhead efficiency variance.

ANSWER

(a) Fixed overhead budget variance
 = Budgeted overhead – Actual overhead
 = Rs. 2,21,000 – Rs. 2,00,000
 = **21,000 F**

(b) Fixed overhead capacity variance
 = Std rate x (Actual hours – budgeted hours)
 = $\frac{₹ 2,21,000}{8,840} \times (8,100 - 8,840)$
 = **18,500 A**

(c) Fixed overhead efficiency variance
 = Std rate x (Std hours for actual production – Actual hours)
 = $\frac{₹ 2,21,000}{8,840} \times (8,800 - 8,100)$
 = **17,500 F**

(iii) Control Ratios:

(a) Capacity ratio.

(b) Efficiency ratio.

(c) Activity ratio. (10 Marks)

Answer



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(a) Capacity Ratio

$$= \frac{\text{Actual hours}}{\text{Budgeted hours}} \times 100$$

$$= \frac{8,100}{8,840} \times 100 = 91.63\%$$

(b) Efficiency Ratio

$$= \frac{\text{Standard hours}}{\text{Actual hours}} \times 100$$

$$= \frac{8,800}{8,100} \times 100 = 108.64\%$$

(c) Activity Ratio

$$= \frac{\text{Standard hours}}{\text{Budgeted hours}} \times 100$$

$$= \frac{8,800}{8,840} \times 100 = 99.55\%$$

Question 6**Answer any four of the following:****(a) State how the following items are treated in arriving at the value of cost of material purchased:****(i) Detention Charges/Fines****(ii) Demurrage****(iii) Cost of Returnable containers****(iv) Central Goods and Service Tax (CGST)****(v) Shortage due to abnormal reasons.****Answer****(a) Treatment of items in arriving at the value of cost of material Purchased**

S. No.	Items	Treatment
(i)	Detention charges/ Fine	Detention charges/ fines imposed for non-compliance of rule or law by any statutory authority. It is an abnormal cost and not included with cost of purchase.
(ii)	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase.
(iii)	Cost of returnable containers	Treatment of cost of returnable containers are as follows: Returnable Containers: If the containers are returned and their costs are refunded, then cost of containers should not be considered in the cost of purchase. If the amount of refund on returning the container is less than the amount paid, then, only the short fall is added with the cost of purchase.]



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(iv)	Central Goods and Service Tax (CGST)	Central Goods and Service Tax (CGST) is paid on manufacture and supply of goods and collected from the buyer. It is excluded from the cost of purchase if the input credit is available for the same. Unless mentioned specifically CGST is not added with the cost of purchase.
(v)	Shortage due to abnormal reasons	Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account.

(b) State the limitations of Budgetary Control System.

ANSWER

(b) Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralised organisation, each unit has its own objective and these units enjoy some degree of discretion. In this type of organisation structure, coordination among different units is required. The success of the budgetary control depends upon willing co-operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organisation structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.
5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organisation is exposed to various uncertain internal and external factors. Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.



(c) Explain Blanket Overhead Rate and Departmental Overhead Rate. How they are calculated? State the conditions required for the application of Blanket Overhead Rate.

ANSWER

Blanket Overhead Rate: Blanket overhead rate refers to the computation of one single overhead rate for the whole factory.

This overhead rate is computed as follows:

Blanket Rate = Total overheads for the factory / Total number of units of base for the factory

Departmental Overhead Rate: It refers to the computation of one single overhead rate for a particular production unit or department.

This overhead rate is determined by the following formula:

Departmental overhead Rate = Overheads of department or cost centre / Corresponding base

Conditions required for the Application of Blanket Overhead:

A blanket rate should be applied in the following cases:

- (1) Where only one major product is being produced.
- (2) Where several products are produced, but
 - (a) All products pass through all departments; and
 - (b) All products are processed for the same length of time in each department.

(d) State the method of costing that would be most suitable for:

- (i) Oil Refinery
- (ii) Interior Decoration
- (iii) Airlines Company
- (iv) Advertising
- (v) Car Assembly

ANSWER

Method of Costing

S.No.	Industry	Method of Costing
(i)	Oil Refinery	Process Costing
(ii)	Interior Decoration	Job Costing
(iii)	Airlines Company	Operation/ Service Costing
(iv)	Advertising	Job Costing
(v)	Car Assembly	Multiple Costing



(e) Give any five examples of the impact of use of Information Technology in Cost Accounting.

ANSWER

Example of Impact of Information Technology in cost accounting may include the following:

(i) After the introduction of ERPs, different functional activities get integrated and as a consequence a *single entry into the accounting system* provides custom made reports for every purpose and saves an organisation from preparing different sets of documents. Reconciliation process of results of both cost and financial accounting systems become simpler and less sophisticated.

(ii) A move towards *paperless environment* can be seen where documents like Bill of Material, Material Requisition Note, Goods Received Note, labour utilisation report etc. are no longer required to be prepared in multiple copies, the related department can get *e-copy* from the system.

(iii) Information Technology with the help of internet (including intranet and extranet) helping in resource procurement and mobilisation. For example, production department can get materials from the stores without issuing material requisition note physically. Similarly, purchase orders can be initiated to the suppliers with the help of extranet. This enables an entity to shift towards Just-in-Time (JIT) approach of inventory management and production.

(iv) Cost information for a cost centre or cost object is ascertained with accuracy in timely manner. Each cost centre and cost object is codified and all related costs are assigned to the cost objects or cost centres using assigned codes. This automates the cost accumulation and ascertainment process. *The cost information can be customised as per the requirement.* For example, when an entity manufacture or provide services, are able to know information job-wise, batch-wise, process-wise, cost centre wise etc.

(v) Uniformity in preparation of report, budgets and standards can be achieved with the help of IT. ERP software plays an important role in bringing uniformity irrespective of location, currency, language and regulations.

(vi) Cost and revenue variance reports are generated in *real time basis* which enables the management to take control measures immediately.

(vii) IT enables an entity to monitor and analyse each process of manufacturing or service activity closely to eliminate non value added activities.

RTP- MAY 2018**Material Cost**

1. Aditya Brothers supplies surgical gloves to nursing homes and polyclinics in the city. These surgical gloves are sold in pack of 10 pairs at price of Rs. 250 per pack.

For the month of April 2018, it has been anticipated that a demand for 60,000 packs of surgical gloves will arise. Aditya Brothers purchases these gloves from the manufacturer at Rs. 228 per pack within a 4 to 6 days lead time. The ordering and related cost is Rs. 240 per order. The storage cost is 10% p.a. of average inventory investment.

Required:

(i) CALCULATE the Economic Order Quantity (EOQ)

(ii) CALCULATE the number of orders needed every year

(iii) CALCULATE the total cost of ordering and storage of the surgical gloves.

(iv) DETERMINE when should the next order to be placed. (Assuming that the company does maintain a safety stock and that the present inventory level is 10,033 packs with a year of 360 working days).

ANSWER

(i) Calculation of Economic Order Quantity:

$$EOQ = \sqrt{\frac{2 \times A \times O}{C_i}} = \sqrt{\frac{2 \times (60,000 \text{ packs} \times 12 \text{ months}) \times ₹ 240}{₹ 228 \times 10\%}}$$

$$= 3,893.3 \text{ packs or } 3,893 \text{ packs.}$$

(ii) Number of orders per year

$$\frac{\text{Annual requirements}}{\text{E.O.Q}} = \frac{7,20,000 \text{ packs}}{3,893 \text{ packs}} = 184.9 \text{ or } 185 \text{ orders a year}$$

(iii) Ordering and storage costs

	(₹)
Ordering costs :- 185 orders × ₹ 240	44,400.00
Storage cost :- ½ (3,893 packs × 10% of ₹228)	44,380.20
Total cost of ordering & storage	88,780.20

(iv) Timing of next order

(a) Day's requirement served by each order.

$$\text{Number of days requirements} = \frac{\text{No. of working days}}{\text{No. of order in a year}} = \frac{360 \text{ days}}{185 \text{ orders}} = 1.94 \text{ days}$$

supply.

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This implies that each order of 3,893 packs supplies for requirements of 1.94 days only.

(b) Days requirement covered by inventory

$$= \frac{\text{Units in inventory}}{\text{Economic order quantity}} \times (\text{Day's requirement served by an order})$$

$$\therefore \frac{10,033 \text{ packs}}{3,893 \text{ packs}} \times 1.94 \text{ days} = 5 \text{ days requirement}$$

(c) Time interval for placing next order Inventory left for day's requirement – Average lead time of delivery 5 days – 5 days = 0 days This means that next order for the replenishment of supplies has to be placed immediately.

Employee Cost

2. Jyoti Ltd. wants to ascertain the profit lost during the year 2017-18 due to increased labour turnover. For this purpose, it has given you the following information:

(1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.

(2) 20% of the output during training period was defective. Cost of rectification of a defective unit was Rs. 25.

(3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.

(4) Selling price per unit is Rs. 180 and P/V ratio is 20%.

(5) Settlement cost of the workers leaving the organization was Rs. 1,83,480.

(6) Recruitment cost was Rs. 1,56,340

(7) Training cost was Rs. 1,13,180

Required:

CALCULATE the profit lost by the company due to increased labour turnover during the year 2017-18.

ANSWER

Output by experienced workers in 50,000 hours =

$$= 50,000 / 10$$

$$= 5,000 \text{ units}$$

Output by new recruits = 60% of 5,000 = 3,000 units Loss of output = 5,000 – 3,000 = 2,000 units Total loss of output

= Due to delay recruitment + Due to inexperience = 10,000 + 2,000 = 12,000 units Contribution per unit = 20% of

Rs.180 = Rs. 36 Total contribution lost = Rs.36 × 12,000 units = Rs. 4,32,000 Cost of repairing defective units = 3,000

$$\text{units} \times 0.2 \times \text{Rs. } 25 = \text{Rs. } 15,000$$

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Profit forgone due to labour turnover

	(₹)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2017-18	9,00,000

Overheads: Absorption Costing Method

3. PQR manufacturers – a small scale enterprise, produces a single product and has adopted a policy to recover the production overheads of the factory by adopting a single blanket rate based on machine hours. The annual budgeted production overheads for the year 2017-18 are Rs. 44,00,000 and budgeted annual machine hours are 2,20,000.

For a period of first six months of the financial year 2017-18, following information were extracted from the books:

Actual production overheads	Rs. 24,88,200
Amount included in the production overheads:	
Paid as per court's order	Rs. 1,28,000
Expenses of previous year booked in current year	Rs. 1,200
Paid to workers for strike period under an award	Rs. 44,000
Obsolete stores written off	Rs. 6,700

Production and sales data of the concern for the first six months are as under:

Production:	
Finished goods	24,000 units
Works-in-progress	
(50% complete in every respect)	18,000 units
Sale:	
Finished goods	21,600 units

The actual machine hours worked during the period were 1,16,000 hours. It is revealed from the analysis of information that $\frac{1}{4}$ of the under/ over absorption was due to defective production policies and the balance was attributable to increase/decrease in costs.

Required:

(i) DETERMINE the amount of under/over absorption of production overheads for the six-month period of 2017-18.

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- (ii) EXAMINE the accounting treatment of under/ over absorption of production overheads, and
- (iii) CALCULATE the apportionment of the under/ over absorbed overheads over the items.

ANSWER

(i) Amount of under/ over absorption of production overheads during the period of first six months of the year 2017-2018:

	Amount (₹)	Amount (₹)
Total production overheads actually incurred during the period		24,88,200
Less: Amount paid to worker as per court order	1,28,000	
Expenses of previous year booked in the current year	1,200	
Wages paid for the strike period under an award	44,000	
Obsolete stores written off	6,700	(1,79,900)
		23,08,300
Less: Production overheads absorbed as per machine hour rate (1,16,000 hours × ₹20*)		23,20,000
Amount of over absorbed production overheads		11,700

*Budgeted Machine hour rate (Blanket rate) = $44,00,000 / 2,20,000$ hours = 20 per hour

(ii) **Accounting treatment of over absorbed production overheads:** As, one fourth of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be transferred to Costing Profit and Loss Account.

Amount to be transferred to Costing Profit and Loss Account = $(11,700 \times \frac{1}{4}) = \text{Rs. } 2,925$

Balance of over absorbed production overheads should be distributed over Works in progress, finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = $(11,700 \times \frac{3}{4}) = \text{Rs. } 8,775$

Supplementary rate = $8,775 / 33,000$ units = 0.2659 per unit



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(iii) Apportionment of under absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (Rs.)
Work-in-Progress (18,000 units × 50% × Rs. 0.2659)	9,000	2,393
Finished goods (2,400 units × Rs. 0.2659)	2,400	638
Cost of sales (21,600 units × Rs. 0.2659)	21,600	5,744
Total	33,000	8,775

Activity Based Costing

4. G-2020 Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Product	Product	Product	
	A	B	C	
Direct Materials	50	40	40	₹/u
Direct Labour @ ₹ 10/ hour	30	40	50	₹/u
Production Overheads	30	40	50	₹/u
Total Cost	110	120	140	₹/u
Quantity Produced	10,000	20,000	30,000	Units

G-2020 Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (₹)
Stores Receiving	Purchase Requisitions	2,96,000
Inspection	Number of Production Runs	8,94,000
Dispatch	Orders Executed	2,10,000
Machine Setup	Number of Setups	12,00,000

The following information is also supplied:

Details	Product A	Product B	Product C
No. of Setups	360	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	750	1,050	1,200
No. of Purchase Requisitions	300	450	500

Required

CALCULATE activity based production cost of all the three products.



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ANSWER

The total production overheads are Rs.26,00,000:

Product A: 10,000 × Rs. 30 = Rs. 3,00,000

Product B: 20,000 × Rs. 40 = Rs. 8,00,000

Product C: 30,000 × Rs. 50 = Rs. 15,00,000

On the basis of ABC analysis this amount will be apportioned as follows:

Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)
Stores Receiving	Purchase Requisition	6:9:10	2,96,000	71,040	1,06,560	1,18,400
Inspection	Production Runs	5:7:8	8,94,000	2,23,500	3,12,900	3,57,600
Dispatch	Orders Executed	6:9:10	2,10,000	50,400	75,600	84,000
Machine Setups	Setups	12:13:15	12,00,000	3,60,000	3,90,000	4,50,000
Total Activity Cost				7,04,940	8,85,060	10,10,000
Quantity Produces				10,000	20,000	30,000
Unit Cost (Overheads)				70.49	44.25	33.67
<i>Add: Conversion Cost (Material + Labour)</i>				80	80	90
Total				150.49	124.25	123.67

Cost Sheet

5. From the following figures, CALCULATE cost of production and profit for the month of March 2018.

	Amount (₹)		Amount (₹)
Stock on 1 st March, 2018		Purchase of raw materials	28,57,000
- Raw materials	6,06,000	Sale of finished goods	1,34,00,000
- Finished goods	3,59,000	Direct wages	37,50,000
Stock on 31 st March, 2018		Factory expenses	21,25,000
- Raw materials	7,50,000	Office and administration expenses	10,34,000
- Finished goods	3,09,000	Selling and distribution expenses	7,50,000
Work-in-process:		Sale of scrap	26,000
- On 1 st March, 2018	12,56,000		
- On 31 st March, 2018	14,22,000		

ANSWER

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Calculation of Cost of Production and Profit for the month ended April 2018:

Particulars	Amount (Rs.)	Amount (Rs.)
Materials consumed:		
- Opening stock	6,06,000	
Add: Purchases	28,57,000	
	34,63,000	
- Less: Closing stock	(7,50,000)	27,13,000
Direct wages		37,50,000
Prime cost		64,63,000
Factory expenses		21,25,000
85,88,000		
Add: Opening W-I-P		12,56,000
Less: Closing W-I-P		(14,22,000)
Factory cost		84,22,000
Less: Sale of scrap		(26,000)
Cost of Production		83,96,000
Add: Opening stock of finished goods		6,06,000
Less: Closing stock of finished goods		(3,59,000)
Cost of Goods Sold		86,43,000
Office and administration expenses		10,34,000
Selling and distribution expenses		7,50,000
Cost of Sales		1,04,27,000
Profit (balancing figure)		29,73,000
Sales		1,34,00,000

Cost Accounting System

6. As of 31st March, 2018, the following balances existed in a firm's cost ledger, which is maintained separately on a double entry basis:

	Debit (₹)	Credit (₹)
Stores Ledger Control A/c	3,20,000	—
Work-in-process Control A/c	1,52,000	—
Finished Goods Control A/c	2,56,000	—
Manufacturing Overhead Control A/c	—	28,000
Cost Ledger Control A/c	—	7,00,000
	7,28,000	7,28,000

During the next quarter, the following items arose:



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	(₹)
Finished Product (at cost)	2,35,500
Manufacturing overhead incurred	91,000
Raw material purchased	1,36,000
Factory wages	48,000
Indirect labour	20,600
Cost of sales	1,68,000
Materials issued to production	1,26,000
Sales returned (at cost)	8,000
Materials returned to suppliers	11,000
Manufacturing overhead charged to production	86,000

Required:

PREPARE the Cost Ledger Control A/c, Stores Ledger Control A/c, Work-in-process Control A/c, Finished Stock Ledger Control A/c, Manufacturing Overhead Control A/c, Wages Control A/c, Cost of Sales A/c and the Trial Balance at the end of the quarter as per costing records.

ANSWER**Cost Ledger Control Account**

Particulars	(Rs.)	Particulars	(Rs.)
To Store Ledger Control A/c	11,000	By Opening Balance	7,00,000
To Balance c/d	9,84,600	By Store ledger control A/c	1,36,000
		By Manufacturing Overhead Control A/c	91,000
		By Wages Control A/c	68,600
	9,95,600		9,95,600

Stores Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Opening Balance	3,20,000	By WIP Control A/c	1,26,000
To Cost ledger control A/c	1,36,000	By Cost ledger control A/c (Returns)	11,000
		By Balance c/d	3,19,000
	4,56,000		4,56,000

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WIP Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Opening Balance	1,52,000	By Finished Stock Ledger Control A/c	2,35,500
To Wages Control A/c	48,000	By Balance c/d	1,76,500
To Stores Ledger Control A/c	1,26,000		
To Manufacturing Overhead Control A/c	86,000		
	4,12,000		4,12,000

Finished Stock Ledger Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Opening Balance	2,56,000	By Cost of Sales	1,68,000
To WIP Control A/c	2,35,500	By Balance c/d	3,31,500
To Cost of Sales A/c (Sales Return)	8,000		
	4,99,500		4,99,500

Manufacturing Overhead Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Cost Ledger Control A/c	91,000	By Opening Balance	28,000
To Wages Control A/c	20,600	By WIP Control A/c	86,000
To Over recovery c/d	2,400		
	1,14,000		1,14,000

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Wages Control Account

Particulars	(Rs.)	Particulars	(Rs.)
To Transfer to Cost Ledger Control A/c	68,600	By WIP Control A/c	48,000
		By Manufacturing Overhead Control A/c	20,600
	68,600		68,600

Cost of Sales Account

Particulars	(Rs.)	Particulars	(Rs.)
To Finished Stock Ledger Control A/c	1,68,000	By Finished Stock Ledger Control A/c (Sales return)	8,000
		By Balance c/d	1,60,000
	1,68,000		1,68,000

Trial Balance

	(Rs.)	(Rs.)
Stores Ledger Control A/c	3,19,000	
WIP Control A/c	1,76,500	
Finished Stock Ledger Control A/c	3,31,500	
Manufacturing Overhead Control A/c	--	2,400
Cost of Sales A/c	1,60,000	
Cost ledger control A/c	--	9,84,600
	9,87,000	9,87,000



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Batch Costing

7. Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake at least 50 units of any item at a time. A customer has given an order for 600 cakes. To process a batch, the following cost would be incurred:

Direct materials - Rs. 5,000

Direct wages - Rs. 500 (irrespective of units)

Oven set- up cost - Rs.750 (irrespective of units)

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads.

AC requires a profit margin of 25% of sales value.

Required:

- (i) DETERMINE the price to be charged for 600 cakes.
- (ii) CALCULATE cost and selling price per cake.
- (iii) DETERMINE what would be selling price per unit If the order is for 605 cakes.

ANSWER

Statement of cost per batch and per order

No. of batch = $600 \text{ units} \div 50 \text{ units} = 12 \text{ batches}$

Particulars	Cost per batch (Rs.)	Total Cost (Rs.)
Direct Material Cost	5,000.00	60,000
Direct Wages	500.00	6,000
Oven set-up cost	750.00	9,000
Add: Production Overheads (20% of Direct wages)	100.00	1,200
Total Production cost	6,350.00	76,200
Add: S&D and Administration overheads (10% of Total production cost)	635.00	7,620
Total Cost	6,985.00	83,820
Add: Profit (1/3rd of total cost)	2,328.33	27,940
(i) Sales price	9,313.33	1,11,760
No. of units in batch	50 units	
(ii) Cost per unit (Rs.6,985 ÷ 50 units)	139.70	
Selling price per unit (9,313.33 ÷ 50 units)	186.27	

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iii) If the order is for 605 cakes, then selling price per cake would be as below:

Particulars	Total Cost (Rs.)
Direct Material Cost	60,500
Direct Wages (Rs.500 × 13 batches)	6,500
Oven set-up cost (Rs.750 × 13 batches)	9,750
Add: Production Overheads (20% of Direct wages)	1,300
Total Production cost	78,050
Add: S&D and Administration overheads (10% of Total production cost)	7,805
Total Cost	85,855
Add: Profit (1/3 rd of total cost)	28,618
Sales price	1,14,473
No. of units	605 units
Selling price per unit (Rs.1,14,473 ÷ 605 units)	189.21

Job Costing

8. A factory uses job costing. The following data are obtained from its books for the year ended 31st March, 2018:

	Amount (Rs.)
Direct materials	9,00,000
Direct wages	7,50,000
Selling and distribution overheads	5,25,000
Administration overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

Required:

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2018-19, the factory received an order for a job. It is estimated that direct materials required will be Rs. 2,40,000 and direct labour will cost Rs. 1,50,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

ANSWER

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(i) Production Statement

For the year ended 31st March, 2018

	Amount (Rs.)
Direct materials	9,00,000
Direct wages	7,50,000
Prime Cost	16,50,000
Factory overheads	4,50,000
Cost of Production	21,00,000
Administration overheads	4,20,000
Selling and distribution overheads	5,25,000
Cost of Sales	30,45,000
Profit	6,09,000
Sales value	36,54,000

Calculation of Rates

- Percentage of factory overheads to direct wages = $\frac{₹4,50,000}{₹7,50,000} \times 100 = 60\%$
- Percentage of administration overheads to Cost of production
= $\frac{₹4,20,000}{₹21,00,000} \times 100 = 20\%$
- Selling and distribution overheads = ₹ 5,25,000 × 115% = ₹ 6,03,750
Selling and distribution overhead % to Cost of production
= $\frac{₹6,03,750}{₹21,00,000} \times 100 = 28.75\%$
- Percentage of profit to sales = $\frac{₹6,09,000}{₹36,54,000} \times 100 = 16.67\%$

(ii) Calculation of price for the job received in 2018-19

	Amount (Rs.)
Direct materials	2,40,000
Direct wages	1,50,000
Prime Cost	3,90,000
Factory overheads (60% of Rs.1,50,000)	90,000
Cost of Production	4,80,000
Administration overheads (20% of Rs.4,80,000)	96,000
Selling and distribution overheads (28.75% of Rs.4,80,000)	1,38,000
Cost of Sales	7,14,000
Profit (20% of Rs.7,14,000)	1,42,800
Sales value	8,56,800

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Process Costing

9. Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of paper containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- ☑ Opening work-in-process at the beginning of the month was 800 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at Rs. 26,640.
- ☑ Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- ☑ Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- ☑ Output sent to finished goods warehouse was 4,200 litres.
- ☑ Losses have a scrap value of Rs.15 per litre.
- ☑ All raw materials are added at the commencement of the process.
- ☑ The cost per equivalent unit (litre) is Rs.39 for the month made up as follows:

	(Rs.)
Raw Material	23
Labour	7
Overheads	9
	39

Required:

- (i) CALCULATE the quantity (in litres) of raw material inputs during the month.
- (ii) CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.
- (iii) CALCULATE the values of raw material, labour and overheads added to the process during the month.
- (iv) PREPARE the process account for the month.

ANSWER

- (i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	800	Transfer to Finished Goods	4,200
Raw material input (balancing figure)	5,360	Process Losses	1,800
		Closing WIP	160
	6,160		6,160

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(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,800
Normal Loss (10% input)	536
Abnormal Loss (balancing figure)	1,264

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	Rs.23.00	Rs.7.00	Rs.9.00
Equivalent units (litre) (refer the working note)	4,824	4,952	5,016
Cost of equivalent units	Rs.1,10,952	Rs.34,664	Rs.45,144
Add: Scrap value of normal loss (536 units × Rs. 15)	Rs.8,040	--	--
Total value added	Rs.1,18,992	Rs.34,664	Rs.45,144

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	800	Units completed:							
Units introduced	5,360	- Opening WIP	800	--	--	240	30	320	40
		- Fresh inputs	3,400	3,400	100	3,400	100	3,400	100
		Normal loss	536	--	--	--	--	--	--
		Abnormal loss	1,264	1,264	100	1,264	100	1,264	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,824		4,952		5,016	



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(iv) Process Account for Month

	Litres	Amount (Rs.)		Litres	Amount (Rs.)
To Opening WIP	800	26,640	By Finished goods	4,200	1,63,800
To Raw Materials	5,360	1,18,992	By Normal loss	536	8,040
To Wages	--	34,664	By Abnormal loss	1,264	49,296
To Overheads	--	45,144	By Closing WIP	160	4,304
	6,160	2,25,440		6,160	2,25,440

Joint Products & By Products

10. A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of Rs. 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of Rs. 1,80,000 and Rs. 1,50,000 respectively. X was further processed in Department 3 at a cost of Rs.1,08,000. There is no waste in further processing. The details of sales affected during the period were as under

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (Rs.)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been Rs. 50, Rs. 40 and Rs. 10 per kg respectively.

Required:

- PREPARE a statement showing the apportionment of joint costs to A, B and X.
- PREPARE a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.
- PREPARE a statement showing the product wise and total profit for the period.
- DECIDE with supporting calculations as to whether any or all the products should be further processed or not

ANSWER

(i) Statement showing the apportionment of joint costs to A, B and X

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (₹)	6,30,000 $\left(\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 9,00,000 \right)$	2,80,000 $\left(\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 4,00,000 \right)$	3,78,000 $\left(\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 5,40,000 \right)$	12,88,000

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(ii) Statement showing the cost per kg. of each product (indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (₹) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000
Joint cost per kg (₹): (I ÷ II)	35	28	7
Further processing Cost per kg. (₹)	10	15	2
	$\left(\frac{₹ 1,80,000}{18,000 \text{ kg}} \right)$	$\left(\frac{₹ 1,50,000}{10,000 \text{ kg}} \right)$	$\left(\frac{₹ 1,08,000}{54,000 \text{ kg}} \right)$
Total cost per kg (₹)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (Rs.)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (Rs.) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (Rs.)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (Rs.)	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (Rs.)	1,80,000	1,50,000	1,08,000	
Total cost (Rs.)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (Rs.)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

Products	A	B	X
Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹/kg	72	50	18
	$\left(\frac{₹ 12,24,000}{17,000 \text{ kg}} \right)$	$\left(\frac{₹ 2,50,000}{5,000 \text{ kg}} \right)$	$\left(\frac{₹ 7,92,000}{44,000 \text{ kg}} \right)$

2. Valuation of closing stock:

Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (Rs.)	45	43	9	
Closing stock value (Rs.)	45,000 (Rs. 45 x 1,000 kg)	2,15,000 (Rs. 43 x 5,000 kg)	90,000 (Rs. 9x10,000 kg)	3,50,000



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(iv) Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (Rs.)	50	40	10
Selling price per kg after further processing (Rs.) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (Rs.)	22	10	8
Less: Further processing cost per kg (Rs.)	(10)	(15)	(2)
Incremental profit (loss) per kg (Rs.)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point

Service Costing

11. AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

	Amount (Rs.)
Teachers' salary (15 teachers × Rs.35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × Rs.15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × Rs.10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
Office & Administration cost	15,20,000
Annual day expenses	4,50,000
Sports expenses	1,20,000

Other information:

(i)

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	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	-

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participates in annual functions and sports activities.

Required:

(i) CALCULATE cost per student per annum for all three streams.

(ii) If the management decides to take uniform fee of Rs. 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.

(iii) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

ANSWER

Calculation of Cost per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
R-apportionment of Economics & Mathematics teachers' salary (W.N- 2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

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(i) Calculation of cost per student per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(ii) Calculation of profitability

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(iii) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:

(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (Rs.)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091
	$\left(\frac{₹4,20,000}{1,040} \times 208 \right)$		$\left(\frac{₹4,20,000}{1,100} \times 160 \right)$	

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- (3) Principal's salary has been apportioned on the basis of time spent by him for administration of classes.
- (4) Lab attendants' salary has been apportioned on the basis of lab classes attended by the students.
- (5) Salary of library staffs are apportioned on the basis of time spent by the students in library.
- (6) Salary of Peons are apportioned on the basis of number of students. The peons' salary allocable to higher secondary classes is calculated as below:

	Amount (₹)
Peon dedicated for higher secondary	1,20,000
(1 peon × ₹10,000 × 12 months)	
Add: 15% of other peons' salary	54,000
{15% of (3 peons × ₹10,000 × 12 months)}	
	1,74,000

- (7) Salary to other staffs, office & administration cost, Annual day expenses and sports expenses are apportioned on the basis of number of students.
- (8) Examination Expenses has been apportion taking number of students and number examinations into account

Standard Costing

12. ABC Ltd. had prepared the following estimation for the month of April:

	Quantity	Rate (Rs.)	Amount (Rs.)
Material-A	800 kg.	45.00	36,000
Material-B	600 kg.	30.00	18,000
Skilled labour	1,000 hours	37.50	37,500
Unskilled labour	800 hours	22.00	17,600

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (Rs.)	Amount (Rs.)
Material-A	900 kg.	43.00	38,700
Material-B	650 kg.	32.50	21,125
Skilled labour	1,200 hours	35.50	42,600
Unskilled labour	860 hours	23.00	19,780

Required:

CALCULATE:

(i) Material Cost Variance;

(ii) Material Price Variance;

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(iii) Material Mix Variance;

(iv) Material Yield Variance;

(v) Labour Cost Variance;

(vi) Labour Efficiency Variance and

(vii) Labour Yield Variance.

ANSWER
Material Variances:

Material	SQ (WN-1)	SP (Rs.)	SQ × SP (Rs.)	RSQ (WN-2)	RSQ × SP (Rs.)	AQ	AQ × SP (Rs.)	AP (Rs.)	AQ × AP (Rs.)
A	940 kg.	45.00	42,300	886 kg.	39,870	900 kg.	40,500	43.00	38,700
B	705 kg.	30.00	21,150	664 kg.	19,920	650 kg.	19,500	32.50	21,125
	1645 kg		63,450	1550 kg	59,790	1550 kg	60,000		59,825

WN-1: Standard Quantity (SQ):

$$\text{Material A- } \left(\frac{800\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 939.68 \text{ or } 940 \text{ kg.}$$

$$\text{Material B- } \left(\frac{600\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} \right) = 704.76 \text{ or } 705 \text{ kg.}$$

WN- 2: Revised Standard Quantity (RSQ):

$$\text{Material A- } \left(\frac{800\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} \right) = 885.71 \text{ or } 886 \text{ kg.}$$

$$\text{Material B- } \left(\frac{600\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} \right) = 664.28 \text{ or } 664 \text{ kg.}$$

$$\begin{aligned} \text{(i) Material Cost Variance (A + B)} &= \{(SQ \times SP) - (AQ \times AP)\} \\ &= \{63,450 - 59,825\} = 3,625 \text{ (F)} \end{aligned}$$

$$\begin{aligned} \text{(ii) Material Price Variance (A + B)} &= \{(AQ \times SP) - (AQ \times AP)\} \\ &= \{60,000 - 59,825\} = 175 \text{ (F)} \end{aligned}$$

$$\begin{aligned} \text{(iii) Material Mix Variance (A + B)} &= \{(RSQ \times SP) - (AQ \times SP)\} \\ &= \{59,790 - 60,000\} = 210 \text{ (A)} \end{aligned}$$

$$\begin{aligned} \text{(iv) Material Yield Variance (A + B)} &= \{(SQ \times SP) - (RSQ \times SP)\} \\ &= \{63,450 - 59,790\} = 3,660 \text{ (F)} \end{aligned}$$



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Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	37.50	41,850	1144	42,900	1,200	45,000	35.50	42,600
Unskilled	893 hrs	22.00	19,646	916	20,152	860	18,920	23.00	19,780
	2,009 hrs		61,496	2,060	63,052	2,060	63,920		62,380

WN- 3: Standard Hours (SH):

$$\text{Skilled labour} - \left(\frac{0.95 \times 1,000 \text{ hr.}}{0.90 \times 1,400 \text{ kg.}} \times 1,480 \text{ kg.} \right) = 1,115.87 \text{ or } 1,116 \text{ hrs.}$$

$$\text{Unskilled labour} - \left(\frac{0.95 \times 800 \text{ hr.}}{0.90 \times 1,400 \text{ kg.}} \times 1,480 \text{ kg.} \right) = 892.69 \text{ or } 893 \text{ hrs.}$$

WN- 4: Revised Standard Hours (RSH):

$$\text{Skilled labour} - \left(\frac{1,000 \text{ hr.}}{1,800 \text{ hr.}} \times 2,060 \text{ hr.} \right) = 1,144.44 \text{ or } 1,144 \text{ hrs.}$$

$$\text{Unskilled labour} - \left(\frac{800 \text{ hr.}}{1,800 \text{ hr.}} \times 2,060 \text{ hr.} \right) = 915.56 \text{ or } 916 \text{ hrs.}$$

$$\begin{aligned} \text{(v) Labour Cost Variance (Skilled + Unskilled)} &= \{(SH \times SR) - (AH \times AR)\} \\ &= \{61,496 - 62,380\} = 884 \text{ (A)} \end{aligned}$$

$$\begin{aligned} \text{(vi) Labour Efficiency Variance (Skilled + Unskilled)} &= \{(SH \times SR) - (AH \times SR)\} \\ &= \{61,496 - 63,920\} = 2,424 \text{ (A)} \end{aligned}$$

$$\begin{aligned} \text{(vii) Labour Yield Variance (Skilled + Unskilled)} &= \{(SH \times SR) - (RSH \times SR)\} \\ &= \{61,496 - 63,052\} = 1,556 \text{ (A)} \end{aligned}$$

Marginal Costing

13. A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of Rs.15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

	A	B
Profit (Rs.)	1,50,000	30,000
Selling Price / unit (Rs.)	200	120
P/V Ratio (%)	40	50

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

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(i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by 7½ %.

(ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

(iii) Simultaneous introduction of both the option, viz, (i) and (ii) above.

ANSWER
Option (i)

Increase in profit when due to change in a manufacturing process there is reduction in joint fixed cost and increase in variable costs.

	(Rs.)
Revised Contribution from 12,000 units of A due to 7.5% increase in Variable Cost {12,000 units × (Rs.200 – Rs.129)}	8,52,000
Revised Contribution from 12,000 units of B due to 7.5% increase in Variable Cost {12,000 units × (Rs.120 – Rs.64.50)}	6,66,000
Total Revised Contribution	15,18,000
Less: Fixed Cost (Rs.15,00,000 – 15% × Rs.15,00,000)	12,75,000
Revised Profit	2,43,000
Less: Existing Profit	1,80,000
Increase in Profit	63,000

Option (ii)

Increase in profit when the price of product A increased by 20% and the price elasticity of its demand would be unity over the range of price.

	(Rs.)
Budgeted Revenue from Product A (12,000 units × Rs.200)	24,00,000
Revised Demand (in units) (Rs.24,00,000 / Rs.240)	10,000
Revised Contribution (in Rs.) [10,000 units × (Rs.240 – Rs.120)]	12,00,000
Less: Existing Contribution (12,000 units × Rs.80)	9,60,000
Increase in Profit (Contribution)	2,40,000

***Note:** Since Price Elasticity of Demand is 1, therefore the Revenue in respect of Products will remain same.

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Option (iii)

Increase in profit on the simultaneous introduction of above two options.

	(Rs.)
Revised Contribution from Product A [10,000 units × (Rs.240 – Rs.129)]	11,10,000
Revised Contribution from Product B [12,000 units × (Rs.120 – Rs.64.50)]	6,66,000
Total Revised Contribution	17,76,000
Less: Revised Fixed Cost	12,75,000
Revised Profit	5,01,000
Less: Existing Profit	1,80,000
Increase in Profit	3,21,000

A comparison of increase in profit figures under above three options clearly indicates that the option (iii) is the best as it increases the profit of the concern by Rs.3,21,000.

Note: The budgeted profit / (loss) for 2018 in respect of products A and B should be Rs. 2,10,000 and (Rs.30,000) respectively instead of Rs. 1,50,000 and Rs. 30,000.

Workings

- Contribution per unit of each product:

	Product	
	A (₹)	B (₹)
Contribution per unit (Sales × P/V Ratio)	80 (₹200 × 40%)	60 (₹120 × 50%)

- Number of units to be sold:

Total Contribution – Fixed Cost = Profit

Let x be the number of units of each product sold, therefore:

$(80x + 60x) - \text{Rs.}15,00,000 = \text{Rs.}1,50,000 + \text{Rs.}30,000$

Or $x = 12,000$ units

Budget and Budgetary Control

14. G Ltd. manufactures two products called 'M' and 'N'. Both products use a common raw material Z. The raw material Z is purchased @ Rs. 36 per kg from the market. The company has decided to review inventory management policies for the forthcoming year.

The following information has been extracted from departmental estimates for the year ended 31st March 2018 (the budget period):

	Product M	Product N
Sales (units)	28,000	13,000
Finished goods stock increase by year-end	320	160
Post-production rejection rate (%)	4	6
Material Z usage (per completed unit, net of wastage)	5 kg	6 kg
Material Z wastage (%)	10	5



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Additional information:

- Usage of raw material Z is expected to be at a constant rate over the period.
- Annual cost of holding one unit of raw material in stock is 11% of the material cost.
- The cost of placing an orders is Rs. 320 per order.
- The management of G Ltd. has decided that there should not be more than 40 orders in a year for the raw material Z.

Required:

(i) PREPARE functional budgets for the year ended 31st March 2018 under the following headings:

(a) Production budget for Products M and N (in units).

(b) Purchases budget for Material Z (in kgs and value).

(ii) CALCULATE the Economic Order Quantity for Material Z (in kgs).

(iii) If there is a sole supplier for the raw material Z in the market and the supplier do not sale more than 4,000 kg. of material Z at a time. Keeping the management purchase policy and production quantity mix into consideration,

CALCULATE the maximum number of units of Product M and N that could be produced.

ANSWER

(i) (a) Production Budget (in units) for the year ended 31st March 2016

	Product M	Product N
Budgeted sales (units)	28,000	13,000
Add: Increase in closing stock	320	160
No. good units to be produced	28,320	13,160
Post production rejection rate	4%	6%
No. of units to be produced	29,500	14,000
	$\left(\frac{28,320}{0.96} \right)$	$\left(\frac{13,160}{0.94} \right)$

(b) Purchase budget (in kgs and value) for Material Z

	Product M	Product N
No. of units to be produced	29,500	14,000
Usage of Material Z per unit of production	5 kg.	6 kg.
Material needed for production	1,47,500 kg.	84,000 kg.
Materials to be purchased	1,63,889 kg.	88,421 kg.
	$\left(\frac{1,47,500}{0.90} \right)$	$\left(\frac{84,000}{0.95} \right)$
Total quantity to be purchased	2,52,310 kg.	
Rate per kg. of Material Z	₹36	
Total purchase price	₹90,83,160	

(ii) Calculation of Economic Order Quantity for Material Z

$$EOQ = \sqrt{\frac{2 \times 2,52,310 \text{ kg.} \times ₹320}{₹36 \times 11\%}} = \sqrt{\frac{16,14,78,400}{₹3.96}} = 6,385.72 \text{ kg.}$$

(iii) Since, the maximum number of order per year can not be more than 40 orders and the maximum quantity per order that can be purchased is 4,000 kg. Hence, the total quantity of Material Z that can be available for production: = 4,000 kg. × 40 orders = 1,60,000 kg.

	Product M	Product N
Material needed for production to maintain the same production mix	1,03,929 kg. $\left(1,60,000 \times \frac{1,63,889}{2,52,310}\right)$	56,071 kg. $\left(1,60,000 \times \frac{88,421}{2,52,310}\right)$
Less: Process wastage	10,393 kg.	2,804 kg.
Net Material available for production	93,536 kg.	53,267 kg.
Units to be produced	18,707 units $\left(\frac{93,536 \text{ kg.}}{5 \text{ kg.}}\right)$	8,878 units $\left(\frac{53,267 \text{ kg.}}{6 \text{ kg.}}\right)$

Miscellaneous
15. (i) DISCUSS on (a) Discretionary Cost Centre and (b) Investment Centre
ANSWER

i) (a) Discretionary Cost Centre: The cost centre whose output cannot be measured in financial terms, thus input-output ratio cannot be defined. The cost of input is compared with allocated budget for the activity. Example of discretionary cost centres are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and co-related with cost incurred on inputs.

(b) Investment Centres: These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.

(ii) DESCRIBE the three advantages of Cost-plus contract.
ANSWER
(ii) Cost plus contracts have the following advantages:

- The Contractor is assured of a fixed percentage of profit. There is no risk of incurring any loss on the contract.
- It is useful specially when the work to be done is not definitely fixed at the time of making the estimate.
- Contractee can ensure himself about 'the cost of the contract', as he is empowered to examine the books and documents of the contractor to ascertain the veracity of the cost of the contract.

(iii) STATE the advantages of Zero-based budgeting.

ANSWER

The advantages of zero-based budgeting are as follows:

- ☑ It provides a systematic approach for the evaluation of different activities and rank them in order of preference for the allocation of scarce resources.
- ☑ It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
- ☑ It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.
- ☑ The areas of wasteful expenditure can be easily identified and eliminated.
- ☑ Departmental budgets are closely linked with corporation objectives.
- ☑ The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

iv) DESCRIBE Operation costing with two examples of industries where operation costing is applied.

ANSWER

This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. Which means conversion activities are similar for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batch wise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs.

The two example of industries are Ready made garments and Jewellery making.



RTP- JULY 2021

Material Cost

1. A Ltd. produces a product 'X' using a raw material 'D'. To produce one unit of X, 4 kg of D is required. As per the sales forecast conducted by the company, it will be able to sale 20,000 units of X in the coming year.

The following are the information related to the raw material D:

- (i) The Re-order quantity is 400 kg. less than the Economic Order Quantity (EOQ).
- (ii) Maximum consumption per day is 40 kg. more than the average consumption per day.
- (iii) There is an opening stock of 2,000 kg.
- (iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
- (v) The purchase price is Rs. 250 per kg.

There is an opening stock of 1,800 units of the finished product X.

The carrying cost of inventory is 14% p.a.

To place an order company has to incur Rs. 1,340 on paper and documentation work.
From the above information FIND OUT the followings in relation to raw material D:

- (a) Re-order Quantity
- (b) Maximum Stock level
- (c) Minimum Stock level
- (d) Calculate the impact on the profitability of the company by not ordering the EOQ.
[Take 300 days for a year]

ANSWER

Working Notes:

- (i) Computation of Annual consumption & Annual Demand for raw material 'D':



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Sales forecast of the product 'X'	20,000 units
Less: Opening stock of 'X'	1,800 units
Fresh units of 'X' to be produced	18,200 units
Raw material required to produce 18,200 units of 'X' (18,200 units × 4 kg.)	72,800 kg.
Less: Opening Stock of 'D'	2,000 kg.
Annual demand for raw material 'D'	70,800 kg.

(ii) Computation of Economic Order Quantity (EOQ):

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times \text{Annual demand of 'D'} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}} \\ &= \sqrt{\frac{2 \times 70,800 \text{ kg.} \times ₹ 1,340}{₹ 250 \times 14\%}} = \sqrt{\frac{2 \times 70,800 \text{ kg.} \times ₹ 1,340}{₹ 35}} = 2,328 \text{ kg.} \end{aligned}$$

(iii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

$$\begin{aligned} &= \left\{ \left(\frac{\text{Annual Consumption of 'D'}}{300 \text{ days}} + 40 \text{ kg.} \right) \times 8 \text{ days} \right\} \\ &= \left\{ \left(\frac{70,800 \text{ kg.}}{300 \text{ days}} + 40 \text{ kg.} \right) \times 8 \text{ days} \right\} = 2,208 \text{ kg.} \end{aligned}$$

(iv) Minimum consumption per day of raw material 'D':

Average Consumption per day = 236 Kg.

Hence, Maximum Consumption per day = 236 kg. + 40 kg. = 276 kg.

So Minimum consumption per day will be

$$\begin{aligned} \text{Average Consumption} &= \frac{\text{Min. consumption} + \text{Max. consumption}}{2} \\ \text{Or, } 236 \text{ kg.} &= \frac{\text{Min. consumption} + 276 \text{ kg.}}{2} \\ \text{Or, Min. consumption} &= 472 \text{ kg} - 276 \text{ kg.} = 196 \text{ kg.} \end{aligned}$$

(a) Re-order Quantity :

EOQ – 400 kg. = 2,328 kg. – 400 kg. = 1,928 kg.

(b) Maximum Stock level:

= Re-order level + Re-order Quantity – (Min. consumption per day × Min. lead time)

= 2,208 kg. + 1,928 kg. – (196 kg. × 4 days) = 4,136 kg. – 784 kg. = 3,352 kg.

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(c) Minimum Stock level:

= Re-order level – (Average consumption per day × Average lead time)
 = 2,208 kg. – (236 kg. × 6 days) = 792 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

	When purchasing the ROQ	When purchasing the EOQ
I Order quantity	1,928 kg.	2,328 kg.
II No. of orders a year	$\frac{70,800 \text{ kg.}}{1,928 \text{ kg.}} = 36.72$ or 37 orders	$\frac{70,800 \text{ kg.}}{2,328 \text{ kg.}} = 30.41$ or 31 orders
III Ordering Cost	37 orders × ₹ 1,340 = ₹ 49,580	31 orders × ₹ 1,340 = ₹ 41,540
IV Average Inventory	$\frac{1,928 \text{ kg.}}{2} = 964 \text{ kg.}$	$\frac{2,328 \text{ kg.}}{2} = 1,164 \text{ kg.}$
V Carrying Cost	964 kg. × ₹ 35 = ₹ 33,740	1,164 kg. × ₹ 35 = ₹ 40,740
VI Total Cost	₹ 83,320	₹ 82,280

Extra Cost incurred due to not ordering EOQ = Rs. 83,320 - Rs. 82,280 = Rs. 1,040

Employee Cost

2. JBL Sisters operates a boutique which works for various fashion houses and retail stores. It has employed 26 workers and pays them on time rate basis. On an average an employee is allowed 8 hours for boutique work on a piece of garment. In the month of December 2020, two workers M and J were given 15 pieces and 21 pieces of garments respectively for boutique work. The following are the details of their work:

	M	J
Work assigned	15 pcs.	21 pcs.
Time taken	100 hours	140 hours

Workers are paid bonus as per Halsey System. The existing rate of wages is Rs. 60 per hour. As per the new wages agreement the workers will be paid Rs. 72 per hour w.e.f. 1st January 2021. At the end of the month December 2020, the accountant of the company has wrongly calculated wages to these two workers taking Rs. 72 per hour.

Required:

- (i) CALCULATE the loss incurred due to incorrect rate selection.
- (ii) CALCULATE the loss incurred due to incorrect rate selection, had Rowan scheme of bonus payment followed.
- (iii) CALCULATE the loss/ savings if Rowan scheme of bonus payment had followed.
- (iv) DISCUSS the suitability of Rowan scheme of bonus payment for JBL Sisters?



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ANSWER

Workings Notes:

Calculation of Total hours saved:

	M	J
No. of garments assigned (Pieces.)	15	21
Hour allowed per piece (Hours)	8	8
Total hours allowed (Hours)	120	168
Hours Taken (Hours)	100	140
Hours Saved (Hours)	20	28

(i) Calculation of loss incurred due to incorrect rate selection:

(While calculating loss only excess rate per hour has been taken)

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Halsey Scheme) (50% of Time Saved × Excess Rate)	120 (50% of 20 Hrs. × ₹12)	168 (50% of 28 Hrs. × ₹12)	288
Excess Wages Paid	1,320	1,848	3,168

(ii) Calculation of loss incurred due to incorrect rate selection had Rowan scheme of bonus payment followed:

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Rowan Scheme) $\left(\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Excess Rate} \right)$	200 $\left(\frac{100}{120} \times 20 \times ₹12 \right)$	280 $\left(\frac{140}{168} \times 28 \times ₹12 \right)$	480
Excess Wages Paid	1,400	1,960	3,360

(iii) Calculation of amount that could have been saved if Rowan Scheme were followed

	M (₹)	J (₹)	Total (₹)
Wages paid under Halsey Scheme	1,320	1,848	3,168
Wages paid under Rowan Scheme	1,400	1,960	3,360
Difference (loss)	(80)	(112)	(192)

(iv) Rowan Scheme of incentive payment has the following benefits, which is suitable with the nature of business in which JBL Sisters operates:

(a) Under Rowan Scheme of bonus payment, workers cannot increase their earnings or bonus by merely increasing its work speed. Bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.

(b) If the rate setting department commits any mistake in setting standards for time to be taken to complete the works, the loss incurred will be relatively low.

Overheads: Absorption Costing Method

3. A manufacturing unit has purchased and installed a new machine at a cost of Rs. 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realise Rs. 90,000 as scrap value at the end of its working life.

Other relevant data are as follows:

(i) Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set-up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.

(ii) An estimated cost of maintenance of the machine is Rs. 2,40,000 p.a.

(iii) The machine requires a component to be replaced every week at a cost of Rs. 2,400.

(iv) There are three operators to control the operations of all the 6 machines. Each operator is paid Rs. 30,000 per month plus 20% fringe benefits.

(v) Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is Rs. 6.

(vi) Departmental and general works overhead allocated to the operation during last year was Rs. 5,00,000. During the current year it is estimated to increase by 10%.

Required:

COMPUTE the machine hour rate.

ANSWER

Working Note:

1. Effective machine hour:
 = Budgeted working hours – Machine Set-up time
 = 2,496 hours – 312 hours = 2,184 hours.



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2. Operators' salary per annum:

Salary (3 operators × ₹30,000 × 12 months)	₹ 10,80,000
Add: Fringe benefits (20% of ₹10,80,000)	₹ 2,16,000
	₹ 12,96,000

3. Depreciation per annum

$$\frac{\text{₹}24,90,000 - \text{₹}90,000}{12 \text{ years}} = \text{₹}2,00,000$$

Computation of Machine hour Rate

	Amount p.a. (₹)	Amount per hour (₹)
<u>Standing charges</u>		
Operators' Salary $\left(\frac{\text{₹}12,96,000}{6 \text{ machines}} \times \frac{1}{2,184 \text{ hours}} \right)$	12,96,000	98.90
Departmental and general overheads: (₹ 5,00,000 × 110%) $\left(\frac{\text{₹}5,50,000}{6 \text{ machines}} \times \frac{1}{2,184 \text{ hours}} \right)$	5,50,000	41.97
(A)	18,46,000	140.87
<u>Machine Expenses</u>		
Depreciation $\left(\frac{\text{₹}2,00,000}{2,184 \text{ hours}} \right)$	2,00,000	91.58
Electricity:		
During working hours (2,496 hours × 60 units × ₹6)	8,98,560	411.43
During maintenance hours (416 hours × 10 units × ₹6)	24,960	11.43
Component replacement cost (2,400 × 52 weeks)	1,24,800	57.14
Machine maintenance cost	2,40,000	109.89
(B)	14,88,320	681.47
Machine Hour Rate (A + B)		822.34

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Activity Based Costing

4. The following budgeted information relates to N Ltd. for the year 2021:

	Products		
	X	Y	Z
Production and Sales (units)	1,00,000	80,000	60,000
	(₹)	(₹)	(₹)
Selling price per unit	90	180	140
Direct cost per unit	50	90	95
	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

The estimated overhead expenses for the year 2021 will be as below:

Machine Department Rs. 73,60,000

Assembly Department Rs. 55,00,000

Overhead expenses are apportioned to the products on the following basis:

Machine Department On the basis of machine hours

Assembly Department On the basis of labour hours

After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (Rs.)	Cost Driver	Quantity
Machining services	64,40,000	Machine hours	9,20,000 hours
Assembly services	44,00,000	Direct labour hours	11,00,000 hours
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups
Order processing	7,20,000	Customer orders	7,200 orders
Purchasing	4,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to PREPARE a product-wise profit statement using:

(i) Absorption costing method;

(ii) Activity-based method.

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ANSWER**(i) Profit Statement using Absorption costing method:**

	Particulars	Product			Total
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B.	Selling price per unit (₹)	90	180	140	
C.	Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
D.	Direct cost per unit (₹)	50	90	95	
E.	Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F.	Overheads:				
(i)	Machine department (₹) (Working note-1)	24,00,000	25,60,000	24,00,000	73,60,000
(ii)	Assembly department (₹) (Working note-1)	30,00,000	16,00,000	9,00,000	55,00,000
G.	Total Cost (₹) [E+F]	1,04,00,000	1,13,60,000	90,00,000	3,07,60,000
H.	Profit (C-G)	(14,00,000)	30,40,000	(6,00,000)	10,40,000

(ii) Profit Statement using Activity based costing (ABC) method:

	Particulars	Product			Total
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	
B.	Selling price per unit (₹)	90	180	140	
C.	Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
D.	Direct cost per unit (₹)	50	90	95	
E.	Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F.	Overheads: (Refer working note-3)				
(i)	Machining services (₹)	21,00,000	22,40,000	21,00,000	64,40,000
(ii)	Assembly services (₹)	24,00,000	12,80,000	7,20,000	44,00,000
(iii)	Set-up costs (₹)	4,50,000	3,00,000	1,50,000	9,00,000
(iv)	Order processing (₹)	2,20,000	2,40,000	2,60,000	7,20,000
(v)	Purchasing (₹)	1,50,000	1,75,000	75,000	4,00,000
G.	Total Cost (₹) [E+F]	1,03,20,000	1,14,35,000	90,05,000	3,07,60,000
H.	Profit (₹) (C-G)	(13,20,000)	29,65,000	(6,05,000)	10,40,000



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Working Notes:

1.

		Products			Total
		X	Y	Z	
A.	Production (units)	1,00,000	80,000	60,000	
B.	Machine hours per unit	3	4	5	
C.	Total Machine hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D.	Rate per hour (₹)	8	8	8	
E.	Machine Dept. cost [C×D]	24,00,000	25,60,000	24,00,000	73,60,000
F.	Labour hours per unit	6	4	3	
G.	Total labour hours [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
H.	Rate per hour (₹)	5	5	5	
I.	Assembly Dept. cost [G×H]	30,00,000	16,00,000	9,00,000	55,00,000

$$\text{Machine hour rate} = \frac{\text{₹73,60,000}}{9,20,000 \text{ hours}} = \text{₹ 8}$$

$$\text{Labour hour rate} = \frac{\text{₹55,00,000}}{11,00,000 \text{ hours}} = \text{₹ 5}$$

2. Calculation of cost driver rate

Cost Pool	Amount (₹)	Cost Driver	Quantity	Driver rate (₹)
Machining services	64,40,000	Machine hours	9,20,000 hours	7.00
Assembly services	44,00,000	Direct labour hours	11,00,000 hours	4.00
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups	100.00
Order processing	7,20,000	Customer orders	7,200 orders	100.00
Purchasing	4,00,000	Purchase orders	800 orders	500.00

3. Calculation of activity-wise cost

		Products			Total
		X	Y	Z	
A.	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B.	Machine hour rate (₹) (Refer Working note-2)	7	7	7	
C.	Machining services cost (₹) [A×B]	21,00,000	22,40,000	21,00,000	64,40,000



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D.	Labour hours (Refer Working note-1)	6,00,000	3,20,000	1,80,000	11,00,000
E.	Labour hour rate (₹) (Refer Working note-2)	4	4	4	
F.	Assembly services cost (₹) [D×E]	24,00,000	12,80,000	7,20,000	44,00,000
G.	Machine set-ups	4,500	3,000	1,500	9,000
H.	Rate per set-up (₹) (Refer Working note-2)	100	100	100	
I.	Set-up cost (₹) [G×H]	4,50,000	3,00,000	1,50,000	9,00,000
J.	Customer orders	2,200	2,400	2,600	7,200
K.	Rate per order (₹) (Refer Working note-2)	100	100	100	
L.	Order processing cost (₹) [J×K]	2,20,000	2,40,000	2,60,000	7,20,000
M.	Purchase orders	300	350	150	800
N.	Rate per order (₹) (Refer Working note-2)	500	500	500	
O.	Purchasing cost (₹) [M×N]	1,50,000	1,75,000	75,000	4,00,000

Cost Sheet

5. RTA Ltd. has the following expenditures for the year ended 31st December, 2020:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	Freight inward		9,20,600
(iii)	Wages paid to factory workers		25,20,000
(iv)	Royalty paid for production		1,80,000
(v)	Amount paid for power & fuel		3,50,000
(vi)	Job charges paid to job workers		3,10,000
(vii)	Stores and spares consumed		1,10,000
(viii)	Depreciation on office building		50,000
(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	40,000	
	- Sales office building	20,000	60,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	28,200	
	- Factory building	18,800	47,000
(xi)	Expenses paid for quality control check activities		18,000
(xii)	Research & development cost paid for improvement in production process		20,000
(xiii)	Expenses paid for pollution control and engineering & maintenance		36,000
(xiv)	Salary paid to Sales & Marketing managers		5,60,000
(xv)	Salary paid to General Manager		6,40,000
(xvi)	Packing cost paid for:		

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	- Primary packing necessary to maintain quality	46,000	
	- For re-distribution of finished goods	80,000	1,26,000
(xvii)	Fee paid to independent directors		1,20,000
(xviii)	Performance bonus paid to sales staffs		1,20,000
(xix)	Value of stock as on 1 st January, 2020:		
	- Raw materials	10,00,000	
	- Work-in-process	8,60,000	
	- Finished goods	12,00,000	30,60,000
(xx)	Value of stock as on 31 st December, 2020:		
	- Raw materials	8,40,000	
	- Work-in-process	6,60,000	
	- Finished goods	10,50,000	25,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – Rs. 48,000/-
 From the above data you are requested to PREPARE Statement of Cost for RTA Ltd. for the year ended 31st December, 2020, showing

- (i) Prime cost,
- (ii) Factory cost,
- (iii) Cost of Production,
- (iv) Cost of goods sold and
- (v) Cost of sales.

ANSWER

Statement of Cost of RTA Ltd. for the year ended 31st December, 2020:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	5,00,00,000	
	- Freight inward	9,20,600	
	Add: Opening stock of raw materials	10,00,000	
	Less: Closing stock of raw materials	(8,40,000)	5,10,80,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		25,20,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,80,000	
	- Amount paid for power & fuel	3,50,000	
	- Job charges paid to job workers	3,10,000	8,40,000

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	Prime Cost		5,44,40,600
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,10,000	
	- Repairs & Maintenance paid for plant & machinery	40,000	
	- Insurance premium paid for plant & machinery	28,200	
	- Insurance premium paid for factory building	18,800	
	- Expenses paid for pollution control and engineering & maintenance	36,000	2,33,000
	Gross factory cost		5,46,73,600
	Add: Opening value of W-I-P		8,60,000
	Less: Closing value of W-I-P		(6,60,000)
	Factory Cost		5,48,73,600
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		18,000
(vi)	Research & development cost paid for improvement in production process		20,000
(vii)	Less: Realisable value on sale of scrap and waste		(48,000)
(viii)	Add: Primary packing cost		46,000
	Cost of Production		5,49,09,600
	Add: Opening stock of finished goods		12,00,000
	Less: Closing stock of finished goods		(10,50,000)
	Cost of Goods Sold		5,50,59,600
(ix)	Administrative overheads:		
	- Depreciation on office building	50,000	
	- Salary paid to General Manager	6,40,000	
	- Fee paid to independent directors	1,20,000	8,10,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	20,000	
	- Salary paid to Manager- Sales & Marketing	5,60,000	
	- Performance bonus paid to sales staffs	1,20,000	7,00,000
(xi)	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		80,000
	Cost of Sales		5,66,49,600



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Cost Accounting System

6. The financial books of a company reveal the following data for the year ended 31st March, 2020:

	(₹)
Opening Stock:	
Finished goods 625 units	1,06,250
Work-in-process	92,000
01.04.2019 to 31.03.2020	
Raw materials consumed	16,80,000
Direct Labour	12,20,000
Factory overheads	8,44,000
Administration overheads (production related)	3,96,000
Dividend paid	2,44,000
Bad Debts	36,000
Selling and Distribution Overheads	1,44,000
Interest received	76,000
Rent received	92,000
Sales 12,615 units	45,60,000
Closing Stock: Finished goods 415 units	91,300
Work-in-process	82,400

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages.
- Administration overheads are recovered at 15% of factory cost.
- Selling and distribution overheads are charged at Rs. 6 per unit sold.
- Opening Stock of finished goods is valued at Rs. 240 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(i) PREPARE statements for the year ended 31st March, 2020 showing:

- the profit as per financial records
- the profit as per costing records.

(ii) PREPARE a statement reconciling the profit as per costing records with the profit as per financial records.

ANSWER

(i) Statement of Profit as per financial records
(for the year ended March 31, 2020)



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	(₹)		(₹)
To Opening stock of Finished Goods	1,06,250	By Sales	45,60,000
To Work-in-process	92,000	By Closing stock of finished Goods	91,300
To Raw materials consumed	16,80,000	By Work-in-Process	82,400
To Direct labour	12,20,000	By Rent received	92,000
To Factory overheads	8,44,000	By Interest received	76,000
To Administration overheads	3,96,000		
To Selling & distribution overheads	1,44,000		
To Dividend paid	2,44,000		
To Bad debts	36,000		
To Profit	1,39,450		
	49,01,700		49,01,700

Statement of Profit as per costing records
(for the year ended March 31, 2020)

	(₹)
Sales revenue (A) (12,615 units)	45,60,000
<u>Cost of sales:</u>	
Opening stock (625 units × ₹ 240)	1,50,000
Add: Cost of production of 12,405 units (Refer to working note 2)	43,28,140
Less: Closing stock $\left(\frac{₹ 43,28,140 \times 415 \text{ units}}{12,405 \text{ units}} \right)$	(1,44,795)
Production cost of goods sold (12,615 units)	43,33,345
Selling & distribution overheads (12,615 units × ₹ 6)	75,690
Cost of sales: (B)	44,09,035
Profit: {(A) – (B)}	1,50,965

(ii) Statement of Reconciliation
(Reconciling the profit as per costing records with the profit as per financial records)

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	(₹)	(₹)
Profit as per Cost Accounts		1,50,965
Add: Administration overheads over absorbed (₹ 5,64,540 – ₹ 3,96,000)	1,68,540	
Opening stock overvalued (₹1,50,000 – ₹ 1,06,250)	43,750	
Interest received	76,000	
Rent received	92,000	
Factory overheads over recovered (₹ 8,54,000 – ₹ 8,44,000)	10,000	3,90,290
		5,41,255
Less: Selling & distribution overheads under recovery (₹ 1,44,000 – ₹ 75,690)	68,310	
Closing stock overvalued (₹1,44,795 – ₹ 91,300)	53,495	
Dividend	2,44,000	
Bad debts	36,000	(4,01,805)
Profit as per financial accounts		1,39,450

Working notes:**1. Number of units produced**

	Units
Sales	12,615
Add: Closing stock	415
Total	13,030
Less: Opening stock	(625)
Number of units produced	12,405

2. Cost Sheet

	(₹)
Raw materials consumed	16,80,000
Direct labour	12,20,000
Prime cost	29,00,000
Factory overheads (70% of direct wages)	8,54,000
Factory cost	37,54,000
Add: Opening work-in-process	92,000
Less: Closing work-in-process	(82,400)
Factory cost of goods produced	37,63,600
Administration overheads (15% of factory cost)	5,64,540
Cost of production of 12,405 units (Refer to working note 1)	43,28,140
Cost of production per unit:	
$= \frac{\text{Total Cost of Production}}{\text{No. of units produced}} = \frac{₹43,28,140}{12,405 \text{ units}} = ₹348.90$	

Job Costing

7. SM Motors Ltd. is a manufacturer of auto components. Following are the details of expenses for the year 2019-20:

	(₹)
(i) Opening Stock of Material	15,00,000
(ii) Closing Stock of Material	20,00,000
(iii) Purchase of Material	1,80,50,000
(iv) Direct Labour	90,50,000
(v) Factory Overhead	30,80,000
(vi) Administrative Overhead	20,50,400

During the FY 2020-21, the company has received an order from a car manufacturer where it estimates that the cost of material and labour will be Rs. 80,00,000 and Rs. 40,50,000 respectively. The company charges factory overhead as a percentage of direct labour and administrative overheads as a percentage of factory cost based on previous year's cost.

Cost of delivery of the components at customer's premises is estimated at Rs. 4,50,000.

You are required to:

- (i) CALCULATE the overhead recovery rates based on actual costs for 2019-20.
- (ii) PREPARE a Job cost sheet for the order received and the price to be quoted if the desired profit is 25% on sales.

ANSWER

(i) Calculation of Overhead Recovery Rate:

$$\begin{aligned} \text{Factory Overhead Recovery Rate} &= \frac{\text{Factory Overhead in 2019-20}}{\text{Direct Labour Costs in 2019-20}} \times 100 \\ &= \frac{\text{₹ } 30,80,000}{\text{₹ } 90,50,000} \times 100 = 34\% \text{ of Direct labour} \end{aligned}$$

Administrative Overhead Recovery Rate

$$\begin{aligned} &= \frac{\text{Administrative Overhead in 2019-20}}{\text{Factory Costs in 2019-20 (W.N.)}} \times 100 \\ &= \frac{\text{₹ } 20,50,400}{\text{₹ } 2,96,80,000} \times 100 = 6.91\% \text{ of Factory Cost} \end{aligned}$$

Working Note:**Calculation of Factory Cost in 2019-20**

Particulars	Amount (Rs.)
Opening Stock of Material	15,00,000
Add: Purchase of Material	1,80,50,000
Less: Closing Stock of Material	(20,00,000)
Material Consumed	1,75,50,000
Direct Labour	90,50,000
Prime Cost	2,66,00,000
Factory Overhead	30,80,000
Factory Cost	2,96,80,000

(ii) Job Cost Sheet for the order received in 2020-21

Particulars	Amount (Rs.)
Material	80,00,000
Labour	40,50,000
Factory Overhead (34% of Rs. 40,50,000)	13,77,000
Factory Cost	1,34,27,000
Administrative Overhead (6.91% of Rs. 1,34,27,000)	9,27,806
Cost of delivery	4,50,000
Total Cost	1,48,04,806
Add: Profit @ 25% of Sales or 33.33% of cost	49,34,935
Sales value (Price to be quoted for the order)	1,97,39,741

Hence the price to be quoted is Rs. 1,97,39,741

Process Costing

8. A company produces a component, which passes through two processes. During the month of November, 2020, materials for 40,000 components were put into Process- I of which 30,000 were completed and transferred to Process- II. Those not transferred to Process- II were 100% complete as to materials cost and 50% complete as to labour and overheads cost. The Process- I costs incurred were as follows:

Direct Materials	Rs. 3,00,000
Direct Wages	Rs. 3,50,000
Factory Overheads	Rs. 2,45,000

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Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

Costs incurred in Process-II are as follows:

Packing Materials	₹ 80,000
Direct Wages	₹ 71,125
Factory Overheads	₹ 85,350

Packing material cost is incurred at the end of the second process as protective packing to the completed units of production.

Required:

- (i) PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.
(ii) PREPARE statement of Equivalent Production, Cost per unit and Process II A/c.

ANSWER
Process I
Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
40,000	Completed	30,000	100	30,000	100	30,000	100	30,000
	Closing WIP	10,000	100	10,000	50	5,000	50	5,000
40,000		40,000		40,000		35,000		35,000

Particulars	Materials	Labour	Overhead	Total
Cost incurred (₹)	3,00,000	3,50,000	2,45,000	8,95,000
Equivalent units	40,000	35,000	35,000	
Cost per equivalent unit (₹)	7.50	10.00	7.00	24.50

Process-I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	40,000	3,00,000	By Process-II A/c (30,000 units × ₹24.5)	30,000	7,35,000
To Labour		3,50,000	By Closing WIP*	10,000	1,60,000
To Overhead		2,45,000			
	40,000	8,95,000		40,000	8,95,000

* (Material 10,000 units × Rs. 7.5) + (Labour 5,000 units × Rs. 10) + (Overheads 5,000 units × Rs. 7)
= Rs. 75,000 + Rs. 50,000 + Rs. 35,000 = Rs. 1,60,000

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Process II
Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
30,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	Normal loss	200		--		--		--
	Closing WIP	1,800	100	1,800	25	450	25	450
30,000		30,000		29,800		28,450		28,450

Particulars	Materials	Labour	Overhead	Total
Process-I Cost	7,35,000	--	--	7,35,000
Cost incurred (₹)	--	71,125	85,350	1,56,475
Equivalent units	29,800	28,450	28,450	--
Cost per equivalent unit (₹)	24.6644	2.5000	3.0000	30.1644

Process-II Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	30,000	7,35,000	By Normal loss A/c	200	--
To Packing Material	--	80,000	By Finished Goods Stock A/c	28,000*	9,24,604
To Direct Wages	--	71,125	By Closing WIP	1,800**	46,871
To Factory Overhead	--	85,350			
	30,000	9,71,475		30,000	9,71,475

* $28,000 \times \text{Rs. } 30.1644 = \text{Rs. } 8,44,603 + \text{Rs. } 80,000$ (Packing Material Cost) = Rs. 9,24,604

** $1,800 \text{ units} \times \text{Rs. } 24.6644 + 450 \text{ units} \times (\text{Rs. } 2.5 + \text{Rs. } 3) = \text{Rs. } 46,871$

Service Costing

9. VPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning, the first trip picks up senior students and the second trip plying an hour later picks up junior students. Similarly, in the afternoon, the first trip takes the junior students and an hour later the second trip takes the senior students home.

The distance travelled by each bus, one way is 8 km. The school works 22 days in a month and remains closed for vacation in May and June. The bus fee, however, is payable by the students for all the 12 months in a year.

The details of expenses for a year are as under:



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Driver's salary – payable for all the 12 in months	₹ 12,000 per month per driver
Cleaner's salary payable for all the 12 months	₹ 8,000 per month per cleaner
License fees, taxes etc.	₹ 8,400 per bus per annum
Insurance Premium	₹ 15,600 per bus per annum
Repairs and Maintenance	₹ 20,500 per bus per annum
Purchase price of the bus	₹ 20,00,000 each
Life of the bus	16 years
Scrap value	₹ 1,60,000
Diesel Cost	₹ 78.50 per litre

Each bus gives an average of 5 km. per litre of diesel. The seating capacity of each bus is 40 students. The school follows differential transportation fees based on distance travelled as under:

Students picked up and dropped within the range of distance from the school	Transportation fee	Percentage of students availing this facility
2 km.	25% of Full	15%
4 km.	50% of Full	30%
8 km.	Full	55%

Due to a pandemic, lockdown imposed on schools and the school remained closed from April 2020 to December 2020. Drivers and cleaners were paid 75% of their salary during the lockdown period. Repairing cost reduced to 75% for the year 2020. Ignore the interest cost.

Required:

- (i) PREPARE a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.
- (ii) FIND OUT transportation fee per student per month in respect of:
 - (a) Students coming from a distance of upto 2 km. from the school.
 - (b) Students coming from a distance of upto 4 km. from the school; and
 - (c) Students coming from a distance of upto 8 km. from the school.
- (iii) CALCULATE the minimum bus fare that has to be recovered from the students for the year 2020.

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ANSWER

(i) Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (₹)	Fleet of 25 buses per annum (₹)
<i>Running costs : (A)</i>		
Diesel (Refer to working note 1)	2,21,056	55,26,400
<i>Repairs & maintenance costs: (B)</i>	20,500	5,12,500
<i>Fixed charges:</i>		
Driver's salary (₹ 12,000 × 12 months)	1,44,000	36,00,000
Cleaners salary (₹ 8,000 × 12 months)	96,000	24,00,000
Licence fee, taxes etc.	8,400	2,10,000
Insurance	15,600	3,90,000
Depreciation $\left(\frac{₹ 20,00,000 - ₹1,60,000}{16 \text{ years}} \right)$	1,15,000	28,75,000
Total fixed charges: (C)	3,79,000	94,75,000
Total expenses: (A+B+C)	6,20,556	1,55,13,900

(ii) Average cost per student per month in respect of students coming from a distance of:

(a) 2 km. from the school {₹ 6,20,556 / (236 students × 12 months)} (Refer to Working Note 2)	₹ 219.12
(b) 4 km. from the school (₹ 219.12 × 2)	₹ 438.24
(c) 8 km. from the school (₹ 219.12 × 4)	₹ 876.48

(iii) Calculation of minimum bus fare to be recovered from the students during the year 2020:
Statement showing the expenses of operating a single bus in year 2020

Particulars	Per bus per annum (₹)
<i>Running costs : (A)</i>	
Diesel (Refer to working note 3)	66,316.80
<i>Repairs & maintenance costs: (B)</i> (₹ 20,500 × 0.75)	15,375
<i>Fixed charges:</i>	
Driver's salary {₹ 12,000 × 3 months + (75% of ₹ 12,000 × 9 months)}	1,17,000
Cleaners salary {₹ 8,000 × 3 months + (75% of ₹ 8,000 × 9 months)}	78,000
Licence fee, taxes etc.	8,400
Insurance	15,600
Depreciation $\left(\frac{₹ 20,00,000 - ₹1,60,000}{16 \text{ years}} \right)$	1,15,000
Total fixed charges: (C)	3,34,000
Total expenses: (A+B+C)	4,15,691.80



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Minimum bus fare to be recovered:

(a) 2 km. from the school {₹ 4,15,691.8 / (236 students × 12 months)} (Refer to Working Note 2)	₹ 146.78
(b) 4 km. from the school (₹ 146.78 × 2)	₹ 293.56
(c) 8 km. from the school (₹146.78 × 4)	₹ 587.12

Working Notes:

1. Calculation of diesel cost per bus:

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (8 km. × 2 trips)	16 km.
Distance travelled per day by a bus (16 km. × 4 shifts)	64 km.
Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled per year (1,408 × 10 months)	14,080 km.
No. of litres of diesel required per bus per year (14,080 km. ÷ 5 km.)	2,816 litres
Cost of diesel per bus per year (2,816 litres × ₹ 78.50)	₹ 2,21,056

2. Calculation of equivalent number of students per bus:

Bus capacity of 2 trips (40 students × 2 trips)	80 students
1/4 th fare students (15% × 80 students)	12 students
1/2 fare students (30% × 80 students × 2) (equivalent to 1/4 th fare students)	48 students
Full fare students (55% × 80 students × 4) (equivalent to 1/4 th fare students)	176 students
Total students equivalent to 1/4 th fare students	236 students

3. Calculation of diesel cost per bus in Year 2020:

Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled during the year 2020 (1,408 × 3 months)	4,224 km.
No. of litres of diesel required per bus per year (4,224 km. ÷ 5 km.)	844.8 litres
Cost of diesel per bus per year (844.8 litres × ₹ 78.50)	₹ 66,316.80

Standard Costing

10. LM Limited produces a product 'SX4' which is sold in a 10 Kg. packet. The standard cost card per packet of 'SX4' is as follows:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 80 per hour	640
Variable Overhead 8 hours @ ₹ 20 per hour	160
Fixed Overhead	<u>250</u>
	<u>1,950</u>

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Budgeted output for a quarter of a year was 10,000 Kg. Actual output is 9,000 Kg.
 Actual costs for this quarter are as follows:

	(₹)
Direct Materials 8,900 Kg @ ₹ 92 per Kg.	8,18,800
Direct Labour 7,000 hours @ ₹ 84 per hour	5,88,000
Variable Overhead incurred	1,40,000
Fixed Overhead incurred	2,60,000

You are required to **CALCULATE**:

- (i) Material Usage Variance
- (ii) Material Price Variance
- (iii) Material Cost Variance
- (iv) Labour Efficiency Variance
- (v) Labour Rate Variance
- (vi) Labour Cost Variance
- (vii) Variable Overhead Cost Variance
- (viii) Fixed Overhead Cost Variance

ANSWER

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
 = Rs. 90 (9,000 kg. – 8,900 kg.)
 = Rs. 9,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
 = 8,900 kg. (Rs. 90 – Rs. 92) = Rs. 17,800 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
 = (SQ × SP) – (AQ × AP)
 = (9,000 kg. × Rs. 90) – (8,900 kg. × Rs. 92)
 = Rs. 8,10,000 – Rs. 8,18,800
 = Rs. 8,800 (Adverse)



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(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
 = Rs. 80 (9,000 x 8hours / 10 – 7,000 hrs)
 = Rs. 80 (7,200 hrs. – 7,000 hrs.)
 = Rs. 16,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
 = 7,000 hrs. (Rs. 80 – Rs. 84)
 = Rs. 28,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
 = (SH × SR) – (AH × AR)
 = (7,200 hrs. × Rs. 80) – (7,000 hrs. × Rs. 84)
 = Rs. 5,76,000 – Rs. 5,88,000
 = Rs. 12,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
 = (7,200 hrs. × Rs. 20) – Rs. 1,40,000
 = Rs. 4,000 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
 = 250 / 10 kgs x 9,000kgs. - 2,60,000
 = Rs. 2,25,000 – Rs. 2,60,000 = Rs. 35,000 (Adverse)

Marginal Costing (Short- term Decision making)

11. Aditya Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	T	U
Sales Mix	35%	35%	30%
Selling Price	₹ 300	₹ 400	₹ 200
Variable Cost	₹ 150	₹ 200	₹ 120
Total Fixed Costs	₹ 18,00,000		
Total Sales	₹ 60,00,000		



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The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	T	M
Sales Mix	50%	25%	25%
Selling Price	₹ 300	₹ 400	₹ 300
Variable Cost	₹ 150	₹ 200	₹ 150
Total Fixed Costs	₹ 18,00,000		
Total Sales	₹ 64,00,000		

Required

- (i) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.
(ii) COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix.

ANSWER
i) Computation of PV ratio, contribution and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price (₹)	300	400	200	
Less: Variable Cost (₹)	150	200	120	
Contribution per unit (₹)	150	200	80	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	35%	35%	30%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	17.5%	17.5%	12%	47%
Present Total Contribution (₹60,00,000 × 47%)				₹ 28,20,000
Less: Fixed Costs				₹ 18,00,000
Present Profit				₹ 10,20,000
Present Break Even Sales (₹18,00,000/0.47)				₹ 38,29,787

(ii) Computation of PV ratio, contribution and break-even sale for proposed product mix

	Products			Total
	S	T	M	
Selling Price (₹)	300	400	300	
Less: Variable Cost (₹)	150	200	150	
Contribution per unit (₹)	150	200	150	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	50%	25%	25%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	25%	12.5%	12.5%	50%
Proposed Total Contribution (₹64,00,000 × 50%)				₹ 32,00,000
Less: Fixed Costs				₹ 18,00,000
Proposed Profit				₹ 14,00,000
Proposed Break Even Sales (₹18,00,000/0.50)				₹ 36,00,000



Budget and Budgetary Control

12. RS Ltd manufactures and sells a single product and has estimated sales revenue of Rs. 302.4 lakh during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material A and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are Rs. 60 per unit sold and fixed selling & distribution overheads are estimated to be Rs. 69,12,000.

The other relevant details are as under:

Purchase Price:	Material A	₹ 160 per kg
	Materials B	₹ 100 per kg
Labour Rate:	Machine Shop	₹ 140 per hour
	Assembly Shop	₹ 70 per hour

	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required:

- CALCULATE number of units of product proposed to be sold and selling price per unit,
- PREPARE Production Budget in units, and
- PREPARE Material Purchase Budget in units.

ANSWER

Workings:

Statement Showing "Total Variable Cost for the year"

Particulars	Amount (₹)
Estimated Sales Revenue	3,02,40,000
Less: Desired Profit Margin on Sale @ 20%	60,48,000
Estimated Total Cost	2,41,92,000
Less: Fixed Selling and Distribution Overheads	69,12,000
Total Variable Cost	1,72,80,000

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Statement Showing "Variable Cost per unit"

Particulars	Variable Cost p.u. (₹)
Direct Materials:	
A: 6 Kg. @ ₹ 160 per kg.	960
B: 3 Kg. @ ₹ 100 per kg.	300
Labour Cost:	
Machine Shop: 4 hrs. @ ₹ 140 per hour	560
Assembly Shop: 2 hrs. @ ₹ 70 per hour	140
Factory Overheads: 20% of (₹ 560 + ₹ 140)	140
Variable Selling & Distribution Expenses	60
Total Variable Cost per unit	2,160

(i) Calculation of number of units of product proposed to be sold and selling price per unit:

Number of Units Sold = Total Variable Cost / Variable Cost per unit

= Rs. 1,72,80,000 / Rs. 2,160

= 8,000 units

Selling Price per unit = Total Sales Value / Number of Units Sold

= Rs. 3,02,40,000 / 8,000 units

= Rs. 3,780

(ii) Production Budget (units)

Particulars	Units
Budgeted Sales	8,000
Add: Closing Stock	3,000
Total Requirements	11,000
Less: Opening Stock	(2,500)
Required Production	8,500

(iii) Materials Purchase Budget (Kg.)

Particulars	Material	Material
	A	B
Requirement for Production	51,000	25,500
	(8,500 units × 6 Kg.)	(8,500 units × 3 Kg.)
Add: Desired Closing Stock	8,000	5,500
Total Requirements	59,000	31,000
Less: Opening Stock	(7,500)	(4,000)
Quantity to be purchased	51,500	27,000

Miscellaneous

13. (a) WRITE note on cost-plus-contracts.

ANSWER

a) These contracts provide for the payment by the contractee of the actual cost of construction plus a stipulated profit, mutually decided between the two parties.

The main features of these contracts are as follows:

- (i) The practice of cost-plus contracts is adopted in the case of those contracts where the probable cost of the contracts cannot be ascertained in advance with a reasonable accuracy.
- (ii) These contracts are preferred when the cost of material and labour is not steady and the contract completion may take number of years.
- (iii) The different costs to be included in the execution of the contract are mutually agreed, so that no dispute may arise in future in this respect. Under such type of contracts, contractee is allowed to check or scrutinize the concerned books, documents and accounts.
- (iv) Such a contract offers a fair price to the contractee and also a reasonable profit to the contractor. The contract price here is ascertained by adding a fixed and mutually pre-decided component of profit to the total cost of the work

(b) HOW apportionment of joint costs upto the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? DISCUSS.

ANSWER

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products upto the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately

Net realizable value Method: From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
- Selling & distribution expenses, if any
- Post split off costs.

The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

(c) DISCUSS cost classification based on variability and controllability.

ANSWER

Cost classification based on variability

(i) Fixed Costs – These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or de-crease with the changes in output. For example, rent, insurance of factory building etc., remain the same for different levels of production.

(ii) Variable Costs – These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.

(iii) Semi-variable Costs – These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

Cost classification based on controllability

(i) Controllable Costs - Cost that can be controlled, typically by a cost, profit or investment centre manager is called controllable cost. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre. For example, direct costs comprising direct labour, direct material, direct expenses and some of the overheads are generally controllable by the shop level management.

(ii) Uncontrollable Costs - Costs which cannot be influenced by the action of a specified member of an undertaking are known as uncontrollable costs. For example, expenditure incurred by, say, the tool room is controllable by the foreman in-charge of that section but the share of the tool-room expenditure which is apportioned to a machine shop is not to be controlled by the machine shop foreman.

(d) DESCRIBE the salient features of budget manual

ANSWER

Salient features of Budget Manual

- Budget manual contains much information which is required for effective budgetary planning.
- A budget manual is a collection of documents that contains key information for those involved in the planning process.
- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results is included in Budget Manual.
- Budget Manual contains a form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- It contains a timetable for the preparation of each budget.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion is included in Budget Manual.

RTP- NOV 2021**Material Cost**

1. The following data are available in respect of material X for the year ended 31st March, 2021:
(Rs.)

Opening stock 9,00,000

Purchases during the year 1,70,00,000

Closing stock 11,00,000

(i) CALCULATE:

(a) Inventory turnover ratio, and

(b) The number of days for which the average inventory is held.

(ii) INTERPRET the ratio calculated as above if the industry inventory turnover rate is 10.

ANSWER

(i) (a) Inventory turnover ratio (Refer to working note)

$$= \frac{\text{Cost of stock of raw material consumed}}{\text{Average stock of raw material}}$$

$$= \frac{\text{₹ } 1,68,00,000}{\text{₹ } 10,00,000} = 16.8$$

(b) Average number of days for which the average inventory is held

$$= \frac{365}{\text{Inventory turnover ratio}} = \frac{365 \text{ days}}{16.8} = 21.73 \text{ days}$$

Working Note:

Particulars	(₹)
Opening stock of raw material	9,00,000
Add: Material purchases during the year	1,70,00,000
Less: Closing stock of raw material	11,00,000
	1,68,00,000

(ii) The Inventory turnover ratio for material X is 16.8 which mean an inventory item takes only 21.73 or 22 days to issue from stores for production process. The rate is better than the industry rate which is 10 time or 36.5 days. This inventory turnover ratio indicates better inventory management system and good demand for the final product in market.

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Employee Cost

2. Textile Ltd. pays following overtime premium for its labour beside normal wages of Rs. 100 per hour:

Before and after normal working hours	80% of basic wage rate
Sundays and holidays	150% of basic wage rate

During the previous year 2019-20, the following hours were worked:

Normal time 3,00,000 hours

Overtime before and after normal working hours 60,000 hours

Overtime on Sundays and holidays 15,000 hours

Total 3,75,000 hours

During the current year 2020-21, the following hours have been worked on job 'Spinning':

Normal	4,000 hours
Overtime before and after normal working hours	400 hours
Overtime on Sundays and holidays	100 hours
Total	4,500 hours

You are required to CALCULATE the labour cost chargeable to job 'Spinning' and overhead in each of the following instances:

- Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
- Where overtime is worked irregularly to meet the requirements of production.
- Where overtime is worked at the request of the customer to expedite the job.

ANSWER

Workings:

Basic wage rate = Rs. 100 per hour

Overtime wage rate before and after working hours = Rs. 100 + (Rs. 100 × 80%)
 = Rs. 180 per hour

Overtime wage rate for Sundays and holidays = Rs. 100 + (Rs. 100 × 150%)
 = Rs. 250 per hour

Computation of average inflated wage rate (including overtime premium):

Particulars	Amount (Rs.)
Annual wages for the previous year for normal time (3,00,000 hrs. × Rs. 100)	3,00,00,000

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Wages for overtime before and after normal working hours (60,000 hrs. × Rs. 180)	108,00,000
Wages for overtime on Sundays and holidays (15,000 hrs. × Rs. 250)	37,50,000
Total wages for 3,75,000 hrs.	4,45,50,000

$$\text{Average inflated wage rate} = \frac{\text{₹ } 4,45,50,000}{3,75,000 \text{ hours}} = \text{₹ } 118.80$$

(a) Where overtime is worked regularly as a policy due to workers' shortage

The overtime premium is treated as a part of employee cost and job is charged at an inflated wage rate. Hence, employee cost chargeable to job 'Spinning'

$$= \text{Total hours} \times \text{Inflated wage rate} = 4,500 \text{ hrs.} \times \text{Rs. } 118.80 = \text{Rs. } 5,34,600$$

(b) Where overtime is worked irregularly to meet the requirements of production

Basic wage rate is charged to the job and overtime premium is charged to factory overheads as under:

Employee cost chargeable to Job 'Spinning' = 4,500 hours @ Rs. 100 per hour

$$= \text{Rs. } 4,50,000$$

$$\text{Factory overhead} = \{400 \text{ hrs.} \times (\text{Rs. } 100 \times 80\%)\} + \{100 \text{ hrs.} \times (\text{Rs. } 100 \times 150\%)\}$$

$$= \{\text{Rs. } 32,000 + \text{Rs. } 15,000\} = \text{Rs. } 47,000$$

(c) Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under: (Rs.)

Job 'Spinning' Employee cost: 4,500 hrs. @ Rs. 100 = 4,50,000

Overtime premium: 400 hrs. @ (Rs. 100 × 80%) = 32,000 100 hrs. @ (Rs. 100 × 150%) = 15,000

Total 4,97,000

Overheads: Absorption Costing Method

3. PL Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of October, 2020:

	(Rs.)
Rent and rates	12,50,000
General lighting	1,50,000
Indirect Wages	3,75,000
Power	5,00,000
Depreciation on machinery	10,00,000
Insurance of machinery	4,00,000



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Other Information:

	P1	P2	P3	S1	S2
Direct wages (Rs.)	7,50,000	5,00,000	7,50,000	3,75,000	1,25,000
Horse Power of Machines used	60	30	50	10	–
Cost of machinery (Rs.)	60,00,000	80,00,000	1,00,00,000	5,00,000	5,00,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	–	–

Expenses of the service departments S1 and S2 are reapportioned as below:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	–	10%
S2	40%	20%	30%	10%	–

Required:

- (i) COMPUTE overhead absorption rate per production hour of each production department.
(ii) DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is Rs. 12,500 and direct labour cost is Rs. 7,500.

ANSWER

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (Rs.)	P1 (Rs.)	P2 (Rs.)	P3 (Rs.)	S1 (Rs.)	S2 (Rs.)
Direct wages	Actual	5,00,000	--	--	--	3,75,000	1,25,000
Rent and Rates	Floor area (4 : 5 : 6 : 4 : 1)	12,50,000	2,50,000	3,12,500	3,75,000	2,50,000	62,500
General lighting	Light points (2 : 3 : 4 : 2 : 1)	1,50,000	25,000	37,500	50,000	25,000	12,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	3,75,000	1,12,500	75,000	1,12,500	56,250	18,750
Power	Horse Power of machines used (6 : 3 : 5 : 1)	5,00,000	2,00,000	1,00,000	1,66,667	33,333	–
Depreciation of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	10,00,000	2,40,000	3,20,000	4,00,000	20,000	20,000
Insurance of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	4,00,000	96,000	1,28,000	1,60,000	8,000	8,000
		41,75,000	9,23,500	9,73,000	12,64,167	7,67,583	2,46,750

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Overheads of service cost centres

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

$$S1 = 7,67,583 + 0.10 S2$$

$$S2 = 2,46,750 + 0.10 S1$$

Substituting the value of S2 in S1 we get

$$S1 = 7,67,583 + 0.10 (2,46,750 + 0.10 S1)$$

$$S1 = 7,67,583 + 24,675 + 0.01 S1$$

$$0.99 S1 = 7,92,258$$

$$S1 = \text{Rs. } 8,00,260$$

$$S2 = 2,46,750 + 0.10 \times 8,00,260$$

$$= \text{Rs. } 3,26,776$$

Secondary Distribution Summary

Particulars	Total (₹)	P ₁ (₹)	P ₂ (₹)	P ₃ (₹)
Allocated and Apportioned over-heads as per primary distribution	31,60,667	9,23,500	9,73,000	12,64,167
S ₁	8,00,260	1,60,052	2,40,078	3,20,104
S ₂	3,26,776	1,30,710	65,355	98,033
		12,14,262	12,78,433	16,82,304

(i) Overhead rate per hour

	P1	P2	P3
Total overheads cost (Rs.)	12,14,262	12,78,433	16,82,304
Production hours worked	6,225	4,050	4,100
Rate per hour (Rs.)	195.06	315.67	410.32

ii) Cost of Product X

	(₹)
Direct material	12,500.00
Direct labour	7,500.00
Prime cost	20,000.00
Production on overheads	
P ₁ 5 hours × ₹ 195.06 =	975.30
P ₂ 3 hours × ₹ 315.67 =	947.01
P ₃ 4 hours × ₹ 410.32 =	1,641.28
Factory cost	23,563.59

Activity Based Costing

4. Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 2020-21 for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	Rs. 39,67,500	Rs. 1,05,03,000	Rs. 60,49,500
Cost of goods sold	Rs. 30,00,000	Rs. 75,00,000	Rs. 45,00,000
Cost of bottles returned	Rs. 60,000	Rs. 0	Rs. 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 2020-21:

Activity	Description of activity	Total Cost (Rs.)	Cost-allocation base
Bottles returns	Returning of empty bottles	60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on-going restocking	8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	15,36,000	15,36,000 items sold

Required:

(i) Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.



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(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity-based costing system, CALCULATE the operating income and operating income as a % of revenues for each product line.

ANSWER

Working notes:

1. Total support cost:

	(Rs.)
Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{\text{₹ 45,00,000}}{\text{₹ 1,50,00,000}} \times 100 = 30\%$$

3. Cost for each activity cost driver:

Activity (1)	Total cost (Rs.) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	Rs. 500 per purchase order
Delivery	12,60,000	3,150 deliveries	Rs. 400 per delivery
Shelf-stocking	8,64,000	8,640 hours	Rs. 100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	Rs. 1 per item sold

(i) Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft Drinks (Rs.)	Fresh Produce (Rs.)	Packaged Foods (Rs.)	Total (Rs.)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000



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Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: (E) = {(A)- (D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (F)= {(E)/(A) × 100}	1.70%	7.17%	3.30%	4.97%

(ii) Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines using an activity-based costing system)

	Soft Drinks (Rs.)	Fresh Produce (Rs.)	Packaged Foods (Rs.)	Total (Rs.)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2,190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5,400:2,700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income: (C) = {(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000
Operating income as a % of revenues: (D) = {(C)/(A) × 100}	10.78%	0.60%	8.75%	4.97%



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Cost Sheet

5. Impact Ltd. provides you the following details of its expenditures for the year ended 31st March, 2021

S. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	GST paid under Composition scheme		10,00,000
(iii)	Freight inwards		5,20,600
(iv)	Trade discounts received		10,00,000
(v)	Wages paid to factory workers		15,20,000
(vi)	Contribution made towards employees' PF & ESIS		1,90,000
(vii)	Production bonus paid to factory workers		1,50,000
(viii)	Fee for technical assistance		1,12,000
(ix)	Amount paid for power & fuel		2,62,000
(x)	Job charges paid to job workers		4,50,000
(xi)	Stores and spares consumed		1,10,000
(xii)	Depreciation on:		
	Factory building	64,000	
	Office building	46,000	
	Plant & Machinery	86,000	1,96,000
(xiii)	Salary paid to supervisors		1,20,000
(xiv)	Repairs & Maintenance paid for:		
	Plant & Machinery	58,000	
	Sales office building	50,000	
	Vehicles used by directors	20,600	1,28,600

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(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	28,100	59,300
(xvi)	Expenses paid for quality control check activities		25,000
(xvii)	Research & development cost paid for improvement in production process		48,200
(xviii)	Expenses paid for administration of factory work		1,38,000
(xix)	Salary paid to functional managers:		
	Production control	4,80,000	
	Finance & Accounts	9,60,000	
	Sales & Marketing	12,00,000	26,40,000
(xx)	Salary paid to General Manager		13,20,000
(xxi)	Packing cost paid for:		
	Primary packing necessary to maintain quality	1,06,000	
	For re-distribution of finished goods	1,12,000	2,18,000
(xxii)	Interest and finance charges paid (for usage of non- equity fund)		3,50,000
(xxiii)	Fee paid to auditors		1,80,000
(xxiv)	Fee paid to legal advisors		1,20,000
(xxv)	Fee paid to independent directors		2,40,000
(xxvi)	Payment for maintenance of website for online sales		1,80,000
(xxvii)	Performance bonus paid to sales staffs		2,40,000
(xxviii)	Value of stock as on 1st April, 2020:		
	Raw materials	9,00,000	
	Work-in-process	4,00,000	
	Finished goods	7,00,000	20,00,000
(xxix)	Value of stock as on 31st March, 2021:		
	Raw materials	5,60,000	
	Work-in-process	2,50,000	
	Finished goods	11,90,000	20,00,000

Amount realized by selling of waste generated during manufacturing process – Rs. 66,000/-
From the above data, you are required to PREPARE Statement of cost of Impact Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

ANSWER

Statement of Cost of Impact Ltd. for the year ended 31st March, 2021:



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Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	Raw materials purchased	5,00,00,000	
	GST paid under Composition scheme*	10,00,000	
	Freight inwards	5,20,600	
	Less: Trade discounts received	(10,00,000)	
	Add: Opening stock of raw materials	9,00,000	
	Less: Closing stock of raw materials	(5,60,000)	5,08,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	15,20,000	
	Contribution made towards employees' PF & ESIS	1,90,000	
	Production bonus paid to factory workers	1,50,000	18,60,000
(iii)	Direct expenses:		
	Fee for technical assistance	1,12,000	
	Amount paid for power & fuel	2,62,000	
	Job charges paid to job workers	4,50,000	8,24,000
	Prime Cost		5,35,44,600
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,10,000	
	Depreciation on factory building	64,000	
	Depreciation on plant & machinery	86,000	
	Repairs & Maintenance paid for plant & machinery	58,000	
	Insurance premium paid for plant & machinery	31,200	
	Insurance premium paid for factory building	28,100	
	Salary paid to supervisors	1,20,000	4,97,300
	Gross factory cost		5,40,41,900
	Add: Opening value of W-I-P		4,00,000
	Less: Closing value of W-I-P		(2,50,000)
	Factory Cost		5,41,91,900
(v)	Quality control cost:		
	Expenses paid for quality control check activities		25,000
(vi)	Research & development cost paid for improvement in production process		48,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,38,000	
	-Salary paid to Production control manager	4,80,000	6,18,000

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(viii)	Less: Realisable value on sale of scrap and waste		(66,000)
(ix)	Add: Primary packing cost		1,06,000
	Cost of Production		5,49,23,100
	Add: Opening stock of finished goods		7,00,000
	Less: Closing stock of finished goods		(11,90,000)
	Cost of Goods Sold		5,44,33,100
(x)	Administrative overheads:		
	Depreciation on office building	46,000	
	Repairs & Maintenance paid for vehicles used by directors	20,600	
	Salary paid to Manager- Finance & Accounts	9,60,000	
	Salary paid to General Manager	13,20,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,40,000	28,86,600
(xi)	Selling overheads:		
	Repairs & Maintenance paid for sales office building	50,000	
	Salary paid to Manager- Sales & Marketing	12,00,000	
	Payment for maintenance of website for online sales	1,80,000	
	Performance bonus paid to sales staffs	2,40,000	16,70,000
(xii)	Packing cost paid for re-distribution of finished goods		1,12,000
(xiii)	Interest and finance charges paid		3,50,000
	Cost of Sales		5,94,51,700

*GST paid under Composition scheme would be included under cost of material as it is not eligible for input tax credit.

Cost Accounting System

6. XYZ Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2020-21:

Particulars	(Rs. in '000)
Opening balances:	
- Stores ledger control A/c	24,000
- Work-in-process control A/c	6,000
- Finished goods control A/c	1,29,000
- Building construction A/c	3,000
- Cost ledger control A/c	1,62,000
During the year following transactions took place:	



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Materials:	
- Purchased	12,000
- Issued to production	15,000
- Issued to general maintenance	1,800
- Issued to building construction	1,200
Wages:	
- Gross wages paid	45,000
- Indirect wages paid	12,000
- For building construction	3,000
Factory overheads:	
- Actual amount incurred (excluding items shown above)	48,000
- Absorbed in building construction	6,000
- Under-absorbed	2,400
Royalty paid	1,500
Selling, distribution and administration overheads	7,500
Sales	1,35,000

At the end of the year, the stock of raw material and work-in-process was Rs. 1,65,00,000 and Rs. 75,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

ANSWER
Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	1,35,000	By Balance b/d	1,62,000
To Building Construction A/c	13,200	By Stores Ledger control A/c	12,000
To Balance c/d	1,44,900	By Wages Control A/c	45,000
		By Factory overhead control A/c	48,000
		By Royalty A/c	1,500
		By Selling, Distribution and Administration overheads	7,500
		By Costing P&L A/c	17,100
	2,93,100		2,93,100



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Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	24,000	By WIP control A/c	15,000
To Cost Ledger control A/c	12,000	By Factory overheads control A/c	1,800
		By Building construction A/c	1,200
		By Factory overhead control A/c (bal. fig.) (loss)	1,500
		By Balance c/d	16,500
	36,000		36,000

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	45,000	By Factory overhead control A/c	12,000
		By Building Construction A/c	3,000
		By WIP Control A/c (bal. fig.)	30,000
	45,000		45,000

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	1,800	By Building Construction A/c	6,000
To Wages Control A/c	12,000	By WIP Control A/c (bal. fig.)	54,900
To Cost Ledger control A/c	48,000	By Costing P&L A/c (under-absorption)	2,400
To Stores Ledger control A/c (loss)	1,500		
	63,300		63,300

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	1,500	By WIP Control A/c	1,500
	1,500		1,500

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Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Finished goods control A/c (bal. fig.)	99,900
To Stores Ledger control A/c	15,000		
To Wages Control A/c	30,000		
To Factory overhead control A/c	54,900		
To Royalty A/c	1,500	By Balance c/d	7,500
	1,07,400		1,07,400

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	1,29,000	By Cost of Goods Sold A/c (Refer working note)	1,08,000
To WIP control A/c	99,900	By Balance c/d	1,20,900
	2,28,900		2,28,900

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	1,08,000	By Cost of sales A/c	1,08,000
	1,08,000		1,08,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	7,500	By Cost of sales A/c	7,500
	7,500		7,500

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	1,08,000	By Costing P&L A/c	1,15,500
To Selling, Distribution and Administration A/c	7,500		
	1,15,500		1,15,500

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	1,15,500	By Cost Ledger control A/c	1,35,000
To Factory overhead control A/c	2,400		
To Cost Ledger control A/c (bal. fig.) (Profit)	17,100		
	1,35,000		1,35,000

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Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	3,000	By Cost Ledger control A/c	13,200
To Stores Ledger control A/c	1,200		
To Wages Control A/c	3,000		
To Factory overhead control A/c	6,000		
	13,200		13,200

Trial Balance

Particulars	Dr.	Cr.
	(₹ in '000)	(₹ in '000)
Stores Ledger Control A/c	16,500	
WIP Control A/c	7,500	
Finished Goods Control A/c	1,20,900	
Cost Ledger Control A/c		1,44,900
	1,44,900	1,44,900

Workings:

$$\text{Cost of Goods sold} = \frac{\text{₹ } 13,50,00,000 \times 80}{100} = \text{₹ } 10,80,00,000$$

Batch Costing

7. Rollon Ltd. is committed to supply 96,800 bearings per annum to Racing Ltd. on steady basis. It is estimated that it costs 25 paise as inventory carrying cost per bearing per month and the set-up cost per run of bearing manufacture is Rs. 588.

(a) COMPUTE what would be the optimum run size for bearing manufacture?

(b) Assuming that the company has a policy of manufacturing 8,800 bearings per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (a) above?

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ANSWER**(a) Optimum production run size (Q)**

$$= \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 96,800 \times ₹ 588}{0.25 \times 12}} = 6,160 \text{ bearings.}$$

(b) Calculation of Extra Cost

Total Cost (of maintaining the inventories) when production run size (Q) are 6,160 and 8,800 bearings respectively.

Total cost = Total set-up cost + Total carrying cost.

Particulars	When run size is 6,160 bearings	When run size is 8,800 bearings
Total set up cost	$= \frac{96,800}{6,160} \times ₹ 588 = ₹ 9,240$ Or, No. of setups = 15.71 (16 setups) $= 16 \times ₹ 588 = ₹ 9,408$	$= \frac{96,800}{8,800} \times ₹ 588 = ₹ 6,468$
Total Carrying cost	$\frac{1}{2} \times 6,160 \times 0.25 \times 12 = ₹ 9,240$	$\frac{1}{2} \times 8,800 \times 0.25 \times 12 = ₹ 13,200$
Total Cost	₹ 18,480/ ₹ 18,648	₹ 19,668

Rs. 1,188/ Rs. 1,020 is the extra cost incurred by the company due to run size not being optimum run size.

Contract Costing

8. RN Builders Ltd. entered into a contract on April 1, 2019. The total contract was for Rs. 2,00,00,000. Actual expenditure for the period April 1, 2019 to March 31, 2020 and estimated expenditure for April 1, 2020 to December 31, 2020 are given below

Particulars	2019-20 (actual) (Rs.)	2020-21 (9 months) (estimated) (Rs.)
Materials issued	36,00,000	34,30,000
Wages: Paid	30,00,000	34,93,000
Outstanding at the end	2,50,000	3,32,000
Plant purchased	10,00,000	-
Sundry expenses: Paid	2,90,000	2,75,000
Prepaid at the end	25,000	-
Establishment charges	5,85,000	-



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A part of the material was unsuitable and thus sold for Rs. 7,25,000 (cost being Rs. 6,00,000) and a part of plant was scrapped and disposed-off for Rs. 1,15,000. The value of plant at site on 31 March, 2020 was Rs. 3,10,000 and the value of material at site was Rs. 1,70,000. Cash received on account to date was Rs. 70,00,000, representing 80% of the work certified. The cost of work uncertified was valued at Rs. 10,95,000.

The contract would be completed by 31st December, 2020 and the contractor estimated further expenditure that would be incurred in completion of the contract:

- A sum of Rs. 12,50,000 would have to be spent on the plant and the residual value of the plant on the completion of the contract would be Rs. 1,50,000.
- Establishment charges would cost the same amount per month as in the previous year.
- Rs. 4,32,000 would be sufficient to provide for contingencies.

Required:

PREPARE a Contract Account for the year ended 31st March, 2020, and CALCULATE estimated total profit on this contract.

ANSWER

RN Builders Ltd.

Contract Account (2019-20)

Particulars	(Rs.)	Particulars	(Rs.)
To Materials issued	36,00,000	By Material sold	7,25,000
To Wages paid	30,00,000	By Plant sold	1,15,000
Add: Outstanding 2,50,000	32,50,000	By Plant at site c/d	3,10,000
To Plant	10,00,000	By Material at site c/d	1,70,000
To Sundry Expenses	2,90,000	By Work-in-progress c/d	
Less: Prepaid (25,000) (Rs. 70,00,000 ÷ 80%)	2,65,000	Work certified	87,50,000
To Establishment charges	5,85,000	Work uncertified 10,95,000	98,45,000
To Costing P & L A/c (Rs. 7,25,000 – Rs. 6,00,000)	1,25,000		
To Notional profit (Profit for the year)	23,40,000		
	1,11,65,000		1,11,65,000

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Calculation of Estimated Profit

	Particulars	(₹)	(₹)
(1)	Material consumed (36,00,000+ 1,25,000– 7,25,000)	30,00,000	
	Add: Further consumption	34,30,000	64,30,000
(2)	Wages:	32,50,000	
	Add: Further cost (34,93,000 – 2,50,000)	32,43,000	
	Add: Outstanding	3,32,000	68,25,000
(3)	Plant used (10,00,000– 1,15,000)	8,85,000	
	Add: Further plant introduced	12,50,000	
	Less: Closing balance of plant	(1,50,000)	19,85,000
(4)	Establishment charges	5,85,000	
	Add: Further charges for nine months (5,85,000 × 9/12)	4,38,750	10,23,750
(5)	Sundry expenses	2,90,000	
	Add: Further expenses	2,75,000	5,65,000
(6)	Reserve for contingencies		4,32,000
	Estimated profit (balancing figure)		27,39,250
	Contract price		2,00,00,000

Process Costing

9. Following information is available regarding Process-I of a manufacturing company for the month of February:

Production Record:

Units in process as on 1 st February (All materials used, 1/4 th complete for labour and overhead)	8,000
New units introduced	32,000
Units completed	28,000
Units in process as on 28 th February (All materials used, 1/3 rd complete for labour and overhead)	12,000

Cost Records:

	(₹)
Work-in-process as on 1 st February	
Materials	1,20,000
Labour	20,000
Overhead	20,000
	<u>1,60,000</u>

Cost during the month:

Materials	5,12,000
Labour	3,00,000
Overhead	3,00,000
	<u>11,12,000</u>

Presuming that average method of inventory is used, PREPARE the following:

- (i) Statement of equivalent production.

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- (ii) Statement showing cost for each element.
 (iii) Statement of apportionment of cost.
 (iv) Process cost account for Process-I.

ANSWER**(i) Statement of equivalent production (Average cost method)**

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	8,000	Completed and transferred	28,000	100	28,000	100	28,000
Units introduced	32,000	Closing WIP	12,000	100	12,000	1/3 rd	4,000
	40,000		40,000		40,000		32,000

(ii) Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	1,20,000	20,000	20,000	1,60,000
Cost incurred during the month	5,12,000	3,00,000	3,00,000	11,12,000
Total cost: (A)	6,32,000	3,20,000	3,20,000	12,72,000
Equivalent units: (B)	40,000	32,000	32,000	
Cost per equivalent unit: (C) = (A ÷ B)	15.8	10	10	35.8

(iii) Statement of apportionment of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (28,000 units × ₹ 35.8)		10,02,400
2. Value of Closing W-I-P:		
- Materials (12,000 units × ₹ 15.8)	1,89,600	
- Labour (4,000 units × ₹ 10)	40,000	
- Overheads (4,000 units × ₹ 10)	40,000	2,69,600

(iv) Process-I Cost Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W-I-P	8,000	1,60,000	By Completed units	28,000	10,02,400
To Materials	32,000	5,12,000	By Closing W-I-P	12,000	2,69,600
To Labour	--	3,00,000			
To Overhead	--	3,00,000			
	40,000	12,72,000		40,000	12,72,000



Joint Products & By Products

10. A company produces two joint products A and B from the same basic materials. The processing is completed in three departments.

Materials are mixed in Department I. At the end of this process, A and B get separated. After separation, A is completed in the Department II and B in Department III. During a period, 4,00,000 kg of raw material was processed in Department I at a total cost of Rs. 17,50,000, and the resultant 50% becomes A and 40% becomes B and 10% normally lost in processing.

In Department II, 1/5th of the quantity received from Department I is lost in processing. A is further processed in Department II at a cost of Rs. 2,60,000.

In Department III, further new material is added to the material received from Department I and weight mixture is doubled, there is no quantity loss in the department III. Further processing cost (with material cost) in Department III is Rs. 3,00,000.

The details of sales during the said period are

	Product A	Product B
Quantity sold (kg)	1,50,000	3,00,000
Sales price per kg (₹)	10	4

There were no opening stocks. If these products sold at split-off-point, the selling price of A and B would be Rs. 8 and Rs. 4 per kg respectively.

Required:

(i) PREPARE a statement showing the apportionment of joint cost to A and B in proportion of sales value at split off point.

(ii) PREPARE a statement showing the cost per kg of each product indicating joint cost, processing cost and total cost separately.

(iii) PREPARE a statement showing the product wise profit for the year.

(iv) On the basis of profits before and after further processing of product A and B, give your COMMENT that products should be further processed or not.

ANSWER

Calculation of quantity produced

	Dept I (kg)	Dept II (kg)	Dept III (kg)
Input	4,00,000	2,00,000 (50% of 4,00,000 kg.)	1,60,000 (40% of 4,00,000 kg.)
Weight (lost) or added	(40,000) (10% of 4,00,000 kg.)	(40,000) (1/5th of 2,00,000 kg.)	1,60,000
	3,60,000	1,60,000	3,20,000
Production of A	2,00,000	1,60,000	--
Production of B	1,60,000	--	3,20,000

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(i) Statement of apportionment of joint cost of dept I

	Product A	Product B
Output (kg)	2,00,000	1,60,000
Selling price per kg (Rs.)	8	4
Sales value (Rs.)	16,00,000	6,40,000
Share in Joint cost (5:2)	12,50,000 (Rs. 17,50,000 × 5 ÷ 7)	5,00,000 (Rs. 17,50,000 × 2 ÷ 7)

(ii) Statement of cost per kg

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Share in joint cost (Rs.)	12,50,000	5,00,000
Joint Cost per kg (Rs.) (A)	7.8125	1.5625
Further processing cost (Rs.)	2,60,000	3,00,000
Further processing cost per kg (Rs.) (B)	1.625	0.9375
Total cost per kg (Rs.) {(A)+(B)}	9.4375	2.5000

(iii) Statement of profit

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Sales (kg)	(1,50,000)	(3,00,000)
Closing stock (kg)	10,000	20,000
	(Rs.)	(Rs.)
Sales	15,00,000 (1,50,000 kg × Rs. 10)	12,00,000 (3,00,000 kg × Rs. 4)
Add: closing stock (at full cost)	94,375 (10,000 kg × Rs. 9.4375)	50,000 (20,000 kg × Rs. 2.5)
Value of production	15,94,375	12,50,000
Less: Share in joint cost	12,50,000	5,00,000
Further processing cost	2,60,000	3,00,000
Profit	84,375	4,50,000



(iv) Profitability statement before and after processing

	Product A		Product B	
	Before (₹)	After (₹)	Before (₹)	After (₹)
Sales Value	16,00,000	84,375 (as per iii above)	6,40,000	4,50,000 (as per iii above)
Share in joint costs	12,50,000		5,00,000	
Profit	3,50,000		1,40,000	

Product A should be sold at split off point and product B after processing because of higher profitability

Service Costing

11. Mr. PS owns a bus which runs according to the following schedule:

(i)	Delhi to Hisar and back, the same day
Distance covered:	160 km. one way
Number of days run each month:	9
Seating capacity occupied	90%.
(ii)	Delhi to Aligarh and back, the same day
Distance covered:	160 km. one way
Number of days run each month:	12
Seating capacity occupied	95%
(iii)	Delhi to Alwar and back, the same day
Distance covered:	170 km. one way
Number of days run each month:	6
Seating capacity occupied	100%
(iv)	Following are the other details:
Cost of the bus	Rs. 15,00,000
Salary of the Driver	Rs. 30,000 p.m.
Salary of the Conductor	Rs. 26,000 p.m.
Salary of the part-time Accountant	Rs. 7,000 p.m.
Insurance of the bus	Rs. 6,000 p.a.
Diesel consumption 5 km. per litre at	Rs. 90 per litre
Road tax	Rs. 21,912 p.a.
Lubricant oil	Rs. 30 per 100 km.
Permit fee	Rs. 500 p.m.
Repairs and maintenance	Rs. 5,000 p.m.
Depreciation of the bus	@ 30% p.a.
Seating capacity of the bus	50 persons

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Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings.

The fares are to be indicated per passenger for the journeys: (i) Delhi to Hisar (ii) Delhi to Aligarh and (iii) Delhi to Alwar.

ANSWER

Working Notes:

1. Total Distance (in km.) covered per month

Bus route	Km. per trip	Trips per day	Days per month	Km. per month
Delhi to Hisar	160	2	9	2,880
Delhi to Aligarh	160	2	12	3,840
Delhi to Alwar	170	2	6	2,040
Total				8,760

2. Passenger- km. per month

	Total seats available per month (at 100% capacity)	Capacity utilised		Km. per trip	Passenger-Km. per month
		(%)	Seats		
Delhi to Hisar & Back	900 (50 seats × 2 trips × 9 days)	90	810	160	1,29,600 (810 seats × 160 km.)
Delhi to Aligarh & Back	1,200 (50 seats × 2 trips × 12 days)	95	1,140	160	1,82,400 (1,140 seats × 160 km.)
Delhi to Alwar & Back	600 (50 seats × 2 trips × 6 days)	100	600	170	1,02,000 (600 seats × 170 km.)
Total					4,14,000

Monthly Operating Cost Statement

Particulars	(₹)	(₹)
(i) Running Costs		
Diesel {(8,760 km ÷ 5 km) × ₹ 90}	1,57,680.00	
Lubricant oil {(8,760 km ÷ 100) × ₹ 30}	2,628.00	1,60,308.00
(ii) Maintenance Costs		
Repairs & Maintenance		5,000.00
(iii) Standing charges		
Salary to driver	30,000.00	
Salary to conductor	26,000.00	
Salary of part-time accountant	7,000.00	
Insurance (₹ 6,000 ÷ 12)	500.00	
Road tax (₹ 21,912 ÷ 12)	1,826.00	
Permit fee	500.00	

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Depreciation {(₹ 15,00,000 × 30%) ÷ 12}	37,500.00	1,03,326.00
Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,68,634.00
Passenger Tax*		1,07,453.60
Total Cost		3,76,087.60
Add: Profit*		1,61,180.40
Total takings per month		5,37,268.00

*Let total takings be X then,

$X = \text{Total costs per month before passenger tax} + 0.2 X (\text{passenger tax}) + 0.3 X (\text{profit})$

$X = \text{Rs. } 2,68,634 + 0.2 X + 0.3 X$

$0.5 X = \text{Rs. } 2,68,634$ or, $X = \text{Rs. } 5,37,268$

Passenger Tax = 20% of Rs. 5,37,268 = Rs. 1,07,453.60

Profit = 30% of Rs. 5,37,268 = Rs. 1,61,180.40

Calculation of Rate per passenger km. and fares to be charged for different routes

$$\begin{aligned} \text{Rate per Passenger-Km.} &= \frac{\text{Total takings per month}}{\text{Total Passenger-Km. per month}} \\ &= \frac{\text{₹ } 5,37,268}{4,14,000 \text{ Passenger-Km.}} = \text{₹ } 1.30 \text{ (approx.)} \end{aligned}$$

Bus fare to be charged per passenger:

Delhi to Hisar	=	Rs. 1.30 x 160 km	=	Rs. 208.00
Delhi to Aligarh	=	Rs. 1.30 x 160 km	=	Rs. 208.00
Delhi to Alwar	=	Rs. 1.30 x 170 km	=	Rs. 221.00

Standard Costing

12. BabyMoon Ltd. uses standard costing system in manufacturing one of its product 'Baby Cap'. The details are as follows:

Direct Material 1 Meter @ Rs. 60 per meter Rs. 60

Direct Labour 2 hour @ Rs. 20 per hour Rs. 40

Variable overhead 2 hour @ Rs. 10 per hour Rs. 20

Total Rs. 120

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During the month of August, 10,000 units of 'Baby Cap' were manufactured. Details are as follows:
 Direct material consumed 11,400 meters @ Rs. 58 per meter
 Direct labour Hours ? @ ? Rs. 4,48,800
 Variable overhead incurred Rs. 2,24,400
 Variable overhead efficiency variance is Rs. 4,000 A. Variable overheads are based on Direct Labour Hours.

You are required to CALCULATE the following Variances:

- (a) Material Variances- Material Cost Variance, Material Price Variance and Material Usage Variance.
 (b) Variable Overheads variances- Variable overhead Cost Variance, Variable overhead Efficiency Variance and Variable overhead Expenditure Variance.
 (c) Labour variances- Labour Cost Variance, Labour Rate Variance and Labour Efficiency Variance.

ANSWER

(i) Material Variances

Budget			Std. for actual			Actual		
Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)
1	60	60	10,000	60	6,00,000	11,400	58	6,61,200

$$\text{Material Cost Variance} = (\text{SQ} \times \text{SP} - \text{AQ} \times \text{AP})$$

$$= 6,00,000 - 6,61,200 = \text{Rs. } 61,200 \text{ (A)}$$

$$\text{Material Price Variance} = (\text{SP} - \text{AP}) \text{AQ}$$

$$= (60 - 58) 11,400 = \text{Rs. } 22,800 \text{ (F)}$$

$$\text{Material Usage Variance} = (\text{SQ} - \text{AQ}) \text{SP}$$

$$= (10,000 - 11,400) 60 = \text{Rs. } 84,000 \text{ (A)}$$

(ii) Variable Overheads variances

Variable overhead cost Variance

$$= \text{Standard variable overhead} - \text{Actual Variable Overhead}$$

$$= (10,000 \text{ units} \times 2 \text{ hours} \times \text{Rs. } 10) - 2,24,400 = \text{Rs. } 24,400 \text{ (A)}$$

Variable overhead Efficiency Variance

$$= (\text{Standard Hours} - \text{Actual Hours}) \times \text{Standard Rate per Hour}$$

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Let Actual Hours be 'X', then:

$$(20,000 - X) \times 10 = 4,000 \text{ (A)}$$

$$2,00,000 - 10X = - 4,000$$

$$X = 2,04,000 \div 10$$

Therefore, Actual Hours (X) = 20,400

Variable overhead Expenditure Variance

= Variable Overhead at Actual Hours - Actual Variable Overheads

$$= 20,400 \times \text{Rs. } 10 - 2,24,400 = \text{Rs. } 20,400 \text{ (A)}$$

(iii) Labour variances

Budget			Std. for actual			Actual		
Hours	Rate (₹)	Amount (₹)	Hours	Rate (₹)	Amount (₹)	Hours	Rate (₹)	Amount (₹)
2	20	40	20,000	20	4,00,000	20,400	22*	4,48,800

*Actual Rate = Rs. 4,48,800 ÷ 20,400 hours = Rs. 22

Labour Cost Variance = (SH × SR) – (AH × AR)

$$= 4,00,000 - 4,48,800 = \text{Rs. } 48,800 \text{ (A)}$$

Labour Rate Variance = (SR – AR) × AH

$$= (20 - 22) \times 20,400 = \text{Rs. } 40,800 \text{ (A)}$$

Labour Efficiency Variance = (SH – AH) × SR

$$= (20,000 - 20,400) \times 20 = \text{Rs. } 8,000 \text{ (A)}$$

Marginal Costing

13. A company has three factories situated in North, East and South with its Head Office in Mumbai. The Management has received the following summary report on the operations of each factory for a period:

(₹ in '000)

Factory	Sales		Profit	
	Actual	Over / (Under) Budget	Actual	Over / (Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE the following for each factory and for the company as a whole for the period:

(i) Fixed Cost

(ii) Break-even Sales

ANSWER



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Computation of Profit Volume Ratio

(₹ in '000)

Factory	Sales			Profit			P/V Ratio (Change in Profit / Change in Sales)
	Actual	Over / (Under) Budget	Budgeted Sales	Actual	Over / (Under) Budget	Budget Profit	
North	1,100	(400)	1,500	135	(180)	315	45%
East	1,450	150	1,300	210	90	120	60%
South	1,200	(200)	1,400	330	(110)	440	55%

i) Computation of Fixed Costs (Rs. in '000)

Factory	Actual Sales	P/V Ratio	Contribution	Actual Profit	Fixed Cost
	(1)	(2)	(3) = (1) × (2)	(4)	(5) = (3) - (4)
North	1,100	45%	495	135	360
East	1,450	60%	870	210	660
South	1,200	55%	660	330	330
Total	3,750		2,025	675	1,350

(ii) Computation of Break-Even Sales

Factory	Fixed Cost (a)	P/V Ratio (b)	Break-even Sales (a) / (b)
North	360	45%	800
East	660	60%	1,100
South	330	55%	600
			2,500

$$\begin{aligned}
 \text{Break-even Sales (Company as Whole)} &= \frac{\text{Fixed Cost}}{\text{Composite P/V Ratio}^*} \\
 &= \frac{\text{₹ 13,50,000}}{54\%} \\
 &= \text{₹ 25,00,000}
 \end{aligned}$$

$$\text{*Composite P/V Ratio} = \frac{\text{Total Contribution}}{\text{Total Actual sales}} = \frac{2,025}{3,750} = 54\%$$



Budget and Budgetary Control

14. The accountant of manufacturing company provides you the following details for year 2019-20:

Particulars	(Rs.)
Direct materials	28,00,000
Direct Wages	16,00,000
Fixed factory overheads	16,00,000
Variable factory overheads	16,00,000
Other variable costs	12,80,000
Other fixed costs	12,80,000
Profit	18,40,000
Sales	1,20,00,000

During the year, the company manufactured two products A and B and the output and costs were:

Particulars	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	Rs. 32.00	Rs. 56.00
Direct materials per unit	Rs. 8.00	Rs. 12.00
Direct wages per unit	Rs. 4.00	Rs. 8.00

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A Rs. 4.00 per unit; and B Rs. 4.80 per unit.

During 2020-21, it is expected that the demand for product A will fall by 25% and for B by 50%. It is decided to manufacture a new product C, the cost for which is estimated as follows:

Particulars	Product C
Output (units)	2,00,000
Selling price per unit	Rs. 28.00
Direct materials per unit	Rs. 6.40
Direct wages per unit	Rs. 4.00

It is anticipated that the other variable costs per unit of Product C will be same as for product A. PREPARE a budget to present to the management, showing the current position and the position for 2020-21. COMMENT on the comparative results.



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ANSWER

Budget Showing Current Position and Position for 2020-21

	Position for 2019-20			Position for 2020-21			
	A	B	Total (A+B)	A	B	C	Total (A+B+C)
Sales (units)	2,00,000	1,00,000	–	1,50,000	50,000	2,00,000	–
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
(A) Sales	64,00,000	56,00,000	1,20,00,000	48,00,000	28,00,000	56,00,000	1,32,00,000
Direct Material	16,00,000	12,00,000	28,00,000	12,00,000	6,00,000	12,80,000	30,80,000
Direct wages	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Factory overhead (variable)	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Other variable costs	800,000	4,80,000	12,80,000	6,00,000	240,000	8,00,000	16,40,000
(B) Marginal Cost	40,00,000	32,80,000	72,80,000	30,00,000	16,40,000	36,80,000	83,20,000
(C) Contribution (A-B)	24,00,000	23,20,000	47,20,000	18,00,000	11,60,000	19,20,000	48,80,000
Fixed costs							
– Factory			16,00,000				16,00,000
– Others			12,80,000				12,80,000
(D) Total fixed cost			28,80,000				28,80,000
Profit (C – D)			18,40,000				20,00,000

Comments: Introduction of Product C is likely to increase profit by Rs. 1,60,000 (i.e. from Rs. 18,40,000 to Rs. 20,00,000) in 2020-21 as compared to 2019-20 even if the demand for Product A & B falls. Therefore, introduction of product C is recommended.

Miscellaneous**15. (a) DIFFERENTIATE between Cost Control and Cost Reduction.****ANSWER**

(a)

S. No.	Cost Control	Cost Reduction
1	Cost control aims at maintaining the costs in accordance with the established standards.	Cost reduction is concerned with reducing costs. It challenges all standards and endeavours to improvise them continuously.
2	Cost control seeks to attain lowest possible cost under existing conditions.	Cost reduction recognises no condition as permanent, since a change will result in lower cost.
3	In case of cost control, emphasis is on past and present.	In case of cost reduction, it is on present and future.
4	Cost control is a preventive function.	Cost reduction is a corrective function. It operates even when an efficient cost control system exists.
5	Cost control ends when targets are achieved.	Cost reduction has no visible end and is a continuous process.



(b) 'Like other branches of accounting, cost accounting also has certain limitations' . EXPLAIN the limitations.

ANSWER

(b) "Like other branches of accounting, cost accounting also has certain limitations". The limitations of cost accounting are as follows:

- (i) Expensive:** It is expensive because analysis, allocation and absorption of overheads requires considerable amount of additional work, and hence additional money.
- (ii) Requirement of reconciliation:** The results shown by cost accounts differ from those shown by financial accounts. Thus, preparation of reconciliation statements is necessary to verify their accuracy.
- (iii) Duplication of work:** It involves duplication of work as organization has to maintain two sets of accounts i.e. Financial Accounts and Cost Accounts

(c) DIFFERENTIATE between Job Costing and Batch Costing.

ANSWER

S. No.	Job Costing	Batch Costing
1	Method of costing used for non- standard and non-repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job.	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality.

(d) DISCUSS the treatment of by-product cost in Cost Accounting when they are of small total value.

ANSWER

When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

- (i) The sales value of the by-products may be **credited to the Costing Profit and Loss Account** and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
- (ii) The sale proceeds of the by-product may be **treated as deductions from the total costs**. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.



PAST PAPER- JULY 2021**Question 1**

Answer the following:

(a) MM Ltd. has provided the following information about the items in its inventory.

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

MM Ltd. has adopted the policy of classifying the items constituting 15% or above of Total Inventory Cost as 'A' category, items constituting 6% or less of Total Inventory Cost as 'C' category and the remaining items as 'B' category.

You are required to:

(i) Rank the items on the basis of % of Total Inventory Cost.

(ii) Classify the items into A, B and C categories as per ABC Analysis of Inventory Control adopted by MM Ltd.

ANSWER

(i) Statement of Total Inventory Cost and Ranking of items

Item code no.	Units	% of Total units	Unit cost (₹)	Total Inventory cost (₹)	% of Total Inventory cost	Ranking
101	25	3.33	50	1,250	16.67	2
102	300	40.00	1	300	4.00	6
103	50	6.67	80	4,000	53.33	1
104	75	10.00	8	600	8.00	4
105	225	30.00	2	450	6.00	5
106	75	10.00	12	900	12.00	3
	750	100	153	7,500	100	

(ii) Classifying items as per ABC Analysis of Inventory Control

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Basis for ABC Classification as % of Total Inventory Cost

15% & above -- 'A' items

7% to 14% -- 'B' items

6% & Less -- 'C' items

Ranking	Item code No.	% of Total units	Total Inventory cost (₹)	% of Total Inventory Cost	Category
1	103	6.67	4,000	53.33	
2	101	3.33	1,250	16.67	
Total	2	10.00	5,250	70.00	A
3	106	10.00	900	12.00	
4	104	10.00	600	8.00	
Total	2	20.00	1,500	20.00	B
5	105	30.00	450	6.00	
6	102	40.00	300	4.00	
Total	2	70.00	750	10.00	C
Grand Total	6	100	7,500	100	

(b) SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments	Expenses (in ₹)	Area in (Sq. Mtr)	Number of Employees
Main Department:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Departments:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Metres' and 'Number of Employees' respectively.

You are required to:

- Prepare a Statement showing the distribution of expenses of Service Departments to the Main Departments using the "Step Ladder method" of Overhead Distribution.
- Compute the Rate per hour of each Main Department, given that, the Purchase Department, Packing Department and Distribution Department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays.

ANSWER

- Schedule Showing the Distribution of Expenses of Service Departments using Step ladder method.



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	Main Department			Service Department	
	Purchase (₹)	Packing (₹)	Distribution (₹)	Maintenance (₹)	Personnel (₹)
Expenses	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Distribution of Maintenance Department (12:15:7:-:6)	1,92,000	2,40,000	1,12,000	(6,40,000)	96,000
Distribution of Personnel Department (800:1700:700:-:-)	1,04,000	2,21,000	91,000	-	(4,16,000)
Total	7,96,000	12,61,000	5,53,000	-	-

(ii) Calculation of Expenses rate per hour of Main Department

	Purchase (₹)	Packing (₹)	Distribution (₹)
Total apportioned expenses (₹)	7,96,000	12,61,000	5,53,000
Total Hours worked	4,380 (12 x 365)	8,760 (24 x 365)	2,920 (8 x 365)
Expenses rate per hour (₹)	181.74	143.95	189.38

(c) AUX Ltd. has an Annual demand from a single customer for 60,000 Covid-19 vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

(i) Find the most Economical Production Run.

(ii) Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.

ANSWER

(i) Calculation of most Economical Production Run

$$= \sqrt{(\text{₹ } 2 \times 60,000 \times 4,800) / (12 \times 12)}$$

$$= 2,000 \text{ Vaccine}$$

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(ii) Calculation of Extra Cost due to processing of 15,000 vaccines in a batch

	When run size is 2,000 vaccines	When run size is 15,000 vaccines
Total set up cost	= $60,000 \times ₹ 4,800 / 2,000$ = ₹ 1,44,000	= $60,000 \times ₹ 4,800 / 15,000$ = ₹ 19,200
Total Carrying cost	$\frac{1}{2} \times 2,000 \times ₹ 144$ = ₹ 1,44,000	$\frac{1}{2} \times 15,000 \times ₹ 144$ = ₹ 10,80,000
Total Cost	₹ 2,88,000	₹ 10,99,200

Thus, extra cost = ₹ 10,99,200 – ₹ 2,88,000 = ₹ 8,11,200

(d) LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:

- (1) Cost Indifference Point in units. Interpret your results.
- (2) The Break-even Point of each method in terms of units

ANSWER

(i) Cost Indifference Point

	Method-1 and Method-2 (₹)
Differential Fixed Cost (I)	₹ 2,00,000 (₹ 3,00,000 – ₹ 1,00,000)
Differential Variable Costs (II) (₹ 15 – ₹ 10)	₹ 5
Cost Indifference Point (I/II)	40,000 (Differential Fixed Cost / Differential Variable Costs <i>per unit</i>)

Interpretation of Results

At activity level below the indifference points, the alternative **with lower fixed costs and higher variable costs should be used**. At activity level above the indifference point, alternative with **higher fixed costs and lower variable costs should be used**.



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No. of Product	Alternative to be Chosen
Product ≤ 40,000 units	Method-1, Semi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

(ii) Break Even point (in units)

	Method-1	Method-2
BEP (in units) = $\frac{\text{Fixed cost}}{\text{Contribution per unit}}$	$\frac{1,00,000}{(25-15)} = 10,000$	$\frac{3,00,000}{(25-10)} = 20,000$

Question 2

(a) The following data relates to manufacturing of a standard product during the month of March, 2021:

Particulars	Amount (in ₹)
Stock of Raw material as on 01-03-2021	80,000
Work in Progress as on 01-03-2021	50,000
Purchase of Raw material	2,00,000
Carriage Inwards	20,000
Direct Wages	1,20,000
Cost of special drawing	30,000
Hire charges paid for Plant	24,000
Return of Raw Material	40,000
Carriage on return	6,000
Expenses for participation in Industrial exhibition	8,000
Legal charges	2,500
Salary to office staff	25,000
Maintenance of office building	2,000
Depreciation on Delivery van	6,000
Warehousing charges	1,500
Stock of Raw material as on 31-03-2021	30,000
Stock of Work in Progress as on 31-03-2021	24,000

- Store overheads on materials are 10% of material consumed.
- Factory overheads are 20% of the Prime cost.
- 10% of the output was rejected and a sum of ₹ 5,000 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products were rectified at an additional expenditure which is equivalent to 20% of proportionate direct wages.
- The total output was 8000 units during the month.

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You are required to prepare a Cost Sheet for the above period showing the:

(i) Cost of Raw Material consumed.

(ii) Prime Cost

(iii) Work Cost

(iv) Cost of Production

(v) Cost of Sales

ANSWER

Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
(i) Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	(30,000)	2,30,000
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	
Hire charges paid for Plant	24,000	54,000
(ii) Prime Cost		4,04,000
Carriage on return	6,000	
Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	80,800	
Additional expenditure for rectification of defective products (refer working note)	2,160	1,11,960
Gross factory cost		5,15,960
Add: Opening value of W-I-P		50,000
Less: Closing value of W-I-P		(24,000)
(iii) Works/ Factory Cost		5,41,960
Less: Realisable value on sale of scrap		(5,000)
(iv) Cost of Production		5,36,960
Add: Opening stock of finished goods		-
Less: Closing stock of finished goods		-
Cost of Goods Sold		5,36,960
Administrative overheads:		
Maintenance of office building	2,000	
Salary paid to Office staff	25,000	
Legal Charges	2,500	29,500
Selling overheads:		
Expenses for participation in Industrial exhibition	8,000	8,000
Distribution overheads:		
Depreciation on delivery van	6,000	
Warehousing charges	1,500	7,500
(v) Cost of Sales		5,81,960

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Alternative Solution (considering Hire charges paid for Plant as indirect expenses)
Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	(30,000)	2,30,000
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	30,000
Prime Cost		3,80,000
Hire charges paid for Plant	24,000	
Carriage on return	6,000	
Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	76,000	
Additional expenditure for rectification of defective products (refer working note)	2,160	1,31,160
Gross factory cost		5,11,160
Add: Opening value of W-I-P		50,000
Less: Closing value of W-I-P		(24,000)
Works/ Factory Cost		5,37,160
Less: Realisable value on sale of scrap		(5,000)
Cost of Production		5,32,160
Add: Opening stock of finished goods		-
Less: Closing stock of finished goods		-
Cost of Goods Sold		5,32,160
Administrative overheads:		
Maintenance of office building	2,000	
Salary paid to Office staff	25,000	
Legal Charges	2,500	29,500
Selling overheads:		
Expenses for participation in Industrial exhibition	8,000	8,000
Distribution overheads:		
Depreciation on delivery van	6,000	
Warehousing charges	1,500	7,500
Cost of Sales		5,77,160

Working Notes:
1. Number of Rectified units

Total Output	8,000 units
Less: Rejected 10%	800 units
Finished product	7,200 units
Rectified units (10% of finished product)	720 units

2. Proportionate additional expenditure on 720 units

= 20% of proportionate direct wages
= $0.20 \times (\text{₹ } 1,20,000 / 8,000) \times 720$
= ₹ 2,160

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(b) OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the split-off point - S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and N can be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oil and processing it were ₹ 40,000. Other details are as follows:

Product	Further processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A		20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions.

ANSWER

Statement of Comparison of Profits before and after further processing

	S (₹)	P (₹)	N (₹)	A (₹)	TOTAL (₹)
A. Sales at split off point	20,000	12,000	28,000	20,000	80,000
B. Apportioned Joint Costs (Refer Working Note)	10,000	6,000	14,000	10,000	40,000
C. Profit at split-off point	10,000	6,000	14,000	10,000	40,000
D. Sales after further processing	1,20,000	40,000	48,000	-	2,08,000
E. Further processing cost	80,000	32,000	36,000	-	1,48,000
F. Apportioned Joint Costs (Refer Working Note)	10,000	6,000	14,000	-	-
G. Profit if further processing (D – E + F)	30,000	2,000	(-) 2,000	-	-
H. Increase/ decrease in profit after further processing (G-C)	20,000	- 4,000	- 16,000	-	-

Suggested Product to be further processed for maximising profits:

On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e. ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

Working Note:

Apportionment of joint costs on the basis of Sales Value at split-off point

Apportioned joint cost = Total joint cost × Sales value of each product / Total Sales value at split-off point

Where,

Total Joint cost = ₹ 40,000

Total sales at split off point (S, P, N and A) = 20,000 + 12,000 + 28,000 + 20,000

= ₹ 80,000

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Share of S in joint cost = ₹
 $\text{₹}40,000 \times \text{₹} 20,000 / 80,000$
 = ₹ 10,000

Share of P in joint cost = ₹
 $\text{₹}40,000 \times \text{₹} 12,000 / 80,000$
 = ₹ 6,000

Share of N in joint cost = ₹
 $\text{₹}40,000 \times \text{₹} 28,000 / 80,000$
 = ₹ 14,000

Share of A in joint cost = ₹
 $\text{₹}40,000 \times \text{₹} 20,000 / 80,000$
 = ₹ 10,000

Alternative Solution

Decision for further processing of Product S, P and N

Products	S (₹)	P (₹)	N (₹)
Sales revenue after further processing	1,20,000	40,000	48,000
Less: sales value at split-off point	20,000	12,000	28,000
Incremental Sales Revenue	1,00,000	28,000	20,000
Less: Further Processing cost	80,000	32,000	36,000
Profit/ loss arising due to further processing	20,000	(-)4,000	(-)16,000

Suggested Product to be further processed for maximising profits:

On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e. ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

(c) Following information is given of a newly setup organization for the year ended on 31st March, 2021.

Number of workers replaced during the period	50
Number of workers left and discharged during the period	25
Average number of workers on the roll during the period	500

You are required to:

- Compute the Employee Turnover Rates using Separation Method and Flux Method.
- Equivalent Employee Turnover Rates for (i) above, given that the organization was setup on 31st January, 2021.

ANSWER

(i) Employee Turnover rate

Using Separation method:

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= Number of employees Separated during the period X 100 / Average number of employees during the period on roll

$$= 25 \times 100 / 500$$

$$= 5\%$$

Using Flux method:

= Number of employees Separated

= Number of employees Replaced during the period X 100 / Average number of employees during the period on roll

$$= (50 + 25) \times 100 / 500$$

$$= 15\%$$

(ii) Equivalent Employee Turnover rate:

= Employee Turnover rate for the period X 365 / Number of days in the period

Using Separation method = $5 \times 365 / 60 = 30.42\%$

$$\text{Or, } = 5 \times 360 / 60 = 30\%$$

$$\text{Or, } = 5 \times 12 / 2 = 30\%$$

Using Flux method = $15 \times 365 / 60 = 91.25\%$

$$\text{Or, } = 15 \times 360 / 60 = 90\%$$

$$\text{Or, } = 15 \times 12 / 2 = 90\%$$

Question 3

(a) The Profit and Loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit and Loss account

(for the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales (15000 units)	15,00,000
To Direct Wages	3,50,000	By Dividend received	9,000
To Factory overheads	2,60,000		
To Administrative overheads	1,05,000		
To Selling overheads	85,000		
To Loss on sale of investments	2,000		
To Net Profit	57,000		
	15,09,000		15,09,000

- Factory overheads are 50% fixed and 50% variable.
- Administrative overheads are 100% fixed.
- Selling overheads are completely variable.
- Normal production capacity of ABC Ltd. is 20,000 units.
- Indirect Expenses are absorbed in the cost accounts on the basis of normal production capacity.



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- Notional rent of own premises charged in Cost Accounts is amounting to ₹ 12,000.

You are required to:

- Prepare a Cost Sheet and ascertain the Profit as per Cost Records for the year ended 31st March, 2021.
- Reconcile the Profit as per Financial Records with Profit as per Cost Records.

ANSWER
(i) Cost Sheet

(for the year ended 31st March, 2021)

	(₹)	(₹)
Direct material		6,50,000
Direct wages		3,50,000
Prime cost		10,00,000
Factory Overheads:		
Variable (50% of ₹ 2,60,000)	1,30,000	
Fixed (₹ 1,30,000 × 15,000/20,000)	97,500	2,27,500
Works cost		12,27,500
Administrative Overheads (₹ 1,05,000 × 15,000/20,000)		78,750
Notional Rent		12,000
Cost of production		13,18,250
Selling Overheads		85,000
Cost of Sales		14,03,250
Profit (Balancing figure)		96,750
Sales revenue		15,00,000

(ii) Statement of Reconciliation

(Reconciling profit shown by Financial and Cost Accounts)

	(₹)	(₹)
Profit as per Cost Account		96,750
Add: Dividend received	9,000	
Add: Notional Rent	12,000	21,000
Less: Factory Overheads under-charged in Cost Accounts (₹ 2,60,000 – ₹ 2,27,500)	32,500	
Less: Administrative expenses under-charged in Cost Accounts (₹ 1,05,000 – ₹ 78,750)	26,250	
Less: Loss on sale of Investments	2,000	(60,750)
Profit as per Financial Accounts		57,000

(b) PQR Ltd. is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below:

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour hours	Labour hours	30,000 Labour hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. of Inspection	8000 Inspections	2,40,000



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The consumption of activities during the period is as under:

Activity / Products	P	Q	R
Direct Labour hours	10,000	8,000	6,000
Production runs	200	180	160
Quality Inspection	3,000	2,500	1,500

You are required to:

- Compute the costs allocated to each Product from each Activity.
- Calculate the cost of unused capacity for each Activity.
- A potential customer has approached the company for supply of 12,000 units of a new product. 'S' to be delivered in lots of 1500 units per quarter. This will involve an initial design cost of ₹ 30,000 and per quarter production will involve the following:

Direct Material	₹ 18,000
Direct Labour hours	1,500 hours
No. of Production runs	15
No. of Quality Inspection	250

Prepare cost sheet segregating Direct and Indirect costs and compute the Sales value per quarter of product 'S' using ABC system considering a markup of 20% on cost.

ANSWER

(i) Statement of cost allocation to each product from each activity

PRODUCTS: -	P (₹)	Q (₹)	R (₹)	TOTAL (₹)
Direct Labour hours (Refer to working note)	1,00,000 (10,000 Labour hours × ₹10)	80,000 (8,000 Labour hours × ₹10)	60,000 (6,000 Labour hours × ₹10)	2,40,000
Production runs (Refer to working note)	60,000 (200 Production runs × ₹ 300)	54,000 (180 Production runs × ₹ 300)	48,000 (160 Production runs × ₹ 300)	1,62,000
Quality Inspections (Refer to working note)	90,000 (3,000 Inspections × ₹30)	75,000 (2,500 Inspections × ₹ 30)	45,000 (1,500 Inspections × ₹ 30)	2,10,000

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Working note:**Rate per unit of cost driver**

Direct Labour hours	(₹ 3,00,000/30,000 Labour hours)	₹ 10 per Labour hour
Production runs	(₹ 1,80,000/600 Production runs)	₹ 300 per Production run
Quality Inspection	(₹ 2,40,000/8,000 Inspections)	₹ 30 per Inspection

(ii) Computation of cost of unused capacity for each activity

Particulars	(₹)
Direct Labour hours [(₹ 3,00,000 – ₹ 2,40,000) or (6,000 x ₹ 10)]	60,000
Production runs [(₹ 1,80,000 – ₹ 1,62,000) or (60 x ₹ 300)]	18,000
Quality Inspection [(₹ 2,40,000 – ₹ 2,10,000) or (1,000 x ₹ 30)]	30,000
Total cost of unused capacity	1,08,000

(iii) Cost sheet and Computation of Sales value per quarter of product 'S' using ABC system

Particulars	(₹)
1500 units of product 'S' to be delivered per quarter	
Initial design cost per quarter (₹ 30,000 / 8 quarters)	3,750
Direct Material Cost	18,000
Direct Labour Cost (1,500 Labour hours x ₹ 10)	15,000
Direct Costs (A)	36,750
Set up Cost (15 Production runs x ₹ 300)	4,500
Inspection Cost (250 Inspections x ₹ 30)	7,500
Indirect Costs (B)	12,000
Total Cost (A + B)	48,750
Add: Mark-up (20% on cost)	9,750
Sale Value	58,500
Selling Price per unit 'S' (₹ 58,500/1500 units)	39

Question 4

(a) A Manufacturing unit manufactures a product 'XYZ' which passes through three distinct Processes - X, Y and Z.

The following data is given:

	Process X	Process Y	Process Z
Material consumed (in ₹)	2,600	2,250	2,000
Direct wages (in ₹)	4,000	3,500	3,000



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☒ The total Production Overhead of ₹ 15,750 was recovered @ 150% of Direct wages.

- 15,000 units at ₹ 2 each were introduced to Process 'X'.
 - The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'Z'.
 - No stock of materials or work in progress was left at the end.
- The following additional information is given:

Process	% of wastage to normal input	Value of Scrap per unit (₹)
X	6%	1.10
Y	?	2.00
Z	5%	1.00

You are required to:

- Find out the percentage of wastage in process 'Y', given that the output of Process 'Y' is transferred to Process 'Z' at ₹ 4 per unit.
- Prepare Process accounts for all the three processes X, Y and Z.

ANSWER

Dr.		Process-X Account				Cr.	
Particulars	Units	(₹)	Particulars	Units	(₹)		
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 1.1]	900	990		
" Additional material	--	2,600	" Process-Y A/c (₹ 2.951* × 14,100 units)	14,100	41,610		
" Direct wages	--	4,000					
" Production OH	--	6,000					
	15,000	42,600		15,000	42,600		

*Cost per unit of completed units

$$= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs units} - \text{Normal loss units}} = \frac{₹ 42,600 - ₹ 990}{15,000 \text{ units} - 900 \text{ units}} = ₹ 2.951$$



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Dr.		Process-Y Account		Cr.	
Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c [(13.44% of 14,100 units) x ₹ 2]	1,895	3,790
" Additional material	--	2,250	" Process-Z A/c (₹ 4 × 12,205 units)	12,205	48,820
" Direct wages	--	3,500			
" Production OH	--	5,250			
	14,100	52,610		14,100	52,610

*Calculation for % of wastage in process 'Y':

Let's consider number of units lost under process 'Y' = A

Now, (Total Cost - Realisable value from normal loss) /

(Inputs units - Normal loss units) = 4

(₹ 52,610 - ₹ 2A) / (14,100 units - A) = ₹ 4

₹ 52,610 - ₹ 2A = ₹ 56,400 - ₹ 4A

2A = ₹ 3,790 => A = 1,895 units

% of wastage = 1,895 units / 14,100 units = **13.44%**

Dr.		Process-Z Account		Cr.	
Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-Y A/c	12,205	48,820	By Normal Loss A/c [(5% of 12,205 units) x ₹ 1]	610	610
" Additional material	--	2,000	" Finished Stock A/c (₹ 4.9771 ⁵ × 12,000 units)	12,000	59,726
" Direct wages	--	3,000			
" Production OH	--	4,500			
" Abnormal gain (₹ 4.9771 ⁵ × 405 units)	405	2,016			
	12,610	60,336		12,610	60,336

⁵Cost per unit of completed units

$$= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs units} - \text{Normal loss units}} = \frac{₹ 58,320 - ₹ 610}{12,205 \text{ units} - 610 \text{ units}} = ₹ 4.9771$$

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Alternative Solution

Dr.		Process-X Account				Cr.	
Particulars	Units	(₹)	Particulars	Units	(₹)		
To Material introduced	15,000	30,000	By Normal Loss A/c [(6% of 15,000 units) x ₹ 1.1]	900	990		
" Additional material	--	2,600	" Process-Y A/c (₹ 2.951* x 14,100 units)	14,100	41,610		
" Direct wages	--	4,000					
" Production OH	--	6,000					
	15,000	42,600		15,000	42,600		

*Cost per unit of completed units

$$= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs units} - \text{Normal loss units}} = \frac{₹ 42,600 - ₹ 990}{15,000 \text{ units} - 900 \text{ units}} = ₹ 2.951$$

Dr.		Process-Y Account				Cr.	
Particulars	Units	(₹)	Particulars	Units	(₹)		
To Process-X A/c	14,100	41,610	By Normal Loss A/c [(#13.44% of 14,100 units) x ₹ 2]	1,895	3,790		
" Additional material	--	2,250	" Process-Z A/c (₹ 4 x 12,631@ units)	12,631	50,524		
" Direct wages	--	3,500					
" Production OH	--	5,250					
" Abnormal gain (₹ 4 x 426 units)	426	1,704					
	14,526	54,314		14,526	54,314		

Working Notes:

@1. Units Transferred from Process Z Account to Finished Stock = 12,000 Units i.e 95% of Inputs.
So, Input of Z or Output of Y is $12,000 \times 100/95 = 12,631$ Units and Normal Loss (5%) is 631 units.

2. Let's consider number of units lost under process 'Y' as:

For Normal loss = A

For Abnormal loss = B

Now, $A + B = 1,469$ [i.e. $14,100 - 12,631$] ... (I)

$(A \times ₹ 2 \text{ per unit}) + (B \times ₹ 4 \text{ per unit}) = [52,610 - 50,524]$

$2A + 4B = 2,086$... (II)

Now, putting the values of (I) in (II), we get,

$2(1,469 - B) + 4B = 2,086$

$2938 - 2B + 4B = 2,086$

$2B = -852 \Rightarrow B = -426$ units

Since, the figure of B is in negative, it is an abnormal gain of 426 units.



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Further, A (i.e. normal loss) = 1,469 + 426 = 1,895 units

#3. % of wastage in Process Y Account = 1,895 units / 14,100 units = **13.44%**

Dr.		Process-Z Account				Cr.	
Particulars	Units	(₹)	Particulars	Units	(₹)		
To Process-Y A/c	12,631	50,524	By Normal Loss A/c [(5% of 12,631 units) x ₹ 1]	631	631		
" Additional material	—	2,000					
" Direct wages	—	3,000					
" Production OH	—	4,500	" Finished Stock A/c (₹ 4.9494 ⁵ × 12,000 units)	12,000	59,393		
	12,631	60,024		12,631	60,024		

⁵Cost per unit of completed units

$$= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs units} - \text{Normal loss units}} = \frac{₹ 60,024 - ₹ 631}{12,631 \text{ units} - 631 \text{ units}} = ₹ 4.9494$$

(b) MRSL Healthcare Ltd. has incurred the following expenditure during the last year for its newly launched 'COVID-19' Insurance policy:

Office administration cost	48,00,000
Claim management cost	3,80,000
Employees cost	16,20,000
Postage and logistics	32,40,000
Policy issuance cost	29,50,000
Facilities cost	46,75,000
Cost of marketing of the policy	1,38,90,000
Policy development cost	35,00,000
Policy servicing cost	96,45,000
Sales support expenses	32,00,000
I.T. Cost	?

Number of Policy sold: 2,800

Total insured value of policies - ₹ 3,500 Crores

Cost per rupee of insured value - ₹ 0.002

You are required to:

(i) Calculate Total Cost for "COVID-19" Insurance policy segregating the costs into four main activities namely (a) Marketing and Sales support (b) Operations (c) I.T. Cost and (d) Support functions.

(ii) Calculate Cost Per Policy.

ANSWER

(i) Calculation of total cost for 'COVID-19' Insurance policy

Particulars	Amount (₹)	Amount (₹)
a. Marketing and Sales support:		
- Policy development cost	35,00,000	
- Cost of marketing	1,38,90,000	
- Sales support expenses	32,00,000	2,05,90,000
b. Operations:		
- Policy issuance cost	29,50,000	
- Policy servicing cost	96,45,000	
- Claim management cost	3,80,000	1,29,75,000
c. IT Cost*		2,21,00,000
d. Support functions		
- Postage and logistics	32,40,000	
- Facilities cost	46,75,000	
- Employees cost	16,20,000	
- Office administration cost	48,00,000	1,43,35,000
Total Cost		7,00,00,000

IT cost

= (₹ 3,500 crores x 0.002) = ₹ 4,79,00,000 = ₹ 2,21,00,000

(ii) Calculation of cost per policy = Total cost / No. of policies

= ₹ 7,00,00,000 / 2,800 = ₹ 25,000

(c) Brick Constructions Ltd. commenced a contract on April 1, 2020. The contract was for ₹ 10,00,000. The following information relates to the Contract as on 31st March, 2021:

- The value of work completed up to Feb. 28, 2021 was certified by the architect and as a matter of policy, the Contractee has retained ₹ 1,30,000 as retention money which is 20% of the certified work and paid the balance amount.
- The cost of work completed subsequent to the architect's certificate was of ₹ 30,000.

22) The expenditure incurred related to material purchase, wages and other chargeable expenses were ₹ 5,10,000

- Materials of the value of ₹ 20,000 were lying on the site.
- A special plant was purchased specifically for this contract at ₹ 40,000 and after use on this contract till 31st March, 2021, it was valued at ₹ 25,000.

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You are required to compute the value of Work Certified, Cash received for certified work and Notional profit of the contract for the year ended on 31st March, 2021.

ANSWER

1. Value of Work Certified

= ₹ 1,30,000 / 20% = ₹ 6,50,000

2. Cash Received

= Value of Work certified – Retention Money

= 6,50,000 – 1,30,000 = ₹ 5,20,000

3. Notional Profit

= Value of Work certified – Cost of work certified

= 6,50,000 - 4,75,000* = ₹ 1,75,000

*Working Note

Cost of work certified = Work cost - Cost of work uncertified

= (Expenditure + Plant used – Material at site) - Cost of work uncertified

= [5,10,000 + (40,000 - 25,000) - 20,000] - 30,000 = ₹ 4,75,000

Question 5

(a) The standard output of a Product 'DJ' is 25 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 6.20, ₹ 6.00 and ₹ 5.70 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 240 (F).

You are required to compute:

- (i) Total Labour Cost Variance.
- (ii) Total Labour Rate Variance.
- (iii) Total Labour Gang Variance.
- (iv) Total Labour Yield Variance, and
- (v) Total Labour Idle Time Variance.

ANSWER

Working Notes:

1. Calculation of Standard Man hours

When 100 workers work for 1 hour, the standard output is 25 units.

Standard man hours per unit = 100 hours / 25 units = 4 hours per unit

2. Calculation of standard man hours for actual output:

= 960 units x 4 hours = 3,840 hours.



3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	6.2	2,480	20	380
Group 'B'	30	1,200	6	7,200	60	1,140
Group 'C'	60	2,400	5.7	13,680	120	2,280
	100	4,000		23,360	200	3,800

4. Calculation of Standard wage Rate:

Labour Efficiency Variance = 240F

(Standard hours for Actual production – Actual Hours) x SR = 240F

$(3,840 - 3,800) \times SR = 240$

Standard Rate (SR) = ₹ 6 per hour

(i) Total Labour Cost Variance

= (Standard hours x Standard Rate) – (Actual Hours x Actual rate)

= $(3,840 \times 6) - 23,360 = 320A$

(ii) Total Labour Rate Variance

= (Standard Rate – Actual Rate) x Actual Hours

Group 'A' = $(6 - 6.2) 400 = 80A$

Group 'B' = $(6 - 6) 1,200 = 0$

Group 'C' = $(6 - 5.7) 2,400 = 720F$

640F

(iii) Total Labour Gang Variance

= Total Actual Time Worked (hours) x {Average Standard Rate per hour of Standard Gang - Average Standard Rate per hour of Actual Gang@}

@ on the basis of hours worked

= $((6) - (3,840 \times 6 / 3,800)) \times 3,800$

= 0

i (iv) Total Labour Yield Variance

= Average Standard Rate per hour of Standard Gang x {Total Standard Time (hours) - Total Actual Time worked (hours)}

= $6 \times (3,840 - 3,800)$

= 240F

(v) Total Labour idle time variance

= Total Idle hours x standard rate per hour

= 200 hours x 6

= **1,200A**

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(b) PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished Goods (in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional Information:

- Closing stock of finished goods at the end of March, 2021 is 10,000 units.
- Each unit of finished output requires 2 kg of Raw Material 'A' and 3 kg of Raw Material 'B'.

You are required to prepare the following budgets for the period November, 2020 to March, 2021 on monthly basis:

- Sales Budget (in ₹)
- Production budget (in units) and
- Raw material Budget for Raw material 'A' and 'B' separately (in units)

ANSWER

(i) Sales Budget (in ₹)

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales (in Units)	30,000	35,000	38,000	25,000	40,000	1,68,000
Selling Price per unit (₹)	10	12	15	15	20	-
Total Sales (₹)	3,00,000	4,20,000	5,70,000	3,75,000	8,00,000	24,65,000

(ii) Production Budget (in units)

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Sales	30,000	35,000	38,000	25,000	40,000	1,68,000
Add: Closing stock of finished goods	3,000	9,000	8,000	6,000	10,000	36,000
Total quantity required	33,000	44,000	46,000	31,000	50,000	2,04,000
Less: Opening stock of finished goods	7,500	3,000	9,000	8,000	6,000	33,500
Units to be produced	25,500	41,000	37,000	23,000	44,000	1,70,500

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(iii) Raw material budget (in units)

For Raw material 'A'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	2	2	2	2	2	-
Total raw material consumption (Kg.): (a × b)	51,000	82,000	74,000	46,000	88,000	3,41,000

For Raw material 'B'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	3	3	3	3	3	-
Total raw material consumption (Kg.): (a × b)	76,500	1,23,000	1,11,000	69,000	1,32,000	5,11,500

Question 6

Answer any four of the following:

(a) Specify the types of Responsibility centres under the following situations:

(i) Purchase of bonds, stocks, or real estate property.

(ii) Ticket counter in a Railway station.

(iii) Decentralized branches of an organization.

(iv) Maharana, Navratna and Miniratna public sector undertaking (PSU) of Central Government.

(v) Sales Department of an organization.

ANSWER

Particulars	Types of Responsibility Centre
(i) Purchase of bonds, stocks, or real estate property.	Investment Centre
(ii) Ticket counter in a Railway station.	Revenue Centre
(iii) Decentralized branches of an organization.	Profit Centre
(iv) Maharatna, Navratna and Miniratna public sector undertaking (PSU) of Central Government.	Investment Centre
(v) Sales Department of an organization.	Revenue Centre

(b) What is Margin of Safety? What does a large Margin of Safety indicates? How can you calculate Margin of Safety?

ANSWER

Margin of Safety: The margin of safety can be defined as the difference between the expected level of sale and the breakeven sales.

The larger the margin of safety, the higher is the chances of making profits.

The Margin of Safety can be **calculated by** identifying the difference between the projected sales and breakeven sales in units multiplied by the contribution per unit. This is possible because, at the breakeven point all the fixed costs are recovered and any further contribution goes into the making of profits.

Margin of Safety = (Projected sales – Breakeven sales) in units x contribution per unit

It also can be calculated as:

Margin of Safety = Profit / (P/V Ratio)

(c) Rowan Premium Bonus system does not motivate a highly efficient worker as a less efficient worker and a highly efficient worker can obtain same bonus under this system. Discuss with an example.

ANSWER

Rowan Premium Plan: According to this system a standard time allowance is fixed for the performance of a job and bonus is paid if time is saved.

Under Rowan System, the bonus is that proportion of the time wages as time saved bears to the standard time.

Bonus = $\frac{\text{Time taken} \times \text{Rate per hour} \times \text{Time Saved}}{\text{Time Allowed}}$

Example explaining highly efficient worker and less efficient worker obtaining same bonus:

Time rate (per Hour) ₹ 60

Time allowed 8 hours.

Time taken by 'X' 6 hours.

Time taken by 'Y' 2 hours.

Bonus = $\frac{\text{Time taken} \times \text{Rate per hour} \times \text{Time Saved}}{\text{Time Allowed}}$

For 'X' = 2 hours 8 hours × 6 hours × ₹ 60 = ₹ 90

For 'Y' = 6 hours 8 hours × 2 hours × ₹ 60 = ₹ 90

From the above example, it can be concluded that a highly efficient worker may obtain same bonus as less efficient worker under this system.

(d) What do you understand by Build-Operate-Transfer (BOT) approach in Service Costing? How is the Toll rate computed?

ANSWER

Build-Operate-Transfer (BOT) Approach: In recent years a growing trend emerged among Governments in many countries to solicit investments for public projects from the private sector under BOT scheme. **BOT is an option for the Government to outsource public projects to the private sector.**

With BOT, the private sector designs, finances, constructs and operate the facility and eventually, after specified concession period, the ownership is transferred to the Government. Therefore, BOT can be seen as a developing technique for infrastructure projects by making them amenable to private sector participation.

Toll Rate: In general, the toll rate should have a direct relation with the benefits that the road users would gain from its improvements. The benefits to road users are likely to be in terms of fuel savings, improvement in travel time and good riding quality.

To compute the toll rate, following formula may be used

= $\frac{\text{Total Cost} + \text{Profit}}{\text{Number of Vehicles}}$

Or, to compute the toll rate following formula with rounding off to nearest multiple of five has been adopted: User fee = Total distance x Toll rate per km.

(e) Write a short note on VED analysis of Inventory Control.

ANSWER

Vital, Essential and Desirable (VED): Under this system of inventory analysis, **inventories are classified on the basis of its criticality for the production function and final product.** Generally, this classification is done for spare parts which are used for production.

(i) Vital- Items are classified as vital when its **unavailability can interrupt the production process and cause a production loss.** Items under **this category are strictly controlled by setting re-order level.**

(ii) Essential- Items under this category are essential but not vital. **The unavailability may cause sub standardisation and loss of efficiency in production process.** Items under this category are reviewed periodically and get the second priority.

(iii) Desirable- Items under this category are optional in nature; **unavailability does not cause any production or efficiency loss.**



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1. Answer the following:

(a) A factory produces two products, 'Ghee' and 'Cream' from a single process. The joint processing costs during a particular month are:

Direct Material ₹ 60,000

Direct Labour ₹ 19,200

Variable Overheads ₹ 24,000

Fixed Overheads ₹ 64,000

Sales: Ghee - 200 litre @ ₹ 600 per litre; Cream – 240 litre @ ₹ 200 per litre.

REQUIRED:

I. Apportion joints costs on the basis of:

(i) Physical Quantity of each product.

(ii) Contribution Margin method, and

II. Determine Profit or Loss under both the methods.

ANSWER

Total Joint Cost

Particulars	Amount (₹)
Direct Material	60,000
Direct Labour	19,200
Variable Overheads	24,000
Total Variable Cost	1,03,200
Fixed Overheads	64,000
Total joint cost	1,67,200

Apportionment of Joint Costs:



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			Product-Ghee	Product-Cream
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	₹ 76,000 $\left(\frac{₹ 1,67,200}{200 + 240 \text{ litre}} \times 200\right)$	₹ 91,200 $\left(\frac{₹ 1,67,200}{200 + 240 \text{ litre}} \times 240\right)$
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
	-	Variable Costs (on basis of physical units)	₹ 46,909 $\left(\frac{₹ 1,03,200}{200 + 240 \text{ litre}} \times 200\right)$	₹ 56,291 $\left(\frac{₹ 1,03,200}{200 + 240 \text{ litre}} \times 240\right)$
		Contribution Margin	73,091 (₹600×200 – 46,909)	- 8,291 (₹200×240 – 56,291)
		Fixed Costs*	₹ 64,000	
		Total apportioned cost	₹ 1,10,909	₹ 56,291
	II.	(iii)	Profit or Loss:	
When Joint cost apportioned on basis of physical units				
A.		Sales Value	₹ 1,20,000	₹ 48,000
B.		Apportioned joint cost on basis of 'Physical Quantity':	₹ 76,000	₹ 91,200
A-B		Profit or (Loss)	44,000	(43,200)
When Joint cost apportioned on basis of 'Contribution Margin Method'				

C		Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 1,10,909	₹ 56,291
A-C		Profit or (Loss)	₹ 9,091	₹ (8,291)

* The fixed cost of ₹ 64,000 is to be apportioned over the joint products- Ghee and Cream in the ratio of their contribution margin but contribution margin of Product- Cream is Negative so fixed cost will be charged to Product-Ghee only.

(b) Zee Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. A Ltd. is expected to have a market share of 2.15% of the total market demand of the pistons in the coming year. It is estimated that it costs ₹ 2.50 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is ₹ 4,500.

(i) COMPUTE the optimum run size for piston manufacturing?

(ii) Assuming that the company has a policy of manufacturing 20,000 pistons per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

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ANSWER

(i) Optimum run size or Economic Batch Quantity (EBQ) = $\sqrt{2 \times D \times S} / C$

Where, D = Annual demand i.e. 2.15% of 8,00,00,000 = 17,20,000 units

S = Set-up cost per run = ₹ 4,500

C = Inventory holding cost per unit per annum

= ₹ 2.5 × 12 months = ₹ 30

EBQ = $\sqrt{2 \times 17,20,000 \text{ units} \times ₹ 4,500} / ₹ 30 = 22,716 \text{ units}$

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (₹)	Inventory holding cost (₹)	Total Cost (₹)
A	20,000 units	86 $\left(\frac{17,20,000}{20,000}\right)$	3,87,000 (86 × ₹ 4,500)	3,00,000 $\left(\frac{20,000 \times ₹ 30}{2}\right)$	6,87,000
B	22,716 units	76 $\left(\frac{17,20,000}{22,716}\right)$	3,42,000 (76 × ₹ 4,500)	3,40,740 $\left(\frac{22,716 \times ₹ 30}{2}\right)$	6,82,740
	Extra Cost (A – B)				4,260

(d) From the following particulars, COMPUTE Notional profit and estimated profit on a contract (which has been 80% complete):

(₹)

Total expenditure to date 4,00,000

Estimated further expenditure to complete the contract (including contingencies) 22,000

Contract price 5,44,000

Work certified 4,89,600

Work uncertified 30,200

Cash received 3,91,680

ANSWER

Computation of machine hour rate of new Machine

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	Total (₹)	Per hour (₹)
A. Standing Charges		
I. Insurance Premium ₹ 9,000 × $\frac{1}{9}$	1,000	
II. Rent $\frac{1}{10} \times ₹2,400 \times 12$ months	2,880	
	3,880	0.97*
B. Machine expenses		
I. Repairs and Maintenance (₹ 6,000 ÷ 4,000 hours)		1.50
II. Depreciation $\left[\frac{₹10,00,000 - ₹10,000}{10 \text{ years} \times 4,000 \text{ hours}} \right]$		24.75
III. Electricity (8 units × ₹ 3.75)		30.00
Machine hour rate		57.22

Working Note

Calculation of productive Machine hour rate

Total hours	4,200
Less: Non-Productive hours	200
Effective machine hours	4,000
* ₹ 3,880 ÷ 4,000 hours =	₹ 0.97

(d) Computation of Notional Profit	(₹)
Value of work certified	4,89,600
Less: Cost of work certified	
(₹ 4,00,000 – ₹ 30,200)	3,69,800
Notional profit	1,19,800

Computation of Estimated Profit	(₹)
Contract price	5,44,000
Less: Estimated total cost	
Cost of work to date	4,00,000
Estimated further expenditure to complete the contract	22,000
Estimated profit	1,22,000

2. (a) The yearly production of a company's product which has a steady market is 40,000 units. Each unit of a product requires 1 kg. of raw material. The cost of placing one order for raw material is ₹ 1,000 and the inventory carrying cost is ₹ 20 per annum. The lead time for procurement of raw material is 36 days and a safety stock of 1,000 kg. of raw materials is maintained by the company. The company has been able to negotiate the following discount structure with the raw material supplier:

Order quantity (kg.)	Discount (₹)
Upto 6,000	NIL
6,001 – 8,000	4,000
8,001 – 16,000	20,000
16,001 – 30,000	32,000
30,001 – 45,000	4,0000



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You are REQUIRED to:

- (i) Calculate the re-order point considering 30 days in a month.
- (ii) Prepare a statement showing the total cost of procurement and storage of raw material after considering the discount of the company elects to place one, two, four or five orders in the year.
- (iii) State the number of orders which the company should place to minimize the costs after taking EOQ also into consideration.

ANSWER

Working notes

1. Annual production = 40,000 units
2. Raw material required for 40,000 units (40,000 units × 1 kg.) = 40,000 kg.
3. $EOQ = \sqrt{2 \times 40,000 \text{ kgs.} \times ₹ 1,000 / ₹ 20}$
= 2,000 kgs.

4. Total cost of procurement and storage when the order size is equal to EOQ or 2,000 kg.

No. of orders (40,000 kg. ÷ 2,000 kg.) = 20 times

Ordering cost (20 orders × ₹1,000) = ₹ 20,000

Carrying cost (₹) ($\frac{1}{2} \times 2,000 \text{ kg.} \times ₹ 20$) = ₹ 20,000

Total cost ₹ 40,000

(i) **Re-order point** = Safety stock + Lead time consumption

= 1,000 kg. + (40,000kg. × 36days / 360days)

= 1,000 kg. + 4,000 kg. = 5,000 kg.

(ii) Statement showing the total cost of procurement and storage of raw materials (after considering the discount)

Order size	No. of orders	Total cost of procurement	Average stock	Total cost of storage of raw materials	Discount	Total cost
Kg.		(₹)	Kg.	(₹)	(₹)	(₹)
(1)	(2)	(3)=(2)×₹1,000	(4)= $\frac{1}{2}$ ×(1)	(5)=(4)×₹20	(6)	(7)=[(3)+(5)-(6)]
40,000	1	1,000	20,000	4,00,000	40,000	3,61,000
20,000	2	2,000	10,000	2,00,000	32,000	1,70,000
10,000	4	4,000	5,000	1,00,000	20,000	84,000
8,000	5	5,000	4,000	80,000	4,000	81,000

(iii) Number of orders which the company should place to minimize the costs after taking EOQ also into consideration is 20 orders each of size 2,000 kg. The total cost of procurement and storage in this case comes to ₹ 40,000, which is minimum. (Refer to working notes 3 and 4)



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(b) Breeze Ltd has decided to analyse the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 54 per case and sells them to retail customers at a list price of ₹ 64.80 per case. The data pertaining to five customers are given below:

Particulars	Customers				
	Aey	Bee	Cee	Dee	Eey
Number of Cases Sold	9,360	14,200	62,000	38,000	9,800
List Selling Price (₹)	64.80	64.80	64.80	64.80	64.80
Actual Selling Price (₹)	64.80	64.08	58.80	60.24	58.32
Number of Purchase Orders	30	50	60	50	60
Number of Customers visits	4	6	12	4	6
Number of Deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expediate Deliveries	0	0	0	0	2

Its five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 240 per purchase order
Customer visits	₹ 360 per each visit
Deliveries	₹ 4.80 per delivery km travelled
Product Handling	₹ 2.40 per case sold
Expedited deliveries	₹ 120 per such delivery

You are REQUIRED to :

- Compute the customer level operating income of each of five retail customers by using the Cost Driver rates.
- Examine the results to give your comments on Customer 'Dee' in comparison with Customer 'Cee' and on Customer 'Eey' in comparison with Customer 'Aey'.

ANSWER

Working note:

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particulars	Customers				
	Aey	Bee	Cee	Dee	Eey
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800
Revenues (at listed price) (₹): (b) {(a) × ₹ 64.80}	6,06,528	9,20,160	40,17,600	24,62,400	6,35,040
Discount (₹): (c) {(a) × Discount per case}	-	10,224 (14,200 cases × ₹ 0.72)	3,72,000 (62,000 cases × ₹ 6)	1,73,280 (38,000 cases × ₹ 4.56)	63,504 (9,800 cases × ₹ 6.48)

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Cost of goods sold (₹): (d) {(a) × ₹ 54}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Customer level operating activities costs					
Order taking costs (₹): (No. of purchase × ₹ 240)	7,200	12,000	14,400	12,000	14,400
Customer visits costs (₹) (No. of customer visits × ₹ 360)	1,440	2,160	4,320	1,440	2,160
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 4.80 per km.)	3,840	3,456	5,760	7,680	11,520
Product handling costs (₹) {(a) × ₹ 2.40}	22,464	34,080	1,48,800	91,200	23,520
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 120}	-	-	-	-	240
Total cost of customer level operating activities (₹)	34,944	51,696	1,73,280	1,12,320	51,840

(i) Computation of Customer level operating income

Particulars	Customers				
	Aey	Bee	Cee	Dee	Eey
Revenues (At list price) (Refer to working note)	6,06,528	9,20,160	40,17,600	24,62,400	6,35,040
Less: Discount (Refer to working note)	-	10,224	3,72,000	1,73,280	63,504
Revenue (At actual price)	6,06,528	9,09,936	36,45,600	22,89,120	5,71,536
Less: Cost of goods sold (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Gross margin	1,01,088	1,43,136	2,97,600	2,37,120	42,336
Less: Customer level operating activities costs (Refer to working note)	34,944	51,696	1,73,280	1,12,320	51,840
Customer level operating income	66,144	91,440	1,24,320	1,24,800	(9,504)

(ii) Comments

Customer Dee in comparison with Customer Cee: Operating income of Customer Dee is more than that of Customer Cee, despite having only 61.29% (38,000 units) of the units volume sold in comparison to Customer Cee (62,000 units). Customer Cee receives a higher percent of discount i.e. 9.26% (₹ 6) while Customer Dee receive a discount of 7.04% (₹ 4.56). Though the gross margin of customer Cee (₹ 2,97,600) is more than that of Customer Dee (₹ 2,37,120) but total cost of customer level operating activities of Cee (₹ 1,73,280) is more in comparison to Customer Dee (₹ 1,12,320). As a result, operating income is more in case of Customer Dee.

Customer Eey in comparison with Customer Aey: Customer Eey is not profitable while Customer Aey is profitable. Customer Eey receives a discount of 10% (₹ 6.48) while Customer Aey doesn't receive any discount. Sales Volume of Customer Aey and Eey is almost same. However, total cost of customer level operating activities of Eey is far more (₹ 51,840) in comparison to Customer Aey (₹ 34,944). This has resulted in occurrence of loss in case of Customer Eey.

3. (a) Navyug Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses a FIFO process costing system to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of the paper files containing records of the process operations for the month.

Navyug Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 900 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 29,970.
- Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 4,200 litres.
- Losses have a scrap value of ₹ 20 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹39 for the month made up as follows:

	(₹)
Raw Material	23
Labour	7
Overheads	9
	39

REQUIRED:

(i) Calculate the quantity (in litres) of raw material inputs during the month.

(ii) Calculate the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.

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(iii) Calculate the values of raw material, labour and overheads added to the process during the month.

(iv) Prepare the process account for the month.

ANSWER

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	900	Transfer to Finished Goods	4,200
Raw material input (balancing figure)	5,260	Process Losses	1,800
		Closing WIP	160
	6,160		6,160

ii) Calculation of Normal Loss and Abnormal Loss/Gain

Particulars	Litres
Total process losses for month	1,800
Normal Loss (10% input)	526
Abnormal Loss (balancing figure)	1,274

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	₹ 23.00	₹ 7.00	₹ 9.00
Equivalent units (litre) (refer the working note)	4,734	4,892	4,966
Cost of equivalent units	₹ 1,08,882	₹ 34,244	₹ 44,694
Add: Scrap value of normal loss (526 units × ₹ 20)	₹ 10,520	--	--
Total value added	₹ 1,19,402	₹ 34,244	₹ 44,694

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	900	Units completed:							
Units introduced	5,260	- Opening WIP	900	--	--	270	30	360	40
		- Fresh inputs	3,300	3,300	100	3,300	100	3,300	100
		Normal loss	526	--	--	--	--	--	--
		Abnormal loss	1,274	1,274	100	1,274	100	1,274	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,734		4,892		4,966	

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iv) Process Account for Month

	Litres	Amount (₹)		Litres	Amount (₹)
To Opening WIP	900	29,970	By Finished goods	4,200	1,63,800
To Raw Materials	5,260	1,19,402	By Normal loss	526	10,520
To Wages	--	34,244	By Abnormal loss	1,274	49,686
To Overheads	--	44,694	By Closing WIP	160	4,304
	6,160	2,28,310		6,160	2,28,310

(b) Xim Ltd. manufactures two types of boxes 'Super' and 'Normal'. The cost data for the year ended 31st March, 2021 is as follows:

	(₹)
Direct Materials	12,00,000
Direct Wages	6,72,000
Production Overhead	2,88,000
Total	21,60,000

There was no work-in-progress at the beginning or at the end of year. It is further ascertained that:

1. Direct materials cost per unit in 'Super' was twice as much of direct material in 'Normal'.
2. 2% cash discount was received for payment made within 30 days to the creditors of Direct materials.
3. Direct wages per unit for 'Normal' were 60% of those of 'Super'.
4. Production overhead per unit was at same rate for both the types of boxes.
5. Administration overhead was 200% of direct labour for each type.
6. Selling cost was ₹ 1 per 'Super' type.
7. Production and sales during the year were as follows:

Production		Sales	
Type	No. of units	Type	No. of units
Super	60,000	Super	54,000
Normal	1,80,000		

8. Selling price was ₹ 30 per unit for 'Super'.

9. Company was also involved in a copyright infringement case related to the manufacturing process of 'Super' production. As per the verdict, it had to pay penalty of ₹ 50,000.

PREPARE Cost Sheet of Xim Ltd. for 'Super' showing:

- (i) Cost per unit and Total Cost
- (ii) Profit per unit and Total Profit

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ANSWER**Cost Sheet of 'Super'**

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	8.00	4,80,000
Direct wages (Working note- (ii))	4.00	2,40,000
Prime cost	12.00	7,20,000
Production overhead (Working note- (iii))	1.20	72,000
Factory Cost	13.20	7,92,000
Administration Overhead (200% of direct wages)	8.00	4,80,000
Cost of production	21.20	12,72,000
Less: Closing stock (60,000 units – 54,000 units)	-	1,27,200
Cost of goods sold i.e. 54,000 units	21.20	11,44,800
Selling cost	1.00	54,000
Cost of sales/ Total cost	22.20	11,98,800
Profit	7.80	4,21,200
Sales value (₹ 30 × 54,000 units)	30.00	16,20,000

Working Notes:

(i) Direct material cost per unit of 'Normal' = M

Direct material cost per unit of 'Super' = 2M

Total Direct Material cost = 2M × 60,000 units + M × 1,80,000 units

Or, ₹ 12,00,000 = 1,20,000 M + 1,80,000 M

Or, M = 12,00,000 / 3,00,000 = ₹ 4

Therefore, Direct material Cost per unit of 'Super' = 2 × ₹ 4 = ₹ 8

(ii) Direct wages per unit for 'Super' = W

Direct wages per unit for 'Normal' = 0.6W

So, (W × 60,000) + (0.6W × 1,80,000) = ₹ 6,72,000

W = ₹ 4 per unit

(iii) Production overhead per unit = (2,88,000) X (60,000 1,80,000) = ₹ 1.20

Production overhead for 'Super' = ₹ 1.20 × 60,000 units = ₹ 72,000

Notes:

1. Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the question and hence to be considered in cost of production only.
2. Cash discount is treated as interest and finance charges; hence, it is ignored.
3. Penalty paid against the copyright infringement case is an abnormal cost; hence, not included.



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4. (a) A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season (winter) months in a year.

During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending 31st March, 2021:

(i) Occupancy during the season is 80% while in the off-season it is 40%.

(ii) Total investment in the hotel is ₹ 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.

(iii) Room attendants are paid ₹ 15 per room per day on the basis of occupancy of rooms in a month.

(iv) Expenses :

• Staff salary (excluding that of room attendants) ₹ 8,00,000

• Repairs to Buildings ₹ 3,00,000

• Laundry Charges ₹ 1,40,000

• Interior Charges ₹ 2,50,000

• Miscellaneous Expenses ₹ 2,00,200

(v) Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.

(vi) Monthly lighting charges are ₹ 110 per room, except in four months in winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month.

You are REQUIRED to work out the room rent chargeable per day both during the season and the off-season months using the foregoing information.

(Assume a month to be of 30 days and winter season to be considered as part of off-season).

ANSWER

Working Notes:

(i) Total Room days in a year

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = 28,800 Room Days	28,800 Room Days × 100% = 28,800
Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = 43,200 Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is ₹110 per month and during winter season of 4 months it is ₹30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

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Season	Occupancy (Room-days)
Season & Non-winter – 80% Occupancy	200 Rooms × 80% × 6 months × ₹ 110 per month = ₹ 1,05,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × ₹110 per month = ₹ 17,600
Off- season & -winter – 40% Occupancy months)	200 Rooms × 40% × 4 months × ₹ 30 per month = ₹ 9,600
Total Lighting charges	₹ 1,05,600+ ₹ 17,600 + ₹ 9,600 = ₹ 132,800

Statement of total cost:

	(₹)
Staff salary	8,00,000
Repairs to building	3,00,000
Laundry	1,40,000
Interior	2,50,000
Miscellaneous Expenses	2,00,200
Depreciation on Building (₹ 300 Lakhs × 80% × 5%)	12,00,000
Depreciation on Furniture & Equipment (₹ 300 Lakhs × 20% × 15%)	9,00,000
Room attendant's wages (₹ 15 per Room Day for 43,200 Room Days)	6,48,000
Lighting charges	1,32,800
Total cost	45,71,000
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	57,13,750

Calculation of Room Rent per day:

Total Rent / Equivalent Full Room days = ₹ 57,13,750/ 36,000 = ₹ 158.72

Room Rent during Season – ₹ 158.72

Room Rent during Off season = ₹ 158.72 × 50% = ₹ 79.36

(b) ABC Ltd. has its factory at two locations viz Noida and Patparganj. Rowan plan is used at Noida factory and Halsey plan at Patparganj factory.

Standard time and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Normal working hours is 9 hours per day in a 5 day week.

Job at Noida factory is completed in 36 hours while at Patparganj factory it has taken 33 hours 45 minutes.

Conversion costs at Noida and Patparganj are ₹ 6,084 and ₹ 5,569 respectively. Overheads account for ₹ 25 per hour.

REQUIRED:

- (i) To find out the normal wage; and**
(ii) To compare the respective conversion costs.

ANSWER

Particulars	Noida	Patparganj
Hours worked	36 hr.	33.75 hr.
Conversion Costs	₹ 6,084	₹ 5,569
Less: Overheads	₹ 900 (₹25 × 36 hr.)	₹ 844 (₹ 25 × 33.75 hr.)
Labour Cost	₹ 5,184	₹ 4,725

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(i) Finding of Normal wage rate:

Let Wage rate be ₹ R per hour, this is same for both the Noida and Patparganj factory.

Normal wage rate can be found out taking total cost of either factory.

Noida: Rowan Plan

Total Labour Cost = Wages for hours worked + Bonus as per Rowan plan

$$₹ 5,184 = (\text{Hours worked} \times \text{Rate per hour}) + (\text{Time saved} \times \text{Hours worked} \times \text{Rate per hour} / \text{Time allowed})$$

$$\text{Or, } ₹ 5,184 = 36 \text{ hr.} \times R + (45 - 36.45 \times 36 \times R)$$

$$\text{Or, } ₹ 5,184 = 36R + 7.2R$$

$$R = ₹ 120$$

$$\text{Normal wage} = 36 \text{ hrs} \times ₹ 120 = ₹ 4,320$$

OR

Patparganj: Halsey Plan

Total Labour Cost = Wages for hours worked + Bonus as per Halsey plan

$$₹ 4,725 = \text{Hours worked} \times \text{Rate per hour} + (50\% \times \text{Hours saved} \times \text{Rate per hour})$$

$$₹ 4,725 = 33.75 \text{ hr.} \times R + 50\% \times (45 \text{ hr.} - 33.75 \text{ hr.}) \times R$$

$$₹ 4,725 = 39.375 R$$

$$R = ₹ 120$$

$$\text{Normal Wage} = 33.75 \text{ hrs} \times ₹ 120 = ₹ 4,050$$

(ii) Comparison of conversion costs:

Particulars	Noida (₹)	Patparganj (₹)
Normal Wages (36 x 120)	4,320	
(33.75 x 120)		4,050
Bonus (7.2 x 120)	864	
(5.625 x 120)	675	
Overhead	900	844
	6,084	5,569

5. (a) Amy Ltd. manufacture and sales its product RM. The following figures have been collected from cost records of last year for the product RM:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 3,45,000
Administration Overhead	2% of Cost of Goods Sold	₹ 1,06,500
Selling & Distribution Overhead	4% of Cost of Sales	₹ 1,02,000

Last Year, 7,500 units were sold at ₹ 185 per unit. From the given information, DETERMINE the followings:

- (i) Break-even Sales (in rupees)
 (ii) Profit earned during last year

(iii) Margin of safety (in %)

(iv) Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

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ANSWER

(a) Working Notes:

(1) Calculation of Cost of Goods Sold (COGS):

$$\text{COGS} = \text{DM} + \text{DL} + \text{FOH} + \text{AOH}$$

$$\text{COGS} = \{0.3 \text{ COGS} + 0.15 \text{ COGS} + (0.10 \text{ COGS} + ₹ 3,45,000) + (0.02 \text{ COGS} + ₹ 1,06,500)\}$$

$$\text{Or, COGS} = 0.57 \text{ COGS} + ₹ 4,51,500$$

$$\text{Or COGS} = ₹ 4,51,500 / 0.43 = ₹ 10,50,000$$

(2) Calculation of Cost of Sales (COS):

$$\text{COS} = \text{COGS} + \text{S\&DOH}$$

$$\text{COS} = \text{COGS} + (0.04 \text{ COS} + ₹ 1,02,000)$$

$$\text{Or COS} = ₹ 10,50,000 + (0.04 \text{ COS} + ₹ 1,02,000)$$

$$\text{Or, COS} = ₹ 11,52,000 / 0.96 = ₹ 12,00,000$$

(3) Calculation of Variable Costs:

Direct Material-	(0.30 × ₹ 10,50,000)	₹ 3,15,000
Direct Labour-	(0.15 × ₹ 10,50,000)	₹ 1,57,500
Factory Overhead-	(0.10 × ₹ 10,50,000)	₹ 1,05,000
Administration OH-	(0.02 × ₹ 10,50,000)	₹ 21,000
Selling & Distribution OH	(0.04 × ₹ 12,00,000)	₹ 48,000
		₹ 6,46,500

(4) Calculation of total Fixed Costs:

Factory Overhead	₹ 3,45,000
Administration OH	₹ 1,06,500
Selling & Distribution OH	₹ 1,02,000
	₹ 5,53,500

5) Calculation of P/V Ratio:

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$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100 \\ &= \frac{(\text{₹ } 185 \times 7,500 \text{ units}) - \text{₹ } 6,46,500}{\text{₹ } 185 \times 7,500 \text{ units}} \times 100 \\ &= \frac{\text{₹ } 13,87,500 - \text{₹ } 6,46,500}{\text{₹ } 13,87,500} \times 100 = 53.41\% \end{aligned}$$

$$(i) \text{ Break-Even Sales} = \frac{\text{Fixed Costs}}{\text{P/V Ratio}} = \frac{\text{₹ } 5,53,500}{53.41\%} = \text{₹ } 10,36,323$$

$$\begin{aligned} (ii) \text{ Profit earned during the last year} &= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs} \\ &= (\text{₹ } 13,87,500 - \text{₹ } 6,46,500) - \text{₹ } 5,53,500 \\ &= \text{₹ } 1,87,500 \end{aligned}$$

$$\begin{aligned} (iii) \text{ Margin of Safety (\%)} &= \frac{\text{Sales} - \text{Breakeven sales}}{\text{Sales}} \times 100 \\ &= \frac{\text{₹ } 13,87,500 - \text{₹ } 10,36,323}{\text{₹ } 13,87,500} \times 100 = 25.31\% \end{aligned}$$

$$\begin{aligned} (iv) \text{ Profit if the sales were 10\% less than the actual sales:} \\ \text{Profit} &= 90\% (\text{₹ } 13,87,500 - \text{₹ } 6,46,500) - \text{₹ } 5,53,500 \\ &= \text{₹ } 1,13,400 \end{aligned}$$

(b) Following information has been provided by a company:

Number of units produced and sold	9,000
Standard labour rate per hour	₹ 12
Standard hours required for	9,000 units -
Actual hours required	25,641 hours
Labour efficiency 105.3%	
Labour rate variance	₹ 1,53,846 (A)

You are required to CALCULATE:

- (i) Actual labour rate per hour
- (ii) Standard hours required for 9,000 units
- (iii) Labour Efficiency variance
- (iv) Standard labour cost per unit
- (v) Actual labour cost per unit.

ANSWER

SR – Standard labour Rate per Hour

AR – Actual labour rate per hour

SH – Standard Hours

AH – Actual hours

(i) Labour rate Variance = AH (SR – AR)



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$$- 1,53,846 = 25,641 (12 - AR)$$

$$- 6 = 12 - AR$$

$$AR = ₹ 18$$

$$(ii) \text{ Labour Efficiency} = SH / AH \times 100 = 105.3$$

$$SH = AH \times 105.3 / 100 = 25,641 \times 105.3 / 100$$

$$SH = 26,999.973$$

$$SH = 27,000 \text{ hours}$$

$$(iii) \text{ Labour Efficiency Variance} = SR (SH - AH)$$

$$= 12 (27,000 - 25,641)$$

$$= ₹ 16,308 (F)$$

$$(iv) \text{ Standard Labour Cost per Unit} = 27,000 \times 12 / 9,000 = ₹ 36$$

$$(v) \text{ Actual Labour Cost Per Unit} = 25,641 \times 18 / 9,000 = ₹ 51.282$$

6. (a) JOURNALISE the following transactions in cost books under Non-Integrated system of Accounting.

(i) Credit Purchase of Material ₹ 27,000

(ii) Manufacturing overhead charged to Production ₹ 6,000

(iii) Selling and Distribution overheads recovered from Sales ₹ 4,000

(iv) Indirect wages incurred for Manufacturing department ₹ 8,000

(v) Material returned from production to stores ₹ 9,000

ANSWER

Journal entries are as follows:

		Dr. (₹)	Cr. (₹)
(i)	Stores Ledger Control A/c..... To Cost Ledger Control A/c	Dr. 27,000	27,000
(ii)	Work-in-Process Control A/c..... To Manufacturing Overhead Control A/c	Dr. 6,000	6,000
(iii)	Cost of Sales A/c..... To Selling & Dist. Overhead Control A/c	Dr. 4,000	4,000
(iv)	(1) Wage Control A/c..... To Cost Ledger Control A/c	Dr. 8,000	8,000
	(2) Manufacturing Overhead Control A/c..... To Wages Control A/c	Dr. 8,000	8,000
OR			
	Manufacturing Overhead Control A/c..... To Cost Ledger Control A/c	Dr. 8,000	8,000
(v)	Stores Ledger Control A/c To Work-in-Process Control A/c	Dr. 9,000	9,000

*Cost Ledger Control A/c is also known as General Ledger Control A/c



(b) EXPLAIN the difference between Cost Accounting and Management Accounting
ANSWER

	Basis	Cost Accounting	Management Accounting
(i)	Nature	It records the quantitative aspect only.	It records both qualitative and quantitative aspect.
(ii)	Objective	It records the cost of producing a product and providing a service.	It Provides information to management for planning and co-ordination.
(iii)	Area	It only deals with cost Ascertainment.	It is wider in scope as it includes financial accounting, budgeting, taxation, planning etc.
(iv)	Recording of data	It uses both past and present figures.	It is focused with the projection of figures for future.
(v)	Development	Its development is related to industrial revolution.	It develops in accordance to the need of modern business world.
(vi)	Rules and Regulation	It follows certain principles and procedures for recording costs of different products.	It does not follow any specific rules and regulations.

(c) DEFINE Zero Based Budgeting and mention its various stages.
ANSWER

Zero-based Budgeting: (ZBB) is an emergent form of budgeting which arises to overcome the limitations of incremental (traditional) budgeting system. Zero- based Budgeting (ZBB) is **defined** as 'a method of budgeting which requires each cost element to be specifically justified, although the activities to which the budget relates are being undertaken for the first time, without approval, the budget allowance is zero'.

ZBB is an activity based budgeting system where budgets are prepared for each activities rather than functional department. Justification in the form of cost benefits for the activity is required to be given. The activities are then evaluated and prioritized by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

ZBB is suitable for both corporate and non-corporate entities. In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

ZBB involves the following stages:

- (i) Identification and description of Decision packages
- (ii) Evaluation of Decision packages
- (iii) Ranking (Prioritisation) of the Decision packages
- (iv) Allocation of resources

(d) HOW do you deal with the following in cost accounts?

- (i) Fringe benefits**
- (ii) Bad debts.**

ANSWER

(i) Fringe benefits: These are the additional payments or facilities provided to the workers apart from their salary and direct cost-allowances like house rent, dearness and city compensatory allowances. These benefits are given in the form of overtime, extra shift duty allowance, holiday pay, pension facilities etc.

These indirect benefits stand to improve the morale, loyalty and stability of employees towards the organisation. If the amount of fringe benefit is considerably large, it may be recovered as direct charge by means of a supplementary wage or labour rate; otherwise, these may be collected as part of production overheads.

(ii) Bad debts: There is no unanimity among different authors of Cost Accounting about the treatment of bad debts. One view is that 'bad debts' should be excluded from cost. According to this view bad debts are financial losses and therefore, they should not be included in the cost of a particular job or product.

According to another view it should form part of selling and distribution overheads, especially when they arise in the normal course of trading. Therefore, bad debts should be treated in cost accounting in the same way as any other selling and distribution cost. However extra ordinarily large bad debts should not be included in cost accounts.



MTP- II- NOV 2021

1. Answer the following:

(a) The following particulars have been compiled in respect of three workers:

	M	N	O
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	90	100	110
Productions in units:			
- Product A	210	-	600
- Product B	360	-	1350
- Product C	460	250	-
Standard time allowed per unit of each product is:			
	A	B	C
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at ₹ 1.50.

You are required to CALCULATE the wages of each worker under:

(i) Guaranteed hourly rate basis.

(ii) Piece work earning basis but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)

ANSWER

(i) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked (Hours)	Hourly wage rate (₹)	Wages (₹)
M	380	90	34,200
N	100	100	10,000
O	540	110	59,400

(ii) Computation of Wages of each worker under piece work earning basis

Product	Piece rate per unit (₹)	Worker-M Units	Worker-M Wages (₹)	Worker-N Units	Worker-N Wages (₹)	Worker-O Units	Worker-O Wages (₹)
A	22.50	210	4,725	-	-	600	13,500
B	30.00	360	10,800	-	-	1,350	40,500
C	45.00	460	20,700	250	11,250	-	-
Total			36,225		11,250		54,000

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Since each worker's earnings are more than 50% of basic pay. Therefore, worker-M, N and O will be paid the wages as computed i.e. ₹ 36,225, ₹ 11,250 and ₹ 54,000 respectively.

Working Notes:
1. Piece rate per unit

Product	Standard time per unit (in minutes)	Piece rate each minute (₹)	Piece rate per unit (₹)
A	15	1.5	22.50
B	20	1.5	30.00
C	30	1.5	45.00

(b) The annual demand for an item of raw material is 48,000 units and the purchase price is ₹ 80 per unit. The cost of processing an order is ₹ 1,350 and the annual cost of storage is ₹ 15 per unit.

(i) DETERMINE is the optimal order quantity and total relevant cost for the order?

(ii) If the cost of processing an order is ₹ 800 and all other data remain same, then DETERMINE the differential cost?

(iii) If the supplier offers bulk purchase of 48,000 units at a price of ₹ 72 and cost of placing the is Nil, SHOULD the order be accepted?

ANSWER

(i) Optimal order quantity i.e. **E.O.Q**

$$= \sqrt{\frac{2 \times 48,000 \times 1,350}{15}} = \sqrt{86,40,000} = 2,939 \text{ units}$$

Relevant Cost of this order quantity	₹
Ordering cost = $\frac{48,000}{2,939} = 16.33$, say 17 orders at ₹ 1,350	22,950.00
Carrying Cost = $\frac{1}{2} \times 2,939 \times 15$	22,042.50
Relevant cost	44,992.50

(ii) Revised EOQ = $\sqrt{\frac{2 \times 48,000 \times 800}{15}} = 2,263 \text{ units}$

Relevant Cost of this order quantity	₹
Ordering cost = $\frac{48,000}{2,263} = 21.21$, say 22 orders at ₹ 800	17,600.00
Carrying cost = $\frac{1}{2} \times 2,263 \times 15$	16,972.50
Relevant cost	34,572.50
Differential cost = 44,992.50 – 34,572.50 = ₹ 10,420	



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(iii) In case of discount in purchase price, the total cost of Purchase cost, ordering cost and carrying cost should be compared.

Original offer at ₹ 80 per unit		Supplier offered at ₹ 72 per unit	
	₹		₹
Purchase Cost (48,000 × 80)	38,40,000.00	Purchase cost (48,000 × 72)	34,56,000.00
Ordering cost	22,950.00	Ordering cost	0.00
Carrying cost	22,042.50	Carrying cost 1×48,000×152	3,60,000.00
Total cost	38,84,992.50		38,16,000.00

This special offer at ₹ 72 per unit should be accepted as it saves ₹ 68,992.50 as compared to original offer.

(c) A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated costs of production are as under:

Direct material	₹ 50 per unit
Direct employee cost	₹ 16 per unit

Indirect expenses:

- Fixed	₹ 32,50,000 per annum
- Variable	₹ 10 per unit
- Semi-variable	₹ 40,000 per month up to 50% capacity and ₹ 15,000 for every 20% increase in the capacity or part thereof.

If production program of the factory is as indicated below and the management desires to ensure a profit of ₹10,00,000 for the year, DETERMINE the average selling price at which each unit should be quoted:

First three months of the year- 50% of capacity;

Remaining nine months of the year- 75% of capacity.

ANSWER

Statement of Cost

	First three months (₹)	Remaining nine months (₹)	Total (₹)
	37,500 units	1,68,750 units	2,06,250 units
Direct material	18,75,000	84,37,500	1,03,12,500
Direct employee cost	6,00,000	27,00,000	33,00,000
Indirect- variable expenses	3,75,000	16,87,500	20,62,500
Indirect – fixed expenses	8,12,500	24,37,500	32,50,000

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Indirect- semi-variable expenses			
- For first three months @ ₹ 40,000 p.m.	1,20,000		1,20,000
- For remaining nine months @ ₹ 70,000* p.m.		6,30,000	6,30,000
Total cost	37,82,500	1,58,92,500	1,96,75,000
Desired profit	-	-	10,00,000
Sales value	-	-	2,06,75,000
Average selling price per unit			100.24

* ₹ 40,000 for 50% capacity + ₹ 15,000 for 20% increase in capacity + ₹ 15,000 for 5% increase in capacity (because cost is increased for every 20% increase in capacity or part thereof)

(d) JK Ltd. has furnished the following standard cost data per unit of production

: Material 10 kg @ ₹ 200 per kg.

Labour 6 hours @ ₹ 110 per hour

Variable overhead 6 hours @ ₹ 200 per hour.

Fixed overhead ₹ 90,00,000 per month (Based on a normal volume of 30,000 labour hours.)

The actual cost data for the month of September 2021 are as follows: Material used 50,000 kg at a cost of ₹ 1,05,00,000.

Labour paid ₹ 31,00,000 for 31,000 hours

Variable overheads ₹ 58,60,000

Fixed overheads ₹ 94,00,000

Actual production 4,800 units.

ANSWER

Budgeted Production 30,000 hours ÷ 6 hours per unit = 5,000 units

Budgeted Fixed Overhead Rate = ₹ 90,00,000 ÷ 5,000 units = ₹ 1,800 per unit

= ₹ 90,00,000 ÷ 30,000 hours = ₹ 300 per hour.

(i) Material Cost Variance = (Std. Qty. × Std. Price) – (Actual Qty. × Actual Price)

= (4,800 units × 10 kg. × ₹200) - ₹1,05,00,000

= ₹ 96,00,000 – ₹ 1,05,00,000

= ₹ 9,00,000 (A)

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(ii) Labour Cost Variance = (Std. Hours × Std. Rate) – (Actual Hours × Actual rate)
 = (4,800 units × 6 hours × ₹ 110) – ₹31,00,000
 = ₹ 31,68,000 – ₹ 31,00,000
 = ₹ 68,000 (F)

(iii) Fixed Overhead Cost Variance= (Budgeted Rate × Actual Qty) – Actual Overhead
 = (₹ 1,800 × 4,800 units) – ₹ 94,00,000
 = ₹ 7,60,000 (A)

OR = (Budgeted Rate × Std. Hours) – Actual Overhead
 = (₹ 300 × 4,800 units × 6 hours) – ₹ 94,00,000
 = ₹ 7,60,000 (A)

(iv) Variable Overhead Cost Variance= (Std. Rate × Std. Hours) – Actual Overhead
 = (4,800 units × 6 hours × ₹ 200) – ₹ 58,60,000
 = ₹ 57,60,000 – ₹ 58,60,000
 = ₹ 1,00,000 (A)

**2. (a) Following information is available regarding process A for the month of October, 2021:
 Production Record:**

Units in process as on 01.10.2021	8,000
(All materials used, 25% complete for labour and overhead)	
New units introduced	32,000
Units completed	28,000
Units in process as on 31.10.2021	12,000
(All materials used, 33-1/3% complete for labour and overhead)	

Cost Records:

Work-in-process as on 01.10.2021	(₹)	
Materials	12,00,000	
Labour	2,00,000	
Overhead	2,00,000	16,00,000
Cost during the month		
Materials	51,20,000	
Labour	30,00,000	
Overhead	30,00,000	1,11,20,000

Presuming that average method of inventory is used, PREPARE:

(i) Statement of Equivalent Production.

(ii) Statement showing Cost for each element.

(iii) Statement of Apportionment of cost.

(iv) Process Cost Account for Process A.

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ANSWER**(i) Statement of Equivalent Production (Average cost method)**

		Equivalent Production						
		Materials		Labour		Overheads		
Input (Units)	Particulars	Output Units	(%*)	Units**	(%*)	Units**	(%*)	Units**
40,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	WIP	12,000	100	12,000	33- 1/3	4,000	33- 1/3	4,000
40,000		40,000		40,000		32,000		32,000

*Percentage of completion ** Equivalent units

(ii) Statement showing Cost for each element

Particulars	Materials	Labour	Overhead	Total
Cost of opening work-in-progress (₹)	12,00,000	2,00,000	2,00,000	16,00,000
Cost incurred during the month (₹)	51,20,000	30,00,000	30,00,000	1,11,20,000
Total cost (₹) : (a)	63,20,000	32,00,000	32,00,000	1,27,20,000
Equivalent units : (B)	40,000	32,000	32,000	
Cost per equivalent unit (₹) : C= (A ÷ B)	158	100	100	358

(iii) Statement of Apportionment of cost

	(₹)	(₹)
Value of output transferred: (A) (28,000 units × ₹ 358)		1,00,24,000
Value of closing work-in-progress: (B)		
Material (12,000 units × ₹158)	18,96,000	
Labour (4,000 units × ₹ 100)	4,00,000	
Overhead (4,000 units × ₹ 100)	4,00,000	26,96,000
Total cost : (A + B)		1,27,20,000

(iv) Process- A Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening WIP	8,000	16,00,000	By Completed units	28,000	1,00,24,000
To Materials	32,000	51,20,000	By Closing WIP	12,000	26,96,000
To Labour		30,00,000			
To Overhead		30,00,000			
	40,000	1,27,20,000		40,000	1,27,20,000



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(b) The following account balances and distribution of indirect charges are taken from the accounts of a manufacturing concern for the year ending on 31st March, 2021:

Item	Total Amount (₹)	Production Departments			Service Departments	
		X (₹)	Y (₹)	Z (₹)	A (₹)	B (₹)
Indirect Material	5,00,000	80,000	1,20,000	1,80,000	1,00,000	20,000
Indirect Labour	10,40,000	1,80,000	2,00,000	2,80,000	2,40,000	1,40,000
Supervisor's Salary	3,84,000	-	-	3,84,000	-	-
Fuel & Heat	60,000					
Power	7,20,000					
Rent & Rates	6,00,000					
Insurance of Assets	72,000					
Canteen Charges	2,40,000					
Depreciation	10,80,000					

The following departmental data are also available:

	Production Departments			Service Departments	
	X	Y	Z	A	B
Area (Sq. ft.)	4,400	4,000	3,000	2,400	1,200
Capital Value of Assets (₹)	40,00,000	60,00,000	50,00,000	10,00,000	20,00,000
Kilowatt Hours	3,500	4,000	3,000	1,500	-
Radiator Sections	20	40	60	50	30
No. of Employees	60	70	120	30	20

Expenses charged to the service departments are to be distributed to other departments by the following percentages

	X	Y	Z	A	B
Department A (%)	30	30	20	-	20
Department B (%)	25	40	25	10	-

PREPARE an overhead distribution statement to show the total overheads of production departments after re-apportioning service departments' overhead by using simultaneous equation method. Show all the calculations to the nearest rupee.

ANSWER**Primary Distribution of Overheads**

Item	Basis	Total Amount (₹)	Production Departments			Service Departments	
			X	Y	Z	A	B
Indirect Material	Actual	5,00,000	80,000	1,20,000	1,80,000	1,00,000	20,000
Indirect Labour	Actual	10,40,000	1,80,000	2,00,000	2,80,000	2,40,000	1,40,000
Supervisor's Salary	Actual	3,84,000	-	-	3,84,000	-	-
Fuel & Heat	Radiator Sections {2:4:6:5:3}	60,000	6,000	12,000	18,000	15,000	9,000
Power	Kilowatt Hours {7:8:6:3:-}	7,20,000	2,10,000	2,40,000	1,80,000	90,000	-
Rent & Rates	Area (Sq. ft.) {22:20:15:12:6}	6,00,000	1,76,000	1,60,000	1,20,000	96,000	48,000
Insurance	Capital Value of Assets {4:6:5:1:2}	72,000	16,000	24,000	20,000	4,000	8,000
Canteen Charges	No. of Employees {6:7:12:3:2}	2,40,000	48,000	56,000	96,000	24,000	16,000
Depreciation	Capital Value of Assets {4:6:5:1:2}	10,80,000	2,40,000	3,60,000	3,00,000	60,000	1,20,000
Total overheads		46,96,000	9,56,000	11,72,000	15,78,000	6,29,000	3,61,000

Re-distribution of Overheads of Service Department A and B

Total overheads of Service Departments may be distributed using simultaneous equation method

Let, the total overheads of A = 'a' and the total overheads of B = 'b'

$$a = 6,29,000 + 0.10 b \text{ (i)}$$

$$\text{or, } 10a - b = 62,90,000 \text{ [(i) } \times 10]$$

$$b = 3,61,000 + 0.20 a \text{ (ii)}$$

$$\text{or, } -0.20a + b = 3,61,000$$



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Solving equation (i) & (ii)

$$10a - b = 62,90,000$$

$$-0.20a + b = 3,61,000$$

$$9.8a = 66,51,000$$

$$a = 6,78,673$$

Putting the value of 'a' in equation (ii), we get

$$b = 3,61,000 + 0.20 \times 6,78,673$$

$$b = 4,96,735$$

Secondary Distribution of Overheads

	Production Departments		
	X	Y	Z
Total overhead as per primary distribution	9,56,000	11,72,000	15,78,000
Service Department A (80% of 6,78,673) (3:3:2)	2,03,602	2,03,602	1,35,734
Service Department B (90% of 4,96,735) (5:8:5)	1,24,184	1,98,694	1,24,184
Total	12,83,786	15,74,296	18,37,918

3. (a) MKL Infrastructure built and operates 110 k.m. highway on the basis of Built-Operate-Transfer (BOT) for a period of 21 years. A traffic assessment has been carried out to estimate the traffic flow per day which shows the following figures:

Sl. No.	Type of vehicle	Daily traffic volume
1.	Two wheelers	44,500
2.	Car and SUVs	3,450
3.	Bus and LCV	1,800
4.	Heavy commercial vehicles	816

The following is the estimated cost of the project:

Sl. no.	Activities	Amount (₹ in lakh)
1	Site clearance	341.00
2	Land development and filling work	9,160.00
3	Sub base and base courses	10,520.00
4	Bituminous work	32,140.00



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5	Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	28,110.00
6	Drainage and protection work	9,080.00
7	Traffic sign, marking and road appurtenance	8,810.00
8	Maintenance, repairing and rehabilitation	12,850.00
9	Environmental management	1,964.00
	Total Project cost	1,12,975.00

An average cost of ₹1,200 lakh has to be incurred on administration and toll plaza operation.

On the basis of the vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles:

Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

Required:

(i) **CACULATE** the total project cost per day of concession period.

(ii) **COMPUTE** toll fee to be charged for per vehicle of each type, if the company wants earn a profit of 15% on total cost.

[Note: Concession period is a period for which an infrastructure is allowed to operate and recover its investment]

ANSWER

(i) **Calculation of total project cost per day of concession period:**

Activities	Amount (₹ in lakh)
Site clearance	341.00
Land development and filling work	9,160.00
Sub base and base courses	10,520.00
Bituminous work	32,140.00
Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	28,110.00
Drainage and protection work	9,080.00
Traffic sign, marking and road appurtenance	8,810.00
Maintenance, repairing and rehabilitation	12,850.00
Environmental management	1,964.00
Total Project cost	1,12,975.00
Administration and toll plaza operation cost	1,200.00
Total Cost	1,14,175.00
Concession period in days (21 years × 365 days)	7,665
Cost per day of concession period (₹ in lakh)	14.90



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(ii) Computation of toll fee:

Cost to be recovered per day = Cost per day of concession period + 15% profit on cost
 = ₹ 14,90,000 + ₹ 2,23,500 = ₹ 17,13,500

Cost per equivalent vehicle = ₹ 17,13,500 / 76,444 units (Refer working note)
 = ₹ 22.42 per equivalent vehicle

Vehicle type-wise toll fee:

Sl. No.	Type of vehicle	Equivalent cost [A]	Weight [B]	Toll fee per vehicle [A×B]
1.	Two wheelers	₹22.42	1	22.42
2.	Car and SUVs	₹22.42	4	89.68
3.	Bus and LCV	₹22.42	6	134.52
4.	Heavy commercial vehicles	₹22.42	9	201.78

Working Note:

The cost per day has to be recovered from the daily traffic. The each type of vehicle is to be converted into equivalent unit. Let's convert all vehicle types equivalent to Two-wheelers..

Sl. No.	Type of vehicle	Daily traffic volume [A]	Weight	Ratio [B]	Equivalent Two-wheeler [A×B]
1.	Two wheelers	44,500	0.05	1	44,500
2.	Car and SUVs	3,450	0.20	4	13,800
3.	Bus and LCV	1,800	0.30	6	10,800
4.	Heavy commercial vehicles	816	0.45	9	7,344
	TOTAL				76,444

(b) XYZ Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2020-21:

Particulars	Amount ('000)
Opening balances:	
- Stores ledger control A/c	48,000
- Work-in-process control A/c	12,000
- Finished goods control A/c	2,58,000
- Building construction A/c	6,000
- Cost ledger control A/c	3,24,000
During the year following transactions took place:	
Materials:	
- Purchased	24,000
- Issued to production	30,000



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- Issued to general maintenance	3,600
- Issued to building construction	2,400
Wages:	
- Gross wages paid	90,000
- Indirect wages paid	24,000
- For building construction	6,000
Factory overheads:	
- Actual amount incurred (excluding items shown above)	96,000
- Absorbed in building construction	12,000
- Under-absorbed	4,800
Royalty paid	3,000
Selling distribution and administration overheads	15,000
Sales	2,70,000

At the end of the year, the stock of raw material and work-in-process was ₹ 33,00,000, and ₹15,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

ANSWER
Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	2,70,000	By Balance b/d	3,24,000
To Building Construction A/c	26,400	By Stores Ledger control A/c	24,000
To Balance c/d	2,89,800	By Wages Control A/c	90,000
		By Factory overhead control A/c	96,000
		By Royalty A/c	3,000
		By Selling. Distribution and Administration overheads	15,000
		By Costing P&L A/c	34,200
	5,86,200		5,86,200

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Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	48,000	By WIP control A/c	30,000
To Cost Ledger control A/c	24,000	By Factory overheads control A/c	3,600
		By Building construction A/c	2,400
		By Factory overhead control A/c (loss) (bal. fig.)	3,000
		By Balance c/d	33,000
	72,000		72,000

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	90,000	By Factory overhead control A/c	24,000
		By Building Construction A/c	6,000
		By WIP Control A/c (bal. fig.)	60,000
	90,000		90,000

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	3,600	By Building Construction A/c	12,000
To Wages Control A/c	24,000	By Costing P&L A/c	4,800
To Cost Ledger control A/c	96,000	By WIP Control A/c (bal. fig)	1,09,800
To Stores Ledger control A/c (loss)	3,000		
	1,26,600		1,26,600

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	3,000	By WIP Control A/c	3,000
	3,000		3,000

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Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	12,000	By Finished goods control A/c (bal. fig)	1,99,800
To Stores Ledger control A/c	30,000		
To Wages Control A/c	60,000		
To Factory overhead control A/c	1,09,800		
To Royalty A/c	3,000	By Balance c/d	15,000
	2,14,800		2,14,800

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	2,58,000	By Cost of Goods Sold A/c (Refer working note)	2,16,000
To WIP control A/c	1,99,800	By Balance c/d	2,41,800
	4,57,800		4,57,800

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	2,16,000	By Cost of sales A/c	2,16,000
	2,16,000		2,16,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	15,000	By Cost of sales A/c	15,000
	15,000		15,000

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	2,16,000	By Costing P&L A/c	2,31,000
To Selling, Distribution and Administration A/c	15,000		
	2,31,000		2,31,000

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Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	2,31,000	By Cost Ledger control A/c	2,70,000
To Factory overhead control A/c	4,800		
To Cost Ledger control A/c	34,200		
	2,70,000		2,70,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Cost Ledger control A/c	26,400
To Stores Ledger control A/c	2,400		
To Wages Control A/c	6,000		
To Factory overhead control A/c	12,000		
	26,400		26,400

Trial Balance

Particulars	Dr. (₹ in '000)	Cr. (₹ in '000)
Stores Ledger Control A/c	33,000	
WIP Control A/c	15,000	
Finished Goods Control A/c	2,41,800	
Cost Ledger Control A/c		2,89,800
	2,89,800	2,89,800

Working Note:

Cost of Goods sold = ₹ 2,70,000 × 80 / 100 = ₹ 2,16,000

4. (a) G Ltd. has the following expenditures for the year ended 31st March, 2021:

Sl. No.		Amount (₹)	Amount (₹)
(i)	Raw materials purchased		20,00,00,000
(ii)	Freight inward		22,41,200
(iii)	Wages paid to factory workers		58,40,000
(iv)	Royalty paid for production		3,45,200
(v)	Amount paid for power & fuel		9,24,000
(vi)	Job charges paid to job workers		16,24,000

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(vii)	Stores and spares consumed		2,24,000
(viii)	Depreciation on office building		1,12,000
(ix)	Repairs & Maintenance paid for:		96,000
	- Plant & Machinery		
	- Sales office building	36,000	1,32,000

(x)	Insurance premium paid for:		
	- Plant & Machinery	62,400	
	- Factory building	36,200	98,600
(xi)	Expenses paid for quality control check activities	39,200	
(xii)	Research & development cost paid improvement in production process	36,400	
(xiii)	Expenses paid for pollution control and engineering & maintenance	53,200	
(xiv)	Salary paid to Sales & Marketing Managers:	20,24,000	
(xv)	Salary paid to General Manager	25,12,000	
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	1,92,000	
	- For re-distribution of finished goods	2,24,000	4,16,000
(xvii)	Performance bonus paid to sales staffs		7,20,000
(xviii)		Value of stock as on 1 st April, 2020:	
	- Raw materials	36,00,000	
	- Work-in-process	18,40,000	
	- Finished goods	22,00,000	76,40,000
(xix)		Value of stock as on 31 st March, 2021:	
	- Raw materials	19,20,000	
	- Work-in-process	17,40,000	
	- Finished goods	36,40,000	73,00,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹1,72,000/-

From the above data you are requested to PREPARE Statement of cost for G Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

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ANSWER**Statement of Cost of G Ltd. for the year ended 31st March, 2021:**

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	20,00,00,000	
	- Freight inward	22,41,200	
	Add: Opening stock of raw materials	36,00,000	
	Less: Closing stock of raw materials	(19,20,000)	20,39,21,200
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		58,40,000
(iii)	Direct expenses:		
	- Royalty paid for production	3,45,200	
	- Amount paid for power & fuel	9,24,000	
	- Job charges paid to job workers	16,24,000	28,93,200
	Prime Cost		21,26,54,400
(iv)	Works/ Factory overheads:		
		2,24,000	
	- Stores and spares consumed		
	- Repairs & Maintenance paid for plant & machinery	96,000	
	- Insurance premium paid for plant & machinery	62,400	
	- Insurance premium paid for factory building	36,200	
	- Expenses paid for pollution control and engineering & maintenance	53,200	4,71,800
	Gross factory cost		21,31,26,200
	Add: Opening value of W-I-P		18,40,000
	Less: Closing value of W-I-P		(17,40,000)
	Factory Cost		21,32,26,200
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		39,200
(vi)	Research & development cost paid improvement in production process		36,400
(vii)	Less: Realisable value on sale of scrap and waste		(1,72,000)
(viii)	Add: Primary packing cost		1,92,000
	Cost of Production		21,33,21,800
	Add: Opening stock of finished goods		22,00,000
	Less: Closing stock of finished goods		(36,40,000)
	Cost of Goods Sold		21,18,81,800
(ix)	Administrative overheads:		
		1,12,000	
	- Depreciation on office building		
	- Salary paid to General Manager	25,12,000	26,24,000
(x)	Selling overheads:		
		36,000	
	- Repairs & Maintenance paid for sales office building		
		20,24,000	



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	- Salary paid to Manager- Sales & Marketing		
		7,20,000	27,80,000
	- Performance bonus paid to sales staffs		
(xi)	Distribution overheads:		
			2,24,000
	- Packing cost paid for re-distribution of finished goods		
	Cost of Sales		21,75,09,800

(b) A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	T	U
Sales Mix	25%	35%	40%
Selling Price	₹ 600	₹ 800	₹ 400
Variable Cost	₹ 300	₹ 400	₹ 240
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	T	M
Sales Mix	40%	35%	25%
Selling Price	₹ 600	₹ 800	₹ 600
Variable Cost	₹ 300	₹ 400	₹ 300
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,28,00,000

Required

- (i) Compute the PV ratio, total contribution, profit and Break-even sales for the existing product mix.
(ii) Compute the PV ratio, total contribution, profit and Break-even sales for the proposed product mix.

ANSWER

- (i) Computation of PV ratio, contribution and break-even sales for existing product mix

	Products			TOTAL
	S	T	U	
Selling Price (₹)	600	800	400	
Less: Variable Cost (₹)	300	400	240	
Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	25%	35%	40%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	12.5%	17.5%	16%	46%



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Present Total Contribution (₹ 1,20,00,000 × 46%)	₹55,20,000
Less: Fixed Costs	₹36,00,000
Present Profit	₹19,20,000
Present Break Even Sales (₹ 36,00,000/0.46)	₹ 78,26,087

(ii) Computation of PV ratio, contribution and break-even sale for proposed product mix

	Products			TOTAL
	S	T	M	
Selling Price (₹)	600	800	600	
Less: Variable Cost (₹)	300	400	300	
Contribution per unit (₹)	300	400	300	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	20%	17.5%	12.5%	50%

Proposed Total Contribution (₹1,28,00,000 × 50%)	₹64,00,000
Less: Fixed Costs	₹36,00,000
Proposed Profit	₹28,00,000
Proposed Break Even Sales (₹36,00,000/0.50)	₹72,00,000

5. (a) The following budgeted information relates to B Ltd. for the year 2021:

	Products		
	X	Y	Z
Production and Sales (units)	1,00,000	80,000	60,000
	(₹)	(₹)	(₹)
Selling price per unit	45	90	70
Direct cost per unit	25	45	50

	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

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The estimated overhead expenses for the year 2021 will be as below:

Machine Department ₹ 36,80,000

Assembly Department ₹ 27,50,000

Overhead expenses are apportioned to the products on the following basis:

Machine Department On the basis of machine hours

Assembly Department On the basis of labour hours

After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	32,20,000	Machine hours	9,20,000 hours
Assembly services	22,00,000	Direct labour hours	11,00,000 hours
Set-up costs	4,50,000	Machine set-ups	9,000 set-ups
Order processing	3,60,000	Customer orders	7,200 orders
Purchasing	2,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to PREPARE a product-wise profit statement using:

(i) Absorption costing method;

(ii) Activity-based method.

ANSWER

(i) Profit Statement using Absorption costing method:

	Particulars	Products			TOTAL
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B.	Selling price per unit (₹)	45	90	70	
C.	Sales Value (₹) [A×B]	45,00,000	72,00,000	42,00,000	1,59,00,000
D.	Direct cost per unit (₹)	25	45	50	
E.	Direct Cost (₹) [A×D]	25,00,000	36,00,000	30,00,000	91,00,000
F.	Overheads:				
(i)	Machine department (₹) (Working note-1)	12,00,000	12,80,000	12,00,000	36,80,000

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(ii)	Assembly department (₹) (Working note-1)	15,00,000	8,00,000	4,50,000	27,50,000
G.	Total Cost (₹) [E+F]	52,00,000	56,80,000	46,50,000	1,55,30,000
H.	Profit (C-G)	(7,00,000)	15,20,000	(4,50,000)	3,70,000

(ii) Profit Statement using Activity based costing (ABC) method:

		Products			TOTAL
Particulars		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	
B.	Selling price per unit (₹)	45	90	70	
C.	Sales Value (₹) [A×B]	45,00,000	72,00,000	42,00,000	1,59,00,000
D.	Direct cost per unit (₹)	25	45	50	
E.	Direct Cost (₹) [A×D]	25,00,000	36,00,000	30,00,000	91,00,000
F.	Overheads: (Refer working note-3)				
(i)	Machining services (₹)	10,50,000	11,20,000	10,50,000	32,20,000
(ii)	Assembly services (₹)	12,00,000	6,40,000	3,60,000	22,00,000
(iii)	Set-up costs (₹)	2,25,000	1,50,000	75,000	4,50,000
(iv)	Order processing (₹)	1,10,000	1,20,000	1,30,000	3,60,000
(v)	Purchasing (₹)	75,000	87,500	37,500	2,00,000
G.	Total Cost (₹) [E+F]	51,60,000	57,17,500	46,52,500	1,55,30,000
H.	Profit (₹) (C-G)	(6,60,000)	14,82,500	(4,52,500)	3,70,000

Working Notes:
(1)

		Products			TOTAL
Particulars		X	Y	Z	
A.	Production (units)	1,00,000	80,000	60,000	
B.	Machine hours per unit	3	4	5	
C.	Total Machine hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D.	Rate per hour (₹)	4	4	4	
E.	Machine Dept. cost [C×D]	12,00,000	12,80,000	12,00,000	36,80,000
F.	Labour hours per unit	6	4	3	
G.	Total labour hours [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
H.	Rate per hour (₹)	2.5	2.5	2.5	
I.	Assembly Dept. cost [G×H]	15,00,000	8,00,000	4,50,000	27,50,000

Machine hour rate = ₹ 36,80,000 / 9,20,000 hours = ₹ 4

Labour hour rate = ₹ 27,50,000 / 11,00,000 hours = ₹ 2.5



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2. Calculation of cost driver rate

Cost Pool	Amount (₹)	Cost Driver	Quantity	Driver rate (₹)
Machining services	32,20,000	Machine hours	9,20,000 hours	3.50
Assembly services	22,00,000	Direct labour hours	11,00,000 hours	2.00
Set-up costs	4,50,000	Machine set-ups	9,000 set-ups	50.00
Order processing	3,60,000	Customer orders	7,200 orders	50.00
Purchasing	2,00,000	Purchase orders	800 orders	250.00

3. Calculation of activity-wise cost

	Particulars	Products			TOTAL
		X	Y	Z	
A.	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B.	Machine hour rate (₹) (Refer Working note-2)	3.5	3.5	3.5	
C.	Machining services cost (₹) [A×B]	10,50,000	11,20,000	10,50,000	32,20,00
D.	Labour hours (Refer Working note-1)	6,00,000	3,20,000	1,80,000	11,00,000
E.	Labour hour rate (₹) (Refer Working note-2)	2	2	2	
F.	Assembly services cost (₹) [D×E]	12,00,000	6,40,000	3,60,000	22,00,000
G.	Machine set-ups	4,500	3,000	1,500	9,000
H.	Rate per set-up (₹) (Refer Working note-2)	50	50	50	
I.	Set-up cost (₹) [G×H]	2,25,000	1,50,000	75,000	4,50,000
J.	Customer orders	2,200	2,400	2,600	7,200
K.	Rate per order (₹) (Refer Working note-2)	50	50	50	
L.	Order processing cost (₹) [J×K]	1,10,000	1,20,000	1,30,000	3,60,000
M.	Purchase orders	300	350	150	800
N.	Rate per order (₹) (Refer Working note-2)	250	250	250	
O.	Purchasing cost (₹) [M×N]	75,000	87,500	37,500	2,00,000



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(b) T Ltd manufactures and sells a single product and has estimated sales revenue of ₹1,51,20,000 during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material A and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are ₹30 per unit sold and fixed selling & distribution overheads are estimated to be ₹34,56,000.

The other relevant details are as under:

Purchase Price:	Material A	₹80 per kg	
	Materials B	₹50 per kg	
Labour Rate:	Machine Shop	₹70 per hour	
	Assembly Shop	₹35 per hour	
	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required

- (i) CALCULATE number of units of product proposed to be sold and selling price per unit,
(ii) PREPARE Production Budget in units and
(iii) PREPARE Material Purchase Budget in units.

ANSWER
Workings

Statement Showing "Total Variable Cost for the year"

Particulars	Amount (₹)
Estimated Sales Revenue	1,51,20,000
Less: Desired Profit Margin on Sale @ 20%	30,24,000
Estimated Total Cost	1,20,96,000
Less: Fixed Selling and Distribution Overheads	34,56,000
Total Variable Cost	86,40,000

Statement Showing "Variable Cost per unit"

Particulars	Variable Cost p.u. (₹)
Direct Materials:	
A: 6 Kg. @ ₹80 per kg.	480
B: 3 Kg. @ ₹50 per kg.	150
Labour Cost:	
Machine Shop: 4 hrs. @ ₹70 per hour	280
Assembly Shop: 2 hrs. @ ₹35 per hour	70
Factory Overheads: 20% of (₹280 + ₹70)	70
Variable Selling & Distribution Expenses	30
Total Variable Cost per unit	1,080

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CA INTER COSTING MA COMPILER 4.0
(i) Calculation of number of units of product proposed to be sold and selling price per unit:

Number of Units Sold = Total Variable Cost / Variable Cost per unit
 = ₹ 86,40,000 / ₹ 1,080
 = 8,000 units
 Selling Price per unit = Total Sales Value / Number of Units Sold
 = ₹ 1,51,20,000 / 8,000 units
 = ₹ 1,890

(ii) Production Budget (units)

Particulars	Units
Budgeted Sales	8,000
Add: Closing Stock	3,000
Total Requirements	11,000
Less: Opening Stock	(2,500)
Required Production	8,500

(iii) Materials Purchase Budget (Kg.)

Particulars	Material A	Material B
Requirement for Production	51,000	25,500
	(8,500 units × 6 Kg.)	(8,500 units × 3 Kg.)
Add: Desired Closing Stock	8,000	5,500
Total Requirements	59,000	31,000
Less: Opening Stock	(7,500)	(4,000)
Quantity to be purchased	51,500	27,000

6. (a) How apportionment of joint costs up-to the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? DISCUSS.
ANSWER
Cost classification based on variability

(i) Fixed Costs – These are the costs which are incurred for a period, and which, within certain output and turnover limits, tend to be unaffected by fluctuations in the levels of activity (output or turnover). They do not tend to increase or decrease with the changes in output. For example, rent, insurance of factory building etc., remain the same for different levels of production.

(ii) Variable Costs – These costs tend to vary with the volume of activity. Any increase in the activity results in an increase in the variable cost and vice-versa. For example, cost of direct labour, etc.

(iii) Semi-variable Costs – These costs contain both fixed and variable components and are thus partly affected by fluctuations in the level of activity. Examples of semi variable costs are telephone bills, gas and electricity etc.

Cost classification based on controllability

(i) Controllable Costs - Cost that can be controlled, typically by a cost, profit or investment centre manager is called controllable cost. Controllable costs incurred in a particular responsibility centre can be influenced by the action of the executive heading that responsibility centre. For example, direct costs comprising direct labour, direct material, direct expenses and some of the overheads are generally controllable by the shop level management.



(ii) Uncontrollable Costs - Costs which cannot be influenced by the action of a specified member of an undertaking are known as uncontrollable costs. For example, expenditure incurred by, say, the tool room is controllable by the foreman in-charge of that section but the share of the tool-room expenditure which is apportioned to a machine shop is not to be controlled by the machine shop foreman.

(b) DISCUSS cost classification based on variability and controllability.

ANSWER

Cost classification based on variability

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(c) WRITE NOTE on cost-plus-contracts.

ANSWER

Cost-Plus Contracts: These contracts provide for the payment by the contractee of the actual cost of construction plus a stipulated profit, mutually decided between the two parties.

The main features of these contracts are as follows:

(i) The practice of cost-plus contracts is adopted in the case of those contracts where the probable cost of the contracts cannot be ascertained in advance with a reasonable accuracy.

(ii) These contracts are preferred when the cost of material and labour is not steady and the contract completion may take number of years.

(iii) The different costs to be included in the execution of the contract are mutually agreed, so that no dispute may arise in future in this respect. Under such type of contracts, contractee is allowed to check or scrutinize the concerned books, documents and accounts.

(iv) Such a contract offers a fair price to the contractee and also a reasonable profit to the contractor. The contract price here is ascertained by adding a fixed and mutually pre-decided component of profit to the total cost of the work.

d) DESCRIBE the salient features of budget manual.

ANSWER

Salient features of Budget Manual

- Budget manual contains much information which is required for effective budgetary planning.
- A budget manual is a collection of documents that contains key information for those involved in the planning process.
- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results is included in Budget Manual
- Budget Manual contains a form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- It contains a timetable for the preparation of each budget.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion is included in Budget Manual.



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CA Bishal Timsina

CA FINAL
AIR 1

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