CA INTER

VIGHNAHARTA

List For

COSTING

MOST IMPORTANT
QUESTIONS with
ANSWERS

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ॐ गं गणपतये नमः

सरस्वती महामाये दिव्य तेज स्वरूपिणी।
हंस वाहिनी समायुक्ता विद्या दानं करोतु मे।

INDEX

INTRODUCTION TO COST & MANAGEMENT ACCOUNTING

Q.1: Answer any four of the following:

(a) Differentiate between "Cost Accounting and Management Accounting".

(b) What are the important points an organization should consider if it wants to adopt Performance Budgeting?

(c) Explain what are the pre-requisites of integrated accounting.

(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

    (vii) Power supply Companies

    (viii) Car manufacturing Industry

    (ix) Cement Industry

    (x) Printing Press

(e) Differentiate between "Marginal and Absorption Costing". **[Nov 2020 (4 x 5 = 20 Marks)]**

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) 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) 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) Method of casting 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) Difference between Marginal costing and Absorption costing

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.

Q.2: Answer any four of the following:

(a) Sate 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.

(b) State the limitations of Budgetary Control System.

(c) Explain Blanket Overhead Rate and Departmental Overhead Rate. How they are

(a) calculated? State the conditions required for the application of Blanket Overhead Rate.

(b) 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

(c) Give any five examples of the impact of use of Information Technology in Cost Accounting.

[Jan 21 (4 x 5 = 20 Marks)]

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.
(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) **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) **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:

$$\text{Blanket Rate} = \frac{\text{Total overheads for the factory}}{\text{Total number of units of base for the factory}}$$

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:

$$\text{Departmental overheads Rate} = \frac{\text{Overheads of department or cost centre}}{\text{Corresponding base}}$$

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) 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) 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.

Q.3:

(a) WRITE note on cost-plus-contracts.

(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.

(c) DISCUSS cost classification based on variability and controllability.

(d) DESCRIBE the salient features of budget manual.   **[RTP May 21]**

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) 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) 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) 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.

- In 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.

Q.4:

(a) DISCUSS the Net Realisable Value (NRV) method of apportioning joint costs to by-products.

(b) DIFFERENCIATE between Service costing and Product costing.

(c) DISCUSS the Controllable and un-controllable variances.

(d) DISCUSS the Standard and Discretionary Cost Centres.

[MTP March 21 (4 × 5 = 20 Marks)]

ANSWER:

(a) **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) 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) **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) **(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.

Q.5:

(a) DISTINGUISH between cost control and cost reduction.

(b) EXPLAIN the advantages that would accrue in using the LIFO method of pricing for the valuation of raw material stock.

(c) DISCUSS basic assumptions of Cost Volume Profit analysis.

(d) DESCRIBE the steps necessary for establishing a good budgetary control system.

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 improvise 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) **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) **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) **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.

Q.6:

(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) Maharatna, Navratna and Miniratna public sector undertaking (PSU) of Central Government.

(v) Sales Department of an organization.

(b) What is Margin of Safety? What does a large Margin of Safety indicates? How can you calculate Margin of Safety?

(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.

(d) What do you understand by Build-Operate-Transfer (BOT) approach in Service Costing? How is the Toll rate computed?

(e) Write a short not on VED analysis of Inventory Control.   **[July 21 (4 × 5 = 20 Marks)]**

ANSWER:

(a)

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 brnaches 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) **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 $= \dfrac{\text{Profit}}{\text{P/V Ratio}}$

(c) **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 $= \dfrac{\text{Time Saved}}{\text{Time Allowed}}$ x Time taken x Rate per hour

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 $= \dfrac{\text{Time Saved}}{\text{Time Allowed}}$ x Time taken x Rate per hour

For 'X' $= \dfrac{2 \text{ hours}}{8 \text{ hours}}$ x 6 hours x ₹ 60 = 90

For 'Y' $= \dfrac{6 \text{ hours}}{8 \text{ hours}}$ x 2 hours x ₹ 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) **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) **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.**

Q.7:

(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

(b) **EXPLAIN the difference between Cost Accounting and Management Accounting**

(c) **DEFINE Zero Based Budgeting and mention its various stages.**

(d) **HOW do you deal with the following in cost accounts?**

    (i) **Fringe benefits**

    (ii) **Bad debts.**   **[MTP Oct 21 (4 x 5 = 20 Marks)]**

ANSWER:

(a) Journal entries are as follows:

			Dr. (₹)	Cr. (₹)
(i)	Stores Ledger Control A/c………………………	Dr.	27,000	
	To Cost Ledger Control A/c			27,000
(ii)	Work-in-Process Control A/c…………………	Dr.	6,000	
	To Manufacturing Overhead Control A/c			6,000
(iii)	Cost of Sales A/c……………………………	Dr.	4,000	
	To Selling & Dist. Overheads Control A/c			4,000
(iv)	(1) Wage Control A/c …………………..	Dr.	8,000	
	To Cost Ledger Control A/c			8,000

(i)		(2) Manufacturing Overhead Control A/c...........	Dr.	8,000	
		To Wages Control A/c			8,000
		OR			
		Manufacturing Overheads Control A/c..............	Dr.	8,000	
		To Cost Ledger Control A/c			8,000
(v)		Stores Ledger Control A/c....................	Dr.	9,000	
		To Work-in-Process control A/c			9,000

*Cost Ledger Control A/c is also known as General Ledger Control A/c

(b) **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.
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(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 follows any specific rules and regulations.

(c) **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) **(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.

Q.8:

(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.

(b) Discuss cost classification based on variability and controllability.

(c) WRITE NOTE on cost-plus-contracts.

(d) DESCRIBE the salient features of budget manual. **[MTP Nov 21 (4 x 5 = 20 Marks)]**

ANSWER:

(a) **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.

(b) **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.

(c) **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 contacts 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) **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.

- In 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.

EMPLOYEE COST & DIRECT EXPENSES

Q.1: 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)	₹ 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. **[Jan 21 (10 Marks)]**

ANSWER:

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. × ₹ 50 × 50 workers = ₹ 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 × ₹ 50 = ₹ 62,175

   Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 62,175) ₹ 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:

   Bonus $= \dfrac{\text{Time taken}}{\text{Time allowed}} \times$ Time saved × hourly rate

$$= \frac{9,,600 \text{ hours}}{12,087} \times 2,487 \text{ hours} \times ₹ 50 = ₹ 98,764$$

Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 98,764) ₹ 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 Note 1, 2 and 3)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Halsey scheme}}{\text{Total hours worked}}$$

$$= \frac{₹ 4,80,000 + ₹ 62,175}{9,600} = ₹ \textbf{56.48}$$

Effective hourly rate of earnings under Rowan scheme:

(b) Effective hourly rate of earnings under Rowan scheme:

(Refer to Working Notes 1, 2 and 4)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Raown scheme}}{\text{Total hours worked}}$$

$$= \frac{₹ 4,80,000 + ₹ 96,875}{9,600 \text{ hours}} = ₹ \textbf{60.29}$$

Effective increase in earnings of worker (in %) $= \frac{₹60.29 - 50}{₹ 50} \times 100 = ₹ \textbf{20.58\%}$

(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 hours × ₹ 50 = ₹ 98.75

Labour cost per unit (under Halsey scheme)

$$= \frac{\text{Total wages paid under the schme}}{\text{Total number of units produced}} = \frac{₹ 5,42,175}{6,120} = ₹ \textbf{88.60}$$

Saving per unit = ₹ 98.75 - ₹ 88.60 = ₹ 10.15

(b) Saving in terms of direct worker cost per unit under Rowan Scheme:

(Refer to Working Note 4)

Labour cost per unit under Rowan scheme = ₹ 5,78,764/6,120 units= ₹ 94.57

Saving per unit = ₹ 98.75 − ₹ 94.57   = ₹ 4.18

(iii) Calculation of Productivity:

Normal Production Horus 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%.

Q.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 ₹ 60 per hour. As per the new wages agreement the workers will be paid ₹ 72 per hour w.e.f. 1stJanuary 2021. At the end of the month December 2020, the accountant of the company has wrongly calculated wages to these two workers taking ₹ 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?   **[RTP May 21]**

ANSWER:

Working 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) $\left(\dfrac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Excess Rate}\right)$	200 $\left(\dfrac{100}{120} \times 20 \times ₹12\right)$	280 $\left(\dfrac{140}{168} \times 28 \times ₹12\right)$	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.

Q.3: 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.   **[MTP MARCH 2021 (5 Marks)]**

ANSWER:

Labour Turnover Rate (Replacement method) $= \dfrac{\text{No. of worker repalced}}{\text{Average No. of workers}}$

Or, $\dfrac{8}{100} = \dfrac{36}{\text{Average No.of workers}}$

Or, Average No. of workers = 450

Labour Turnover Rate (Separation method) $= \dfrac{\text{No. of workers separated}}{\text{Average No. of workers}}$

Or, $\dfrac{6}{100} = \dfrac{\text{No. of workers separated}}{450}$

Or, No. of workers separated = 27

Labour Turnover Rate (Flux Method) $= \dfrac{\text{No. of Separateuion + No. of accession (Joinings)}}{\text{Average No. of workers}}$

Or, $\dfrac{14}{100} = \dfrac{27 + \text{No. of accessions (joinings)}}{450}$

Or, 100 (27 + No. of Accessions) = 6,300

Or, No. of Accessions = 36

(i) The No. of workers recruited and Joined   = 36

(ii) The No. of workers left and discharged   = 27

Q.4: 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.   **[MTP April 21 (5 Marks)]**

ANSWER:

Employee turnover rate using:

(i) Separation Method:

$$= \frac{\text{No. of workers left + No. of workers discharged}}{\text{Average number of workers}} \times 100$$

$$= \frac{(40 + 160)}{(3,800 + 4,200) \div 2} \times 100 = \frac{200}{4,000} \times 100 = 5\%$$

(ii) Replacement Method:

$$= \frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100 \qquad = \frac{150}{4,000} \times 100 = 3.75\%$$

(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:

$$= \frac{\text{No. of separation + No. of accessions}}{\text{Average number of workers}} \times 100$$

$$= \frac{(200 + 600)}{(3,800 + 4,200) \div 2} \times 100 = \frac{800}{4,000} \times 100 = 20\%$$

Q.5: 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:

(i) Compute the Employee Turnover Rates using Separation Method and Flux Method.

(ii) Equivalent Employee Turnover Rate for (i) above, given that the organization was setup on 31st January, 2021. **[July 21(5 Marks)]**

ANSWER:

(i) Employee Turnover rate

Using Separation method:

$$= \frac{\text{Number of employees Separated during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{25}{500} \times 100 = 5\%$$

Using Flux method:

Number of employees Separated+

$$= \frac{\text{Number of employees Replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{50 - 25}{500} \times 100 = 15\%$$

(ii) Equivalent Employee Turnover rate:

$$= \frac{\text{Employee Turnover rate for the period}}{\text{Number of days in the period}} \times 365$$

Using Separation method $\qquad = \frac{5}{60} \times 365 \qquad = 30.42\%$

Or,	$= \frac{5}{60} \times 360$	$= 30\%$
Or,	$= \frac{5}{60} \times 12$	$= 91.25\%$
Using Flux method	$= \frac{15}{60} \times 365$	$= 91.25\%$
Or,	$= \frac{15}{2} \times 360$	$= 90\%$
Or,	$= \frac{15}{2} \times 12$	$= 90\%$

Q.6: 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
Production 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.) **[MTP Nov 21 (5 Marks)]**

<u>ANSWER</u>:

(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 earnings basis

Product	Piece rate per unit	Worker-M		Worker-N		Worker- O	
	(₹)	Units	Wages (₹)	Units	Wages (₹)	Units	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

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

Q.7: The standard time allowed for a certain piece of work is 240 hours. Normal wage rate is ₹ 75 per hour.

The bonus system applicable to the work is as follows:

Percentage of time saved to time allowed (slab rate)		Bonus
(i)	Up to the first 20% of time allowed	25% of the corresponding saving in time.
(ii)	For and within the next 30% of time allowed	40% of the corresponding saving in time.
(iii)	For and within the next 30% of time allowed	30% of the corresponding saving in time.
(iv)	For and within the next 20% of time allowed	10% of the corresponding saving in time.

Calculate the total earnings of a worker over the piece of work and his earnings per hour when he takes—

(a) 256 hours,

(b) 120 hours, and

(c) 24 hours respectively.

ANSWER:

Calculation of total earnings and earnings per hour:

	Particulars	(a) Time taken is 256 hours	(b) Time taken is 120 hours	(c) Time taken is 24 hours
A.	Time Allowed	240 hours	240 hours	240 hours
B.	Time taken	256 hours	120 hours	24 hours
C.	Time Saved (A − B)	Nil	120 hours	216 hours
D.	Bonus hours (Refer workings)	Nil	40.80 hours	64.80 hours
E.	Hours to be paid (B + D)	256 hours	160.80 hours	88.80 hours
F.	Wages rate per hour	₹ 75	₹ 75	₹75
G.	**Total earnings (E x F)**	₹ 19,200	₹ 12,060	₹ 6,660
H.	**Earnings per hour (G÷B)**	₹ 75	₹ 100.50	₹ 277.50

Working Note:

Calculation of bonus hours:

	Time saved 120 hours	Time Saved 216 hours
For first 20% of time allowed i.e. 48 hours	12 (25% of 48 hours)	12 (25% of 48 hours)
For next 30% of time allowed i.e. 72 hours	28.80 (40% of 72 hours)	28.80 (40% of 72 hours)

For next 30% of time allowed i.e. 72 hours	--	21.60 (30% of 72 hours)
For next 20% of time allowed i.e. 48 hours	--	2.40 (10% of 24 hours)
Bonus hours	**40.80**	**64.80**

MATERIAL COST

Q.1: An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is ₹ 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs ₹ 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?   **[Nov 2020 (10 Marks)]**

ANSWER:

Working Notes:

Annual requirement (A)	= 27,000 units
Cost per order (O)	= ₹ 240
Inventory carrying cost (i)	= 12.5%
Cost per unit of spare (c)	= ₹ 50
Carrying cost per unit (i × c)	= ₹ 50 × 12.5% **= ₹ 6.25**

Economic Order Quantity (EOQ)

$$= \sqrt{\frac{2 \times A \times O}{i \times c}}$$

$$= \sqrt{\frac{2 \times 27{,}000 \times 240}{6.25}} = \textbf{1440 units}$$

(i)   Calculation of saving by opting EOQ:

	Existing Order policy	EOQ Model
No. of orders	9 $\left(\dfrac{27{,}000}{3{,}000}\right)$	**18.75 or 19** $\left(\dfrac{27{,}000}{1{,}440}\right)$
A. Ordering Cost (₹)	**2,160** (₹ 240 x 9)	**4,500** $\left\{₹\,240\,x\,\left(\dfrac{27{,}000}{1{,}440}\right)\right\}$
B. Carrying cost (₹)	**9,375** $\left(\dfrac{3{,}000\,x\,₹\,6.25}{2}\right)$	**4,500** $\left(\dfrac{1{,}440\,x\,₹\,6.25}{2}\right)$
Total cost (A + B) (₹)	**11,535**	**9,000**

Savings of Cost by opting EOQ Model = ₹ 11,535 – ₹ 9,000 = ₹ 2,535

(ii)   Re-order point under EOQ:

Re-order point/ Re-order level = Maximum consumption × Maximum lead time

Consumption per day = $\dfrac{27{,}000 \text{ units}}{360 \text{ days}}$ = 75 units

Re-order point/ Re-order level = 75 units x 12 days = 900 units

(iii)   Frequency of Orders (in days):

$\dfrac{360 \text{ days}}{\text{No. of orders a year}}$ = $\dfrac{360 \text{ days}}{19}$ = 19.95 days or 19 days

Q.2: 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 ₹ 1.50 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is ₹ 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?   [Jan 21]

ANSWER:

(i)   **Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)**

Economic Batch Quantity (EBQ) = $\sqrt{\dfrac{2DS}{C}}$

Where, D   = Annual demand for the Stents

= 4,00,00,000 × 2.5% = 10,00,000 units

S   = Set- up cost per run

= ₹ 225

C   = Carrying cost per unit per annum

= ₹ 1.50 × 12 = ₹ 18

EQB   = $\sqrt{\dfrac{2 \times 10,00,000 \times ₹ 225}{₹ 18}}$

= 5,000 units of Stents

(ii)   **Minimum inventory holding cost**

Minimum Inventory Cost   = Average Inventory × Inventory Carrying Cost per unit per annum

= (5,000 ÷ 2) × ₹ 18

= ₹ 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	= $\dfrac{10,00,000}{4,000}$ × ₹ 225 = ₹ 56,250	= $\dfrac{10,00,000}{5,000}$ × ₹ 225 = ₹ 45,000
Total Carrying cost	½ x 4,000 x ₹ 18 = 36,000	½ x 5,000 x ₹ 18 = 45,000
Total Cost	₹ 92,250	₹ 90,000

Extra cost = ₹ 92,250 - ₹ 90,000 **= ₹ 2,250**

Q.3: 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 ₹ 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 ₹ 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':**

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):**

$$EOQ = \sqrt{\frac{2 \times \text{Annual demand of 'D' } \times \text{ Orderings cost}}{\text{Carrying cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 70,800 \text{ kg. } \times ₹ 1,340}{₹ 250 \times 14\%}} = \sqrt{\frac{2 \times 70,800 \text{ kg. } \times ₹ 1,340}{₹ 35}} = 2,328 \text{ kg.}$$

(iii) **Re – Order level:**

= (Maximum consumption per day × Maximum lead time)

$$= \left\{ \left(\frac{\text{Annual Consumption of 'D'}}{300 \text{ days}} + 40 \text{ kg.} \right) \times 8 \text{ days} \right\}$$

$$= \left\{ \left(\frac{70,800 \text{ kg.}}{300 \text{ days}} + 40 \text{ kg.} \right) \times 8 \text{ days} \right\} = 2,208 \text{ kg.}$$

(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

Average Consumption $= \frac{\text{Min. consumption + Max. consumption}}{2}$

Or, 236 kg. $= \frac{\text{Min. consumption + 276 kg.}}{2}$

Or, Min. consumption = 472 kg. – 276 kg. = 196 kg.

(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.

(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 order x ₹ 1,340 = ₹ 49,580	31 orders x ₹ 1,340 = 41,540
IV	Average Inventory	$\frac{1,928}{2}$ = 964 kg.	$\frac{2,328 \text{ kg.}}{2}$ = 1,164 kg.
V	Carrying Cost	964 kg. x ₹ 35 = ₹ 33,740	1,164 kg. x ₹ 35 = ₹ 40.470
VI	Total Cost	₹ 83,320	₹ 82,280

Extra Cost incurred due to not ordering EOQ = ₹83,320 - ₹82,280 = ₹1,040

Q.4: 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** [MTP March 21 (5 Marks)]

ANSWER:

(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

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 kg. (Approx)

Q.5: A company uses three raw material Pi, Qu and Ar for a particulars product for which the following data applies:

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

= $\frac{\text{Minimum stock + Maximum stock}}{2}$ (Refer to Working Note)

= $\frac{4,000 + 16,250}{2}$ = 10,125 kg.

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.

Q.6: MM Ltd. has provided the following information about the items in its inventory.

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	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. **[July 21 (5 Marks)]**

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

Basis for ABC Classification as % of Total Inventory Cost

15% & above	--	'A' items
70% 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	

Q.7: AUX Ltd. has an Annual demand forma single customer for 60,000 COIVD-19 vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccines 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.

[July 21 (5 Marks)]

ANSWER:

(i) Calculation of most Economical Production Run

$$= \sqrt{\frac{2 \times 60,000 \times ₹\,4,800}{12 \times 12}} = 2,000 \text{ Vaccine}$$

(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	$= \frac{60,000}{2,000} \times ₹\,4,800$ = ₹ 1,44,000	$= \frac{60,000}{15,000} \times ₹\,4,800$ = ₹ 19,200
Total Carrying cost	½ x 2,000 x ₹ 144 = ₹ 1,44,000	½ x 15,000 x ₹ 144 = ₹ 10,80,000
Total Cost	₹ 2,88,000	₹ 10,99,200

Thus, extra cost = ₹ 10,99,200 - ₹ 2,88,000 = **₹ 8,11,200**

Q.8: 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?   **[MTP Oct 21 (5 Marks)]**

ANSWER:

(i)   Optimum run size or Economic Batch Quantity (EBQ) = $\sqrt{\dfrac{2 \times D \times S}{C}}$

Where,   D   = Annual demanded 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 x 12 months = ₹ 30

EBQ   = $\sqrt{\dfrac{2 \times 17,20,000 \text{ units} \times ₹\,4,500}{₹\,30}}$ = 22,716 units

(ii)   Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of setups	Set-up Cost (₹)	Inventory holding cost (₹)	Total Cost (₹)
A	20,000 units	86 $\left(\dfrac{17,20,000}{20,000}\right)$	3,87,00 (86 x ₹ 4,500)	3,00,000 $\left(\dfrac{20,000 \times ₹\,30}{2}\right)$	6,87,000
B	22,716 units	76 $\left(\dfrac{17,20,000}{22,716}\right)$	3,42,000 (76 x ₹ 4,500)	3,40,740 $\left(\dfrac{22,716 \times ₹\,30}{2}\right)$	6,82,740
	Extra Cost (A − B)				4,260

OVERHEADS

Q.1: 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.)	B (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:

	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.

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

Item	Basis	Total	X	Y	Z	A	B
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
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

$a = 3,14,500 + 0.10\ b$ (i)

    or, $10a - b = 31,45,000$ [(i) ×10]

$b = 1,80,500 + 0.20\ a$ (ii)

    or, $-0.20a + b = 1,80,500$

Solving equation (i) & (ii)

$10a - b = 31,45,000$

$-0.20a + b = 1,80,500$

$9.8a = 33,25,500$

$a = Rs.\ 3,39,337$

Putting the value of 'a' in equation (ii), we get

$b = 1,80,500 + 0.20 \times 3,39,337$

$b = Rs.\ 2,48,367$

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

Q.2: 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.10,000, 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 paisa 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.

[MTP April 21 (5 Marks)]

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 $= \dfrac{Rs.\ 1,00,000 -\ Rs.\ 10,000}{10\ years} = Rs.\ 9,000$

(iii) Chemical solution cost per annum = Rs. 200 × 50 weeks = Rs. 10,000

(iv) Wages of attendants (per annum) $= \dfrac{Rs.\ 1,200 \times 50\ weeks}{6\ machines} = Rs.\ 10,000$

Calculation of Machine hour rate

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 $\left(\dfrac{30,000}{2,000}\right)$		15.00
B. Machine Expense		
(iii) Depreciation	9,000	4.50
(iv) Electricity $\left(\dfrac{Rs.\ 0.9\ \times 16\ units \times 1,900\ hours}{2,000\ hours}\right)$	-	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**

Q.3: SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments Main Department:	Expenses (in ₹)	Area in (Sq. Mtr)	Number of Employees
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Services Departments:			
Maintenance Department	6,40,000	4	200
Personal 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:

(i) Prepare a Statement showing the distribution of expenses of Service Departments to the Main Departments using the "Step Ladder method" of Overhead Distribution.

(ii) Compute the Rate per hour of each Main 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. **[July 21 (5 Marks)]**

ANSWER:

(i) Schedule Showing the Distribution of Expenses of Services Departments using Step ledder method.

	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

Q.4: 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

Item	Total Amount	X	Y	Z	A	B
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 Department			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 department after re-apportioning service departments' overhead by using simultaneous equation method. Show all the calculations to the nearest rupee.

[MTP Nov 21 (10 Marks)]

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'

$$a = 6,29,000 + 0.10 b \qquad\qquad (i)$$

$$\text{or, } 10a - b = 62,90,000 \qquad\qquad [(i) \times 10]$$

$$b = 3,61,000 + 0.20 a \qquad\qquad (ii)$$

$$\text{or, } -0.20a + b = 3,61,000$$

Solving equation (i) & (ii)

$$10a - b = 62,90,000$$
$$-0.20a + b = 3,61,000$$
$$9.8a \quad = 66,51,000$$

$$a \quad = 6,78,673$$

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
Services 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**

Q.5: PM Ltd. has three Production departments P₁, P₂, P₃ and two Service Department S₁ and S₂ details pertaining to which are as under:

	P₁	P₂	P₃	S₁	S₂
Direct wages (₹)	60,000	40,000	60,000	30,000	3,900
Working hours	3,070	4,475	2,419	--	--
Value of machines (₹)	12,00,000	16,00,000	20,00,000	1,00,000	1,00,000
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:

	(₹)
Rent and Rates	1,00,000
General Lighting	12,000
Indirect Wages	38,780

Power		30,000
Depreciation on machines		2,00,000
Sundries		1,93,900

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 ₹ 1,000 and Direct Labour Cost is ₹ 600.

<center>[MTP March 22 (10 Marks)]</center>

<u>**ANSWER**</u>:

<center>**Statement Showing Distribution of Overheads of PM Ltd.**</center>

Particulars	Basis	Total	Production Departments			Service Departments	
			P₁	P₂	P₃	S₁	S₂
		(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
Direct wages	Actual	33,900	--	--	--	30,000	3,900
Rent & rates	Area	1,00,000	20,000	25,000	30,000	20,000	5,000
General lighting	Light points	12,000	2,000	3,000	4,000	2,000	1,000
Indirect wages	Direct wages	38,780	12,000	8,000	12,000	6,000	780
Power	H.P.	30,000	12,000	6,000	10,000	2,000	--
Depreciation of machines	Value of machines	2,00,000	48,000	64,000	80,000	4,000	4,000
Sundries	Direct wages	1,93,900	60,000	40,000	60,000	30,000	3,900
		6,08,580	1,54,000	1,46,000	1,96,000	94,000	18,580

<center>**Redistribution of Service Department's Expenses over Production Departments**</center>

	P₁	P₂	P₃	S₁	S₂
	(₹)	(₹)	(₹)	(₹)	(₹)
Total overhead distributed as above	1,54,000	1,46,000	1,96,000	94,000	18,580
Dept. S₁ Overheads apportioned (20:30:40:—:10)	18,800	28,200	37,600	(94,000)	9,400
Dept. S₂ overheads apportioned (40:20:30:10:—)	11,192	5,596	8,394	2,798	(27,980)
Dept. S₁ Overheads apportioned (20:30:40:—:10)	560	839	1,119	(2,798)	280
Dept. S₂ overheads apportioned (40:20:30:10:—)	124	63	93	--	(280)
	1,84,676	1,80,698	2,43,206	--	--
Working hours	3,070	4,475	2,419		
Rate per hour	60.16	40.38	100.54		

Determination of total cost of Product 'X'

	(₹)
Direct material cost	1,000.00
Direct labour cost	600.00
Overhead cost (See working note)	744.14
	2,344.14

Working Note:

Overhead cost

$= (₹\ 60.16 \times 4\ \text{hrs.}) + (₹\ 40.38 \times 5\ \text{hrs.}) + (₹\ 100.54 \times 3\ \text{hrs.})$

$= ₹\ 240.62 + ₹\ 201.90 + ₹\ 301.62 = ₹\ 744.14$

Q.6: PL Ltd. has three production departments P_1, P_2 and P_3 and two service departments S_1 and S_2. The following data are extracted from the records of the company for the month of October, 2020:

	(₹)
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

Other Information:

	P_1	P_2	P_3	S_1	S_2
Direct wages (₹)	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 (₹)	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:

	P_1	P_2	P_3	S_1	S_2
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 ₹ 12,500 and direct labour cost is ₹ 7,500.

ANSWER:

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P₁ (₹)	P₂ (₹)	P₃ (₹)	S₁ (₹)	S₂ (₹)
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

Overheads of service cost centres

Let S_1 be the overhead of service cost centre S_1 and S_2 be the overhead of service cost centre S_2.

$S_1 = 7,67,583 + 0.10\ S_2$

$S_2 = 2,46,750 + 0.10\ S_1$

Substituting the value of S_2 in S_1 we get

$S_1 = 7,67,583 + 0.10\ (2,46,750 + 0.10\ S_1)$

$S_1 = 7,67,583 + 24,675 + 0.01\ S_1$

$0.99\ S_1 = 7,92,258$

$\therefore S_1 = ₹\ 8,00,260$

$\therefore S_2 = 2,46,750 + 0.10 × 8,00,260$

$\quad\quad = ₹\ 3,26,776$

Secondary Distribution Summary

Particulars	Total (₹)	P₁(₹)	P₂(₹)	P₃(₹)
Allocated and Apportioned over-heads as per primary distribution	31,60,667	9,23,500	9,73,000	12,64,167
S₁	8,00,260	1,60,052	2,40,078	3,20,104
S₂	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 (₹)	12,14,262	12,78,433	16,82,304
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	**195.06**	**315.67**	**410.32**

(ii) Cost of Product X

	(₹)
Direct materials	12,500.00
Direct labour	7,500.00
Prime cost	**20,000.00**
Production on overheads	
P_1 5 hours x ₹ 195.06 = 975.30	
P_2 3 hours x ₹ 315.67 = 947.01	
P_3 4 hours x ₹ 410.32 = 1,641.28	3,563.59
Factory cost	**23,563.59**

Q.7: Pretz Ltd. is a manufacturing company having two production departments, 'A' & 'B' and two service departments 'X' & 'Y'. The following is the budget for March, 2022:

	Total (₹)	A (₹)	B (₹)	C (₹)	Y (₹)
Direct Material		2,00,000	4,00,000	4,00,000	2,00,000
Direct wages		10,00,000	4,00,000	2,00,000	4,00,000
Factory rent	9,00,000				
Power (Machine)	5,10,000				
Depreciation	2,00,000				
General Lighting	3,00,000				
Perquisites	4,00,000				

Additional information:

	A	B	C	Y
Area (Sq. ft.)	500	250	250	500
Capital value of assets (₹ lakhs)	40	80	20	20
Light Points	10	20	10	10
Machine hours	1,000	2,000	1,000	1,000
Horse power of machines	50	40	15	25

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

	A	B	X	Y
Services Dept. 'X' (%)	55	25	--	20
Service Dept. 'Y' (%)	60	35	5	--

You are required to:

(a) PREPARE a statement showing distribution of overheads to various departments.

(b) PREPARE a statement showing re-distribution of service departments expenses to production departments using-

    (i) Simultaneous equation method

    (ii) Trial and error method

    (iii) Repeated Distribution Method. **[RTP May 22]**

<u>**ANSWER**</u>:

(a) **Primary Distribution of Overheads**

	Basis	Total (₹)	A (₹)	B (₹)	X (₹)	Y (₹)
Direct materials	Direct	6,00,000	--	--	4,00,000	2,00,000
Direct wages	Direct	6,00,000	--	--	2,00,000	4,00,000
Factory rent *(2:1:1:2)	Area	9,00,000	3,00,000	1,50,000	1,50,000	3,00,000
Power (Machine) (10:16:3:5*)	H.P. x Machine Hrs.	5,10,000	1,50,000	2,40,000	45,000	75,000
Depreciation (2:4:1:1)	Capital value	2,00,000	50,000	1,00,000	25,000	25,000
General Lighting (1:2:1:1)	Light Points	3,00,000	60,000	1,20,000	60,000	60,000
Perquisites (5:2:1:2)	Direct Wages	4,00,000	2,00,000	80,000	40,000	80,000
		35,10,000	7,60,000	6,90,000	9,20,000	11,40,000

*{(1000 × 50) : (2000 × 40) : (1000 × 15) : (1000 × 25)}

(50000 : 80000 : 15000 : 25000)

(10 : 16 : 3 : 5)

(b) **(i)** **Redistribution of Service Department's expenses using 'Simultaneous equation method'**

$$X = 9,20,000 + 0.05\ Y$$

$$Y = 11,40,000 + 0.20\ X$$

Substituting the value of X,

$$Y = 11,40,000 + 0.20\ (9,20,000 + 0.05\ Y)$$

$$= 13,24,000 + 0.01\ Y$$

$$Y - 0.01Y = 13,24,000$$

$$Y = \frac{13,24,000}{0.99}$$

$$Y = ₹\ 13,37,374$$

The total expense of **Y is ₹ 13,37,374** and that of **X is ₹ 9,86,869** i.e., ₹ 9,20,000 + (0.05 × ₹ 13,37,374).

Distribution of Service departments' overheads to Production departments

	Production Departments	
	A (₹)	B (₹)
Overhead as per primary distribution	7,60,000	6,90,000
Dept – X (55% and 25% of ₹ 9,86,869)	5,42,778	2,46,717
Dept – Y (60% and 35% of ₹ 13,37,374)	8,02,424	4,68,081
	21,05,202	14,04,798

(ii) **Redistribution of Service Department's expenses using 'Trial and Error Method':**

	Services Departments

	X (₹)	Y (₹)
Overheads as per primary distribution	9,20,000	11,40,000
(i) Apportionment of Dept.-X expenses to Dept.-Y (20% of ₹ 9,20,000)	----	1,84,000
	----	13,24,000
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 13,24,000)	66,200	----
(i) Apportionment of Dept- X expenses to Dept-Y (20% of ₹ 66,200)	----	13,240
(ii) Apportionment of Dept-Y expense to Dept-X (5% of ₹ 13,240)	662	----
(i) Apportionment of Dept- X expenses to Dept-Y (20% of ₹ 662)		132
(ii) Apportionment of Dept-Y expense to Dept-X (5% of ₹ 132)	7	
Total	9,86,869	13,37,372

Distribution of Service departments' overheads to Production departments

	Production Departments	
	A (₹)	B (₹)
Overhead as per primary distribution	7,60,000	6,90,000
Dept – X (55% and 25% of ₹ 9,86,869)	5,42,778	2,46,717
Dept – Y (60% and 35% of ₹ 13,37,372)	8,02,423	4,68,080
	21,05,201	14,04,797

(iii) **Redistribution of Service Department's expenses using repeated distribution method.**

	A (₹)	B (₹)	X (₹)	Y (₹)
Overhead as per primary distribution	7,60,000	6,90,000	9,20,000	11,40,000
Dept. X overhead apportioned in the ratio (55:25:--:20)	5,06,000	2,30,000	(9,20,000)	1,84,000
Dept. Y overhead apportioned in the ratio (60:35:5:---)	7,94,400	4,63,400	66,200	(13,24,000)
Dept. X overhead apportioned in the ratio (55:25:---:20)	36,410	16,550	(66,200)	13,240
Dept. Y overhead apportioned in the ratio (60:35:5:---)	7,944	4,634	662	(13,240)
Dept. X overhead apportioned in the ratio (55:25:---:20)	364	166	(662)	132
Dept. Y overhead apportioned in the ratio (60:35:5: —)	79	46	7	(132)
Dept. X overhead apportioned in the ratio (55:25:—:20)	4	3	(7)	--
	21,05,201	14,04,799	--	--

BUDGETARY CONTROL

Q.1: G Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of ₹ 6,00,000 utilises only 60% capacity of the plant. The following data are available:

(1)	Selling price	:	₹ 100 per unit
(2)	Variable cost	:	₹ 30 per unit
(3)	Semi-variable expenses	:	₹ 60,000 fixed + ₹ 5 per unit
(4)	Fixed expenses	:	₹ 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. **[Nov 2020]**

ANSWER:

Flexible Budget

Activity Level	60%	80%	100%
Production (units)	6,000	8,000	10,000
	(₹)	(₹)	(₹)
Sales @ ₹ 100 per unit	6,00,000	8,00,000	10,00,000 3,50,000
Variable Cost (@ ₹ 35 (₹ 30 + ₹ 5) per unit)	2,10,000	2,80,000	
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**

Q.2: 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	₹ 60 per unit
Direct Labour	₹ 30 per unit Indirect Overheads:
Fixed	₹ 65,50,000 per annum
Variable	₹ 15 per unit
Semi-variable	₹ 5,00,000 per annum up to 60% capacity and ₹ 50,000 for every 5% increase in capacity or part thereof up to 80% capacity and thereafter ₹ 75,000 for every 10% increase in capacity or part thereof.

Company desires to earn a profit of ₹ 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 :

(2) Determine the average selling price at which each of the toy should be sold to earn the desired profit.

(3) Given the above scenario, advise whether company should accept an offer to sell each Toy at:

(a) ₹ 130 per Toy

(b) ₹ 129 per Toy

ANSWER:

(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**

* ₹ 5,00,000+ [3 times (from 60% to 75%) x 50,000] = ₹ 6,50,000

** ₹ 6,50,000+ [1 time (from 75% to 80%) x 50,000] + [2 times (from 80% to 100%) × 75,000] = ₹ 8,50,000

(2) (a) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

(b) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

Q.3: RS Ltd manufactures and sells a single product and has estimated sales revenue of ₹ 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 ₹ 60 per unit sold and fixed selling & distribution overheads are estimated to be ₹ 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:

(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	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

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
	=	₹ 1,72,80,000 / ₹ 2,160
	=	8,000 units
Selling Price per unit	=	Total Sales Value / Number of Units Sold
	=	₹ 3,02,40,000 / 8,000 units
	=	₹ 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) Material Purchases 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

Q.4: 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:

	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:

(i)   PREPARE profitability statement for the FY 2020-21 and

(ii) PREPARE a budget for the FY 2021-22.   [MTP March 21 (10 Marks)]

ANSWER:

(i)   Production-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 overheads on the basis of direct wages

$$= \frac{9,50,000}{12,50,000} \times 100 = 76\%$$

(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)

Q.5: 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		

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.**   **[MTP April 21 (10 Marks)]**

ANSWER:

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

Level of sales required for present level of Profits $= \dfrac{\text{Total contribution Required}}{\text{New Contribution per unit}}$

$$= \dfrac{\text{Rs. } 14,40,000}{\text{Rs. } 12.40}$$

$$= 1,16,129 \text{ units}$$

(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

Level of sales required for present level of Profits $= \dfrac{\text{Total contribution Required}}{\text{New Contribution per unit}}$

$$= \dfrac{\text{Rs. } 14,40,000}{\text{Rs. } 14.40}$$

$$= 1,00,000 \text{ units}$$

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.

Q.6: 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 or Raw Material 'B'.

You are required to prepare the following budgets for the period November, 2020 to March, 2021 on monthly basis:

(i)   Sales Budget (in ₹)

(ii)   Production budget (in units) and

(iii) Raw material Budget for Raw material 'A' and 'B' separately (in units)   **[July 21(10 Marks)]**

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**

(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 x 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 x b)	**76,500**	**1,23,000**	**1,11,000**	**69,000**	**1,32,000**	5,11,500

Q.7: A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated cost 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.   [MTP Nov 21]

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
Indirect – semi-variable expenses			
- For first thee month @ ₹ 40,000 p.m.	1,20,000		1,20,000
- For remaining nine months @ ₹ 70,00* 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)

Q.8: 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
	Material 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. **[MTP Nov 21 (10 Marks)]**

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

(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 (8,500 units x 6 kg.)	25,500 (8,500 units x 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

MARGINAL COSTING

Q.1: Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse it's production mix in respect of these three products - 'X', 'Y' and 'Z'.

You have the following information :

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12

Direct labour :

Departments:	Rate per Hour (₹)	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 (₹)	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. **[Nov 2020]**

ANSWER:

(i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X (₹)	Y (₹)	Z (₹)
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 (₹)	Total Contribution (₹)
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**

Q.2: **During a particular period ABC Ltd has furnished the following data:**

Sales ₹ 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. **[Jan 2021]**

ANSWER:

Contribution to sales ratio (P/V ratio)	= 37%	
Variable cost ratio	= 100% - 37%	= 63%
Variable cost	= ₹ 10,00,000 x 63% = ₹ 6,30,000	

After decrease in selling price and fixed cost, sales quantity has not changed. Thus, variable cost is ₹ 6,30,000.

Revised Contribution to sales	= 30%
Thus, Variable cost ratio	= 100% − 30% = 70%
Thus, Revised sales	= $\frac{₹\,6,30,000}{70\%}$ = ₹ 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
	= ₹ 5,40,000 (₹ 9,00,000 x 60%) x 30%

= ₹ 1,62,000

(ii) **Revised sales** = ₹ 9,00,000 (as calculated above)

(iii) **Revised Break-even point** = Revised sales x Revised break-even sales ratio

= ₹ 9,00,000 x 60%

= ₹ 5,40,000

Q.3: Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilization (%)	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

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 ₹ 60,00,000.

(iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

[Jan 21 (10 Marks)]

ANSWER:

Workings:

2. 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

3. PV ratio of merged plant $= \dfrac{\text{Contribution}}{\text{Sales}} \times 100$

$$= \frac{₹\,68,50,000}{₹\,1,50,00,000} \times 100 = 45.67\%$$

(i) Break even sales of merged plant $= \dfrac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$$= \frac{₹\,28,00,000}{45.67\%}$$

$$= ₹\,61,30,939.34 \text{ (approx.)}$$

Capacity utilization $= \dfrac{₹\,61,30,939.34}{₹\,1,50,00,000} \times 100 = 40.88\%$

(ii) Profitability of the merged plant at 80% capacity utilization

$$= (₹ 1,50,00,000 \times 80\%) \times P/v \text{ ratio} - \text{fixed cost}$$

$$= ₹ 1,20,00,000 \times 45.67\% - ₹ 28,00,000$$

$$= ₹ 26,80,400$$

(iii)   Sales to earn a profit of ₹ 60,00,000

Desired sales $= \dfrac{\text{Fixed Cost} + \text{desired profit}}{\text{P/V Ratio}}$

$$= \dfrac{₹ 28,00,000 + ₹ 60,00,000}{45.67\%}$$

$$= ₹ 1,92,68,666 \text{ (approx.)}$$

(iv)   Increase in fixed cost

$$= ₹ 28,00,000 \times 5\% = ₹ 1,40,000$$

Therefore, percentage increase in sales price

$$= \dfrac{₹ 1,40,000}{₹ 1,92,68,666} \times 100 = 0.726\% \text{ (approx.)}$$

Q.4: ABC Health care runs an Intensive Medical Care Unit. For this purpose, it has hired a building at a rent of ₹ 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 ₹ 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 ₹ 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 ₹ 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 ₹ 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. **[Jan 21 (10 Marks)]**

ANSWER:

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 x ₹ 1500 x12)	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	= ₹ 17,55,000
Total Patient days	= 15,600 days
Contribution per Patient day	= ₹ 17,55,000 / 15,600 days = ₹ 112.50
Total Profit	= ₹ 6,81,000
Total Patient days	= 15,600 days
Profit per Patient day	= ₹ 6,81,000 / 15,600 days = ₹ 43.65

(ii)	**Breakeven Point**	= Fixed Cost / Contribution per Patient day
		= ₹ 10,74,000 / ₹ 112.50
		= 9,547 patient days

Q.5: 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

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.

[RTP May 21]

ANSWER:

(i)   Computation of PV ratio, contribution and break-even sales for existing product mix

	Products			Total
	S	**T**	**M**	
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

		₹ 38,29,787
Present Break Even Sales (₹ 18,00,000/0.47)		

(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%
Present Total Contribution (₹60,00,000 × 50%)				₹ 32,00,000
Less: Fixed Costs				₹ 18,00,000
Present Profit				₹ 14,00,000
Present Break Even Sales (₹ 18,00,000/0.50)				₹ 36,00,000

Q.6: 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.

ANSWER:

Workings:

(1)   Contribution per unit   = Selling price per unit – Variable cost per unit

= Rs. 50 – {Rs. (16,00,000 + 4,00,000 + 8,00,000) ÷ 80,000 units}

= Rs. 50 – Rs. 35 = Rs. 15

(2)   Profit-Volume (P/V) Ratio = $\frac{\text{Contribution per unit}}{\text{Selling price per unit}} \times 100 = \frac{Rs.\ 15}{Rs.\ 50} \times 100 = 30\%$

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

Rs. 50x $\qquad$ = Rs. 35 x + Rs. 7,20,000 + Rs. 10x

Rs. 50x – Rs. 45x $\quad$ = Rs. 7,20,000

Or, x = $\dfrac{\text{Rs. } 7,20,000}{\text{Rs. } 5}$ = 1,44,000 units

Therefore, Sales needed = 1,44,000 units × 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 × 80%)	37.50 (Rs. 50 × 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 $\left[\dfrac{\text{Desired Contribution}}{\text{Contribution per unit}}\right]$	2,40,000 units $\left[\dfrac{\text{Rs. } 12,00,000}{\text{Rs. } 5}\right]$	4,80,000 units $\left[\dfrac{\text{Rs. } 12,00,000}{\text{Rs. } 2.5}\right]$
(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

(iv) Sales price to bring down BEP to 10,000 units:

B.E.P (Units) $\qquad = \dfrac{\text{Fixed Cost}}{\text{Contribution per unit}}$

Or, Contribution per unit $\quad = \dfrac{\text{Rs. } 7,20,000}{10,000 \text{ units}} = \text{Rs. } 72$

So, Sales Price (per unit) $\quad$ = Variable Cost + Contribution

$\qquad$ = Rs. 35 + Rs. 72 = Rs. 107

Q.7: **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 cost	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. **[July 21 (5 Marks)]**

ANSWER:

(i) Cost Indifference Point

		Method-1 and Method-2 (₹)
Differentia Fixed Cost	(I)	₹ 2,00,000 (₹ 3,00,000 - ₹ 1,00,000)
Differential Variable Costs	(II)	₹ 5 (₹ 15 − ₹ 10)
Cost Indifference Point (Differential Fixed Cost/ Differential Variable Costs per unit)	(I/II)	40,000

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 Product	Alternative to be Chosen
Product ≤ 40,000 units	Method-1, Simi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

(ii) Break Even point (in units)

	Method-1	Method-2
BEP (in units) = $\dfrac{\text{Fixed cost}}{\text{Contribution per unit}}$	$\dfrac{1,00,000}{(25-15)}$ = 10,000	$\dfrac{3,00,000}{(25-10)}$ = 20,000

Q.8: 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 Overheads	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 Overheads is related with production activity)

[MTP Oct 21 (10 Marks)]

ANSWER:

Working Notes:

(1)   **Calculation of Cost of Goods Sold (COGS):**

COGS   = DM + DL + FOH + AOH

COGS   = {0.3 COGS + 0.15 COGS + (0.10 COGS + ₹ 3,45,000) + (0.02 COGS + ₹ 1,06,500)}

Or, COGS   = 0.57 COGS + ₹ 4,51,500

Or COGS $= \dfrac{₹\ 4,51,500}{0.43} = ₹\ 10,50,000$

(2)   **Calculation of Cost of Sales (COS):**

COS   =   COGS + S&DOH

COS   =   COGS + (0.04 COS + ₹ 1,02,000)

Or COS =   ₹ 10,50,000 + (0.04 COS = ₹ 1,02,000)

Or, COS = $\dfrac{₹\ 11,52,000}{0.96} = ₹\ 12,00,000$

(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:**

P/V Ratio $= \dfrac{\text{Contribution}}{\text{Sales}} \times 100 \quad = \dfrac{\text{Sales}\ -\ \text{Variable Costs}}{\text{Sales}} \times 100$

$= \dfrac{(₹\ 185\ \text{x}\ 7,500\ \text{units})\ -₹6,46,500}{₹\ 185\ \text{x}\ 7,500\ \text{units}} \times 100$

$= \dfrac{₹\ 13,87,500\ -\ ₹\ 6,46,500}{₹\ 13,87,500} \times 100 = 53.41\%$

(i)   Break-Even Sales $= \dfrac{\text{Fixed Costs}}{\text{P/V Ratio}} = \dfrac{₹\ 5,53,500}{53.41\%} = ₹\ 10,36,323$

(ii)   Profit earned during the last year

= (Sales – Total Variable Costs) – Total Fixed Costs

= (₹ 13,87,500 - ₹ 6,46,500) - ₹ 5,53,500

= ₹ 1,87,500

(iii)   Margin of Safety (%) $= \dfrac{\text{Sales}\ -\ \text{Breakeven sales}}{\text{Sales}} \times 100$

$= \dfrac{₹\ 13,87,500\ -\ ₹\ 10,36,323}{₹\ 13,87,500} \times 100 = 25.31\%$

(iv)   Profit if the sales were 10% less than the actual sales:

Profit   = 90% (₹ 13,87,500 - ₹ 6,46,500) - ₹ 5,53,500

= ₹ 1,13,400

STANDARD COSTING

Q.1: 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 product 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reasons. The hourly wage rate 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.   **[July 21 (10 Marks)]**

ANSWER:

Working Notes:

1. **Calculation of Standard Man hours**

   When 100 workers work for 1 hours, the standard output is 25 units.

   Standard man hours per unit $= \dfrac{100 \text{ hours}}{25 \text{ units}}$ **= 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) x 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 x 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) × {Average Standard Rate per hour of Standard Gang -Average Standard Rate per hour of Actual Gang@}

@ on the basis of hours worked

$= 3,800 \times \left(6 - \frac{3,840 \times 6}{3,800}\right)$

= 0

(iv) **Total Labour Yield Variance**

= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}

= 6 x (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

Q.2: **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.**   **[MTP Oct 21 (10 Marks)]**

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)

       - 1,53,846   = 25,641 (12 – AR)

       - 6   = 12 – AR

	AR	= ₹ 18

(ii) Labour Efficiency $= \frac{SH}{AH} \times 100 = 105.3$

SH $= \frac{AH \times 105.3}{100} = \frac{25,641 \times 105.3}{100}$

SH $= 26,999.973$

SH $= 27,000$ hours

(iii) Labour Efficiency Variance $= SR (SH - AH)$

$= 12 (27,000 - 25,641)$

$= ₹ 16,308 (F)$

(iv) Standard Labour Cost per Unit $= \frac{27,000 \times 12}{9,000} = ₹ 36$

Actual Labour Cost Per Unit $= \frac{25,641 \times 18}{9,000} = ₹ 51.282$

Q.3: 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 overheads ₹ 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 ₹ 1,50,00,000.

Labour paid ₹ 31,00,000 for 31,000 hours

Variable overheads ₹ 58,60,000

Fixed overheads ₹ 94,00,000

Actual production 4,800 units.

CALCULATE:

(i)   Material Cost Variance.

(ii)   Labour Cost Variance.

(iii)   Fixed Overheads Cost Variance.

(iv)   Variable Overhead Cost Variance.   **[MTP Nov 21 (5 Marks)]**

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)

(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

$$= ₹ 68,000 \text{ (F)}$$

(iii) Fixed Overhead Cost Variance = (Budgeted Rate × Actual Qty) − Actual Overhead

$$= (₹ 1,800 × 4,800 \text{ units}) − ₹ 94,00,000$$

$$= ₹ 7,60,000 \text{ (A)}$$

OR $$= (\text{Budgeted Rate} × \text{Std. Hours}) − \text{Actual Overhead}$$

$$= (₹ 300 × 4,800 \text{ units} × 6 \text{ hours}) − ₹ 94,00,000$$

$$= ₹ 7,60,000 \text{ (A)}$$

(iv) Variable Overhead Cost Variance = (Std. Rate × Std. Hours) − Actual Overhead

$$= (4,800 \text{ units} × 6 \text{ hours} × ₹ 200) - ₹ 58,60,000$$

$$= ₹ 57,60,000 - ₹ 58,60,000$$

$$= ₹ 1,00,000 \text{ (A)}$$

Q.4: Following are the details given:

Budgeted Days	**25**
Budgeted Fixed Overheads	**1,00,000**
Budgeted Production	**800 units per day**
Actual Production	**21,000 units**

Fixed Overheads are absorbed @ ₹ 10 per hour.

Fixed overheads efficiency variance	**10,000 A**
Fixed overheads calendar variance	**8,000 F**
Fixed overheads cost variance	**15,000 A**

You are required to CALCULATE:

(a) **Actual Fixed Overheads**

(b) **Actual Days**

(c) **Actual Hours**

(d) **Fixed overheads Expenditure variance**

(e) **Fixed overheads volume variance**

(f) **Fixed overheads capacity variance**   [MTP March 22 (10 Marks)]

ANSWER:

(i) Fixed Overhead Cost Variance = (Std. Fixed Overheads − Actual Fixed Overheads)

$$= (\frac{1,00,000}{20,000} × 21,000 \text{ units} − \text{Actual Fixed Overheads}) = 15,000A$$

$$= (1,05,000 − \text{Actual Fixed Overheads}) = 15,000 \text{ A}$$

=> **Actual Fixed overhead   = 1,20,000**

(ii) Fixed Overhead Calendar Variance = (Actual Days − Budgeted Days) x Budgeted rate per day

$$= (\text{Actual Days} − 25) × \frac{1,00,000}{25} = 8,000 \text{ F}$$

$$= (\text{Actual Days} − 25) = 2$$

=> **Actual Days   = 27**

(iii) Fixed Overhead Efficiency Variance   = (Standard Hours for Actual Production − Actual Hours)

$$X \text{ Budgeted rate per hour}$$

$$= \left(\frac{10,000}{20,000} \times 21,000 - \text{Actual Hours}\right) \times 10 = 10,000 \text{ A}$$

$$= (10,500 - \text{Actual Hours}) = -1,000$$

=> Actual Hours = 11,500

(iv) Fixed overheads Expenditure variance = (Budgeted Fixed Overheads – Actual Fixed Overheads)

$$= (1,00,000 - 1,20,000) = \textbf{20,000A}$$

(v) Fixed overheads volume variance = (Budgeted units – Actual Units) x Budgeted Rate per unit

$$= (20,000 - 21,000) \times \frac{1,00,000}{20,000} = \textbf{5,000 F}$$

(vi) Fixed overheads capacity variance = (Budgeted Hours for Actual Days – Actual Hours)

x Budgeted Rate per Hour

$$= \left(\frac{10,000}{25} \times 27 - 11,500\right) \times 10 = \textbf{7,000 F}$$

Q.5: BabyMoon Ltd. uses standard costing system in manufacturing one of its product 'Baby Cap'. The details are as follows:

Direct Material 1 Meter @ ₹ 60 per meter	₹ 60
Direct Labour 2 hour @ ₹ 20 per hour	₹ 40
Variable overhead 2 hour @ ₹ 10 per hour	₹ 20
Total	₹ 120

During the month of August, 10,000 units of 'Baby Cap' were manufactured. Details are as follows:

Direct material consumed	11,400 meters @	₹ 58 per meter	
Direct labour Hours	?	@ ?	₹ 4,48,800
Variable overhead incurred			₹ 2,24,400

Variable overhead efficiency variance is ₹ 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.

[RTP Nov 21]

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

Material Cost Variance = (SQ × SP – AQ × AP)

= 6,00,000 – 6,61,200 = ₹ 61,200 (A)

Material Price Variance = (SP – AP) AQ

$$= (60 - 58)\ 11{,}400 \qquad\qquad = ₹\ 22{,}800\ (F)$$

Material Usage Variance $\qquad$ **= (SQ – AQ) SP**

$$= (10{,}000 - 11{,}400)\ 60 \ = ₹\ 84{,}000\ (A)$$

(ii) Variable Overheads variances

Variable overhead cost Variance

= Standard variable overhead – Actual Variable Overhead

$$= (10{,}000\ \text{units} \times 2\ \text{hours} \times ₹\ 10) - 2{,}24{,}400 = ₹\ 24{,}400\ (A)$$

Variable overhead Efficiency Variance

= (Standard Hours – Actual Hours) × Standard Rate per Hour

Let Actual Hours be 'X', then:

$$(20{,}000 - X) \times 10 \qquad\qquad\qquad = 4{,}000\ (A)$$

$$2{,}00{,}000 - 10X \qquad\qquad\qquad\qquad = -\ 4{,}000$$

$$X \qquad\qquad\qquad\qquad\qquad = 2{,}04{,}000 \div 10$$

Therefore, Actual Hours (X) $\qquad\qquad = 20{,}400$

Variable overhead Expenditure Variance

= Variable Overhead at Actual Hours - Actual Variable Overheads

$$= 20{,}400 \times ₹\ 10 - 2{,}24{,}400 = ₹\ 20{,}400\ (A)$$

(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 = ₹ 4,48,800 ÷ 20,400 hours = ₹ 22

Labour Cost Variance $\quad$ **= (SH × SR) – (AH × AR)**

$$= 4{,}00{,}000 - 4{,}48{,}800 \quad = ₹\ 48{,}800\ (A)$$

Labour Rate Variance $\quad$ **= (SR – AR) × AH**

$$= (20 - 22) \times 20{,}400 \quad = ₹\ 40{,}800\ (A)$$

Labour Efficiency Variance = (SH – AH) × SR

$$= (20{,}000 - 20{,}400) \times 20 \qquad = ₹\ 8{,}000\ (A)$$

Q.6: The standard output of a Product 'D' is 50 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 1,920 units of product 'D' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 12.40, ₹ 12.00 and ₹ 11.40 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 ₹ 480 (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:

1. **Calculation of Standard Man hours**

   When 100 workers work for 1 hour, the standard output is 50 units.

   Standard man hours per unit $= \dfrac{100 \ hours}{50 \ units}$ = **2 hours per unit**

2. **Calculation of standard man hours for actual output:**

   = 1,920units x 2 hours = 3,840 hours.

3. **Calculation of actual cost**

Types of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	12.40	4,960	20	380
Group 'B'	30	1,200	12	14,400	60	1,140
Group 'C'	60	2,400	11.40	27,360	120	2,280
	100	**4,000**		**46,720**	**200**	**3,800**

4. **Calculation of Standard wage Rate:**

   Labour Efficiency Variance   = 480F

   (Standard hours for Actual production – Actual Hours) x SR   = 480F

            (3,840 – 3,800) x SR   = 480

            Standard Rate (SR)   **= ₹ 12 per hour**

   (i) **Total Labour Cost Variance**

   = (Standard hours x Standard Rate) – (Actual Hours x Actual rate)

   = (3,840 x 12) – 46,720 **= 640A**

   (ii) **Total Labour Rate Variance**

   = (Standard Rate – Actual Rate) x Actual Hours

        Group 'A' = (12 - 12.40) 400   =   160A

        Group 'B' = (12 - 12) 1,200   =   0

        Group 'C' = (12 – 11.40) 2,400   =   <u>1,440F</u>

                           <u>**1,280F**</u>

   (iii) **Total Labour Gang Variance**

   = Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang -Average Standard Rate per hour of Actual Gang@}

   @ on the basis of hours worked

   $= 3,800 \times \left(12 - \dfrac{3,840 \ \times 12}{3,800}\right)$

   = 0

   [**Note:** As the number of workers in standard and actual is the same, there is no difference in mix ratio, so labour gang variance will be NIL]

   (iv) **Total Labour Yield Variance**

= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}

= 12 x (3,840 − 3,800)

= 480F

(v) **Total Labour idle time variance**

= Total Idle hours x standard rate per hour

= 200 hours x 12

= 2,400A

Q.7: In a manufacturing company the standard units of production for the year were fixed at 1,20,000 units and overhead expenditures were estimated to be as follows:

Particulars	Amount (₹)
Fixed	12,00,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable nature)	1,80,000
Variable	6,00,000

Actual production during the month of April, 2021 was 8,000 units. Each month has 20 working days. During the month there was one public holiday. The actual overheads were as follows:

Particulars	Amount (₹)
Fixed	1,10,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable)	19,200
Variable	48,000

You are required to calculate the following variances for the month of April 2021:

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** [Dec 21 (5 Marks)]

ANSWER:

Working Notes

Fixed Overheads $= \dfrac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \dfrac{₹\,12,00,000}{1,20,000 \text{ units}}$	₹ 10
Fixed Overheads element in Semi-Variable Overheads i.e. 60% of ₹ 1,80,000	₹ 1,80,000
Fixed Overheads $= \dfrac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \dfrac{₹\,1,08,000}{1,20,000 \text{ units}}$	₹ 0.90
Standard Rate of Absorption of Fixed overheads per unit (₹ 10 + ₹ 0.90)	₹ 10.90
Fixed Overheads Absorbed on 8,000 units @ ₹ 10.90	₹ 87,200
Budgeted Variable Overheads	₹ 6,00,000
Add: Variable element in Semi-Variable Overheads 40% of ₹ 1,80,000	₹ 72,000
Total Budgeted Variable overheads	₹ 6,72,000

Standard Variable Cost per unit $= \dfrac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} = \dfrac{₹6,72,000}{1,20,000 \text{ units}}$		₹ 5.60
Standard Variable Overheads for 8,000 units @ ₹ 5.60		₹ 44,800
Budgeted Annual Fixed Overheads (₹ 12,00,000 + 60% of ₹ 1,80,000)		₹ 13,08,000
Possible Fixed Overheads $= \dfrac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Day}}$ x Actual Days $\left[\dfrac{₹1,09,000}{20 \text{ Days}} \times 19 \text{ Days}\right]$		₹ 1,03,550
Actual Fixed Overheads (₹ 1,10,000 x 60% of ₹ 19,200)		₹ 1,21,520
Actual Variable Overheads (₹ 48,000 + 40% of ₹ 19,200)		₹ 55,680

COMPUTATION OF VARIANCES

i.   Overheads Cost Variance   = Absorbed Overheads – Actual overheads

          = (₹ 87,200 + 44,800) – (₹ 1,21,520 + ₹ 55,680)

          = ₹ 45,200 (A)

ii.   Fixed Overhead Cost Variance   = Absorbed Fixed Overheads – Actual Fixed Overheads

          = ₹ 87,200 - ₹ 1,21,520

          = ₹ 34,320 (A)

iii.   Variable Overheads Cost Variance = Standard Variable Overheads for Production – Actual Variable Overheads

          = 44,800 - ₹ 55,680

          = ₹ 10,880 (A)

iv.   Fixed Overhead Volume Variance = Absorbed Fixed overheads – Budgeted Fixed Overheads

          = ₹87,200 - ₹ 1,09,000

          = ₹ 21,800 (A)

v.   Fixed Overhead Expenditure Variance = Budgeted Fixed overheads – Actual Fixed Overheads

          = ₹ 10.90 x 10,000 units - ₹ 1,21,520

          = ₹ 12,520 (A)

vi.   Calendar Variance   = Possible Fixed Overheads – Budgeted Fixed Overheads

          = ₹ 1,03,550 - ₹ 1,09,000

          = ₹ 5,450 (A)

         OR

Calendar Variance = (Actual days – Budgeted days) x Standard fixed overhead rate per day

Standard fixed overheads rate per day = 1308000/20*12   = ₹ 5450

Fixed Overhead Calendar Variance = (19-20) x 5450   = 5450 (A)

Q.8: Y Lid manufactures "Product M" which requires three types of raw materials - "A", "B" & "C". Following information related to 1st quarter of the F.Y. 2022-23 has been collected from its books of accounts. The standard material input required for 1,000 kg of finished product 'M' are as under:

Material	Quantity (Kg.)	Std. Rate per Kg. (₹)
A	500	25
B	350	45
C	250	55
	1100	

Standard Loss	100	
Standard Output	1000	

During the period, the company produced 20,000 kg. of product "M" for which the actual quantity of materials consumed and purchase prices are as under:

Material	Quantity (Kg.)	Purchase price per Kg. (₹)
A	11,000	23
B	7,500	48
C	4,500	60

You are required to calculate:

(i)   **Material Cost Variance**

(ii)   **Material Price Variance for each raw material and Product 'M'**

(iii)   **Material Usage Variance for each raw material and Product 'M'**

(iv)   **Material Yield Variance**   [Nov 22 (10 Marks)]

Note: Indicate the nature of variance i.e. Favourable or Adverse.

ANSWER:

Basic Calculations:

	Standard for 20,000 kg.			Actual for 20,000 kg.		
	Qty.	Rate	Amount	Qty.	Rate	Amount
	Kg.	(₹)	(₹)	Kg.	(₹)	(₹)
A	10,000	25	2,50,000	11,000	23	2,53,000
B	7,000	45	3,15,000	7,500	48	3,60,000
C	5,000	55	2,75,000	4,500	60	2,70,000
Total	22,000		8,40,000	23,000		8,83,000

Calculation of Variances:

(i)   Material Cost Variance = Std. Cost for actual output–Actual cost

MCV =8,40,000– 8,83,000 = ₹ 43,000(A)

(ii)   Material Price Variance = (SP–AP) × AQ

A   = (25 - 23) x 11,000   = 22,000 (F)

B   = (45 – 48) x 7,500   = 22,500 (A)

C   = (55 – 60) x 4,500   = 22,500 (A)

    23000 (A)

(iii)   Material Usages Variance = (SQ–AQ) × SP

A   = (10,000 – 11,000) x 25   = 25,000 (A)

B   = (7,000 – 7,500) x 45 = 22,500 (A)

C   = (5,000 – 4,500) x 55 = 27,500 (F)

    20,000 (A)

(iv)   Material Yield Variance = (SQ–RSQ*) × SP

A   = (10,000 – 10,454.54) x 25   = 11,363.5(A)

B   = (7,000 – 7,318.18) x 45   = 14,318.1(A)

C   = (5,000 – 5,227.27) × 55   = <u>12,500(A)</u>

                                       <u>38,181.6(A)</u>

*Revised Standard Quantity (RSQ)

A   = $\dfrac{10,000}{22,000}$ × 23,000   = 10,454.54

B = $\dfrac{7,000}{22,000}$ × 23,000   = 7,318.18

C   = $\dfrac{5,000}{22,000}$ × 23,000   = 5,227.27

Material Yield Variance can also be Calculated as below

Material yield variance   = Standard cost per unit (Actual yield – Standard yield)

Standard Cost per unit   = $\dfrac{₹\,8,40,000}{20,000}$ = ₹ 42

New Standard Yield   = $\dfrac{20,000}{22,000}$ × 23,000 = 20,909

Material yield variance   = ₹ 42 (20,000 – 20,909)

                               = ₹ 38,178 (A)

COST SHEET

Q.1: 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 ₹ 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 ₹ 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

ANSWER:

Preparation of Cost Sheet for Super Pen

No. of units produced = 40,000 units

No. of units sold = 36,000 units

Particulars	Per unit (₹)	Total (₹)
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
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

	1.00	36,000
Selling cost		
Cost of sales/ Total cost	22.20	7,99,200
Profit	7.80	2,80,800
Sales value (₹ 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, ₹ 8,00,000   = 80,000 M + 1,20,000 M

Or,   M $= \dfrac{₹\,8,00,000}{₹\,2,00,000} = ₹\,4$

Therefore, Direct material Cost per unit of Super pen = 2 × ₹ 4 = ₹ 8

(ii)   Direct wages per unit for Super pen   = W

Direct wages per unit for Normal Pen   = 0.6W

So, (W x 40,000) + (0.6W x 1,20,000) = ₹ 4,48,000

W = ₹ 4 per unit

(iii)   Production overhead per unit $= \dfrac{₹\,1,92,000}{(40,000 + 1,20,000)} = ₹\,1.20$

Production overhead for Super pen = ₹ 1.20 x 40,000 units = ₹ 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.

Q.2: The following data are available from the books and records of Q Ltd. for the month of April 2020:

Direct Labour Cost   = ₹ 1,20,000 (120% of Factory Overheads)

Cost of Sales   = ₹ 4,00,000

Sales   = ₹ 5,00,000

Accounts show the following figures:

	1st April, 2020 (₹)	30th April, 2020 (₹)
Inventory:		
Raw material	20,000	25,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
Other details:		
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.

ANSWER:

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

*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		
Less: Direct labour		2,80,000
Raw material consumed		(1,20,000)
		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

Q.3: RTA Ltd. has the following expenditure for the year ended 31st December, 2020:

SI. 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 activities 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 mangers		5,60,000
(xv)	Salary paid to General Manager		6,40,000
(xvi)	Packing cost paid for:		
	- 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 1stJanuary, 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 31stDecember, 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 – ₹ 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.

<div align="right">[RTP May 21 & MTP March 21 (10 Marks)]</div>

ANSWER:

Statement of Cost of RTA Ltd. for the year ended 31st December, 2020:

SI. 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
	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

Q.4: 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:

	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. **[MTP April 21 (10 Marks)]**

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:

$$= \frac{8,000}{6 \times 6,750 + 3 \times 14,000 + 1,77,500}$$

$$= \frac{80,000}{40,500 + 42,000 + 77,500}$$

$$= \frac{80,000}{1,60,000} = 0.5$$

So, the overhead rate will be:

Luxury = 0.5 x 6 = Rs. 3

Herbal = 0.5 x 3 = Rs. 1.5

Beauty = 0.5 x 1 = 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 (Rs.3 x 6,750)	21,000 (Rs.1.5 x 14,000)	38,750 (Rs.0.5 x 77,500)	80,000
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 (Rs.47,750 x 0.20)	17,350 (Rs.86,750 x 0.20)	78,750 (Rs. 3,93,750 x 0.20)	1,05,650
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 (Rs.25 x 6,750)	2,10,000 (Rs.15 x 14,000)	6,20,000 (Rs.8 x 77,500)	9,98,750

Q.5: 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
Employee 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 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.   [July 21 (5 Marks)]

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

Calculation of cost per policy = $\frac{\text{Total cost}}{\text{No. of policies}} = \frac{₹\,7,00,00,000}{2,800} = ₹\,25,000$

Q.6: 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   **[MTP Oct 21 (10 Marks)]**

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 Overheads (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 x 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 x 60,000 units + M x 1,80,000 units

Or, ₹ 12,00,000 = 1,20,000 M + 1,80,000 M

Or, M = $\frac{₹\,12,00,000.}{3,00,000}$ = ₹ 4

Therefore, Direct material Cost per unit of 'Super' = 2 x ₹ 4 = ₹8

(ii) Direct wages per unit for 'Super' = W

Direct wages per unit for 'Normal' = 0.6W

So, (W x 60,000) + (0.6W x 1,80,000) = ₹ 6,72,000

W = ₹ 4 per unit

(iii) Production overheads per unit = $\frac{₹\,2,88,000}{(60,000 + 1,80,000)}$ = ₹ 1.20

Production overhead for 'Super' = ₹ 1.20 x 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.

Q.7: G Ltd. has the following expenditures for the year ended 31st March, 2021:

SI. No.		Amount (₹)	Amount (₹)
(i)	Raw material 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
(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

SI. No.	Particulars	Amount (₹)	Amount (₹)
(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 1st 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 31st 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. **[MTP Nov 21 (10 Marks)]**

ANSWER:

(a) Statement of Cost of G Ltd. for the year ended 31st March, 2021:

SI. 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:		
	- Stores and spares consumed	2,24,000	
	- 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: Realizable 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:			
		Depreciation on office building	1,12,000		
		Salary paid to General Manager	25,12,000	26,24,000	
	(x)	Selling overheads:			
		- Repairs & Maintenance paid for sales office building	36,000		
		- Salary paid to Manager – Sales & Marketing	20,24,000		
		- Salary paid to Manager – Sales staffs	7,20,000	27,80,000	
	(xi)	Distribution overheads:			
		- Packing cost paid for re-distribution of finished goods		2,24,000	
		Cost of Sales		21,75,09,800	

Q.8: The following data relates to manufacturing of a standard product during the month of February, 2022:

Particulars	(₹)
Stock of Raw material as on 01-02-2022	1,20,000
Work in Progress as on 01-02-2022	75,000
Purchase of Raw Material	3,00,000
Carriage Inwards	30,000
Direct Wages	1,80,000
Cost of special drawing	45,000
Hire charges paid for Plant (Direct)	36,000
Return of Raw Material	60,000
Carriage on return	9,000
Expenses for participation in Industrial exhibition	12,000

		Amount
Maintenance of office building		3,000
Salary to office staff		37,500
Legal charges		3,750
Depreciation on Delivery van		9,000
Warehousing charges		2,250
Stock of Raw material as on 28-02-2022		45,000
Stock of Work in Progress as on 28-02-2022		36,000

- 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 ₹ 7,500 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 8,000 units during the month.

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   **[MTP March 22 (10 Marks)]**

ANSWER:

Statement of Cost for the month of February, 2022

Particulars		Amount (₹)	Amount (₹)
(i)	**Cost of material Consumed:**		
	Raw materials purchased (₹ 3,00,000 - ₹ 60,000)	2,40,000	
	Carriage inwards	30,000	
	Add: Opening stock of raw materials	1,20,000	
	Less: Closing stock of raw materials	(45,000)	3,45,000
	Direct Wages		1,80,000
	Direct expenses:		
	Cost of special drawing	45,000	
	Hire charges paid for Plant (Direct)	36,000	81,000
(ii)	**Prime Cost**		**6,06,000**
	Carriage on return	9,000	
	Store overheads (10% of material consumed)	34,500	
	Factory overheads (20% of Prime cost)	1,21,200	
	Additional expenditure for rectification of defective products (refer working note)	3,240	1,67,940
	Gross Factory cost		7,73,940
	Add: Opening value of W-I-P		75,000
	Less: Closing value of W-I-P		(36,000)
(iii)	**Works/ Factory Cost**		**8,12,940**

	Less: Realisable value on sale of scrap		(7,500)
(iv)	**Cost of Production**		**8,05,440**
	Add: Opening stock of finished goods		--
	Less: Closing stock of finished goods		--
	Cost of Goods Sold		**8,05,440**
	Administrative overheads:		
	Maintenance of office building	3,000	
	Salary paid to Office staff	37,500	
	Legal Charges	3,750	44,250
	Selling overheads:		
	Expenses for participation in Industrial exhibition	12,000	12,000
	Distribution overheads:		
	Depreciation on delivery van	9,000	
	Warehousing charges	2,250	11,250
(v)	**Cost of Sales**		**8,72,940**

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 x (₹ 1,80,000/8,000) x 720

= ₹ 3,240

RECONCILIATION

Q.1: The following figures have been extracted from the financial accounts of a manufacturing firm for the first year of its operations:

	(₹)
Direct Material Consumption	50,00,000
Direct Wages	30,00,000
Factory Overheads	16,00,000
Administration Overheads (production related)	7,00,000
Selling and Distribution Overheads	9,60,000
Bad Debts	80,000
Preliminary Expenses written off	40,000
Legal Charges	10,000
Dividend 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 ₹56,00,000. Factory overhead is recovered at 20% on Prime cost. Administration overhead is recovered at ₹6 per unit of production. Selling and distribution overheads are recovered at ₹8 per unit sold.

Prepare the profit and Loss Accounts both as per financial records and as per cost records. RECONCILE the profit as per the two records.

ANSWER:

Profit and Loss Account (As per financial records)

Particulars	Amount in (₹)	Particulars	Amount in (₹)
To Direct Material	50,00,000	By Sales (1,20,000 units)	1,20,00,000
To 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 Administration Overheads	7,00,000	By Gross Profit b/d	29,60,000
To Selling and Dist. OH	9,60,000	By dividend	1,00,000
To Bad Debts	80,000	By Interest	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)

Particulars	Total (₹)
Direct Material	56,00,000

Add: Direct Wages	30,00,000
Prime Cost	86,00,000
Add: Factory Overheads (20% of ₹86,00,000)	17,62,000
Gross Factory Cost	1,03,20,000
Less: Closing Stock (WIP)	(2,40,000)
Net Factory Cost (1,24,000 units)	1,00,80,000
Add: Administration overheads (1,24,000 units @₹6 p.u.)	7,44,000
Cost Production (1,24,000 units)	1,08,24,000
Less: Finished Goods (4,000 units @ ₹87.29)	(3,49,160)
Cost of Goods sold (1,20,000 units)	1,04,74,840
Add: Selling and Distribution Overhead (1,20,000 @ ₹8 p.u.)	9,60,000
Cost of Sales	1,14,34,840
Add: Net Profit (Balancing Figure)	5,65,160
Sales Revenue	**1,20,00,000**

Statement of Reconciliation of Profit as obtained under cost and Financial Accounts

	(₹)	Total (₹)
Profit as per Cost Records		5,65,160
Add: Excess of Material consumption	6,00,000	
Factory Overheads	1,20,000	
Administration Overhead	44,000	
Dividend Received	1,00,000	
Interest Received	20,000	8,84,000
Less: Bad Debts	80,000	
Preliminary expense written off	40,000	
Legal Charges	10,000	
Over-Valuation of stock in cost book (₹3,49,160 - ₹3,20,000)	29,160	(1,59,160)
Profit as per Financial Records		12,90,000

Q.2: R Ltd. showed a Net Profit of ₹ 3,60,740 as per their cost accounts for the year ended 31st March, 2021.

The following information was revealed as a result of scrutiny of the figures from the both sets of accounts:

Sr. No.	Particulars	(₹)
i.	Over recovery of selling overheads in cost accounts	10,250
ii.	Over valuation of closing stock in cost accounts	7,300
iii.	Rent received credited in financial accounts	5,450
iv.	Bad debts provided in financial accounts	3,250
v.	Income tax provided in financial accounts	15,900
vi.	Loss on sale of capital asset debited in financial accounts	5,800
vii.	Under recovery of administration overheads in cost accounts	3,600

Required:

Prepare a reconciliation statement showing the profit as per financial records.

ANSWER:

Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as pe financial records)

	(₹)	(₹)
Net profit as per Cost Accounts		3,60,740
Add:		
Over recovery of selling overheads in cost accounts	10,250	
Rent received credited in financial accounts	5,450	15,700
		376,440
Less:		
Over valuation of closing stock in cost accounts	7,300	
Bad debts provided in financial accounts	3,250	
Income tax provided in financial accounts	15,900	
Loss on sale of capital asset debited in financial accounts	5,800	
Under recovery of administration overheads in cost accounts	3,600	35,850
Profit as per Financial Accounts		3,40,590

Q.3: Journalize the following transactions assuming the cost and financial accounts are integrated:

Particulars	Amount (₹)
Direct Materials issued to production	**₹ 5,88,000**
Allocation of Wages (indirect)	**₹ 7,50,000**
Factory Overheads (over absorbed)	**₹ 2,25,000**
Administrative Overheads (Under absorbed)	**₹ 1,55,000**
Deficiency found in stock of Raw material (Normal)	**₹ 2,00,000**

ANSWER:

Particulars			(₹)	(₹)
(i)	Work-in-Progress Ledger Control A/c	Dr.	5,88,000	
	To Stores Ledger Control A/c			5,88,000
	(Being issue of direct materials to production)			
(ii)	Factory Overheads control A/c	Dr.	7,50,000	
	To Wages Control A/c			7,50,000
	(Being allocation of Indirect wages)			
(iii)	Factory Overhead Control A/c	Dr.	2,25,000	
	To Costing Profit & Loss A/c			2,25,000
	(Being transfer of over absorption of Factory overhead)			
(iv)	Costing Profit & Loss A/c	Dr.	1,55,000	

				1,55,000
	To Administration Overheads Control A/c			
	(Being transfer of under absorption of Administration overhead)			
(v)	Factory Overhead Control A/c	Dr.	2,00,000	
	To Stores Ledger Control A/c			2,00,000
	(Being transfer of deficiency in stock of raw material)			

(Note: Costing P/&/L = P/&/L and SLC = MLC)

Q.4: X Ltd. follows Non-Integrated Accounting System. Financial Accounts of the company show a Net Profit of ₹ 5,50,000 for the year ended 31st March, 2022. The chief accountant of the company has provided following information from the Financial Accounts and Cost Accounts:

Sr. No.	Particulars	(₹)
(i)	Legal Charges provided in financial accounts	15,250
(ii)	Interim Dividend received credited in financial accounts	4,50,000
(iii)	Preliminary Expenses written off in financial accounts	25,750
(iv)	Over recovery of selling overheads in cost accounts	11,380
(v)	Profit on sale of capital asset credited in financial accounts	30,000
(vi)	Under valuation of closing stock in cost accounts	25,000
(vii)	Over recovery of production overheads in cost accounts	10,200
(viii)	Interest paid on Debentures shown in financial accounts	50,000

Required:

Find out the Profit (Loss) as per Cost Accounts by preparing a Reconciliation Statement.

[Nov 2022 (5 Marks)]

ANSWER:

Reconciliation Statement

(Reconciliation the profit as per financial records with the profit as per costing records)

	Particulars	(₹)	Total (₹)
	Profit as per Financial Accounts		5,50,000
Add:	Legal Charges	15,250	
	Preliminary expenses written off	25,750	
	Interest paid	50,000	91,000
			6,41,000
Less:	Under valuation of closing stock in cost book	25,000	
	Interim Dividend Received	4,50,000	
	Over recovery of selling overheads in cost accounts	11,380	
	Over recovery of production overhead in cost accounts	10,200	5,26,580
	Profit on sale of Assets	30,000	
	Profit as per Cost Accounts		1,14,420

Q.5: Indicate, for following items, whether to be shown in the Cost Accounts or Financial Accounts:

(i) Preliminary expenses written off during the year

(ii) Interest received on bank deposits

(iii) Dividend, interest received on investments

(iv) Salary for the proprietor at notional figure though not incurred

(v) Charges in lieu of rent where premises are owned

(vi) Rent receivables

(vii) Loss on sale of Fixed Assets

(viii) Interest on capital at notional figure though not incurred

(ix) Goodwill written off

(x) Notional Depreciation on the assets fully depreciated for which book value is Nil.

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[Nov 22 (5 Marks)]

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ANSWER:

S. No.	Items	Accounts
(i)	Preliminary expenses written off during the year	Financial Accounts
(ii)	Interest received on bank deposits	Financial Accounts
(iii)	Dividend, interest received on investments	Financial Accounts
(iv)	Salary for the proprietor at notional figure though not incurred	Cost Accounts
(v)	Charges in lieu of rent where premises are owned	Cost Accounts
(vi)	Rent receivables	Financial Accounts
(viii)	Loss on the sales of Fixed Assets	Financial Accounts
(ix)	Interest on capital at notional figure though not incurred	Cost Accounts
(ix)	Goodwill written off	Financial Accounts
(x)	Notional Depreciation on the assets fully depreciated for which book value is nil	Cost Accounts

PROCESS COSTING

Q.1: 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 ₹ 80 per unit.

Processing cost is ₹ 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'.   **[Nov 2020]**

ANSWER:

Comprehensive Cost Statement

Particulars	Total Cost (₹)	Product-M (₹)	Product-N (₹)
No. of units produced *		5,400 units	810 units
Cost of raw material (₹ 80 × 6,750 units) Processing cost:	5,40,000		
- Labour cost (₹ 2,25,000 x 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** $\left(\dfrac{1,48,500 \text{ x } 100}{180}\right)$	**66,000** $\left(\dfrac{1,48,500 \text{ x } 80}{180}\right)$
Other joint costs (including material) in the ratio of output (5,400:810)	6,16,500	**5,36,087** $\left(\dfrac{6,16,500 \text{ x } 5,400}{6,210}\right)$	**80,413** $\left(\dfrac{6,16,500 \text{ x } 810}{6,210}\right)$
(ii) Total product cost	**7,65,000**	**6,18,587**	**1,46,413**

* No. of units produced of Product M = 6750 units x 80% = 5400 units

No. of units produced of Product N = 6750 units x 12% = 810 units

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Q.2: Following details are related to the work done in Process-I by ABC Ltd. during the month or May 2019:

	(₹)
Opening work in process (3,000 units)	
Materials	1,80,500

		32,400
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%
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 ₹ 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   [Nov 2020 (10 Marks)]

ANSWER:

(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

(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	(₹)	Particulars	Units	(₹)
To Opening W.I.P:					
— Materials	3,000	1,80,500 32,400	By Normal Loss	1,800	1,12,500
— Labour	--	90,000	(₹ 62.5 × 1,800 units)		
— Overheads	--				
To Materials introduced	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

(iv) Normal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
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	(₹)	Particulars	Units	(₹)
To Process-I A/c	3,000	3,64,200	By Cost Ledger Control A/c (₹ 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**

Q.3: MNO Ltd has provided following details:

- Opening work in progress is 10,000 units at ₹ 50,000 (Material 100%, Labour and overheads 70% complete).

- Input of materials is 55,000 units at ₹ 2,20,000. Amount spent on Labour and Overheads is ₹ 26,500 and ₹ 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 ₹ 8.50 per unit.

You are required to prepare using FIFO method:

(i)   Statement of Equivalent production

(ii)   Abnormal Loss Account   [Jan 2021]

ANSWER:

(i)   Statement of Equivalent Production (Using FIFO method)

Particulars	Input Units	Particulars	Output Units	Material %	Material Units	Labour & O.H. %	Labour & O.H. 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	6,250	29,698	By Cost Ledger Control A/c	6,250	53,125

(Refer Working Note-2)			(6,250 units × ₹ 8.5)		
To Costing Profit & Loss A/c	-	23,427			
	6,250	**53,125**		**6,250**	**53,125**

Workings 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 = ₹ (3.7174 + 0.5191 + 1.2047) = ₹ 5.4412

2. **Valuation of Abnormal Loss**

	(₹)
Materials (6,250 units × ₹ 3.7174	2,20,000
Labour (3,750 units × ₹ 0.5191)	11,946.63
Overheads (3,750 units × ₹ 1.2047)	4,517.62
	29,698

Q.4: Mayura Chemicals Ltd buys a particular raw material at ₹ 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:

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-realisable 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.

[Jan 2021 (10 Marks)]

ANSWER:

(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

		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 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	11,25,000 (22,500 x ₹ 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 production 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:

$$= \frac{\text{Total Joint Cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable value or each product}$$

Joint cost of product x $= \frac{₹\,5,98,000}{₹\,11,50,000} \times ₹\,4,50,000 = ₹\,2,34,000$

Joint cost of product Y $= \frac{₹\,5,98,000}{₹\,11,50,000} \times ₹\,3,00,000 = ₹\,1,56,000$

Joint cost of product Z $= \frac{₹\,5,98,000}{₹\,11,50,000} \times ₹\,4,00,000 = ₹\,2,08,000$

Q.5: 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	₹ 3,00,000
Direct Wages	₹ 3,50,000
Factory Overheads	₹ 2,45,000

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.

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.   [RTP May 21]

ANSWER:

Process 1

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 × ₹ 7.5) + (Labour 5,000 units × ₹ 10) + (Overheads 5,000 units × ₹7)

= ₹ 75,000 + ₹ 50,000 + ₹ 35,000 = ₹ 1,60,000

Process II

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	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 × ₹ 30.1644 = ₹ 8,44,603 + ₹ 80,000 (Packing Material Cost) = ₹ 9,24,604

** 1,800 units × ₹ 24.6644 + 450 units × (₹ 2.5 + ₹3) = ₹ 46,871

Q.6: 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

		14,000	16,000	14,000
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   **[MTP March 21 (10 Marks)]**

ANSWER:

Total direct wages

= Rs. 42,000 + Rs. 54,000 + Rs. 48,000 = Rs. 1,44,000

Percentage absorption of production overhead on the basis of direct wages

$= \dfrac{2,88,000}{1,44,000} \times 100 = 200\%$

(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

* Cost per unit $= \dfrac{\text{Rs. } (3,42,000 - 3,500)}{(7,000 - 350) \text{ units}} = ₹\ 50.9022$

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

** Cost per unit $= \dfrac{\text{Rs. } (6,49,955 - 6,600)}{(6,600 - 600) \text{ units}} = ₹\ 108.3089$

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

*** Cost per unit = $\dfrac{\text{Rs. } (8,05,406 - 2,a600 - 21,000)}{(5,200-260-600) \text{ units}}$ = ₹ 180.1396

\# Realisable value = Rs. 135 − (85+15) = 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

Q.7: 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.   **[MTP April 21 (5 Marks)]**

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:

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:

$$=\frac{0.5}{500} = 990 = 0.99 \text{ Kg.}$$

The cost of raw material would be Rs. 80 × 0.99 kg. = Rs.79.20

Q.8: 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 of unit

(iii) Value of units transferred to next process   **[MTP April 21 (10 Marks)]**

ANSWER:

(i) Statement of Equivalent Production (FIFO Method)

Input		Output		Equivalent Production			
				Material		Labour & Overhead	
Particulars	Units	Particulars	Units	(%)	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:

	Material (Rs.)	Labour (Rs.)
Opening W-I-P	1,50,000	
Add: Labour (6,400 units × Rs. 2.0106)	12,868	
Overhead (6,400 units × Rs. 1.0053)	6,434	1,69,302
New introduced (3,00,000 units × Rs. 7.0159)		21,04,770
		22,74,072

OPERATING COSTING

Q.1: Mr. X, an employee of a company, uses his own car for official purposes and the company reimburses him at ₹ 1.80 per km. He claims that the re-imbursement should be at higher amount. A scrutiny of expenses incurred on car reveals the following:

1. Oil change ₹ 120 (every 4,800 kilometers)

2. Maintenance ₹ 1,800 (every 9,600 kilometers)

3. Yearly Insurance Premium ₹ 4,000.

4. Cost of the car is ₹ 1,08,000. The residual value after useful life of 3 years is ₹ 60,000.

5. Petrol price is ₹ 5 per litre and 8 kilometers are traveled on one litre.

Mr. X travels is an average of 192 kilometers in a day, works 5 days in a week, has 16 days vacation in a year and spends 15 working days a month in the office. Total 365 days in a year.

Required:

(a) Determine an equitable rate of re-imbursement,

(b) Number of kilometers that have to be traveled per day to break-even at the current rate of reimbursement.

ANSWER:

Total days in a year	365
Less: Non-Working Days (52 weeks x 2 days)	(104)
Working Days	**261**
Less: Vacation Days	(16)
Less: Office Stay (Days) (15 days x 12 months)	(180)
Days on Traveling Work	**65**

No. of Kilometers = 65 days x 192 kms = 12,480 kms

Computation of Travel Cost per km.

Particulars	Total (₹)	Cost per km (₹)
(A) Fixed Costs:		
Depreciation [(₹ 1,08,000 - ₹ 60,000)/3 years]	16,000	
Insurance	4,000	
Total Fixed Costs (A)	**20,000**	**1.6026**
(B) Variable Costs:		
Oil change $\left(\frac{₹\,120}{4,800\ kms} \times 12,480\ kms\right)$	312	0.0250
Maintenance $\left(\frac{₹\,1,800}{9,600\ kms} \times 12,480\ kms\right)$	2,340	0.1875
Petrol (₹ 5/8 kms x 12,480 kms)	7,800	0.6250
Total Variable Costs (B)		
Total Cost [(A) + (B)]	**10,452**	**0.8375**
	30,452	**2.44**

a) Equitable rate of re-imbursement   = ₹ 2.44 per km

b) Current reimbursement rate   = ₹ 1.80 per km

Assume, X kilometers. Per annum leads to break-even, i.e., cost per km. computed at that level is equal to current reimbursement rate of ₹ 1.80 per km.

Hence, $\dfrac{\text{Variable Cost + Fixed Cost}}{\text{Total Kilometers}}$ = Cost per kilometer

$\dfrac{0.8375X + 20,000}{X}$ = ₹ 1.80

Solving, we get X = 20,780 km

Hence, in order to break-even at current reimbursement rate, no. of kilometers to be traveled per day = ₹ 20,780/65 days = 320 kilometers per day.

Q.2: M/s XY Travels has been given a 25 km. long route to run an air-conditioned Mini Bus. The cost of bus is ₹ 20,00,000. It has been insured @ 3% premium per annum while annual road tax amounts to ₹ 36,000. Annual repairs will be ₹ 50,000 and the bus is likely to last for 5 years. The driver's salary will be ₹ 2,40,000 per annum and the conductor's salary will be ₹ 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 ₹ 3,18,000 per annum. Diesel and oil will be ₹ 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.

ANSWER:

i) Statement showing the Operating Cost per Passenger-km.

Particulars	Monthly (₹)	
(A) Standing Charges:		
Insurance Charge [(₹ 20,00,000 x 3%)/ 12]		5,000
Road Tax (₹ 36,000/12)		3,000
Depreciation (20,00,000/5 x 1/12		33,333.33
Total (A)	**41,333.33**	
(B) Maintenance Charges:		
Repairs (₹ 50,000/ 12)		4,166.67
Office and Administration overheads (₹ 3,18,000/12)		26,500
Total (B)	**30,666.67**	
(C) Running Cost/ Charges:		
Driver's Salary (₹ 2,40,000/12)		20,000
Conductor's Salary (₹ 1,80,000/12)		15,000
Diesel & Oil $\left(5,000 \text{ kms} \times \dfrac{₹ 1,500}{100 \text{ kms}}\right)$		75,000
Total (C)	**41,333.33**	
Cost before commission and profit (A) + (B) + (C)		1,82,000
Commission (₹ 2,80,000 x 10%) (WN 2)		28,000
Profit (₹ 2,80,000 x 25%) (WN 2)		70,000
Takings (WN 1)	**2,80,000**	

ii) **Fare per Passenger km** = $\dfrac{\text{Total Collection/ Takings}}{\text{Total Passenger−km}}$ (WN 3)

Fare per Passenger-km = $\dfrac{₹ 2,80,000}{2,00,000}$ = ₹ 1.40

Working Notes:

1) Cost before commission (10%) and profit (25%) is ₹ 1,82,000 which is 65% of total takings. So total takings is (₹ 1,82,000/ 65%) = ₹ 2,80,000.

2) Commission is 10% of ₹ 2,80,000 = ₹ 28,000 and Profit is 25% of ₹ 2,80,000 = ₹ 70,000

3) Total km is (4 Round Trips x Days in a month) = (4 x 2 x 25 x 25) = 5,000 kms

Passenger km is 5,000 km x 40 passenger = 2,00,000

Q.3: The Union Transport Company has been given a 20 km long route to ply a bus. The bus costs the company ₹ 1,00,000. It has been insured at 3% per annum. The annual road tax amounts to ₹ 2,000. Garage rent is ₹ 400 per month. Annual repair is estimated to cost ₹ 2,360 and the bus is likely to last for five years.

The salary of the driver and the conductor is ₹ 600 and ₹ 200 per month respectively in addition to 10% of taking as commission to be shared equally by them. The manager's salary is ₹ 1,400 per month and stationery will cost ₹ 100 per month. Petrol and oil will cost ₹ 50 per 100 kilometers.

The bus will make three round trips per day carrying on an average 40 passengers in each trip. Assuming 15% profit on takings and that the bus will ply on an average 25 days in a month, prepare operating cost statement on a full year basis and also calculate the bus fare to be charged from each passenger per kilometer.

ANSWER:

Union Transport Company

Statement showing Operating Cost of the bus per annum

Particulars	Amount in (₹)
(A) Fixed Charges:	
Manager's Salary (₹ 1,400 x 12 months)	16,800
Driver's Salary (₹ 600 x 12 months)	7,200
Conductor's Salary (₹ 200 x 12 months)	2,400
Road Tax	2,000
Insurance (3% of ₹ 1,00,000)	3,000
Garage Rent (₹ 400 x 12 months)	4,800
Stationery (₹ 100 x 12)	1,200
Depreciation (₹ 1,00,000/ 5 years)	20,000
Repairs	2,360
	59,760
(B) Variable Charges:	
Petrol and Oil (36,000* kms x ₹ 50)/ 100	18,000
Total Costs (A + B)	**77,760**
Add: 10% of Takings for Commission of Driver and Conductor	
15% Profit – Desired on Takings	
25% on Total Takings = 33-1/3 of cost	25,920
	1,03,680

Calculation of total distance covered = (20 km x 2 x 3 x 25 x 12) = 36,000 kms per annum

Effective passenger Kms = (2x 20 kms x 3 trips x 40 passengers x 25 days x 12 months)

= 14,40,000 passenger Kms

Calculation of bus fare to be charged:

Rate to be charged per km from each passenger = ₹ 1,03,680 ÷ 14,40,000 passenger Kms = ₹ 0.072

Q.4: EPS 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 & an hour later the second trip takes the senior students home.

The distance travelled by each bus, one way is 16 km. The school works 24 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 the year 2003-2004 are as under:

Driver's Salary – Payable for all the 12 months	₹5,000 per month per driver
Cleaner's Salary payable for all the 12 months	₹3,000 per month per cleaner
(one cleaner has been employed for every five buses)	
License Fees, Taxes etc.	₹2,300 per bus per annum
Insurance Premium	₹15,600 per bus per annum
Repairs and Maintenance	₹16,400 per bus per annum
Purchase Price of the bus	₹16,50,000 each
Life of the bus	16 years
Scrap Value	₹1,50,000
Diesel Cost	₹18.50 per litre

Each bus gives an average of 10 km per litre of diesel. The seating capacity of each bus is 60 students. The seating capacity is fully occupied during whole year.

The school follows differential bus fees, based on distance traveled as under:

Students picked up and Dropped within the range of Distance from the school	Bus Fee	Percentage of students availing this facility
4 km	25% of full	15%
8 km	50% of full	30%
16 km	Full	55%

Ignore interest. Since the bus fees have to be based on average cost, you are required to:

i)   Prepare a statement showing expenses of operating a single bus & the fleet of 25 buses for a year.

ii) Work out Average Cost per student per month in respect of:

   a) Students coming from a distance of upto 4 km from the school;

   b) Students coming from a distance of upto 8 km from the school; and

   c) Students coming from a distance of upto 16 km from the school.

ANSWER:

i)   Statement showing expenses of operating a single bus & Fleet of 25 buses for a year:

Particulars	Per Bus per annum (₹)	Fleet of 25 buses per annum (₹)
Diesel (Refer to Working Note 1)	56,832	14,20,800
Repairs & Maintenance Costs	16,400	4,10,000
Depreciation	93,750	23,43,750
Driver's Salary	60,000	15,00,000
Cleaners Salary	7,200	1,80,000
License Fee, Taxes etc.	2,300	57,500
Insurance	15,600	3,90,000

Total Expenses	2,52,082	63,02,050

ii) Average cost per student per month in respect of student coming from a distance of:

   a) 4 kms from the school (₹2,52,082/354 students x 12 months)   ₹59.34

      (Refer to working note2)

   b) 8 kms from the school (₹59.34 x 2)   ₹118.68

   c) 16 kms from the school (₹59.34 x 4)   ₹237.36

Working Notes:

1) **Calculation of Diesel Cost per bus:**

No. of trips made by a bus each day	4
Distance traveled in one trip both ways (16 kms x 2 trips)	32 kms
Distance traveled per day by a bus (32 kms x 4 shifts)	128 kms
Distance traveled during the month (128 kms x 24 days)	3,072 kms
Distance traveled per year (3,072 kms x 10 months)	30,720 kms
No. of Litres of diesel required per bus per year (30,720 kms/10 kms)	3,072 litres
Cost of diesel per year (3,072 liters x 18.50)	₹56,832

2) **Calculation of Number of Students per bus:**

Bus capacity of 2 trips	120 students
1/4th fare students (15% x 120 students)	18 students
½ fare 30% students (equivalent to 1/4th fare students)	72 students
Full fare 55% students (equivalent to 1/4th fare students)	264 students
Total 1/4th fare students	354 students

Q.5: A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-seasons (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 room 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 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 –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 x 40% x 6 months x 30 days in a month = 14,400 Room Days	14,400 Room Days x 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:

Season	Occupancy (Room-days)
Season & Non-winter – 80% Occupancy	200 Rooms x 80% x 6 months x ₹ 110 per month **= ₹ 1,05,600**
Off-seasons & Non-winter- 40% Occupancy (8 – 6 months)	200 Rooms x 40% x 2 months x ₹ 110 per month **= ₹ 17,600**
Off-season & - winter – 40% occupancy months)	200 Rooms x 40% x 4 months x ₹ 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	2,50,000
Miscellaneous Expenses	2,00,200
Depreciation on Building (₹ 300 Lakhs x 80% x 5%	**12,00,000**
Depreciation on Furniture & Equipment (₹ 300 Lakhs x 20% x 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 of 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

Q.6: 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
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 vehicles 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 days 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] **[MTP Nov 21 (10 Marks)]**

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 course	10,520.00
Bituminous work	32,140.00
Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc.	
Drainage and protection work	9,080.00
Traffic sig, 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 year x 365 days)	7,665
Cost per day of concession period (₹ in lakh)	**14.90**

(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 $= \dfrac{₹\,17,13,500}{76,444 \text{ units (Refer working note)}}$

= ₹ 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 x 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 x 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**

Q.7 YSPP Transport Company is running local city buses. It has a fleet of 20 Buses. Each bus can carry average 40 passengers per day and cover distance of 112.50 kms per day. Due to Covid-19 pandemic, the company is running 90% buses on average.

Below are the operations expenses worked out for the month of November, 2021:

Original cost per bus	₹ 48,00,000
Insurance for 20 buses	₹ 63,36,000 per annum
Diesel & Oil	₹ 10 per km.
Salary of drivers per bus	₹ 25,000
Salary of cleaners per bus	₹ 15,000
Tyres and tubes	₹ 12,58,040
Lubricants	₹ 10,70,000
Repairs	₹ 24,70,000
Road tax per bus	₹ 1,50,000
Administrative overhead	₹ 50,88,000 per annum

Depreciation on buses is computed @ 20% using Straight Line Method.

Passenger tax is 15% on total taking.

Based on abovementioned information, you are required to COMPUTE the fare to be charged from each passenger per kilometer assuming 25% margin on total taking (Total receipts from passengers.)
[MTP March 22 (10 Marks)]

ANSWER:

Operating Cost Statement

Particulars	Total Cost per Month (in ₹)
Fixed Charges:	
Salary of Drivers (₹ 25,000 × 20 buses)	5,00,000
Salary of Cleaners (₹ 15,000 × 20 buses)	3,00,000
Road Tax (₹ 1,50,000 × 20 buses)	30,00,000
Insurance (₹ 63,36,000/12 months)	5,28,000
Depreciation $\left(\frac{48,00,000 \times 20\% \times 20\ buses}{12\ months}\right)$	16,00,000
Administrative Overheads (₹ 50,88,000/12 months)	4,24,000
Total (A)	**63,52,000**
Variable Charges:	
Diesel (60,750 km. × ₹ 10)	6,07,500
Tyres and Tubes	12,58,040
Lubricants	10,70,000
Repairs	24,70,000
Total (B)	**54,05,540**
Total Operating Cost (A + B)	1,17,57, 540
Add: Passenger tax (Refer to WN-1)	29,39,385
Add: Profit (Refer to WN-1)	48,98,975
Total takings (C)	**1,95,95,900**

No. of passengers kms. In a month (D)	24,30,000
Cost per passenger km. (C/D)	**8.06**

Working Notes:

1. Let total takings be X then Passenger tax and profit will be as follows:

   X = ₹ 1,17,57,540 + 0.15X + 0.25X

   X − 0.40X = ₹ 1,17,57,540

   X = $\frac{1,17,57,540}{0.60}$ = ₹ 1,95,95,900

   Passenger tax = ₹ 1,95,95,900 × 0.15 = ₹ 29,39,385

   Profit = ₹ 1,95,95,900 × 0.25 = ₹ 48,98,975

2. Total Kilometres to run during the month of November, 2021

   = (112.50 km. × 30 days × 20 Buses) x 90% = 60,750 Kilometres

3. Total passenger Kilometres during the month of November, 2021

   = 60,750 km. × 40 passengers = 24,30,000 Passenger- km.

Q.8: 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	₹ 15,00,000
Salary of the Driver	₹ 30,000 p.m.
Salary of the Conductor	₹ 26,000 p.m.
Salary of the part-time Accountant	₹ 7,000 p.m.
Insurance of the bus	₹ 6,000 p.a.
Diesel consumption 5 km. per litre at	₹ 90 per litre
Road tax	₹ 21,912 p.a.
Lubricant oil	₹ 30 per 100 km.
Permit fee	₹ 500 p.m.
Repairs and maintenance	₹ 5,000 p.m.

	@ 30% p.a.
Depreciation of the bus	@ 30% 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 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

		Product A	Product B
(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	
	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	
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 = Total costs per month before passenger tax + 0.2 X (passenger tax) + 0.3 X (profit)

X = ₹ 2,68,634 + 0.2 X + 0.3 X

0.5 X = ₹ 2,68,634 or, X = ₹ 5,37,268

Passenger Tax　 = 20% of ₹ 5,37,268 = ₹ 1,07,453.60

Profit　　　　　 = 30% of ₹ 5,37,268 = ₹ 1,61,180.40

Calculation of Rate per passenger km. and fares to be charged for different routes

Rate per Passenger-Km. = $\dfrac{\text{Total takings per month}}{\text{Total Passenger−Km.per month}}$

$$= \dfrac{₹\,5,37,268}{4,14,000\ \text{Passenger−Km,.}} = ₹\ 1.30\ \text{(approx.)}$$

Bus fare to be charged per passenger:

Delhi to Hisar	=	₹ 1.30 × 160 km	=	₹ 208.00
Delhi to Aligarh	=	₹ 1.30 × 160 km	=	₹ 208.00
Delhi to Alwar	=	₹ 1.30 × 170 km	=	₹ 221.00

JOB & BATCH COSTING

Q.1: 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.

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

[MTP March 21 (5 Marks)]

ANSWER:

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

$* \dfrac{\text{Chargeable expenses}}{\text{Dierct labour hour for the month}} \times \text{Direct labour hours for batch}$

Q.2: A company has been asked to quote for a job. The company aims to make a net profit of 30% on sales. The estimated cost for the job is as follows:

Direct materials 10 kg @ ₹ 10 per kg

Direct labour 20 hours @ ₹ 5 per hour

Variable production overheads are recovered at the rate of ₹ 2 per labour hour.

Fixed production overheads for the company are budgeted to be ₹ 1,00,000 each year and are recovered on the basis of labour hours.

There are 10,000 budgeted labour hours each year. Other costs in relation to selling, distribution and administration are recovered at the rate of ₹ 50 per job.

Determine quote for the job by the company.

ANSWER:

Determination of quotation price for the job

Cost	Amount in (₹)
Direct Material (10 kg x ₹ 10)	100
Direct Labour (20 hours x ₹ 5)	100
Variable production overheads (20 hours x ₹ 2)	40
Fixed Overheads $\left(\dfrac{₹\,1,00,000}{10,000\ \text{budgeted hours}} \times 20\ \text{hours} \right)$	200
Other costs	50
Total Costs	490

Net profit is 30% of sales, therefore total costs represent 70% (₹ 490 x 100)/ 70 = ₹ 700 price to quote for job.

To check answer is correct; profit achieved will be ₹ 210 (₹ 700 - ₹ 490)

= ₹ 210/ ₹ 700 = 30%

Q.3: 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 material utilized - ₹ 1,87,00,000.

Direct labour utilized - ₹ 2,400 hours at ₹ 80 per hour

Budgeted production overheads are ₹ 48,00,000 for the period and are recovered on the basis of 24,000 labour hours.

Budgeted selling and administration overheads are ₹ 18,00,000 for the period and recovered on the basis of total budgeted total production cost of ₹ 36,00,00,000.

Required: Calculate the price to be charged for the job.

ANSWER:

Calculation of job price

Particulars	Amount in (₹)

Direct materials	1,87,00,000
Direct wages (₹ 80 x 2,400 hours)	1,92,000
Production overheads $\left(\frac{₹\,48,00,000}{24,000\ hours} \times 2,400\ hours\right)$	4,80,000
Production Cost	**1,93,72,000**
Selling and administration overheads $\left(\frac{₹\,18,00,000}{36,00,00,000} \times ₹\,1,93,72,000\right)$	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**

Q.4: The following data relate to the manufacture of a standard product during the 4 week ended 28th February 20x9:

Raw Material Consumed	₹ 4,00,000
Direct Wages	₹ 2,40,000
Machine Hours Worked	3,200 hours
Machine Hour Rate	₹ 40
Office Overheads	10% of works cost
Selling Overheads	₹ 20 per unit
Units Produced and sold	10,000 at ₹ 120 each

You are required to Find Out the cost per unit and profit for the 4-week ended 28th February 20X9.

ANSWER:

Statement of Cost per unit   No. of units produced: 10,000 units

Particulars	Cost per Unit (₹)	Amount (₹)
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 x ₹ 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 x ₹ 20)	20.00	2,00,000
Cost of sales/ Total Cost	**104.48**	**10,44,800**
Add: Profit (Bal. Fig.)	15.52	1,55,200
Sales	**120.00**	**12,00,000**

Q.5: W Ltd. has a capacity of 1,20,000 units per annum as its optimum capacity. The production costs are as under:

Direct Material - ₹ 90 per unit

Direct Labour - ₹ 60 per unit

Overheads:

Fixed: ₹ 30,00,000 per annum

Variable: ₹ 100 per unit

Semi variable; ₹ 20,00,000 per annum upto 50% capacity and an extra amount of ₹ 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 ₹ 20,00,000 for the year DETERMINE the average selling price at which each unit should be quoted

First 3 months: 80% Capacity

Remaining 9 months: 80% Capacity

Ignore Administration Selling and Distribution overheads.

ANSWER:

Statement of Cost and Total Sales   Amount (₹)

Particulars	First 3 Months	Next 9 Months	Total
Capacity Utilisation (No. of units)	15,000	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
Semi Variable	5,00,000 (For First 3 months at the rate of ₹ 20,000,000)	21,00,000 (at the rate of ₹ 28,00,000 for 9 months)	26,00,000
Total Cost	**50,000**	**2,30,50,000**	**2,73,50,000**
Add: Profit			20,00,000
Sales			
			2,93,50,000

Average selling price = ₹ 2,93,50,000 ÷ 87,000 units = ₹ 337.356

Q.6: 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 ₹ 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? **[RTP Nov 21]**

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	$= \dfrac{96,800}{6,160} \times ₹\,588 = ₹\,9,240$	$= \dfrac{96,800}{8,800} \times ₹\,588 = ₹\,6,468$

	Or, No. of setup = 15.71 (16 setup) = 16 x ₹ 588 = 9,408	
Total Carrying cost	½ x 6,160 x 0.25 x 12 = ₹ 9,240	½ x 8,800 x 0.25 x 12 = ₹ 13,200
Total Cost	**₹ 18,480/ ₹ 18,648**	**₹ 19,668**

₹ 1,188/ ₹ 1,020 is the extra cost incurred by the company due to run size not being optimum run size.

Q.7: Brostom Ltd. manufactures 'Stent' that is used by hospitals in angioplasty, a procedure used to open blocked coronary arteries without open-heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 1 crore 'Stents' in the coming year. Brostom Ltd. is having a market share of 10% of the total market demand of the Stents. It is estimated that it costs ₹ 3.00 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is ₹ 450.

Required:

(i)   WHAT would be the optimum run size for Stent manufacture?

(ii)   WHAT is the minimum inventory holding cost?   [RTP May 22]

ANSWER:

(i)   **Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)**

Economic Batch Quantity (EBQ) = $\sqrt{\frac{2DS}{C}}$

Where, D   = Annual demand for the Stents

= 1,00,00,000 x 10% = 10,00,000 units

S   = Set-up cost per run

= ₹ 450

C   = Carrying cost per unit per annum

= ₹ 3 x 12 = ₹ 36

EBQ   = $\sqrt{\frac{2 \times 10,00,000 \times ₹ 450}{₹ 36}}$

= 5,000 units of Stents

(ii)   **Minimum inventory holding cost**

Minimum Inventory Cost   = Average Inventory x Inventory Carrying Cost per unit per annum

= (5,000 ÷ 2) × ₹ 36

= ₹ 90,000

(iii)   **Calculation of the extra cost due to manufacturing policy**

	When run size is 6,000 units	When run size is 5,000 units i.e. at EBQ
Total set up cost	= $\frac{10,00,000}{6,000}$ × ₹ 450 = ₹ 75,000	= $\frac{10,00,000}{5,000}$ × ₹ 450 = ₹ 90,000
Total Carrying cost	½ × 6,000 × ₹ 36 ₹ 1,08,000	½ × 5,000 × ₹ 36 = ₹ 90,000
Total Cost	**₹ 1,83,000**	**₹1,80,000**

Extra Cost = ₹ 1,83,000 - ₹ 1,80,000 = **₹ 3,000**

Q.8: **KJ Motors Ltd. is a manufacturer of auto components. Following are the details of expenses for the year 2020-21:**

		(')
(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 2021-22, the company has received an order from a car manufacturer where it estimates that the cost of material and labour will be ₹ 80,00,000 and ₹ 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 ₹ 9,50,000.

You are required to:

(i) CALCULATE the overhead recovery rates based on actual costs for 2020-21.

(ii) PREPARE a job cost sheet for the order received and the price to be quoted if the desired profit is 25% on sales.

[RTP May 22]

ANSWER:

(i) **Calculation of Overhead Recovery Rate:**

Factory Overhead Recovery Rate
$$= \frac{\text{Factory Overhead in } 2020-21}{\text{Direct labour cost in } 2020-21} \times 100$$

$$= \frac{₹\,30,80,000}{₹\,90,50,000} \times 100 = 34\% \text{ of Direct labour}$$

Administrative overhead Recovery Rate
$$= \frac{\text{Administrative Overhead in } 2020-21}{\text{Factory cost in } 2020-21 \text{ (W.N.)}} \times 100$$

$$= \frac{₹\,20,50,400}{₹\,2,96,80,000} \times 100 = 6.91\% \text{ of Factory Cost}$$

Working Note: Calculation of Factory Cost in 2020-21

Particulars	Amount (₹)
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 2021-22

Particulars	Amount (₹)
Material	80,00,000
Labour	40,50,000
Factory Overhead (34% of ₹ 40,50,000)	13,77,000
Factory Cost	1,34,27,000
Administrative Overhead (6.91% of ₹ 1,34,27,000)	9,27,806
Cost of delivery	9,50,000
Total Cost	1,53,04,806
Add: Profit @ 25% of Sales or 33.33% of cost	51,01,602
Sales value (Price to be quoted for the order)	2,04,06,408

Hence the price to be quoted is ₹ 2,04,06,408.

ACTIVITY BASED COSTING (ABC)

Q.1: 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 (₹)	8	6	5
Direct Labour per unit (₹)	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 :

	(₹)
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.

[Nov 2020 (6 Marks)]

ANSWER:

(i)   Calculation Cost-Driver's rate

Activity	Overhead cost (₹)	Cost-driver level	Cost driver rate (₹)
	(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

(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

Q.2: Describe the various levels of activities under 'ABC' methodology.　　　　　[Nov 2020 (4 Marks)]

ANSWER:

Various Level of Activities under ABC Methodology

Level of Activities	Meaning
1. Unit level activities	These are those activities for which the consumption of resources can be identified with the number of units 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.
3. Product level activities	These are the activities which are performed to support different products in product line.
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.

Q.3: 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) Cost per unit:	1200	1440	1968
Direct Material (₹)	90	84	176
Direct Labour (₹)	18	20	30

Budgeted direct labour rate was ₹ 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.

ANSWER:

1.   **Traditionl absorption Costing**

		X	Y	Z	Total
(a)	Quantity (units)	1,200	1,440	1,968	4608
(b)	Direct labour	18	20	30	-
(c)	Direct labour hours (a x b) / ₹ 4	5,400	7,200	14,760	27,360

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= (₹ 50,000 + ₹ 40,000 + ₹ 28,240 + ₹ 1,28,000) ÷ 27,360 hours

= ₹ 2,46,240 ÷ 27,360 hours

= ₹ 9 per direct labour hour

Units 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
	$\left(\dfrac{9 \times 18}{4}\right)$	$\left(\dfrac{9 \times 20}{4}\right)$	$\left(\dfrac{9 \times 30}{4}\right)$
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 rat (₹) (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 or 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]
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.

Q.4: The following budgeted information relates to N Ltd. for the year 2021:

Particulars	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 ₹ 73,60,000

Assembly Department ₹ 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 (₹)	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.   [RTP May 21]

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 (₹)	90	180	140	
C.	Sales Value (₹) [A x 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 x 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	Products			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 x 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 x D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F.	Overheads: (Refer working note-3)				
	(i) Machine department (₹)	21,00,000	22,40,000	21,00,000	64,40,000
	(ii) Assembly department (₹)	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

Working Notes:

1.

	Particulars	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 x 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 x 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 x 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 x H]**	**30,00,000**	**16,00,000**	**9,00,000**	**55,00,000**

Machine hour rate $= \dfrac{₹\,73,60,000}{9,20,000\ \text{hours}} = ₹\,8$

Labor hour rate $= \dfrac{₹\,55,00,000}{11,00,000\ \text{hours}} = ₹\,5$

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**

	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)	7	7	7	
C.	**Machining services cost (₹) [A×B]**	**21,00,000**	**22,40,000**	**21,00,000**	**64,40,000**
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

		100	100	100	
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

Q.5: 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, deprecation 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:

ANSWER:

(i) Total Overhead = Rs. (2,52,000 + 80,000 + 60,000 + 40,000 + 10,368) = Rs. 4,42,368

Total machine hours = 1,440 × 4 + 1,200 × 3 + 960 × 2 + 1,008 × 1

= 5,760 + 3,600 + 1,920 + 1,008 = 12,288 M. Hrs.

∴ Overhead recovery rate / M.H. = $\frac{Rs.\ 4,42,368}{12,288\ M.\ Hrs.}$ = 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 × Rs.36)	108 (3 × Rs.36)	72 (2 × Rs.36)	36 (1 × 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 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 or total 192 runs.

(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 × 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

(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 × 84 = 1,20,960	1,200 × 90 = 1,08,000	960 × 80 = 76,800	1,008 × 96 = 96,768
Labour	1,440 × 20 = 28,800	1,200 × 18 = 21,600	960 × 14 = 13,440	1,008 × 16 = 16,128
	1,49,760	1,29,600	90,240	1,12,896
Overhead cost:				
Set up	2,000 × 30 = 60,000	2,000 × 25 = 50,000	2,000 × 20 = 40,000	2,000 × 21 = 42,000
Store receiving	720 × 50 = 36,000	720 × 50 = 36,000	720 × 50 = 36,000	720 × 50 = 36,000
Inspection	1,000 × 30 = 30,000	1,000 × 25 = 25,000	1,000 × 20 = 20,000	1,000 × 21 = 21,000
Material handling	54 × 60 = 3,240	54 × 50 = 2,700	54 × 40 = 2,160	54 × 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

Q.6: 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

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.

[MTP April 21 (10 Marks)]

ANSWER:

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 of each Department

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%).

Q.7: 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 Deliver capacity which is provide 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	8,000 Inspections	2,40,000

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:

(i) Compute the costs allocated to each Product from each Activity.

(ii) Calculate the cost of unused capacity for each Activity.

(iii) 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.

[July 21 (10 Marks)]

ANSWER:

(i) Statement of cost allocation to each product from each activity

	Product			
	P (₹)	Q (₹)	R (₹)	Total (₹)
Direct Labour hours (Refer to working note)	1,00,000 (10,000 Labour hours x ₹ 10)	80,000 (8,000 labour hours x ₹ 10)	60,000 (6,000 Labour hours x ₹ 10)	2,40,000

Production runs (Refer to working note)	60,000 (200 Production runs x ₹ 300)	54,000 (180 Production runs x ₹ 300)	48,000 (160 Production runs x ₹ 300)	1,62,000
Quality Inspections (Refer to working note)	90,000 (3,000 Inspections x ₹ 30)	75,000 (2,500 Inspections x ₹ 30)	45,000 (1,500 Inspections x ₹ 30)	2,10,000

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**

Q.8: 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

The estimated overhead expenses for the year 2021 will be as below:

Machine Department ₹ 36,80,000

Assembly Department ₹ 27,50,000

Overheads 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 estimated 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.   [MTP Nov 21 (10 Marks)]

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 x 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 x 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
(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:

	Particulars	Product			Total
		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 x 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 x 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)

		Product			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 x 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 x D]**	12,00,000	12,80,000	12,00,000	36,80,000
F.	Labour hours per unit	6	4	3	
G.	Total labor hours [A x 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 x H]**	15,00,000	8,00,000	4,50,000	27,50,000

Machine hour rate $= \dfrac{₹\,36,80,000}{9,20,000\ hours} = ₹\,4$

Labour hour rate $= \dfrac{₹\,27,50,000}{11,00,000\ hours} = ₹\,2.5$

(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 | 250.0 |

(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)	3.5	3.5	3.5	
C.	**Machining services cost (₹) [A x B]**	**10,50,000**	**11,20,000**	**10,50,000**	**32,20,000**
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 x 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.	**Se-up cost (₹) [G x 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 x 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 x N]**	**75,000**	**87,500**	**37,500**	**2,00,000**