CA Intermediate

Paper 4

Cost & Management Accounting

Chapter-wise compilation of RTP, MTP and PYP

May'24

VIVITSU
STRIVING TOWARDS KNOWLEDGE

NEW *Modified as per new scheme*

Amended as per May'24

11
Attempts
Compilation

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CA Finalist _____

(Once you print this write your name in this blank to give you the much-needed motivation. Remember what you see is what you achieve!)

Disclaimer:

GETTING THE MOST FROM THIS BOOK

A QUICK GUIDE

1 INITIAL READING

After your initial reading of a particular chapter in your study material, go through the questions in our 3, 5, and 11 attempt's compilations, focusing on the chapter you've just covered. Make note of challenging questions for later reference.

2 FIRST REVISION

During your first revision, revisit the marked questions. If you still can't answer them, highlight them in red and review the related concepts to improve your understanding. This process helps you to grasp the key concepts and address your weak points

3 KEEP GOING WITH THE REVISIONS

Repeat the reading and revision process as often as possible before your exams. Each iteration will enhance your confidence and knowledge.

4 EXAMINERS COMMENTS

Pay attention to the examiner's comments in our compilations, as they highlight common mistakes. Learning from these errors will help you avoid them in your exams

Frequently Asked Questions

1. **Why RTP's, MTP's and PYP's?**
   RTP's, MTP's, and PYP's are extremely important to ensure that you reproduce ICAI language. These questions train you to understand what is important and what is expected of you.
   At least 41% of questions* are asked from previous RTP's, MTP's and PYP's.

2. **What is included?**
   In this compiler, all questions from the last 3, 5 or 11 attempts depending on the one you have selected will be available. There will be references to the marks and the attempt from which they were asked. Identical or similar questions have been removed and references for both attempts are mentioned.

3. **What is the benefit of Chapter-wise?**
   We have categorized each and every question from all Old RTPs, MTP's, and PYP's into chapters. This means that you don't have to wait until you've completed your entire syllabus to tackle an RTP, MTP, or past paper. You can start solving these questions to check your conceptual clarity right after finishing a particular chapter.

4. **What does amended for the latest attempt mean?**
   When we reviewed all the questions from the past 11 attempts of RTP, MTP, and PYP'S, we didn't just segregate them Chapterwise; we also updated them to reflect the latest provisions. All the answers provided in the compilation are applicable for the May 2024 examination. So, there's no need to stress about outdated or incorrect information.

5. **How are Old RTP's, MTP's & PYP's beneficial for me?**
   All old RTPs, MTPs, and PYPs have been organized according to the new syllabus issued by ICAI. This means that if a specific chapter from the old scheme is not included in the new scheme, it has been omitted. If a particular chapter in the new scheme is based on concepts from two or more chapters in the old scheme, it has been adapted to align with how the chapter should be in the new scheme. If a chapter is only partially included in the new scheme, the questions related to those specific concepts are only included in the corresponding chapter of the new scheme. A comprehensive reconciliation of the chapters between the new scheme and the old scheme is provided on the following page.

6. **What if a new attempt is added post my purchase?**
   If you have purchased materials for the May 2024 attempt, you will receive a file with the questions segregated Chapterwise specifically for that attempt.

7. **What does N/A mean?**
   It could mean any of the following:
   1. No questions from that chapter have been included in the selected attempts.
   2. The chapter is newly introduced, and as a result, no questions have been previously asked in RTP's, MTP's, or PYP's.

*This is on an average based on the last 11 attempts

Cost and Management Accounting

Reconciliation of chapters of the new scheme (May'24) with old course

New Chapter No.	Chapter Name as per NEW Syllabus	Paper No. as per Old Course
1	Introduction to Cost and Management Accounting	Same
2	Material Cost	Same
3	Employee Cost and Direct Expenses	Same
4	Overheads – Absorption Costing Method	Same
5	Activity Based Costing	Same
6	Cost Sheet	Same
7	Cost Accounting Systems	Same
8	Unit & Batch Costing	Same
9	Job Costing	Same
10	Process & Operation Costing	Same
11	Joint Products and By Products	Same
12	Service Costing	Same
13	Standard Costing	Same
14	Marginal Costing	Same
15	Budgets and Budgetary Control	Same

Note:

Contract Costing as per the Old Syllabus has been removed in the New Syllabus.

Table of Contents

21 MTPs: March'18, April'18, Aug'18, Oct'18, May'19, April'19, Oct'19, May'20, Oct'20, March'21, April'21, Oct '21, Nov '21, March '22, April '22, Sep '22, Oct '22, March '23, April '23, Sep '23 & Oct '23

11 PYPs: May'18, Nov'18, May'19, Nov'19, Nov'20, Jan'21, July '21, Dec '21, May'22, Nov '22, May '23

12 RTPs: May'18, Nov'18, May'19, Nov'19, May'20, Nov'20, May'21, Nov '21, May '22, Nov '22, May '23, Nov '23

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Chapter 1
Introduction to Cost and Management Accounting

Question 1

Discuss the impact of Information Technology in Cost Accounting. (MTP 5 Marks March '19 & April '23 & Sep '23, PYP 5 Marks Jan '21, RTP May '20, RTP May'22)

Answer 1

The impact of IT in cost accounting may include the followings:

(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 organization 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 utilization report etc. are no longer required to be prepared in multiple copies, the related department can get e -copy from the system.

(iii) Information Technology with the help of internet (including intranet and extranet) helps in resource procurement and mobilization. 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 center or cost object is ascertained with accuracy in timely manner. Each cost center and cost object is codified and all related costs are assigned to the cost object or cost center. This process automates the cost accumulation and ascertainment process. The cost information can be customized as per the requirement. For example, when an entity manufacture or provide services, it can know information job -wise, batch-wise, process-wise, cost center wise etc.

(v) Uniformity in preparation of report, budgets and standards can be achieved with the help of IT. ERP software plays an important role in bringing uniformity irrespective of location, currency, language and regulations.

(vi) Cost and revenue variance reports are generated in real time basis which enables the management to take control measures immediately.

(vii) IT enables an entity to monitor and analyse each process of manufacturing or service activity closely to eliminate non value added activities.

The above are examples of few areas where Cost Accounting is done with the help of IT.

Question 2

Discuss the four different methods of costing along with their applicability to concerned industry? (MTP March '18, 5 Marks)

Answer 2

Four different methods of costing along with their applicability to concerned industry have been discussed as below:

(i) Job Costing: The objective under this method of costing is to ascertain the cost of each job order. A job card is prepared for each job to accumulate costs. The cost of the job is determined by adding all costs against the job it has incurred. This method of costing is used in printing press, foundries and general engineering workshops, advertising etc.

(ii) Batch Costing: This system of costing is used where small components/ parts of the same kind are required to be manufactured in large quantities. Here batch of similar products is treated as a job and cost of such a job is ascertained as discussed under (1), above. If in a cycle manufacturing unit, rims are produced in batches of 2,500 units each, then the cost will be determined in relation to a batch of 2,500 units.

(iii) Contract Costing: If a job is very big and takes a long time for its completion, then method used for costing is known as Contract Costing. Here the cost of each contract is ascertained separately. It is

suitable for firms engaged in the construct ion of bridges, roads, buildings etc.

(iv) **Operating Costing:** The method of Costing used in service rendering undertakings is known as operating costing. This method of costing is used in undertakings like transport, supply of water, telephone services, hospitals, nursing homes etc.

Question 3

Discuss the prerequisite of installing cost accounting system. (MTP Aug '18 5 Marks)

Answer 3

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

(i) **Objective:** The objective of costing system, for example whether it is being introduced for fixing prices or for insisting a system of cost control.

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

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

(iv) **Knowing the product:** Nature of product determines the type of costing system to be implemented. The product which has by -products requires costing system which account for by-products as well. In case of perishable or short self - life, marginal costing method is required to know the contribution and minimum price at which it can be sold.

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

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

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

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

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

Question 4

Discuss the essential features of a good cost accounting system. (MTP Oct '19, 5 Marks, Old & New SM)

Answer 4

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

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

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

(c) **Uniformity and consistency:** There should be uniformity and consistency in classification, treatment and

reporting of cost data and related information. This is required for benchmarking and comparability of the results of the system for both horizontal and vertical analysis.

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

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

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

Question 5

State the limitations of cost and management accounting. (MTP Oct '18 5 Marks, RTP Nov'21)

Answer 5

Like other branches of accounting, cost and management accounting is also having certain limitations.

The limitations of cost and management accounting are as follows:

1. **Expensive:** It is expensive because analysis, allocation and absorption of overheads require considerable amount of additional work, and hence additional money.

2. **Requirement of Reconciliation:** The results shown by cost accounts differ from those shown by financial accounts. Thus Preparation of reconciliation statements is necessary to verify their accuracy.

3. **Duplication of Work:** It involves duplication of work as organization has to maintain two sets of accounts i.e. Financial Account and Cost Account.

4. **Inefficiency:** Costing system itself does not control costs but its usage does.

Question 6

DISCUSS the steps to be followed to exercise control over cost. (MTP 5 Marks Oct'20)

Answer 6

To exercise control over cost, following steps are followed:

(i) **Determination of pre-determined standard or results:** Standard cost or performance targets for a cost object or a cost centre is set before initiation of production or service activity. These are desired cost or result that need to be achieved.

(ii) **Measurement of actual performance:** Actual cost or result of the cost object or cost centre is measured. Performance should be measured in the same manner in which the targets are set i.e. if the targets are set up operation-wise, and then the actual costs should also be collected and measured operation-wise to have a common basis for comparison.

(iii) **Comparison of actual performance with set standard or target:** The actual performance so measured is compared against the set standard and desired target. Any deviation (variance) between the two is noted and reported to the appropriate person or authority.

(iv) **Analysis of variance and action:** The variance in results so noted are further analysed to know the reasons for variance and appropriate action is taken to ensure compliance in future. If necessary, the standards are further amended to take developments into account.

Question 7

DISCUSS the Standard and Discretionary Cost Centres (MTP 5 Marks March'21 & Oct '23, Old & New SM)

Answer 7

(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 center 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 centers are Research & Development department, Advertisement department where output of these department cannot be measured with certainty and co-related with cost incurred on inputs.

Question 8

DISTINGUISH between cost control and cost reduction (MTP 5 Marks, Apr'21, Apr 19, Aug 18 & Oct '23) (RTP (Nov '21, May 19, Nov '18 & Nov '22 & May '23) (PYP May '19 5 Marks, PYP 5 Marks Dec '21)

Answer 8

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.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this theoretical question on 'Cost control and Cost reduction', below average performance of the examinees was observed.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

The theory question required knowledge of the concepts of two terms Cost Control and Cost Reduction to identify differences between them. Most of the examinees answered partly correct. Performance of the examinees was below average.

Question 9

EXPLAIN the difference between Cost Accounting and Management Accounting (MTP 5 Marks, Oct '21 & March '23) (RTP Nov'19, May '20 & Nov '22) (PYP 5 Marks Nov 20)

Answer 9

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.

Question 10

How do you deal with the following in cost accounts?

(i) Fringe benefits

(ii) Bad debts. (MTP 5 Marks, Oct'21)

Answer 10

(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 organization. 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.

Question 11

DISCUSS cost classification based on variability and controllability. (MTP 5 Marks Nov '21 & March '18) (RTP May '21 & May '19, Old & New SM)

Answer 11

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.

Question 12

STATE Direct Expenses with examples. (MTP 5 Marks April '19)

Answer 12

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

(a) Royalty paid/ payable for production or provision of service;

(b) Hire charges paid for hiring specific equipment;

(c) Cost for product/ service specific design or drawing;

(d) Cost of product/ service specific software;

(e) Other expenses which are directly related with the production of goods or provision of service.

Question 13

EXPLAIN the difference between product cost and period cost. (5 Marks April '19, Oct'22)

Answer 13

Product costs are those costs that are identified with the goods purchased or produced for resale. In a manufacturing organisation they are attached to the product and that are included in the inventory valuation for finished goods, or for incomplete goods. Product cost is also known as inventoriable cost. Under absorption costing method it includes direct material, direct labour, direct expenses, directly attributable costs (variable and non-variable) and other production (manufacturing) overheads. Under marginal costing method Product Costs includes all variable production costs and the all fixed costs are deducted from the contribution.

Periods costs are the costs, which are not assigned to the products but are charged as expense against revenue of the period in which they are incurred. General Administration, marketing, sales and distributor overheads are recognized as period costs.

Question 14

Some of the items of PR Company, a manufacturer of corporate office furniture, are provided below. As the company is in the process of developing a formal cost accounting system, you are required to CLASSIFY the items into three categories namely: (i) Cost tracing (ii) Cost allocation (iii) Non-manufacturing item. Carpenter wages, Depreciation - office building, Glue for assembly, Lathe department supervisor, Metal brackets for drawers, Factory washroom supplies, Lumber, Samples for trade shows, Lathe depreciation, Lathe operator wages. (MTP 4 Marks March '22)

Answer 14

Item	Cost Tracing	Cost Allocation	Non-manufacturing
Carpenter wages	√		
Depreciation - office building			√
Glue for assembly		√	
Lathe department supervisor		√	
Metal brackets for drawers	√		
Factory washroom supplies		√	
Lumber	√		
Samples for trade shows			√

Lathe depreciation		√	
Lathe operator wages		√	

Question 15

STATE the method of costing for the following industries:

(i) Sugar manufacturing

(ii) Bridge Construction

(iii) Advertising

(iv) Car Assembly (MTP 4 Marks April '22)

Answer 15

S. No.	Industry	Method of costing
(i)	Sugar manufacturing	Process costing
(ii)	Bridge Construction	Contract Costing
(iii)	Advertising	Job costing

Question 16

DEFINE cost units? WRITE the cost unit basis against each of the following Industry/Product-Automobile, Steel, Cement, Chemicals, Power and Transport. (5 Marks March '23)(RTP Nov '22)

Answer 16

Cost units are usually the units of physical measurement like number, weight, area, volume, length, time and value.

Industry or Product	Cost Unit Basis
Automobile	Number
Steel	Ton
Cement	Ton/ per bag etc.
Chemicals	Litre, gallon, kilogram, ton etc.
Power	Kilo-watt hour (kWh)
Transport	Passenger- kilometer

Question 17

DISCUSS short notes on (i) Discretionary Cost Centre and (ii) Investment Centre (RTP Nov 20 & May '18)

Answer 17

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

(ii) Investment Centres: These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres are measured on the basis of Return on Investment (ROI) besides profit. Examples of investment centres are Maharatna, Navratna and Miniratna companies of Public Sector Undertakings of Central Government.

Question 18

DESCRIBE Operation costing with two examples of industries where operation costing is applied. (RTP Nov '20)

Answer 18

This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. This means conversion activity is similar

for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batch wise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs. The two examples of industries are Ready made garments and Jeweler making.

Question 19

DEFINE Controllable Cost and Uncontrollable Cost. (RTP Nov '18) (MTP 5 Marks March '19, April '23 & Sep '23)

<div align="center">Or</div>

EXPLAIN the difference between controllable & uncontrollable costs? (RTP May '22)

Answer 19

(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.

Question 20

SUGGEST the unit of cost for following industries: (RTP May 23)

- (a) **Transport**
- (b) **Power**
- (c) **Hotel**
- (d) **Hospital**
- (e) **Steel**
- (f) **Coal mining**
- (g) **Professional Services**
- (h) **Gas**
- (i) **Engineering**
- (j) **Oil**

Answer 20

Cost units are as follows:

Industry or Product	Cost Unit Basis
Transport	Passenger- kilometer
Power	Kilo-watt hour (kWh)
Hotel	Room
Hospitals	Patient day
Steel	Ton
Coal mining	Tonne/ton
Professional services	Chargeable hour, job, contract
Gas	Cubic feet

Engineering	Contract, job
Oil	Barrel, tonne, litre

Question 21

Narrate the objectives of cost accounting. (Nov '23)

Answer 21

The main objectives of introduction of a Cost Accounting System in a manufacturing organization are as follows:

(i) Ascertainment of cost: The main objective of a Cost Accounting system is to ascertain cost for cost objects. Costing may be post completion or continuous but the aim is to arrive at a complete and accurate cost figure to assist the users to compare, control and make various decisions.

(ii) Determination of selling price: Cost Accounting System in a manufacturing organisation enables to determine desired selling price after adding expected profit margin with the cost of the goods manufactured.

(iii) Cost control and Cost reduction: Cost Accounting System equips the cost controller to adhere and control the cost estimate or cost budget and assist them to identify the areas of cost reduction.

(iv) Ascertainment of profit of each activity: Cost Accounting System helps to classify cost on the basis of activity to ascertain activity wise profitability.

(v) Assisting in managerial decision making: Cost Accounting System provides relevant cost information and assists managers to make various decisions.

Question 22

Mention the Cost Unit of the following Industries:

    (i) Electricity

(ii) Automobile
(iii) Cement
(iv) Steel
(v) Gas
(vi) Brick Making
(vii) Coal Mining
(viii) Engineering
(ix) Professional Services (PYP Nov'19,5 Marks)

Answer 22

Cost Unit of Industries:

S. No.	Industry	Cost Unit Basis
(i)	Electricity	Kilowatt-hour (kWh)
(ii)	Automobile	Number
(iii)	Cement	Ton/ per bag etc.
(iv)	Steel	Ton
(v)	Gas	Cubic feet
(vi)	Brick-making	1,000 bricks
(vii)	Coal mining	Tonne/ton
(viii)	Engineering	Contract, job
(ix)	Professional services	Chargeable hour, job, contract
(x)	Hospitals	Patient day

Question 23

Why are cost and management accounting information are required by the staff at operational level? Describe. (PYP May '18, 5 Marks)

Answer 23

Operational level staffs- The operational level staffs like supervisors, foreman, team leaders are requiring information

(i)   to know the objectives and performance goals for them

(ii) to know product and service specifications like volume, quality and process etc.

(iii) to know the performance parameters against which their performance is measured and evaluated.

(iv) to know divisional (responsibility centre) profitability etc.

Question 24

Mention and explain types of responsibility centers. (PYP Nov '18, 5 Marks)

Answer 24

There are four types of responsibility centres:

(i)   Cost Centres: The responsibility centre which is held accountable for incurrence of costs which are under its control. The performance of this responsibility centre is measured against pre- determined standards or budgets. The cost centres are of two types:

(a) Standard Cost Centre and (b) Discretionary Cost Centre

(ii) Revenue Centres: The responsibility centres which are accountable for generation of revenue for the entity. Sales Department for example, is the responsible for achievement of sales target and revenue generation. Though, revenue centres does not have control on the all expenditures it incurs but some time expenditures related with selling activities like commission to sales person etc. are incurred by revenue centres.

(iii) Profit Centres: These are the responsibility centres which have both responsibility of generation of revenue and incurrence of expenditures. Since, managers of profit centres are accountable for both costs as well as revenue, profitability is the basis for measurement of performance of these responsibility centres. Examples of profit centres are decentralised branches of an organisation.

(iv) Investment Centres: These are the responsibility centres which are not only responsible for profitability but also has the authority to make capital investment decisions. The performance of these responsibility centres is measured based on Return on Investment (ROI) besides profit.

Question 25

State the Method of Costing to be used in the following industries: ". (PYP 5 Marks Nov '20)

        (i)   **Real Estate**

        (ii)   **Motor repairing workshop**

        (iii)   **Chemical Industry**

        (iv)   **Transport service**

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(v)   Assembly of bicycles
(vi)   Biscuits manufacturing Industry
(vii) Power supply Companies
(viii) Car manufacturing Industry
(ix)   Cement Industry
(x)   Printing Press

Answer 25

Method of costing used in different industries:

S. No.	Industries	Method of Costing
(i)	Real Estate	Contract Costing
(ii)	Motor Repairing Workshop	Job Costing
(iii)	Chemical Industry	Process Costing
(iv)	Transport Service	Service/Operating Costing
(v)	Assembly of Bicycles	Unit/ Single/Output/Multiple Costing
(vi)	Biscuits Manufacturing Industry	Batch Costing
(vii)	Power Supply Companies	Service/Operating Costing
(viii)	Car Manufacturing Industry	Multiple Costing
(ix)	Cement Industry	Unit/Single/Output Costing
(x)	Printing Press	Job Costing

Question 26

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. (PYP 5 Marks Jan '21)**

Answer 26

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

Question 27

Specify the types of Responsibility centres under the following situations:

(i)   **Purchase of bonds, stocks, or real estate property.**

(ii) **Ticket counter in a Railway station.**

(iii) **Decentralized branches of an organization.**

(iv) **Maharana, Navratna and Miniratna public sector undertaking (PSU) of Central Government.**

(v)   **Sales Department of an organization. (PYP 5 Marks July 21)**

Answer 27

Particulars	Types of Responsibility Centre
(i) Purchase of bonds, stocks, or real estate property.	Investment Centre
(ii) Ticket counter in a Railway station.	Revenue Centre

(iii) Decentralized branches of an organization.	Profit Centre
(iv) Maharatna, Navratna and Miniratna public sector undertaking (PSU) of Central Government.	Investment Centre
(v) Sales Department of an organization.	Revenue Centre

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

It was a theoretical question requiring examinees to specify the type of responsibility centre for the given five statements. Majority of the examinees failed to give clear responses to the statements. Performance of the examinees was below average.

Question 28

Explain Direct Expenses and how these are measured and their treatment in cost accounting. (PYP May '19 5 Marks)

Answer 28

Direct Expense: Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

(i) Royalty paid/ payable for production or provision of service;

(ii) Hire charges paid for hiring specific equipment;

(iii) Cost for product/ service specific design or drawing;

(iv) Cost of product/ service specific software;

(v) Other expenses which are directly related with the production of goods or provision of service. The above list of expenses is not exhaustive; any other expenses which are directly attributable to the production or service are also included as direct expenses.

Measurement of Direct Expenses

The direct expenses are measured at invoice or agreed price net of rebate or discount but includes duties and taxes (for which input credit not available), commission and other directly attributable costs. In case of sub-contracting, where goods are get manufactured by job workers independent of the principal entity, are measured at agreed price. Where the principal supplies some materials to the job workers, the value of such materials and other incidental expenses are added with the job charges paid to the job workers.

Treatment of Direct Expenses

Direct Expenses forms part the prime cost for the product or service to which it can be directly traceable and attributable. In case of lump-sum payment or one-time payment, the cost is amortized over the estimated production volume or benefit derived. If the expenses incurred are of insignificant amount. i.e. not material, it can be treated as part of overheads.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This theoretical question was related to 'Direct Expenses'. Poor performance of the examinees was observed.

Question 29

Briefly explain the 'techniques of costing'. (PYP 5 Marks Dec '21)

Answer 29

Techniques	Description
Uniform Costing	When a number of firms in an industry agree among themselves to follow the same system of costing in detail, adopting common terminology for various items and processes they are said to follow a system of uniform costing. Advantages of such a system are: i. A comparison of the performance of each of the firms can be made with that of another, or with the average performance in the industry. ii. Under such a system, it is also possible to determine the cost of production of goods which is true for the industry as a whole. It is found useful when tax-relief or protection is sought from the Government.
Marginal Costing	It is defined as the ascertainment of marginal cost by differentiating between fixed and variable costs. It is used to ascertain effect of changes in volume or type of output on profit.
Standard Costing and Variance Analysis	It is the name given to the technique whereby standard costs are pre-determined and subsequently compared with the recorded actual costs. It is thus a technique of cost ascertainment and cost control. This technique may be used in conjunction with any method of costing. However, it is especially suitable where the manufacturing method involves production of standardized goods of repetitive nature.
Historical Costing	It is the ascertainment of costs after they have been incurred. This type of costing has limited utility. • Post Costing: It means ascertainment of cost after production is completed. • Continuous costing: Cost is ascertained as soon as the job is completed or even when the job is in progress.
Absorption Costing	It is the practice of charging all costs, both variable and fixed to operations, processes or products. This differs from marginal costing where fixed costs are excluded.
Direct costing	Direct costing is a specialized form of cost analysis that only uses variable costs to make decisions. It does not consider fixed costs, which are assumed to be associated with the time periods in which they are incurred.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This theory question on technique of costing was not answered well. Examinees answered different methods of costing instead of techniques. Performance of the examinees was poor.

Question 30

Identify the methods of costing from the following statements:

(i) Costs are directly charged to a group of products.

(ii) Nature of the product is complex and method cannot be ascertained.

(iii) Costs ascertained for a single product.

(iv) All costs are directly charged to a specific job.

(v) Costs are charged to operations and averaged over units produced. **(PYP 5 Marks May'22)**

Answer 30

Method of costing followed:

Situation	Method of costing
(i) Costs are directly charged to a group of products.	Batch costing
(ii) Nature of the product is complex and method cannot be ascertained.	Multiple costing

(iii) Cost is ascertained for a single product.	Unit/ Single/Output costing
(iv) All costs are directly charged to a specific job.	Job costing
(v)Costs are charged to operations and averaged over units produced.	Process costing

Question 31

Mention the cost units (physical measurements) for the following Industry/product:

    (i)   **Automobile**
    (ii)   **Gas**
    (iii) **Brick works**
    (iv) **Power**
    (v)   **Steel**
    (vi) **Transport (by road)**
    (vii) **Chemical**
    (viii) **Oil**
    (ix) **Brewing**
    (x)   **Cement (PYP 5 Marks Nov 22)**

Answer 31

Industry or Product	Cost Units
Automobile	Number
Gas	Cubic feet
Brick works	1,000 bricks
Power	Kilo-watt hour (kWh)
Steel	Tonne
Transport (by road)	Passenger- kilometer or Tonne-kilometer
Chemical	Litre, gallon, kilogram, tonne etc.
Oil	Barrel, tonne, litre
Brewing	Barrel
Cement	Ton/ per bag etc.

Question 32

Explain: Opportunity cost (PYP 2 Marks May '18)

Answer 32

Opportunity Cost - This cost refers to the value of sacrifice made or benefit of opportunity foregone in accepting an alternative course of action. For example, a firm financing its expansion plan by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.

Question 33

Define cost objects and give examples of any four cost objects. (PYP 5 Marks, May '23)

Answer 33

Definition of cost objects

Cost object is anything for which a separate measurement of cost is required. Cost object may be a product, a service, a project, a customer, a brand category, an activity, a department or a programme etc.

Examples of cost objects

Product	Smart phone, Tablet computer, SUV Car, Book etc.
Service	An airline flight from Delhi to Mumbai, Concurrent audit assignment, Utility bill payment facility etc.

Project	Metro Rail project, Road projects etc.
Activity	Quality inspection of materials, Placing of orders etc.
Process	Refinement of crudes in oil refineries, melting of billets or ingots in rolling mills etc.
Department	Production department, Finance & Accounts, Safety etc.

Chapter 2
Material Cost

Question 1

DISTINGUISH clearly between Bin cards and Stores Ledger. (MTP 4 Marks March '22 & March '23, Old & New SM)

Answer 1

Difference between Bin Card & Stores Ledger

Bin Card	Stores Ledger
It is maintained by the storekeeper in the store.	It is maintained in cost accounting department.
It contains only quantitative details of material received, issued and returned to stores.	It contains information both in quantity and value.
Entries are made when transaction takes place.	It is always posted after the transaction.
Each transaction is individually posted.	Transactions may be summarized and then posted.
Inter-department transfers do not appear in Bin Card.	Material transfers from one job to another job are recorded for costing purposes.

Question 2

A Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will able to sale 20,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

(i) The Re-order quantity is 200 kg. less than the Economic Order Quantity (EOQ).

(ii) Maximum consumption per day is 20 kg. more than the average consumption per day.

(iii) There is an opening stock of 2,000 kg.

(iv) Time required to get the raw materials from the suppliers is 4 to 8 days.

(v) The purchase price is Rs.125 per kg.

There is an opening stock of 1,800 units of the finished product Exe. The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur Rs. 720 on paper and documentation work. From the above information COMPUTE the followings in relation to raw material Dee:

(a) Re-order Quantity

(b) Maximum Stock level

(c) Minimum Stock level

(d) Impact on the profitability of the company by not ordering the EOQ.

[Take 364 days for a year] (MTP April '19, 10 Marks)(RTP May'19)(Same concept different figures RTP May 21)

Answer 2

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'Dee':

Sales forecast of the product 'Exe'	20,000 units
Less: Opening stock of 'Exe'	1,800 units
Fresh units of 'Exe' to be produced	18,200 units
Raw material required to produce 18,200 units of 'Exe' (18,200 units × 2	36,400 kg.

kg.)	
Less: Opening Stock of 'Dee'	2,000 kg.
Annual demand for raw material 'Dee'	34,400 kg.

Computation of Economic Order Quantity (EOQ):

$$EOQ = \sqrt{\frac{2 \ X \ Annual \ Consumption \ of \ "Dee"}{Carrying \ Cost \ Per \ Unit \ Per \ annum}} = \sqrt{\frac{2X34,400 \ kg.X \ Rs.720}{Rs.125 \ X \ 13.76\%}}$$

$$= \sqrt{\frac{2x34,400kg.X \ Rs.720}{Rs.17.2}} = 1,697 \ kg.$$

(ii) Re- Order level:

= (Maximum consumption per day × Maximum lead time)

$$= \left\{\left(\frac{Annual \ Consumption \ of \ 'Dee'}{364 \ Days} + 20kg.\right) X \ 8 \ days\right\}$$

$$= \left\{\left(\frac{36,400kg.}{364 \ Days} + 20kg.\right) X \ 8 \ days\right\} = 960kg.$$

(iii) Minimum consumption per day of raw material 'Dee':

Average Consumption per day   = 100kg.

Hence, Maximum Consumption per day   = 100 kg. + 20 kg. = 120 kg.

So, Minimum consumption per day will be

Average Consumption =   Min.consumption + Max.consumption / 2

Or, 100 kg. = Min.consumption 120kg. / 2

Or, Min. consumption = 200 kg − 120 kg. = 80 kg.

(a) Re-order Quantity:

EOQ − 200 kg. = 1,697 kg. − 200 kg. = 1,497 kg.

(b) Maximum Stock level:

= Re-order level + Re-order Quantity − (Min. consumption per day × Min. lead time)

= 960 kg. + 1,497 kg. − (80 kg. × 4 days)

= 2,457 kg. − 320 kg. = 2,137 kg.

(c) Minimum Stock level:

= Re-order level − (Average consumption per day × Average lead time)

= 960 kg. − (100 kg. × 6 days) = 360 kg.

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,497 kg.	1,697 kg.
II	No. of orders a year	34,400kg./1,497kg. = 22.9 or 23 orders	34,400 kg./1,697kg. = 20.27 or 21 orders
III	Ordering Cost	23 orders × Rs. 720 = Rs.16,560	21 orders × Rs. 720 = Rs.15,120
IV	Average Inventory	1,497kg./2 = 748.5kg.	1,697kg./2 = 848.5kg.
V	Carrying Cost	748.5 kg. × Rs. 17.2 = Rs.12,874.2	848.5 kg. × Rs. 17.2 = Rs.14,594.2
VI	Total Cost	Rs. 29,434.20	Rs. 29,714.20

Cost saved by not ordering EOQ = Rs. 29,714.20 - Rs. 29,434.20 = Rs. 280.

Question 3

A store keeper has prepared the below list of items kept in the store of the factory.

Item	Units	Unit cost (₹)
A	12,000	30.00
B	18,000	3.00
C	6,000	35.00
D	750	220.00
E	3,800	75.00
F	400	105.00
G	600	300.00
H	300	350.00
I	3,000	250.00
J	20,000	7.50
K	11,500	27.50
L	2,100	75.00

The store keeper requires your help to classify the items for prioritization. You are required to APPLY ABC analysis to classify the store items as follows:

Store items which constitutes approx. 70%, 20% and 10% of total value as A, B and C respectively. (MTP March '18, 10 Marks)

Answer 3

Statement of Total Cost and Ranking

Item	Units	% of Total units	Unit cost (₹)	Total cost (₹)	% of Total cost	Ranking
A	12,000	15.30%	30.00	3,60,000	12.97%	2
B	18,000	22.94%	3.00	54,000	1.95%	11
C	6,000	7.65%	35.00	2,10,000	7.57%	5
D	750	0.96%	220.00	1,65,000	5.95%	7
E	3,800	4.84%	75.00	2,85,000	10.27%	4
F	400	0.51%	105.00	42,000	1.51%	12
G	600	0.76%	300.00	1,80,000	6.49%	6
H	300	0.38%	350.00	1,05,000	3.78%	10
I	3,000	3.82%	250.00	7,50,000	27.03%	1
J	20,000	25.49%	7.50	1,50,000	5.41%	9
K	11,500	14.66%	27.50	3,16,250	11.40%	3
L	2,100	2.68%	75.00	1,57,500	5.68%	8
	78,450	100.00%		27,74,750	100.00%	

Statement of classification of Inventory

Ranking	Item	% of Total units	Cost (₹)	% of Total Cost	Category
1	I	3.82%	7,50,000	27.03%	
2	A	15.30%	3,60,000	12.97%	
3	K	14.66%	3,16,250	11.40%	
4	E	4.84%	2,85,000	10.27%	

5	C	7.65%	2,10,000	7.57%	
Total		**46.27%**	**19,21,250**	**69.24%**	**A**
6	G	0.76%	1,80,000	6.49%	
7	D	0.96%	1,65,000	5.95%	
8	L	2.68%	1,57,500	5.68%	
9	J	25.49%	1,50,000	5.41%	
Total		**29.89%**	**6,52,500**	**23.53%**	**B**
10	H	0.38%	1,05,000	3.78%	
11	B	22.94%	54,000	1.95%	
12	F	0.51%	42,000	1.51%	
Total		**23.84%**	**2,01,000**	**7.24**	**C**
	12	100%	27,74,750	100%	

Question 4

The annual demand for an item of raw material is 4,000 units and the purchase price is expected to be Rs. 90 per unit. The incremental cost of processing an order is Rs. 135 and the annual cost of storage is estimated to be Rs. 12 per unit. COMPUTE the optimal order quantity and total relevant cost of this order quantity? Suppose that Rs. 135 as estimated to be the incremental cost of processing an order is incorrect and should have been Rs. 80. All other estimates are correct. ESTIMATE the difference in cost on account of this error? Assume at the commencement of the period that a supplier offers 4,000 units at a price of Rs. 86. The materials will be delivered immediately and placed in the stores. Assume that the incremental cost of placing the order is zero and original estimate of Rs. 135 for placing an order for the economic batch is correct. ANALYSE, should the order be accepted? (MTP Aug '18, 10 Marks)

Answer 4

(i) Optimal order quantity i.e. E.O.Q. $= \frac{\sqrt{2 \times 4,000 \times 135}}{12} = \sqrt{90,000}$

= 300 units

Relevant Cost of this order quantity	Rs.
Ordering Cost $= \frac{4,000}{300}$ 13.33 say 14 orders at Rs.135	1,890
Carrying Cost $= \frac{1}{2} \times 300 \times 12$	1,800
Relevant cost	3,690

(ii) Revised EOQ $= \sqrt{\frac{2 \times 4,000 \times 80}{12}}$ = 231 units

Ordering Cost $= \frac{4,000}{231}$ = 17.32 say 18 orders at Rs. 80	1,440
Carrying Cost $= \frac{1}{2} \times 231 \times 12$	1,386

Different in cost on account of this error = 3,690 – 2,826 = Rs. 864

(iii) In case of discount in purchase price, the total cost of Purchase cost, ordering cost and carrying cost should be compared.

Original offer at Rs. 90 per unit		Supplier offered at Rs. 86 per unit	
	Rs.		Rs.

Purchase Cost	3,60,000	Purchase cost 4,000 × 86	3,44,000
Ordering cost	1,890	Ordering cost	Nil
Carrying cost	1,800	Carrying cost 1/2 ×4,000 × 12	24,000
Total cost	3,63,690		3,68,000

This special offer at Rs. 86 per unit should not be accepted as its total cost is higher by Rs. 4,310 (3,68,000 – 3,63,690).as compared to original offer.

Question 5

A Ltd. manufactures a product X which requires two raw materials A and B in a ratio of 1:4. The sales department has estimated a demand of 5,00,000 units for the product for the year. To produce one unit of finished product, 4 units of material A is required.

Stock position at the beginning of the year is as below:

Product- X	12,000 units
Material A	24,000 units
Material B	52,000 units

To place an order the company has to spend Rs.15,000. The company is financing its working capital using a bank cash credit @13% p.a.

Product X is sold at Rs.1,040 per unit. Material A and B are purchased at Rs.150 and Rs.200 respectively.

Required:

COMPUTE economic order quantity (EOQ):

(i) If purchase order for the both materials is placed separately.

(ii) If purchase order for the both materials is not placed separately. (MTP Oct. '19, 5 Marks)

Answer 5

Workings:

Annual production of Product X = Annual demand – Opening stock

= 5,00,000 – 12,000 = 4,88,000 units

Annual requirement for raw materials = Annual production × Material per unit – Opening stock of material

Material A = 4,88,000 × 4 units – 24,000 units = 19,28,000 units

Material B = 4,88,000 × 16 units – 52,000 units = 77,56,000 units

(i) Computation of EOQ when purchase order for the both materials is placed separately

$$EOQ = \sqrt{\frac{2 \times Annual\ Requirement\ for\ material \times Ordeing\ cost}{Carrying\ Cost\ per\ unit\ per\ annum}}$$

$$Material\ A = \sqrt{\frac{2 \times 19,28,000\ units \times Rs.15,000}{13\%\ of\ Rs.150}}$$

$$= \sqrt{\frac{38,56,000 \times Rs.15,000}{Rs.19.5}}$$

= 54,462 units

$$Material\ B = \sqrt{\frac{2 \times 77,56,000\ units \times Rs.15,000}{13\%\ of\ Rs.200}}$$

$$= \sqrt{\frac{1,55,12,000 \times Rs.15,000}{Rs.26}}$$

= 94,600 units

(ii) Computation of EOQ when purchase order for the both materials is not placed separately

$$\text{Material A \& B} = \sqrt{\frac{2 \times 19,28,000 units + 77,56,000)units \times Rs.15,000}{13\% \ of \ Rs.190*}}$$

$$= \sqrt{\frac{1,93,68,000 \times Rs.15,000}{Rs.24.7}}$$

$$= 1,08,452 \ units$$

$$\text{Material A} = \frac{1,08,452 \times 19,28,000}{96,84,000} = 21,592 \ units$$

$$\text{Material A} = \frac{1,08,452 \times 77,56,000}{96,84,000} = 86,860 \ Units$$

$$= \frac{*(Rs.150 \times 19,28,000)(Rs.200 \times 77,56,000)}{(19,28,000 \ 77,56,000)} = Rs.190$$

Question 6

Distinguish between Bill of Materials and Material Requisition Note. (MTP Oct. '19, Oct'20 5 Marks)

Answer 6

	Bills of Material	Material Requisition Note
1.	It is document or list of materials prepared by the engineering/ drawing department.	It is prepared by the foreman of the consuming department.
2.	It is a complete schedule of component parts and raw materials required for a particular job or work order.	It is a document authorizing Store-Keeper to issue material to the consuming department
3.	It often serves the purpose of a Store Requisition as it shows the complete schedule of materials required for a particular job i.e. it can replace stores requisition.	It cannot replace a bill of material.
4	It can be used for the purpose of quotation.	It is useful in arriving historical cost only.
5	It helps in keeping a quantitative control on materials drawn through Stores Requisition.	It shows the material actually drawn from stores.

Question 7

A company manufactures a product from a raw material, which is purchased at Rs.180 per kg. The company incurs a handling cost of Rs.1,460 plus freight of Rs.940 per order. The incremental carrying cost of inventory of raw material is Rs.2.5 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is Rs.18per kg per annum. The annual production of the product is 1,00,000 units and 2.5 units are obtained from one kg. of raw material.

Required:

(i) CALCULATE the economic order quantity of raw materials.

(ii) DETERMINE, how frequently company should order for procurement be placed.

(iii) If the company proposes to rationalize placement of orders on quarterly basis, DETERMINE the percentage of discount in the price of raw materials should be negotiated? Assume 360 days in a year. (MTP 10 Marks May 20, RTP May'23) (Same concept different figures MTP 5 Marks Oct'18)

Answer 7

(i) Calculation of Economic Order Quantity (E.O.Q)

Annual requirement (usage) of raw material in kg. (A) = 1,00,000units / 2.5 units per kg. = 40,000kg.

Ordering Cost (Handling & freight cost) (O) = Rs.1,460 + Rs.940 = Rs.2,400

Carrying cost per unit per annum (C) i.e. inventory carrying cost + working capital cost
= (Rs.2.5 × 12 months) + Rs.18 = Rs.48 per kg.

$$E.O.Q. = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 40,000kg. \times Rs.2,400}{Rs.48}} = 2,000 \text{ kg.}$$

(ii) Frequency of placing orders for procurement:

Annual consumption (A) = 40,000 kg.

Quantity per order (E.O.Q) = 2,000 kg.

No. of orders per annum$(\frac{A}{E.O.Q}) = \frac{40.000kg.}{2,000kg.}$ = 20 orders

Frequency of placing orders(in days) = $\frac{360 days}{20 orders}$ = 18 days

(iii) Percentage of discount in the price of raw materials to be negotiated:

Particulars	On Quarterly Basis	On E.O.Q Basis
1. Annual Usage (in Kg.)	40,000 kg.	40,000 kg.
2. Size of the order	10,000 kg.	2,000 kg.
3. No. of orders (1 ÷ 2)	4	20
4. Cost of placing orders or Ordering cost (No. of orders × Cost per order)	Rs.9,600 (4 order × Rs2,400)	Rs.48,000 (20 orders × Rs2,400)
5. Inventory carrying cost (Average inventory × Carrying cost per unit)	Rs.2,40,000 (10,000 kg. × ½ × Rs.48)	Rs.48,000 (2,000 kg. × ½ × Rs.48)
6. Total Cost (4 + 5)	Rs.2,49,600	Rs.96,000

When order is placed on quarterly basis the ordering cost and carrying cost increased by Rs.1,53,600 (Rs.2,49,600 - Rs.96,000).

So, discount required = Rs.1,53,600

Total annual purchase = 40,000 kg. × Rs.180 = Rs.72,00,000. So, Percentage of discount to be negotiated

Question 8

Joy Toy Limited deals in trading of 'superhero' toy figure. The annual demand for the toy car is 14,400 units. The company incurs fixed order placement and transportation cost of ₹212 each time an order is placed. Each toy costs ₹ 450 and the trader has a carrying cost of 25 percent p.a. The company has been offered a quantity discount of 8% on the purchase of 'superhero' toy figure provided the order size is 5,000 units at a time.

Required:

(i) COMPUTE the economic order quantity

(ii) STATE whether the quantity discount offer can be accepted. (MTP 5 Marks March '23 & Oct 20, Old & New SM)

Answer 8

i.Calculation of Economic Order Quantity (EOQ) = $\sqrt{\frac{2AO}{C}}$

$= \sqrt{\frac{2 \times 14,400 \ units \times Rs.212}{Rs.450 \times 25\%}}$ = 233 units

ii.Evaluation of Profitability of Different Options of Order Quantity

(A)	When EOQ is ordered	(₹)
Purchase Cost	(14,400 units x Rs. 450)	64,80,000
Ordering Cost	[(14,400 units/233 units) x Rs. 212]	13,102
Carrying Cost	(233 units x 1/2 x 450 x 25%)	13,106
Total Cost		65,06,208

(B) When Quantity Discount of 8% is accepted

		(₹)
Purchase Cost	(14,400 units x Rs. 414)	59,61,600
Ordering Cost	[(14,400 units/5,000 units) x Rs212]	611
Carrying Cost	(5,000 units x 1/2 x Rs.414 x 25%)	2,58,750
Total Cost		62,20,961

Advise – The total cost of inventory is lower if quantity discount is accepted. The company would save Rs. 2,85,247 (Rs. 65,06,208 - Rs. 62,20,961).

Note: Figures may change slightly because of approximation and decimals)

Question 9

A company manufactures 10,000 units of a product per month. The cost of placing an order is ₹200. The purchase price of the raw material is ₹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 5 Marks April 23 & March '21) (Same concept different figures PYP 5 Marks Nov'18)

Answer 9

(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 = 1/2 (Maximum level + Minimum level)

= ½ (8,091 kg. + 3,900 kg.) = 5,995.5 kg.

OR

= Minimum Level + ½ ROQ

= 3,900 kg. + ½ X 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) = ₹ 200

Carrying cost per kg. Per annum (c × i) = ₹ 20 × 20% = ₹4

Economic order quantity (EOQ) = $\sqrt{\frac{2AO}{C \times i}}$

= $\sqrt{\frac{2 \times 28,600\ kgs. \times Rs.200}{Rs.4}}$ = 1,691 kg. (Approx)

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this question, performance of the examinees was below average. Most of the examinees have made mistake by taking output instead of raw material consumed figure for calculation of re order quantity.

Question 10

EXPLAIN the advantages that would accrue in using the LIFO method of pricing for the valuation of raw material stock. (MTP 5 Marks, April'21)

Answer 10

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.

Question 11

The yearly production of a company's product which has a steady market is 40,000 units. Each unit of a product requires 1 kg. of raw material. The cost of placing one order for raw material is ₹ 1,000 and the inventory carrying cost is ₹ 20 per annum. The lead time for procurement of raw material is 36 days and a safety stock of 1,000 kg. of raw materials is maintained by the company. The company has been able to negotiate the following discount structure with the raw material supplier:

Order quantity (kg.)	Discount (₹)
Up to 6,000	NIL
6,001 – 8,000	4,000
8,001 – 16,000	20,000
16,001 – 30,000	32,000
30,001 – 45,000	4,0000

You are REQUIRED to:

(i) Calculate the re-order point considering 30 days in a month.

(ii) Prepare a statement showing the total cost of procurement and storage of raw material after considering the discount of the company elects to place one, two, four or five orders in the year.

(iii) State the number of orders which the company should place to minimize the costs after taking EOQ also into consideration. (MTP 10 Marks, Oct '21)

Answer 11

(a) Working notes

1. Annual production = 40,000 units

2. Raw material required for 40,000 units (40,000 units × 1 kg.) = 40,000 kg.

3. EOQ = $\sqrt{2 \times 40,000 kgs. \times Rs.\,1,000\, /Rs.\,20}$ = 2,000 kgs.

4. Total cost of procurement and storage when the order size is equal to EOQ or

2,000 kg. No. of orders (40,000 kg. ÷ 2,000 kg.) = 20 times

Ordering cost (20 orders × ₹1,000) = ₹ 20,000

Carrying cost (₹) (½ × 2,000 kg. × ₹ 20) = ₹ 20,000

Total cost ₹ 40,000

(i) Re-order point = Safety stock + Lead time consumption

= 1,000 kg. + 40,000kg.×36days

= 1,000 kg. + 4,000 kg.   = 5,000 kg.

(ii) statement showing the total cost of procurement and storage of raw materials
(after considering the discount)

Order size	No. of orders	Total cost of procurement	Average stock	Total cost of storage of raw materials	Discount	Total cost
Kg.		(₹)	Kg.	(₹)	(₹)	(₹)
(1)	(2)	(3)=(2)×₹1,000	(4)=½×(1)	(5)=(4)×₹20	(6)	(7)=[(3)+(5)– (6)]
40,000	1	1,000	20,000	4,00,000	40,000	3,61,000
20,000	2	2,000	10,000	2,00,000	32,000	1,70,000
10,000	4	4,000	5,000	1,00,000	20,000	84,000
8,000	5	5,000	4,000	80,000	4,000	81,000

(iii) Number of orders which the company should place to minimize the costs after taking EOQ also into consideration is 20 orders each of size 2,000 kg. The total cost of procurement and storage in this case comes to ₹ 40,000, which is minimum. (Refer to working notes 3 and 4)

Question 12

The annual demand for an item of raw material is 48,000 units and the purchase price is ₹ 80 per unit. The cost of processing an order is ₹ 1,350 and the annual cost of storage is ₹ 15 per unit.

(i) DETERMINE is the optimal order quantity and total relevant cost for the order?

(ii) If the cost of processing an order is ₹ 800 and all other data remain same, then DETERMINE the differential cost?

(iii) If the supplier offers bulk purchase of 48,000 units at a price of ₹ 72 and cost of placing the is Nil, SHOULD the order be accepted? (MTP 5 Marks Nov '21)

Answer 12

(i) Optimal order quantity i.e. E.O.Q.

= $\sqrt{\dfrac{2 \times 48,000 \times 1,350}{15}}$ = $\sqrt{86,40,000}$ = 2,939 units

Relevant Cost of this order quantity	₹
Ordering cost = 48,000 / 2,939 =16.33, say 17 orders at ₹1,350	22,950.00
Carrying Cost = 1/2 × 2,939 × 15	22,042.50
Relevant cost	**44,992.50**

(ii) **Revised EOQ** = $\sqrt{\dfrac{2 \times 48,000 \times 800}{15}}$ = 2,263 units

Relevant Cost of this order quantity	₹
Ordering cost =48,000 / 2,2,63 21.21, say 22 orders at ₹ 800	17,600.00
Carrying cost = 1/2 × 2,263 × 15	16,972.50
Relevant cost	**34,572.50**

Differential cost = 44,992.50 – 34,572.50 = ₹ **10,420**

(iii) In case of discount in purchase price, the total cost of Purchase cost, ordering cost and carrying cost should be compared.

Original offer at ₹ 80 per unit		Supplier offered at ₹ 72 per unit	
	₹		₹
Purchase Cost (48,000 × 80)	38,40,000.00	Purchase cost (48,000 × 72)	34,56,000.00
Ordering cost	22,950.00	Ordering cost	0.00
Carrying cost	22,042.50	Carrying cost ½ × 48, 000 × 15	3,60,000.00
Total cost	38,84,992.50		38,16,000.00

This special offer at ₹ 72 per unit should be accepted as it saves ₹ 68,992.50 as compared to original offer.

Question 13

M/s SE Traders is a distributor of an electronic items. A periodic inventory of electronic items on hand is taken when books are closed at the end of each quarter. The following information is available for the quarter ended on 30th September, 2021:

Sales	₹ 2,19,30,000
Opening Stock	12,500 units @ ₹ 600 per unit
Administrative Expenses	₹ 5,62,500
Purchases (including freight inward):	
- July 1, 2021	25,000 units @ ₹ 573 per unit
- September 30, 2021	12,500 units @ ₹ 630 per unit
Closing stock- September 30, 2021	16,000 units

You are required to COMPUTE the following by WAM (Weighted Average Method), FIFO method and LIFO method assuming issue/ consumption pattern was even throughout the quarter:

(i) Value of Inventory on 30th September, 2021.

(ii) Profit or loss for the quarter ended 30th September, 2021. (MTP 10 Marks April '22)

Answer 13

(i) Computation of Value of Inventory as on 30th September 2021:

Date	Particulars	Units	WAM (₹)	FIFO (₹)	LIFO (₹)
01-07-21	Opening Stock	12,500	75,00,000 (₹600×12,500)	75,00,000 (₹600×12,500)	75,00,000 (₹600×12,500)
01-07-21	Purchases	25,000	1,43,25,000 (₹573×25,000)	1,43,25,000 (₹573×25,000)	1,43,25,000 (₹573×25,000)
30-09-21	Purchases	12,500	78,75,000 (₹630×12,500)	78,75,000 (₹630×12,500)	78,75,000 (₹630×12,500)
01-07-21 to 30-09-21	Issues/ Consumption (Balancing figure)	34,000	2,01,96,000*	1,98,19,500**	2,01,94,500***
30-09-21	Closing Stock	16,000	95,04,000	98,80,500	95,05,500

Weighted average rate = $\frac{Rs.75,00,000 + Rs.1,43,25,000 + Rs.78,75,000}{(12,500 + 25,000 + 12,500)\,units}$ = Rs. 594

* ₹ 594 x 34,000 = ₹ 2,01,96,000

** ₹ 600 × 12,500 + ₹ 573 × 21,500 = ₹ 1,98,19,500

*** ₹ 630 × 12,500 + ₹ 573 × 21,500 = ₹ 2,01,94,500

(ii) Computation of Profit or Loss for the Quarter ended 30th September 2021

Particulars	WAM (₹)	FIFO (₹)	LIFO (₹)
Sales	2,19,30,000	2,19,30,000	2,19,30,000
Less: Consumption	2,01,96,000	1,98,19,500	2,01,94,500
Less: Administrative Exp.	5,62,500	5,62,500	5,62,500
Profit or Loss	11,71,500	15,48,000	11,73,000

Question 14

A company produces a product 'AB' by using two raw materials - 'Material Ae' and 'Material Be' in the ratio of 5:3.

A sales volume of 50,000 kgs is estimated for the month of December by the managers expecting the trend will continue for entire year. The ratio of input and output is 8:5.

Other Information about Raw Material Ae is as follows:

Purchase Price ₹ 150 per kg

Re-order period 2 to 3 days

Carrying Cost 12%

Note: Material Ae is perishable in nature and if not used within 3.5 days of purchase it becomes obsolete. To place an order for material 'Ae', the company has to incur an administrative cost of ₹ 375 per order. At present, material 'Ae' is purchased in a lot of 7,500 kgs. to avail the discount on purchase. Company works for 25 days in a month and production is carried out evenly.

You are required to CALCULATE:

(i) Economic Order Quantity (EOQ) for Material Ae;

(ii) Maximum stock level for Material Ae.   (MTP 5 Marks Sep'22)

Answer 14

(i) Monthly production of AB = 50,000 kgs

Raw material required = 50,000/5 x 8 = 80,000 kgs Material Ae and Material Be ratio = 5:3

Therefore, material Ae = 80,000/8 x 5 = 50,000 kgs

Calculation of EOQ $= \sqrt{\dfrac{2 \times (\text{Annual demand} \times \text{cost per order})}{\text{Annual holding cost per unit}}}$

$$EOQ = \sqrt{\dfrac{2 \times 50,000 \text{ kgs} \times 12 \times 375}{12\% \text{ of } ₹150}} = 5,000 \text{ kgs}$$

(ii) Calculation of maximum stock level of Material Ae which is perishable in nature and is required to be used within 3.5 days.

(a) Stock equals to 3.5 days consumption = 50,000 kgs/ 25 days x 3.5 days = 7,000 kgs

(b) Maximum stock level for Material Ae

Maximum stock = Reorder quantity + reorder level – (minimum consumption x minimum lead time)

Where, reorder quantity = 7,500 kgs

Reorder level = maximum consumption* x maximum lead time

= 50,000/ 25 x 3 days = 6,000 kgs

Now, Maximum stock level = 7,500 kgs + 6,000 kgs – (50,000 /25 days x 2 days) = 9,500 kgs

Stock required for 3.5 days consumption is lower than the maximum stock level calculated above. Therefore, maximum stock level will be 7,000 kgs.

(*since production is processed evenly throughout the month hence material consumption will also be even.)

Question 15

BRIEF the treatment of following while calculating purchase cost of material: Trade Discount, Cash Discount, Penalty, Insurance charges, Commission paid. (MTP 5 Marks Sep'22)

Answer 15

Trade Discount	Trade discount is deducted from the purchase price if it is not shown as deduction in the invoice.
Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.
Penalty	Penalty of any type is not included with the cost of purchase
Insurance charges	Insurance charges are paid for protecting goods during transit. It is added with the cost of purchase.
Commission paid	Commission or brokerage paid is added with the cost of purchase.

Question 16

The following are the details of receipts and issues of a material of stores in a manufacturing company for the period of three months ending 30th June, 2022:

Receipts:

Date	Quantity (kg.)	Rate per kg. (₹)
April 10	1,600	50.00
April 20	2,400	49.00
May 5	1,000	51.00
May 17	1,100	52.00
May 25	800	52.50
June 11	900	54.00
June 24	1,400	55.00

There was 1,500 kg. in stock at April 1, 2022 which was valued at ₹ 48.00 per kg.

Issues:

Date	Quantity (kg.)

April 4	1,100
April 24	1,600
May 10	1,500
May 26	1,700
June 15	1,500
June 21	1,200

Issues are to be priced on the basis of weighted average method.

The stock verifier of the company reported a shortage of 80 kgs. on 31st May, 2022 and 60 kgs. on 30th June, 2022.

You are required to PREPARE a Stores Ledger Account. (MTP 10 Marks Oct'22)

Answer 16

Stores Ledger Account for the three months ending 30th June, 2022 (Weighted Average Method)

Date	GRN No.	Receipts Qty. (Kg.)	Rates (Rs.)	Amounts	MR No.	Issues Qty. (Kg.)	Rates (Rs.)	Amount (Rs.)	Balance Qty. (Kg.)	Amount (Rs.)	Rate for further Issue (Rs.)
April 1									1,500	72,000	48.00
April 4						1,100	48.00	52,800	400	19,200	48.00
April 10		1,600	50.00	80,000					2,000	99,200	$\frac{99,200}{2,000} = 49.60$
April 20		2,400	49.00	1,17,600					4,400	216,800	$\frac{2,16,800}{4,400} = 49.30$
April 24						1,600	49.30	78,880	2,800	137,920	$\frac{1,37,920}{2,800} = 49.30$
May 5		1,000	51.00	51,000					3,800	188,920	$\frac{1,88,920}{3,800} = 49.70$
May 10						1,500	49.70	74,550	2,300	114,370	$\frac{1,14,370}{2,300} = 49.70$
May 17		1,100	52.00	57,200					3,400	171,570	$\frac{1,71,570}{3,400} = 50.50$
May 25		800	52.50	42,000					4,200	213,570	$\frac{2,13,570}{4,200} = 50.90$
May 26						1,700	50.90	86,530	2,500	127,040	$\frac{1,27,040}{2,500} = 50.90$
May 31					Shortage	80			2,420	127,040	$\frac{1,27,040}{2,420} = 52.50$
June 11		900	54.00	48,600					3,320	175,640	$\frac{1,75,640}{3,320} = 49.60$
June 15						1,500	52.90	79,350	1,820	96,290	$\frac{99,200}{2,000} = 52.90$
June 21						1,200	52.90	63,480	620	32,810	$\frac{32,810}{620} = 52.90$
June 24		1,400	55.00	77,000					2,020	109,810	$\frac{1,09,810}{2,020} = 54.40$
June 30					Shortage	60			1,960	109,810	$\frac{1,09,810}{1,960} = 56.00$

Question 17

P Limited produces product 'P'. It uses annually 60,000 units of a material 'Rex' costing ` 10 per unit. Other relevant information are:

Cost of placing an order	:	` 800 per order
Carrying cost	:	15% per annum of average inventory
Re-order period	:	10 days
Safety stock	:	600 units

The company operates 300 days in a year.

You are required to calculate:

(i) **Economic Order Quantity for material 'Rex'.**

(ii) **Re-order Level.**

(iii) **Maximum Stock Level.**

(iv) **Average Stock Level. (MTP 5 Marks , Oct '23)**

Answer 17

I. Economic Order Quantity (E.O.Q)

$$= \sqrt{\frac{2X \text{ Annual requiremnet of Rex}'X \text{ Ordering cost per order}}{\text{Annual Carrying cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 60,000 \ units \times Rs.800}{Rs.10 \times 15\%}} = \sqrt{\frac{9,60,00,000}{Rs.1.5}} = 8,000 \text{ Units}$$

II. Re-order Level = Safety Stock + (Normal daily Usage × Re-order period)

$$= 600 + \left(\frac{60,000 \ units}{300 \ days} X \ 10 \ Days\right)$$

= 600 + 2,000

= 2,600 units

III. Maximum Stock Level = E.O.Q (Re-order Quantity) + Safety Stock

= 8,000 units + 600 units

= 8,600 units

IV. Average Stock Level $= \text{Minimum Stock level} + \frac{1}{2} \text{ Re} - \text{order Quantity}$

$= 600^* + \frac{1}{2} 8,000 \text{ units}$

= 4,600 units

OR

Average Stock Level $= \frac{Maximum \ Stock \ level + Minimum \ Stock \ Level}{2}$

$= \frac{8,600 \ units + 600 \ units}{2}$ = 4,600 units

* Minimum Stock Level = Re- Order Level - (Normal daily usage × Re-order period)

$= 2,600 - \left(\frac{60,000 \ units}{300 \ days} X \ 10 \ Days\right)$

= 2,600 − 2,000

= 600 units

OR

Minimum Stock Level = Safety Stock level = 600 units

Question 18

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

Date	Particulars	Units	Rate per unit (₹)
15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order- 008)	10,000	-
05-01-20	MRN**-003 (against the Purchase Order- 008)	500	-

06-01-20	Material Requisition-011	3,000	-
07-01-20	Purchase Order- 010	10,000	9,750
10-01-20	Material Requisition-012	4,500	-
12-01-20	GRN-009 (against the Purchase Order- 009)	10,000	-
12-01-20	MRN-004 (against the Purchase Order- 009)	400	-
15-01-20	Material Requisition-013	2,200	-
24-01-20	Material Requisition-014	1,500	-
25-01-20	GRN-010 (against the Purchase Order- 010)	10,000	-
28-01-20	Material Requisition-015	4,000	-
31-01-20	Material Requisition-016	3,200	-

*GRN- Goods Received Note; **MRN- Material Returned Note Based on the above data, you are required to CALCULATE:

(i) **Re-order level**

(ii) **Maximum stock level**

(iii) **Minimum stock level**

(iv) **PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01- 2020.**

(v) **Value of components used during the month of January, 2020.**

(vi) **Inventory turnover ratio. (RTP May'20)**

Answer 18

Workings:

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-20) Minimum component usage = 1,500 units (Material requisition on 24-01-20)

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

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

Minimum lead time = 14 days (30-12-2019 to 12-01-2020)

Calculations:

(i) **Re-order level**

= Maximum usage × Maximum lead time

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

(ii) **Maximum stock level**

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

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

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

(iii) **Minimum stock level**

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

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

= 94,500 units – 52,500 units

= 42,000 units

(iv) **Store Ledger for the month of January 2020:**

Date	Receipts	Issue	Balance

	GRN/ MRN	Units	Rate ₹	Amt. (₹ '000)	MRN/ MR	Units	Rate ₹	Amt. (₹ '000)	Units	Rate ₹	Amt. (₹ '000)
01-01-20	-	-	-	-	-	-	-	-	3,500	9,810	34,335
05-01-20	008	10,000	9,930	99,300	003	500	9,930	4,965	13,000	9,898	1,28,670
06-01-20	-	-	-	-	011	3,000	9,898	29,694	10,000	9,898	98,980
10-01-20	-	-	-	-	012	4,500	9,898	44,541	5,500	9,898	54,439
12-01-20	009	10,000	9,780	97,800	004	400	9,780	3,912	15,100	9,823	1,48,327
15-01-20	-	-	-	-	013	2,200	9,823	21,611	12,900	9,823	1,26,716
24-01-20	-	-	-	-	014	1,500	9,823	14,734	11,400	9,823	1,11,982
25-01-20	010	10,000	9,750	97,500	-	-	-	-	21,400	9,789	2,09,482
28-01-20	-	-	-	-	015	4,000	9,789	39,156	17,400	9,789	1,70,326
31-01-20	-	-	-	-	016	3,200	9,789	31,325	14,200	9,789	1,39,001

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

Value of stock as on 31-01-2020 ('000) = ₹ 1,39,001

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

Sum of material requisitions 011 to 016 ('000)

= ₹ 29,694 + ₹ 44,541 + ₹ 21,611 + ₹ 14,734 + ₹ 39,156 + ₹ 31,325 = ₹ 1,81,061

(vi) Inventory Turnover Ratio

$$= \frac{Value\ of\ materials\ used}{Average\ stock\ value}$$

$$= \frac{Rs.1,81,061}{(1,3,001+34,335)/2} = \frac{Rs.1,81,061}{Rs.86,668} = 2.09$$

Question 19

HBL Limited produces product 'M' which has a quarterly demand of 20,000 units. Each product requires 3 kg. and 4 kg. of material X and Y respectively. Material X is supplied by a local supplier and can be procured at factory stores at any time, hence, no need to keep inventory for material X. The material Y is not locally available, it requires to be purchased from other states in a specially designed truck container with a capacity of 10 tons. The cost and other information related with the materials are as follows: (RTP Nov'19)

Particulars	Material –X	Material-Y
Purchase price per kg. (excluding GST)	₹ 140	₹ 640
Rate of GST	18%	18%
Freight per trip (fixed, irrespective of quantity)	-	'28,000
Loss of materials in transit*	-	2%
Loss in process*	4%	5%
*On purchased quantity		
Other information:		
- The company has to pay 15% p.a. to bank for cash credit facility.		
- Input credit is available on GST paid on materials.		
Required:		
(i) CALCULATE cost per kg. of material X and Y		
(ii) CALCULATE the Economic Order quantity for both the materials.		

Answer 19

Working Notes:(a) Annual purchase quantity for material X and Y:			
Annual demand for product M- 20,000 units × 4 = 80,000 units			
Particulars		Mat-X	Mat-Y
Quantity required for per unit of product M		3 kg.	4 kg.

Net quantity for materials required	2,40,000 kg.	3,20,000 kg.
Add: Loss in transit	-	6,881 kg.
Add: Loss in process	10,000 kg.	17,204 kg
Purchase quantity	2,50,000 kg.	3,44,085 kg

Note - Input credit on GST paid is available; hence, it will not be included in cost of material.

(i) Calculation of cost per kg. of material X and Y:		
Particulars	**Mat-X**	**Mat-Y**
Purchase quantity	2,50,000 kg.	3,44,085 kg.
Rate per kg.	'140	'640
Purchase price	'3,50,00,000	'22,02,14,400
Add: Freight	0	'9,80,000*
Total cost	'3,50,00,000	'22,11,94,400
Net Quantity	2,40,000 kg.	3,20,000 kg
Cost per kg.	'145.83	'691.23

*No. of trucks = $\frac{3,44,085 kg}{10 ton \times 1,000}$ = 34.40 trucks or 35 trucks

Therefore, total freight = 35 trucks × '28,000 = '9,80,000

(ii) **Calculation of Economic Order Quantity (EOQ) for Mat.-X and Y:**

EOQ = $\sqrt{\dfrac{2 \times Annual\ Requirement\ Order\ cost}{Carrying\ cost\ per\ unit\ p.a}}$

Particulars	Mat-X	Mat-Y
Annual Requirement	2,50,000 kg.	3,44,085 kg.
Ordering cost	0	'28,000
Cost per unit	'145.83	'691.23
Carrying cost	15%	15%
Carrying cost per unit p.a.	0*	'103.68
EOQ	0	13,632.62 kg.

Question 20

Rounak Ltd. is the manufacturer of monitors for PCs. A monitor requires 4 units of Part-M. The following are the details of its operation during 20X8:

Average monthly market demand	2,000 Monitors
Ordering cost	₹ 1,000 per order
Inventory carrying cost	20% per annum
Cost of Pat	₹ 350 per part
Normal usage	425 parts per week
Minimum usage	140 parts per week
Maximum usage	710 parts per week
Lead time to supply	3-5 weeks

COMPUTE from the above:

(i) Economic Order Quantity (EOQ). If the supplier is willing to supply quarterly 30,000 units of Part- M at a discount of 5%, is it worth accepting?

(ii) **Reorder level**

(iii) **Maximum level of stock**

(iv) **Minimum level of stock. (RTP Nov'18)**

Answer 20

A = Annual usage of parts = Monthly demand for monitors × 4 parts × 12 months

= 2,000 monitors × 4 parts × 12 months = 96,000 units O = Ordering cost per order = ₹ 1,000/- per order

C1 = Cost per part = ₹ 350/-

iC1 = Inventory carrying cost per unit per annum

= 20% × ₹ 350 = ₹ 70/- per unit, per annum Economic order quantity (EOQ):

$$E.O.Q = \sqrt{\frac{2AO}{iC1}} = \sqrt{\frac{2 \times 96,000 \ units \times 1,000}{"70}}$$

= 1,656 parts (approx.)

The supplier is willing to supply 30,000 units at a discount of 5%, therefore cost of each part shall be ₹ 350 − 5% of 350 = ₹ 332.5

Total cost (when order size is 30,000 units):

= Cost of 96,000 units + Ordering cost + Carrying cost.

= (96,000 units × ₹ 332.50) + (96,000 units / 30,000 units × '1,000) + 1/2 (30,000 units × 20% × ₹ 332.50)

= ₹3,19,20,000 + ₹3,200* + ₹9,97,500 = ₹3,29,20,700

Total cost (when order size is 1,656 units):

= (96,000 units × ₹350) + + (96,000 units / 1,656 units × '1,000) + 1/2 (1,656 units × 20% × ₹ 350)

= ₹ 3,36,00,000 + ₹ 57,970* + ₹ 57,960 = ₹ 3,37,15,930

Since, the total cost under the supply of 30,000 units with 5% discount is lower than that when order size is 1,656 units, therefore the offer should be accepted.

Note: While accepting this offer consideration of capital blocked on order size of 30,000 units has been ignored.

*Order size can also be taken in absolute figure.

(1) Reorder level

= Maximum consumption × Maximum re-order period

= 710 units × 5 weeks = 3,550 units

(2) Maximum level of stock

= Re-order level + Reorder quantity − (Min. usage × Min. reorder period)

= 3,550 units + 1,656 units − (140 units × 3 weeks) = 4,786 units.

(3) Minimum level of stock

= Re-order level − Normal usage × Average reorder period

= 3,550 units − (425 units × 4 weeks) = 1,850 units.

Question 21

Aditya Brothers supplies surgical gloves to nursing homes and polyclinics in the city. These surgical gloves are sold in pack of 10 pairs at price of ₹ 250 per pack.

For the month of April 2018, it has been anticipated that a demand for 60,000 packs of surgical gloves will arise. Aditya Brothers purchases these gloves from the manufacturer at ₹ 228 per pack within a 4 to 6 days lead time. The ordering and related cost is ₹ 240 per order. The storage cost is 10% p.a. of average inventory investment.

Required:

(i) **CALCULATE the Economic Order Quantity (EOQ)**

(ii)   **CALCULATE the number of orders needed every year**

(iii)   **CALCULATE the total cost of ordering and storage of the surgical gloves.**

(iv)   **DETERMINE when should the next order to be placed. (Assuming that the company does maintain a safety stock and that the present inventory level is 10,033 packs with a year of 360 working days). (RTP May 18)**

Answer 21

(i)   **Calculation of Economic Order Quantity:**

$$EOQ = \sqrt{\frac{2XAXO}{Ci}} = \sqrt{\frac{2 \, X \, (60,000 \, packs \times 12 \, months) \times ₹240}{₹228 \times 10\%}}$$

= 3,893.3 packs or 3,893 packs.

(ii)   **Number of orders per year**

Annual requirements

$$\frac{Annual \, requirements}{E.O.Q.} = \frac{7,20,000 \, packs}{3,893 \, packs} = 184.9 \, or \, 185 \, orders \, a \, year$$

(iii)   **Ordering and storage costs**

	(₹)
Ordering costs :– 185 orders x ₹ 240	44,400.00
Storage cost :– ½ (3,893 packs x 10% of ₹228)	44,380.20
Total cost of ordering & storage	88,780.20

(iv)   Timing of next order

(a)   **Day's requirement served by each order.**

Number of day requirements = $\frac{No.of \, working \, days}{No.of \, order \, in \, a \, year} = \frac{360 \, days}{185 \, orders}$ = 1.94 days supply.

This implies that each order of 3,893 packs supplies for requirements of 1.94 days only.

(b)   **Days requirement covered by inventory**

= $\frac{Units \, in \, inventory}{Economic \, order \, quantity}$x   (Day's requirement served by an order)

∴ $\frac{10,033 \, packs}{3,893 \, packs}$x 1.94 days = 5 days requirement

(c)   **Time interval for placing next order**

Inventory left for day's requirement – Average lead time of delivery

5 days – 5 days = 0 days

This means that next order for the replenishment of supplies has to be placed immediately.

Question 22

A company uses four raw materials A, B, C and D for a particular product for which the following data apply :–

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (₹)	Delivery period (in weeks)			Re-order level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?
B	8	8,000	22	5	6	7	70,000	?
C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 units of the said product. What would be the following quantities:–

    (i)   **Minimum Stock of A?**

    (ii)   **Maximum Stock of B?**

    (iii) **Re-order level of C?**

    (iv) **Average stock level of A?**

    (v)   **Re-order level of D?**

    (vi) **Minimum Stock level of D? (RTP Nov '20) (Same concept different figures MTP 5 Marks, April '21, Old & New SM)**

Answer 22

    (i) Minimum stock of A

    Re-order level – (Average consumption × Average time required to obtain delivery)

    = 60,000 kg. – (900units × 12 kg. × 3 weeks) = 27,600 kg.

    (ii) Maximum stock of B

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

    = 70,000 kg.+ 8,000 kg– (550units ×8 kg.× 5 weeks).

    =78,000–22,000 = 56,000 kg.

    (iii) Re-order level of C

    Maximum re-order period × Maximum Usage

    =   7 weeks × (1,250units × 6 kg.) = 52,500 kg.

OR

    =   Minimum stock of C+(Average consumption × Average delivery time)

    =   25,500 kg.+ [(900 units ×6 kg.)×5 weeks] =52,500 kg.

    (iv) Average stock level of A

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

$$= \frac{27,600 + 58,800}{2} = 43,200 \text{ kg.}$$

    Working note

    Maximum stock of A = ROL + ROQ – (Minimum consumption × Minimum re-order period)

    = 60,000 kg. + 12,000 kg. – [(550units × 12 kg.) × 2 weeks] = 58,800 kg.

    (v) Re-order level of D

    Maximum re-order period × Maximum Usage

    = 3 weeks × (1,250 units × 5 kg.) = 18,750 kg

    (vi) Minimum stock of D

    Re-order level – (Average consumption × Average time required to obtain delivery)

    = 18,750 kg. – (900units × 5 kg. × 2 weeks) = 9,750 kg.

Question 23

The following data are available in respect of material X for the year ended 31st March, 2021:

	(Rs.)
Opening stock	9,00,000
Purchases during the year	1,70,00,000

Closing stock	11,00,000

(i) CALCULATE:

(a) Inventory turnover ratio, and

(b) The number of days for which the average inventory is held.

(ii) INTERPRET the ratio calculated as above if the industry inventory turnover rate is 10. (RTP Nov '21, Old & New SM)

Answer 23

(i)

(a) Inventory turnover ratio (Refer to working note)

$$= \frac{Cost\ of\ Stock\ of\ raw\ material\ Consumed}{Average\ stock\ of\ raw\ material}$$

$$= \frac{Rs.1,68,00,000}{Rs.10,00,.000} = 16.8$$

(b) Average number of days for which the average inventory is held

$$= \frac{365}{Inventory\ turnover\ ratio} = \frac{365\ days}{16.8} = 21.73\ days$$

Working Note:

Particulars	(₹)
Opening stock of raw material	9,00,000
Add: Material purchases during the year	1,70,00,000
Less: Closing stock of raw material	11,00,000
	1,68,00,000

(ii) The Inventory turnover ratio for material X is 16.8 which mean an inventory item takes only 21.73 or 22 days to issue from stores for production process. The rate is better than the industry rate which is 10 time or 36.5 days. This inventory turnover ratio indicates better inventory management system and good demand for the final product in market.

Question 24

Sky & Co., an unregistered supplier under GST, purchased material from Vye Ltd. which is registered under GST. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot	**₹ 2,50,000**
Trade discount	**@ 10% on listed price**
CGST and SGST (Credit Not available)	**12% (6% CGST + 6% SGST) Cash discount @ 10%**
(Will be given only if payment is made within 30 days.)	
Toll Tax paid	**₹ 5,000**
Freight and Insurance	**₹ 17,000**
Demurrage paid to transporter	**₹ 5,000**
Commission and brokerage on purchases	**₹ 10,000 Amount deposited for returnable**
containers	**₹ 30,000 Amount of refund on returning**
the container	**₹ 20,000**
Other Expenses	**@ 2% of total cost**

20% of material shortage is due to normal reasons.

The payment to the supplier was made within 21 days of the purchases. You are required to

CALCULATE cost per unit of material purchased by Sky & Co. (RTP May '22, Old & New SM) (Same concept different figures MTP 5 Marks March '22 & Sep '23)

Answer 24

Calculation of cost per unit:

Particulars	Units	(₹)
Listed Price of Materials	5,000	2,50,000
Less: Trade discount @ 10% on invoice price		(25,000)
		2,25,000
Add: CGST @ 6% of ₹ 2,25,000		13,500
Add: SGST @ 6% of ₹ 2,25,000		13,500
		2,52,000
Add: Toll Tax		5,000
Freight and Insurance		17,000
Commission and Brokerage Paid		10,000
Add: Cost of returnable containers: Amount deposited ₹ 30,000 *Less:* Amount refunded ₹ 20,000		10,000
		2,94,000
Add: Other Expenses @ 2% of Total Cost ₹ $\left(\frac{2,94,000}{98} X2\right)$		6,000
Total cost of material		3,00,000
Less: Shortage material due to normal reasons @ 20%	1,000	-
Total cost of material of good units	4,000	3,00,000
Cost per unit (₹ 3,00,000/4,000 units)		75

Note:

1. GST is payable on net price i.e., listed price less discount.

2. Cash discount is treated as interest and finance charges; hence it is ignored.

3. Demurrage is penalty imposed by the transporter for delay in uploading or off -loading of materials. It is an abnormal cost and not included.

4. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

Question 25

M/s Tanishka Materials Private Limited produces a product which names "ESS". The consumption of raw material for the production of "ESS" is 210 Kgs to 350 Kgs per week. Other information is as follows:

Procurement Time:	**5 to 9 Days**
Purchase price of Raw Materials:	**₹ 100 per kg**
Ordering Cost per Order:	**₹ 200**
Storage Cost:	**1% per month plus ₹ 2 per unit per annum Consider**

365 days a year.

You are required to CALCULATE:

(a) **Economic Order Quantity**

(b) **Re-Order Level (ROL)**

(c) **Maximum Stock Level**

(d) **Minimum Stock Level**

(e) **Average Stock Level**

(f) **Number of Orders to be placed per year**

(g) **Total Inventory Cost**

(h) **If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders, whether offer is acceptable?**

(i) **If the Answer is no, what should be the counteroffer w.r.t. percentage of discount? (RTP Nov'22)**

Answer 25

As procurement time is given in days, consumption should also be calculated in days:

Maximum Consumption per Day: $\frac{350}{7} = 50\ kgs$

Minimum Consumption per Day $\frac{210}{7} = 30\ kgs$

Average Consumption per Day $\frac{(50+30)}{2} = 40\ kgs$

(a) **Calculation of Economic Order Quantity (EOQ)**

Annual consumption of Raw Materials (A): 40 Kgs x 365 days = 14,600 Kgs Storage or Carrying Cost per unit

per annum (C):(₹ 100 x 1% x 12 months) + ₹ 2 = ₹ 14
Ordering Cost (O): ₹ 200 per Order

EOQ $\sqrt{\frac{2 \times A \times 0}{c}}$

$\sqrt{\frac{2 \times 14,600 \times 200}{14}}$ = 646 Kgs.

(b) **Re-Order Level (ROL)** = (Maximum consumption Rate × Maximum Procurement Time)

$\qquad$ = $\qquad$ 50 kgs per day × 9 days

$\qquad$ = $\qquad$ 450 kgs

(c) **Maximum Stock Level** = Recorder Level + Recorder Quantity – (Minimum

$\qquad$ Consumption Rate × Minimum Procurement Time)

$\qquad$ = $\qquad$ 450 kgs + 646 kgs - (30 kgs X 5 days) = $\qquad$ 946 kgs

(d) **Minimum Stock Level** = Recorder Level – (Average consumption Rate ×

$\qquad$ Average Procurement Time)

$\qquad$ = $\qquad$ 450 kgs – (40 kgs X 7 days) = $\qquad$ 170 kgs

(e) **Average Stock Level** = $\frac{\text{Maximum Stock Level + Minimum Stock Level}}{2}$

$= \frac{946\ \text{kgs} + 170\ \text{kgs}}{2}$ = 558 kgs

(f) **Number of Orders to be placed per year**

$= \frac{\text{Annual Consumption of Raw Materials}}{EOQ}$

$= \frac{14600 kgs}{646 kgs}$ = 22.60 Orders or 23 Orders

(g) **Total Inventory Cost**

Cost of Materials (A x Purchase Price) (14600 kgs x ₹ 100) = ₹ 14,60,000

Total Ordering Cost (No. of Orders x O) (23 Orders x 200) =₹ 4,600

Total Carrying Cost (EOQ / 2 x C) (646 kgs / 2 x ₹ 14)=₹4,522

Total Inventory Cost =₹ 14,69,122

(h) **If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders:**

Offer Price	= ₹ 100 x 99%	= ₹ 99
Revised Carrying Cost = (₹ 99 x 1% x 12 months) + ₹2		= ₹ 13.88
Revised Order Quantity = 14600 kgs / 2 Orders		= 7300 kgs
Total Inventory Cost at Offer Price		
Cost of Materials (A x Purchase Price) (14600 kgs x ₹ 99)		= ₹ 14,45,400
Total Ordering Cost (No. of Orders x O) (2 Orders x 200)		= ₹ 400
Total Carrying Cost (EOQ / 2 x C) (7300 kgs / 2 x ₹13.88)		= ₹ 50,662
Total Inventory Cost		₹ 14,96,462

Advice: As total inventory cost at offer price is ₹ 27,340 (14,96,462 – 14,69,122) higher, offer should not be accepted.

(i) Counter-offer:

Let Discount Rate   = z%

Counter-Offer Price   = ₹ 100 – z% = ₹ 100 – z

Revised Carrying Cost = [(₹ 100 – z) x 1% x 12 months] + ₹ 2 = ₹ 12 -0.12z + ₹ 2 = ₹ 14 – 0.12z

Total Inventory Cost at Counter-Offer Price

Cost of Materials (A x Purchase Price) [14600 kgs x (₹ 100 – z)] = ₹ 14,60,000 – 14,600z

Total Ordering Cost (No. of Orders x O) (2 Orders x 200) = ₹ 400

Total Carrying Cost (EOQ / 2 x C) [7300 kgs / 2 x (₹ 14 – 0.12z)] = ₹ 51,100 – 438z Total Inventory Cost

₹ 15,11,500 – 15038z

₹ 14,69,122   = ₹ 15,11,500 – 15038z Or 15038z = 42,378

Or
z   = 2.82

Therefore, discount should be at least 2.82% in offer price.

Question 26

Following details are related to a manufacturing concern:

Re-order Level	1,60,000 units
Economic Order Quality	90,000
Minimum Stock Level	1,00,000 units
Maximum Stock Level	1,90,000 units
Average Lead Time	6 days
Difference between minimum lead time and Maximum lead time	4 days

Calculate:

(i)   Maximum consumption per day

(ii)   Minimum consumption per day (Nov '23)

Answer 26

Difference between Minimum lead time Maximum lead time

= 4 days Max. lead time – Min. lead time = 4 days

Or, Max. lead time = Min. lead time + 4 days……………………………. (i)

Average lead time is given as 6 days i.e.

$\frac{Max.lead time + Min.lead\ time}{2}$ = 6 Days ………………………………………(ii)

Putting the value of (i) in (ii),

$\frac{Min.lead\ time + 4\ Days + Min.lead\ Time}{2}$ = 6 Days

Or, Min. lead time + 4 days + Min. lead time = 12 days

Or, 2 Min. lead time = 8 days

Or, Minimum lead time = $\frac{8\ days}{2}$ = 4 Days

Putting this Minimum lead time value in (i), we get

Maximum lead time = 4 days + 4 days = 8 days

(i) Maximum consumption per day:

Re-order level = Max. Re-order period × Maximum Consumption per day 1,60,000 units

= 8 days × Maximum Consumption per day

Or, Maximum Consumption per day = $\frac{1,60,000\ units}{8\ days}$ = 20,000 units

(ii) Minimum Consumption per day:

Maximum Stock Level =

Re-order level + Re-order Quantity – (Min. lead time × Min. Consumption per day) Or,

1,90,000 units = 1,60,000 units + 90,000 units – (4 days × Min. Consumption per day) Or, 4

days × Min. Consumption per day = 2,50,000 units – 1,90,000 units

Or, Minimum Consumption per day = $\frac{60,000\ units}{4\ days}$ = 15,000 units

Question 27

Define Inventory Control and give its objectives.

List down the basis to be adopted for Inventory Control. (PYP Nov'19, 5 Marks)

Answer 27

Inventory Control: The Chartered Institute of Management Accountants (CIMA) defines Inventory

Control as "The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks."

The objective of inventory control is to make a balance between sufficient stock and over - stock. The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. A trade-off between Stock-out and Over-stocking is required. The management may employ various methods of Inventory control to have a balance. Management may adopt the following basis for Inventory control:
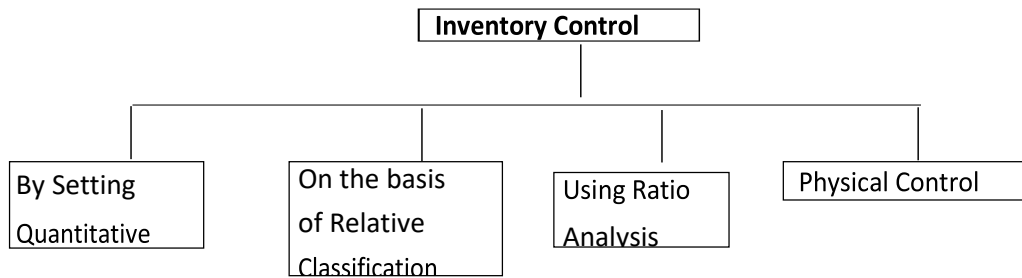
```
                    Inventory Control

       ┌──────────────┬──────────────┬──────────────┐
  By Setting      On the basis    Using Ratio    Physical Control
  Quantitative    of Relative     Analysis
                  Classification
```

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical question relating to the topic 'Material cost' to calculate EOQ and Total Inventory cost. Performance of the examinees was good.

Question 28

Surekha Limited Produces 4000 Litres of paints on a quarterly basis. Each Litre requires 2 kg of raw material. The cost of placing one order for raw material isRs. 40 and the purchasing price of raw material is Rs. 50 per kg. The storage cost and interest cost is 2% and 6% per annum respectively. The lead time for procurement of raw material is 15 days. Calculate Economic Order Quantity and Total Annual Inventory Cost in respect of the above raw material. (PYP Nov'19,5 Marks)

Answer 28

Working:

Calculation of Annual demand of raw material

=4,000 Litres (per quarter) x 4 (No. of Quarter in a year) x 2 kg. (raw material required for each Litre of paint) **=** 32,000 kg.

Calculation of Carrying cost

Storage rate	=	2%
Interest Rate	=	6%
Total	=	8% per annum

Carrying cost per unit per annum = 8% of Rs.50 = **Rs.** 4 per unit per annum

$$\sqrt{\frac{2 \times Annual\ demand(A) \times Ordering\ Cost\ per\ order(O)}{Carrying\ Cost\ per\ unit\ per\ annum(C)}}$$

(i) EOQ = $\sqrt{\frac{2 \times 32,000kg. \times '40}{'4}}$ = 800 Kg

(ii) Total Annual Inventory Cost

Purchasing cost of 32,000kg @ Rs.50 per kg	=	**Rs.** 16,00,000
Ordering Cost $\left(\frac{32,000kg}{800kg} \times Rs.40\right)$	=	Rs.1,600
Carrying Cost of Inventory($\frac{15\ days}{30\ days} \times 800\ kg \times Rs.40$	=	Rs. 1,600
		Rs. 16,03,200

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a theoretical question based on Inventory Control. Below Average performance was observed by the examinees.

Question 29

The following are the details of receipt and issue of material 'CXE' in a manufacturing Co. during the month of April 2019:

Date	Particulars	Quantity (kg)	Rate per kg
April 4	Purchase	3,000	₹ 16
April8	Issue	1,000	
April15	Purchase	1,500	₹ 18
April 20	Issue	1,200	
April 25	Return to supplier out of purchase made on April 15	300	
April 26	Issue	1,000	
April 28	Purchase	500	₹ 17

Opening stock as on 01-04-2019 is 1,000 kg @Rs. 15 per kg.

On 30th April, 2019 it was found that 50 kg of material 'CXE' was fraudulently misappropriated by the store assistant and never recovered by the Company.

Required:

(i) Prepare a store ledger account under each of the following method of pricing the issue:

(a) Weighted Average Method

(b) LIFO

(ii) What would be the value of material consumed and value of closing stock as on 30-04-2019 as per these two methods? (PYP May '19, 10 Marks)

Answer 29

(i) (a) Stores Ledger Account for the month of April, 2019 (Weighted Average Method)

	Receipt			Issue			Balance		
1-4-19	–	–	–	–	–	–	1,000	15.00	15,000
4-4-19	3,000	16.00	48,000	–	–	–	4,000	15.75	63,000
8-4-19	–	–	–	1,000	15.75	15,750	3,000	15.75	47,250
15-4-19	1,500	18.00	27,000	–	–	–	4,500	16.50	74,250
20-4-19	–	–	–	1,200	16.50	19,800	3,300	16.50	54,450
25-4-19	–	–	–	300	18.00	5,400	3,000	16.35	49,050
26-4-19	–	–	–	1,000	16.35	16,350	2,000	16.35	32,700
28-4-19	500	17.00	8,500	–	–	–	2,500	16.48	41,200
30-4-19	–	–	–	50	16.48	824	2,450	16.48	40,376

(b) Stores Ledger Account for the month of April, 2019 (LIFO)

Date	Qty Units	Rate	Amount Qty	Units	Rate	Amount	Qty Units	Rate	Amount
		(')	(')		(')	(')		(')	(')
1-4-19	–	–	–	–	–	–	1,000	15	15,000
4-4-19	3,000	16	48,000	–	–	–	1,000	15	15000
							3,000	16	48,000
8-4-19	–	–	–	1,000	16	16,000	1,000	15	15,000
							2,000	16	32,000
15-4-19	1,500	18	27,000	–	–	–	1,000	15	15,000
							2,000	16	32,000
							1,500	18	27,000
20-4-19	–	–	–	1,200	18	21,600	1,000	15	15,000
							2,000	16	32,000
							300	18	5,400
25-4-19	–	–	–	300	18	5,400	1,000	15	15,000

Date	Receipts Qty	Rate	Amount	Issues Qty	Rate	Amount	Balance Qty	Rate	Amount
							2,000	16	32,000
26-4-19	–	–	–	1,000	16	16,000	1,000	15	15,000
							1,000	16	16,000
28-4-19	500	17	8,500	–	–	–	1,000	15	15,000
							1,000	16	16,000
							500	17	8,500
30-4-19	–	–	–	50	17	850	1,000	15	15,000
							1,000	16	16,000
							450	17	7,650

(ii) Value of Material Consumed and Closing Stock

	Weighted Average method (₹)	LIFO method(₹)
Opening stock as on 01-04-2019	15,000	15,000
Add: Purchases	83,500	83,500
	98,500	98,500
Less: Return to supplier	5,400	5,400
Less: Abnormal loss	824	850
Less:ClosingStockason30-04-2019	**40,376**	**38,650**
Value of Material Consumed	51,900	53,600

Question 30

M/s. X Private Limited is manufacturing a special product which requires a component "SKY BLUE". The following particulars are available for the year ended 31st March, 2018:

Annual demand of "SKY BLUE" 12000 Units Cost of placing an order ₹ 1,800

Cost per unit of "SKY BLUE ₹ 640

Carrying cost per annum 18.75%

The company has been offered a quantity discount of 5 on the purchases of "SKY BLUE" provided the order size is 3000 components at a time.

You are required to:

(i) Compute the Economic Order Quantity.

(ii) Advise whether the quantity discount offer can be accepted. (PYP May '18, 5 Marks)

Answer 30

(i) **Calculation of Economic Order Quantity**

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 12,000 \text{ units} \times Rs.1,800}{Rs.640 \times 18.75/100}} = 600 \text{ units}$$

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

	(₹)
When EOQ is ordered	
Purchase Cost (12,000 units x Rs. 640)	76,80,000
Ordering Cost [A/Q × O - (12,000 units/ 600 units) x Rs. 1,800]	36,000
Carrying Cost (Q/2 × C × i - 600 units x Rs. 640 x ½ x 18.75/100)	36,000
Total Cost	77,52,000

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When Quantity Discount is accepted

		(`)
Purchase Cost	(12,000 units X ` 608)	72,96,000
Ordering Cost $[\frac{A}{Q}$ XO	(12,000 units/3,000 units) X ` 1,800]	7,200
Carrying Cost $[\frac{Q}{2}$ X C X i	(3,000 units X ` 608 X½ X 18.75/100)]	1,71,000
Total Cost		74,74,200

Advise – The total cost of inventory is higher if EOQ is adopted. If M/s. X Private Limited gets a discount of 5% on the purchases of "SKY BLUE" (if order size is 3,000 components at a time), there will be financial benefit of ` 2,77,800 (77,52,000 - 74,74,200). However, order size of big quantity will increase volume of average inventory to 5 times. There may be risk of shrinkage, pilferage and obsolescence etc., of inventory due to increase in the average volume of inventory holding. This aspect also has to be taken into consideration before opting the discount offer and taking final decision.

Question 31

Explain 'Just In Time' (JIT) approach of inventory management. (PYP May '18, 5 Marks)

Answer 31

Just in Time (JIT) Inventory Management

JIT is a system of inventory management with an approach to have a zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

(i) Produce goods only when it is required and

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

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

Question 32

Explain: FIFO and LIFO method of stores issue. (PYP May '18, 2 Marks)

Answer 32

First-in First-out (FIFO) method: It is a method of pricing the issues of materials, in the order in which they are purchased. In other words, the materials are issued in the order in which they arrive in the store or the items longest in stock are issued first. Thus each issue of material only recovers the purchase price which does not reflect the current market price. This method is considered suitable in times of falling price because the material cost charged to production will be high while the replacement cost of materials will be low.

Last-in-First-out (LIFO) method: It is a method of pricing the issues of materials. This method is based on the assumption that the items of the last batch (lot) purchased are the first to be issued. Therefore,

under this method the prices of the last batch (lot) are used for pricing the issues, until it is exhausted, and so on. If however, the quantity of issue is more than the quantity of the latest lot than earlier (lot) and its price will also be taken into consideration. During inflationary period or period of rising prices, the use of LIFO would help to ensure that the cost of production determined on the above basis is approximately the current one.

Question 33

Explain obsolescence and circumstances under which materials become obsolete. State the steps to be taken for its treatment. (PYP Nov '18, 5 Marks)

Answer 33

Obsolescence: Obsolescence is defined as "the loss in the intrinsic value of an asset due to its supersession".

Materials may become obsolete under any of the following circumstances:

(i) where it is a spare part, or a component of a machinery used in manufacture and that machinery becomes obsolete;

(ii) where it is used in the manufacture of a product which has become obsolete;

(iii) where the material itself is replaced by another material due to either improved quality or fall in price.

Treatment: In all three cases, the value of the obsolete material held in stock is a total loss and immediate steps should be taken to dispose it off at the best available price. The loss arising out of obsolete materials on abnormal loss does not form part of the cost of manufacture.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a theoretical question on obsolescence of material. Below average performance was observed.

Question 34

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? (PYP 10 Marks Nov 20)

Answer 34

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)	$= \sqrt{\dfrac{2 \times A \times O}{C \times i}} = \sqrt{\dfrac{2 \times 27,000 \times 240}{6.25}} = 1440$ Units

(i) Calculation of saving by opting EOQ:

	Existing Order policy	EOQ Model
No. of orders	9	**18.75 or 19**
	$\left(\dfrac{27,000}{3,000}\right)$	$\left(\dfrac{27,000}{1,440}\right)$

2.32

A. Ordering Cost (₹)	**2,160** (₹ 240 × 9)	**4,500** $\left\{Rs.\,240 \times \left(\dfrac{27,000}{1,440}\right)\right\}$
B. Carrying cost (₹)	**9,375** $\left(\dfrac{3,000 \times Rs.\,6.25}{2}\right)$	**4,500** $\left(\dfrac{\mathbf{1,440} \times \boldsymbol{Rs.\,6.25}}{\mathbf{2}}\right)$
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 = $\dfrac{27,000 \; units}{360 \; days}$ = **75 units**

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

(iii) Frequency of Orders (in days):

$\dfrac{360 \; days}{No.of \; orders \; a \; year} = \dfrac{360 \; days}{19}$ = 18.95 days or 19 days

Question 35

State how the following items are treated in arriving at the value of cost of material purchased:
  (i) Detention Charges/Fines

  (ii) Demurrage

  (iii) Cost of Returnable containers

  (iv) Central Goods and Service Tax (CGST)

  (v) Shortage due to abnormal reasons. (PYP 5 Marks Jan 21)

Answer 35

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.

Question 36

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

Item Code Number	Units	Unit Cost (₹)
101	25	50
102	300	01
103	50	80
104	75	08
105	225	02
106	75	12

MM Ltd. has adopted the policy of classifying the items constituting 15% or above of Total Inventory Cost as 'A' category, items constituting 6% or less of Total Inventory Cost as 'C' category and the remaining items as 'B' category.

You are required to:

(i) Rank the items on the basis of % of Total Inventory Cost.

(ii) Classify the items into A, B and C categories as per ABC Analysis of Inventory Control adopted by MM Ltd. (PYP 5 Marks July 21)

Answer 36

(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
7% to 14%	--	'B' items
6% & Less	--	'C' items

Ranking	Item code No.	% of Total units	Total Inventory cost (₹)	% of Total Inventory Cost	Category
1	103	6.67	4,000	53.33	
2	101	3.33	1,250	16.67	
Total	2	10.00	5,250	70.00	A
3	106	10.00	900	12.00	

4	104	10.00	600	8.00	
Total	2	20.00	1,500	20.00	B
5	105	30.00	450	6.00	
6	102	40.00	300	4.00	
Total	2	70.00	750	10.00	C
Grand Total	6	100	7,500	100	

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> It was a practical problem on inventory control for assigning ranks based on inventory cost percentage. The second part was related to ABC classification by following the criteria given in the question. Most of the examinees answered in the correct line. Above average performance was observed.

Question 37

Write a short note on VED analysis of Inventory Control.   (PYP 5 Marks July '21)

Answer 37

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 standardization 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.**

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> It was a theoretical question requiring examinees to write a short note on the concept of VED analysis of Inventory Control. Performance of the examinees was below average.

Question 38

The following details are provided by M/s. SKU Enterprises for the year ended 31st March, 2018:

Particulars	Material-M (₹)	Material-N (₹)
Stock as on 01-04-2017	6,00,000	10,00,000
Stock as on 31-03-2018	4,50,000	7,25,000
Purchases during the year	9,50,000	18,40,000

You are required to:

(i) **Calculate Turnover Ratio of both the materials.**

(ii) **Advise which of the two materials is fast moving. (Assume 360 days in a year). (PYP 5 Marks May '18) (Same concept different figures PYP Dec'21 5 Marks)**

Answer 38

Material M	Material N
Turnover ratio	Turnover ratio
$=$ Cost of stock of raw material consumed / Average stock of raw material	$=$ Cost of stock of raw material consumed / Average stock of raw material

= ₹6,00,000 + ₹9,50,000 -₹4,50,000 / (6,00,000+ 4,50,000) / 2 =2.09	= ₹10,00,000 + ₹18,40,000 -₹7,25,000. / (10,00,000+ 7,25,000) / 2=2.45
Average number of days for which the average inventory is held	Average number of days for which the average inventory is held
= 360 / Inventory turnover ratio	= 360 / Inventory turnover ratio
= 360 days / 2.09 = 172.25 days	= 360 days / 2.45 = 146.94 days

(ii) Advice

Comparatively Material M is slower than Material N since Inventory holding period of 'M' is 172.25 days in Comparison to 'N' i.e. 146.94 days. Infact, both materials have slow inventory turnover. Though, different business has their own expected rates for inventory turnover like food shops have fast inventory turnover, shop selling furniture etc. will have slower inventory turnover while manufacturers of large items of plant will have very long inventory turnover. If it is not as per the Industry Standard, then a slow turnover may indicate that excessive inventory is held and risk of obsolete or spoiled inventory will increase. Large quantity of slow moving material means that capital is locked up in business and not earning revenue. It is advisable to make proper investigations into slow moving materials and take steps to minimize the loss arises therefrom as it may impact overall financial health of the organisation.

Question 39

What is Bill of Material? Describe the uses of Bill of Material in following departments:

(i) Purchases Department

(ii) Production Department

(iii) Stores Department

(iv) Cost/Accounting Department (PYP 5 Marks Dec '21)

Answer 39

Bill of Material: It is a detailed list specifying the standard quantities and qualities of materials and components required for producing a product or carrying out of any job.

Uses of Bill of Material in different department:

Purchase Department	Production Department	Stores Department	Cost/ Accounting Department
Materials are procured (purchased) on the basis of specifications mentioned in it.	Production is planned according to the nature, volume of the materials required to be used. Accordingly, material requisition lists are prepared.	It is used as a reference document while issuing materials to the requisitioning department.	It is used to estimate cost and profit. Any purchase, issue and usage are compared/ verified against this document.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This theory question on Bill of Material was not answered in the correct line. Most of the students had written the concept of invoicing of material instead of bill of material. Performance of the examinees was poor.

Question 40

A Limited a toy company purchases its requirement of raw material from S Limited at ₹ 120 per kg. The company incurs a handling cost of ₹ 400 plus freight of ₹ 350 per order. The incremental carrying cost of inventory of raw material is ₹ 0.25 per kg per month. In addition the cost of working capital finance on the investment in inventory of raw material is ₹ 15 per kg per annum. The annual

production of the toys is 60,000 units and 5 units of toys are obtained from one kg. of raw material.

Required:

(i) Calculate the Economic Order Quantity (EOQ) of raw materials.

(ii) Advise, how frequently company should order to minimize its procurement cost. Assume 360 days in a year.

(iii) Calculate the total ordering cost and total inventory carrying cost per annum as per EOQ. (PYP 5 Marks May'22)

Answer 40

Annual requirement of raw material in kg. (A) = $\frac{60,000 \text{ units}}{5 \text{ units per kg}}$ = 12,000 kg.

Ordering Cost (Handling & freight cost) (O)   = ₹ 400 + ₹ 350 = ₹ 750

Carrying cost per unit per annum i.e. inventory carrying cost + working capital cost (c × i)

= (₹ 0.25 × 12 months) + ₹15 = ₹ 18 per kg

(i) E.O.Q.= $\sqrt{\frac{2 \times 12,000 \text{kgs} \times ₹750}{₹18}}$ = 1,000 kg.

(ii) Frequency of orders for procurement:

Annual consumption (A)= 12,000 kg.

Quantity per order (EOQ) = 1,000 kg.

No. of orders per annum

$\left[\frac{A}{EOQ}\right]$ = $\frac{12,000 \text{kg}}{1,000 \text{kg}}$ = 12

Frequency of placing orders (in months) = $\frac{12 \text{ months}}{12 \text{ orders}}$ = 1 months

Or, (in days) = $\frac{360 \text{days}}{12 \text{ orders}}$= 30 days

(iii) Calculation of total ordering cost and total inventory carrying cost as per EOQ:

	Amount/Quantity
Size of the order	1,000 kg.
No. of orders	12
Cost of placing orders	₹ 9,000 (12 orders × ₹ 750)
Inventory carrying cost	₹ 9,000 (1,000 kg. × ½ × ₹ 18)
Total Cost	₹18,000

Question 41

Write down the treatment of following items associated with purchase of materials.

(i) Cash discount

(ii) IGST

(iii) Demurrage

(iv) Shortage

(v) Basic Custom Duty (PYP 5 Marks May'22)

Answer 41

Treatment of items associated with purchase of materials is tabulated as below

S. No.	Items	Treatment
(i)	Cash Discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.

(ii)	Integrated Goods and Service Tax (IGST)	Integrated Goods and Service Tax (IGST) is paid on inter-state supply of goods and provision of services and collected from the buyers. It is excluded from the cost of purchase if credit for the same is available. Unless mentioned specifically it should not form part of cost of purchase.
(iii)	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
(iv)	Shortage	Shortage in materials are treated as follows: Shortage due to normal reasons: Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, or due to any unavoidable conditions etc. are the reasons of normal loss. 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.
(v)	Basic Custom Duty	Basic Custom duty is paid on import of goods from outside India. It is added with the purchase cost.

Question 42

MM Ltd. uses 7500 valves per month which is purchased at a price of ₹ 1.50 per unit. The carrying cost is estimated to be 20% of average inventory investment on an annual basis. The cost to place an order and getting the delivery is ₹ 15. It takes a period of 1.5 months to receive a delivery from the date of placing an order and a safety stock of 3200 valves is desired.

You are required to determine:

    (i)   The Economic Order Quantity (EOQ) and the frequency of orders.

    (ii) The re-order point.

    (iii) The Economic Order Quantity (EOQ) if the valve cost ₹ 4.50 each instead of 1.50 each.

    (Assume a year consists of 360 days) (PYP 5 Marks Nov 22)

Answer 42

    (i)   Calculation of Economic Order Quantity

        Annual requirement (A)   = 7500×12= 90,000 Valves

        Cost per order (O)   = ₹ 15

        Inventory carrying cost (i)   = 20%

        Cost per unit of spare (c)   = ₹ 1.5

        Carrying cost per unit (i × c)   = ₹ 1.5 × 20% = ₹ 0.30

$$\text{Economic Order Quantity (EOQ)} = \sqrt{\frac{2 \times A \times O}{i \times c}}$$

$$= \sqrt{\frac{2 \times 90,000 \times 15}{0.3}} = 3,000 \text{ Valves}$$

        Frequency of order or Number of Orders = 90,000/3,000 = 30 orders.

        So Order can be placed in every 12 (360days/30) days

    (ii) Re-order Quantity = {Maximum Consumption X Maximum lead time} + safety Stock

                = {7500X1.5} + 3200 = 14,450 Valves

    (iii) Calculation of Economic Order Quantity if valve costs ₹ 4.50

        Carrying cost is 20% of ₹ 4.50 = ₹ 0.90

Economic Order Quantity (EOQ) = $\sqrt{\frac{2 \times A \times O}{i \times c}}$

$= \sqrt{\frac{2 \times 90,000 \times 15}{0.9}}$

= 1732.0508 units or 1733 Valves

Question 43

Which system of inventory management is known as 'Demand pull' or 'Pull through' system of production? Explain. Also, specify the two principles on which this system is based. (PYP 5 Marks Nov 22)

Answer 43

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

It is a system of inventory management with an approach to have a zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles
(i) Produce goods only when it is required and
(ii) the products should be delivered to customers at the time only when they want.

Question 44

The following information pertains to ZB Limited for the year:

Profit volume ratio	30%
Margin of Safety (as % of total sales	25%
Fixed cost	`12,60,000

You are required to calculate:

(i) Break even sales value (`).

(ii) Total sales value (`) at present,

(iii) Proposed sales value (`) if company wants to earn the present profit after reduction of 10% in fixed cost,

(iv) Sales in value (`) to be made to earn a profit of 20% on sales assuming fixed cost remains unchanged,

(v) New Margin of Safety if the sales value at present as computed in (ii) decreased by 12.5%. (PYP 5 Marks, May '23)

Answer 44

i) **Calculation of Break-even sales in value:**

= Fixed Cost ÷ P/V Ratio

= `12,60,000 ÷ 30% = `42,00,000

ii) **Calculation of Total Sales value:**

Sales value (S) = Break-even Sales + Margin of Safety

Or, S = 42,00,000 + 0.25 S

Or, 0.75 S = 42,00,000

Or, S = 42,00,000 ÷ 0.75

Or, Sales = `56,00,000

iii) **Calculation of proposed sales value to earn present profit:**

Present profit = Sales – Variable cost – Fixed Cost

= ` 56,00,000 – 70% of 56,00,000 – ` 12,60,000

= ` 56,00,000 – ` 39,20,000 – ` 12,60,000

= ` 4,20,000

Proposed Sales value (S) = 0.7S + (90% of ` 12,60,000) + 4,20,000

S = 0.7S + 11,34,000 + 4,20,000

S = 15,54,000 ÷ 0.3 = ` 51,80,000

iv) **Calculation of sales value to earn 20% on sales:**

Sales Value (S) = 0.7 S + 12,60,000 + 0.2S

S = 12,60,0000 ÷ 0.10 = ` 1,26,00,000

v) **New Margin of Safety:**

= (Sales – BES) ÷ Sales

= (87.5% of 56,00,000 – 42,00,000) ÷ (87.5% of 56,00,000)

= (49,00,000 – 42,00,000) ÷ 49,00,000 = 7,00,000 ÷

49,00,000 = 14.29%

Or

= (Sales – BES)

= (87.5% of 56,00,000 – 42,00,000)

= ` 7,00,000

Question 45

A Limited has furnished the following information for the months from 1st January to 30th April, 2023:

	January	February	March	April
Number of Working days	25	24	26	25
Production (in units) per working day	50	55	60	52
Raw Material Purchases (% by weights to total of 4 months)	21%	26%	30%	23%
Purchase price of raw material (per kg)	` 10	` 12	` 13	` 11

Quantity of raw material per unit of product: 4 kg.

Opening stock of raw material on 1stJanuary: 6,020 kg. (Cost ` 63, 210)

Closing stock of raw material on 30thApril: 5,100 kg.

All the purchases of material are made at the start of each month.

Required:

(i) **Calculate the consumption of raw materials (in kgs) month-by- month and in total.**

(ii) **Calculate the month-wise quantity and value of raw materials purchased.**

(iii) **Prepare the priced stores ledger for each month using the FIFO method. (PYP 10 Marks, May '23)**

Answer 45

i) Calculation of consumption of Raw Material (in kgs) month by month and total

Particulars	Jan	Feb	March	April	Total
No. of working days	25	24	26	25	-
Production (Per day)	50	55	60	52	-
Production	1,250	1,320	1,560	1,300	5,430
Raw Material Consumed (in kgs)	5,000	5,280	6,240	5,200	21,720

Calculation of Raw Material Purchased

Purchased	(Kg)
Closing stock on 30th April	5,100
Add: Raw Material consumed	21,720
Less: Opening stock on 1st January	(6,020)
Raw Material purchased	20,800

ii) Calculation of month wise quantity and value of raw material purchased

	%	Purchased (Kg)	Price (`)	Value (`)
January	21	4,368	10	43,680
February	26	5,408	12	64,896
March	30	6,240	13	81,120
April	23	4,784	11	52,624
Total		20,800		2,42,320

iii) Store Price Ledger by using FIFO method.

Months	Particulars	Receipts			Issue			Balance		
		Qty	Rate	Amount (`)	Qty	Rate	Amount (`)	Qty	Rate	Amount (`)
Jan	Opening							6,020	10.5	63,210
	Purchases	4,368	10	43,680				6,020	10.5	63,210
								4,368	10	43,680
	Consumption				5,000	10.5	52,500	1,020	10.5	10,710
								4,368	10	43,680
Feb	Purchases	5,408	12	64,896				1,020	10.5	10,710
								4,368	10	43,680
								5,408	12	64,896
	Consumption				1,020	10.5	10,710	108	10	1,080
					4,260	10	42,600	5,408	12	64,896
March	Purchase	6,240	13	81,120				108	10	1,080
								5,408	12	64,896
								6,240	13	81,120
	Consumption				108	10	1,080			
					5,408	12	64,896			
					724	13	9,412	5,516	13	71,708
April	Purchases	4,784	11	52,624				5,516	13	71,708

	Consumption							4,784	11	52,624
					5,200	13	67,600	316	13	4,108
								4,784	11	52,624
										56,732

Chapter 3
Employee Cost and Direct Expenses

Question 1

A, B and C are three industrial workers working in Sports industry and are experts in making cricket pads. A, B and C are working in Mahi Sports, Virat Sports and Sikhar Sports companies respectively. Workers are paid under different incentive schemes. Company wise incentive schemes are as follows:

Company	Incentive scheme
Mahi Sports	Emerson's efficiency system
Virat Sports	Merrick differential piece rate system
Sikhar Sports	Taylor's differential piece work system

The relevant information for the industry is as under:

Standard working hours	8 hours a day
Standard output per hour (in units)	2
Daily wages rate	Rs. 360
No. of working days in a week	6 days

Actual outputs for the week are as follows:

A	B	C
132 units	108 units	96 units

You are required to calculate effective wages rate and weekly earnings of all the three workers. **(MTP March '19, 10 Marks)**

Answer 1

Calculation of effective wages rate and weekly earnings of the workers A, B and C

Workers	A	B	C
Standard Output	96 units	96 units	96 units
	(8 hrs. × 2 units × 6 days)	(8 hrs. × 2 units × 6 days)	(8 hrs. × 2 units × 6 days)
Actual Output	132 units	108 units	96 units
Efficiency (%)	$\dfrac{132\ Units}{96\ Units} \times 100 = 137.5$	$\dfrac{108\ Untis}{96\ Units} \times 100 = 112.5$	$\dfrac{96\ Units}{96\ Units} \times 100 = 100$
Daily wages Rate	Rs. 360	Rs. 360	Rs. 360
Incentive system	Emerson's Efficiency System	Merrick differential piece rate system	Taylor's differential piece work system
Rate of Bonus	57.5% of time rate (20% + 37.5%)	20% of ordinary piece rate	25% of ordinary piece rate
Effective Wage Rate	Rs. 70.875 per hour	Rs. 27 per piece	Rs. 28.125 per piece
	$\left(\dfrac{Rs.\,360}{8\ Hours}\,157.5\%\right)$	$\left(\dfrac{Rs.\,360}{16\ Units}\,120\%\right)$	$\left(\dfrac{Rs.\,360}{16\ Units}\,125\%\right)$
Total weekly earnings	Rs. 3,402	Rs. 2,916	Rs. 2,700

Question 2

Discuss the accounting treatment of Idle time and overtime wages. **(MTP May'20, April '19, 5 Marks, RTP May'19, Old & New SM)**

Answer 2

Accounting treatment of idle time wages & overtime wages in cost accounts: Normal idle time is treated as a part of the cost of production. Thus, in the case of direct workers, an allowance for normal idle time is built into the labour cos t rates. In the case of indirect workers, normal idle time is spread over all the products or jobs through the process of absorption of factory overheads.

Under Cost Accounting, the overtime premium is treated as follows:

If overtime is resorted to at the desire of the customer, then the overtime premium may be charged to the job directly.

If overtime is required to cope with general production program or for meeting urgent orders, the overtime premium should be treated as overhead cost of particular depart ment or cost center which works overtime.

Overtime worked on account of abnormal conditions should be charged to costing Profit & Loss Account. If overtime is worked in a department due to the fault of another department the overtime premium should be charged to the latter department.

OR

Normal idle time: It is the time which cannot be avoided or reduced in the normal course of business. **It is treated as a part of cost of production. Thus, in the case of direct workers an allowance for normal idle time is considered setting of standard hours or standard rate.**

In case of indirect workers, normal idle time is considered for the computation of overhead rate.

Abnormal idle time: Apart from normal idle time, there may be factors which give rise to abnormal idle time. Abnormal idle time cost is not included as a part of production cost and is shown as a separate item in the Costing Profit and Loss Account. The cost of abnormal idle time should be further categorized into controllable and uncontrollable. For each category, the break-up of cost due to various factors should be separately shown. This would help the management in fixing responsibility for controlling idle time. Management should aim at eliminating controllable idle time and on a long- term basis reducing even the normal idle time. This would require a detailed analysis of the causes leading to such idle time.

Causes of Overtime and Treatment of Overtime premium in cost accounting

Causes	Treatment
(1) The customer may agree to bear the entire charge of overtime because urgency of work.	(1) If overtime is resorted to at the desire of the customer, then overtime premium may be charged to the job directly.
(2) Overtime may be called for to make up any shortfall in production due to some unexpected development.	(2) If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
(3) Overtime work may be necessary to make up a shortfall in production due to some fault of management.	(3) If overtime is worked in a department due to the fault of another department, the overtime premium should be charged to the latter department.

(4) Overtime work may be resorted to, to secure an out-turn in excess of the normal output to take advantage of an expandingmarket or of rising demand	(4) Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.

Question 3

Anirban Ltd. wants to ascertain the profit lost during the year 20X8-X9 due to increased labour turnover. For this purpose, they have given you the following information

(1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.

(2) 20% of the output during training period was defective. Cost of rectification of a defective unit was Rs. 25.

(3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.

(4) Selling price per unit is Rs.180 and P/V ratio is 20%.

(5) Settlement cost of the workers leaving the organization was Rs.1,83,480.

(6) Recruitment cost was Rs.1,56,340

(7) Training cost was Rs.1,13,180.

You are required to CALCULATE the profit lost by the company due to increased labour turnover during the year 20X8-X9. (MTP 5 Marks ,April '19 & Sep '23 , RTP May '18)

Answer 3

Output by experienced workers in 50,000 hours = 50,000/10= 5,000 units

Output by new recruits = 60% of 5,000 = 3,000 units

Less of output = 5,000 – 3,000 = 2,000 units

Total loss of output = 10,000 + 2,000 = 12,000 units

Contribution per unit = 20% of 180 = Rs. 36

Total contribution cost = 36 × 12,000 = Rs. 4,32,000

Cost of repairing defective units = 3,000 × 0.2 × 25 = Rs. 15,000

Profit forgone due to labour turnover

	(Rs.)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340
Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 20X8-X9	9,00,000

Question 4

Two workers 'A' and 'B' produce the same product using the same material. Their normal wage rate is also the same. 'A' is paid bonus according to Rowan scheme while 'B' is paid bonus according to Halsey scheme. The time allowed to make the product is 120 hours. 'A' takes 90 hours while 'B' takes 100 hours to complete the product. The factory overhead rate is Rs. 50 per hour actually worked. The factory cost of product manufactured by 'A' is Rs. 80,200 and for product manufactured by 'B' is Rs. 79,400.

Required:

(i) COMPUTE the normal rate of wages.

(ii) CALCULATE the material cost.

(iii) PREPARE a statement comparing the factory cost of the product as made by two workers. (MTP March '18, 5 Marks) (Same concept different figures Old & New SM)

Answer 4

Let x be the cost of material and y be the normal rate of wage/hour

	Worker A (Rs.)	Worker B (Rs.)
Material cost	x	x
Labour wages	90 y	100 y
Bonus	Rowan system	Halsey system
	$\frac{Time\ Saved}{Time\ allowed} \times$ hour worked ×rate $\times 50\% \times rate$	Hours Saved
Overheads	$\frac{30}{120} \times 90 \times Y = 22.5y$ $90 \times$ Rs. 50 = 4,500	$20 \times \frac{1}{2} \times y = 10y$ 100 x Rs. 50 = 5,000
Factory cost	x + 112.5y + 4,500 = 80,200 ∴x + 112.5y = 75,700 (1)	x + 110y + 5,000 = 79,400 ∴ x + 110y = 74,400…. (2)

Solving (1) and (2) we get x = Rs. 17,200 and y = Rs. 520

(i) Normal rate of wages is Rs. 520 per hour.		
(ii) Cost of materials = Rs. 17,200.		
(iii) Comparative Statement of factory cost		
	Worker A (Rs.)	**Worker B (Rs.)**
Material cost	17,200	17,200
Wages	46,800	52,000
	(90 x Rs. 520)	(100 x Rs. 520)
Bonus	11,700	5,200

	$\left(\frac{30}{120} \times 90 \times 520\right)$	$\left(20 \times \frac{1}{2} \times 520\right)$
Overheads	4,500	5,000
Factory Cost	80,200	79,400

Question 5

Corrs Consultancy Ltd. is engaged in BPO industry. One of its trainee executives in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

Following is the some data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end
Data Processors	**540**	**1,080**	**60**	**1,560**
Payroll Processors	**?**	**20**	**60**	**40**
Supervisors	**?**	**60**	**---**	**?**
Voice Agents	**?**	**20**	**20**	**?**
Assistant Managers	**?**	**20**	**---**	**30**

Senior Voice Agents	4	---	---	12
Senior Data Processors	8	---	---	34
Team Leaders	?	---	---	?
Employees transferred from the Subsidiary Company				
Senior Voice Agents	---	8	---	---
Senior Data Processors	---	26	---	---
Employees transferred to the Subsidiary Company				
Team Leaders	---	---	60	---
Assistant Managers	---	---	10	---

At the beginning of the year there were total 772 employees on the payroll of the company. The opening strength of the Supervisors, Voice Agents and Assistant Managers were in the ratio of 3 : 3 : 2. The company has decided to abandon the post of Team Leaders and consequently all the Team Leaders were transferred to the subsidiary company.

The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to CALCULATE:

(a) Labour Turnover rate using Replacement method and Separation method.

(b) Verify the Labour turnover rate calculated under Flux method by the trainee executive of the Corrs Consultancy Ltd. (MTP Aug '18, 10 Marks)

Answer 5

Working Notes:

(i)   Calculation of no. of employees at the beginning and end of the year

	At the Beginning of the year	At the end of the year
Data Processors	540	1,560
Payroll Processors [Left- 60 + Closing- 40 – Joined- 20]	80	40
Supervisors*	30	90
Voice Agents*	30	30
Assistant Managers*	20	30
Senior Voice Agents	4	12
Senior Data Processors	8	34
Team Leaders	60	0
Total	**772**	**1,796**

(*) **At the beginning of the year:**

Strength of Supervisors, Voice Agents and Asst.Managers =

[772 – {540 + 80 + 4 + 8 + 60} employees] or [772 – 692 = 80 employees]

$$\left[\left\{Supervisors - 80 \times \frac{3}{8} = 30, Voice\ Agents - 80 \times \frac{3}{8} = 30\ \&\ Asst.\ Managers - 80 \times \frac{2}{8} = 20\right\} employees\right]$$

At the end of the year :

[Supervisor-(Opening- 30 + 60 Joining) = 90; Voice Agents- (Opening- 30 + 20 Joined − 20 Left) = 30]

(ii)   No. of Employees Separated, Replaced and newly recruited during the year

Particulars	Separations	New Recruitment	Replacement	Total Joining
Data Processors	60	1,020	60	1,080
Payroll Processors	60	--	20	20
Supervisors	--	60	--	60
Voice Agents	20	--	20	20
Assistant Managers	10	10	10	20
Sr. Voice Agents	--	8	--	8
Sr. Data Processors	--	26	--	26
Team Leaders	60	--	--	--
Total	**210**	**1,124**	**110**	**1,234**

(Since, Corrs Consultancy Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer -out are treated as recruitment and separation respectively.)

(a) Calculation of Labour Turnover:

Replacement Method = $\frac{No.of\ employees\ replace\ During\ the\ year}{Average\ no.of\ employees\ onroll} \times 100$

$\frac{110}{(772+1,796)/2} \times 100 = \frac{100}{1,284} \times 100 = 8.57\%$

Separation Method = $\frac{No.of\ employees\ separate\ during\ the\ year}{Average\ no.of\ employees\ onroll} \times 100$

$= \frac{210}{1,284} \times 100 = 16.36\%$

(b) Labour Turnover under Flux Method

$= \frac{No.of\ employees\ (Joined\ Separated)during\ the\ year}{Average\ no.of\ employees\ onr} \times 10$

$= \frac{No.of\ employees\ (Re\ Placed\ New\ recruited\ Separated\ )during\ the\ year}{Average\ no.of\ employees\ onroll} \times 100$

$\frac{1,234+210}{1,284} \times 10 = 112.46\%$

Labour Turnover calculated by the executive trainee of the Personnel department is incorrect as it has not taken the No. of new recruitment while calculating the labour turnover under Flux method.

Question 6

Discuss the remedial steps to be taken to minimize the labour turnover. (MTP Oct'19, 5 Marks)

Answer 6

The following steps are useful for minimizing labour turnover:

(a) Exit interview: An interview to be arranged with each outgoing employee to ascertain the reasons of his leaving the organization.

(b) Job analysis and evaluation: to ascertain the requirement of each job.

(c) Organization should make use of a scientific system of recruitment, placement and promotion for

employees.

(d) Organization should create healthy atmosphere, providing education, medical and housing facilities for workers.

(e) Committee for settling workers grievances.

Question 7

RST Company Ltd. has computed labour turnover rates for the quarter ended 31st March, 2017 as 20%, 10% and 5% under flux method, replacement method and separation method respectively. If the number of workers replaced during that quarter is 50.

Calculate:

(i) Workers recruited and joined

(ii) Workers left and discharged and

(iii) Average number of workers on roll. (MTP Oct'18, 5 Marks) (Same concept different figures MTP 5 Marks Mar'21, MTP 5 Marks Oct'22)

Answer 7

Labour Turnover Rate (Replacement Method) = $\frac{No.of\ Workers\ replaced}{Average\ no.of\ workers} \times 100$

Or, $\frac{10}{100} = \frac{50}{Average\ no.of\ workers}$

Thus, Average No. of workers = 500

Labour Turnover Rate (Separation Method) = $\frac{No.of\ workers\ replaced}{Average\ no.of\ workers} \times 100$

Or, $\frac{5}{100} = \frac{Number\ of\ workers\ separated}{50}$

Thus, No. of workers separated = 25

Labour Turnover Rate (Flux Method)

= $\frac{No.of\ Separations+No.of\ Accession\ (Joinings)}{Average\ no.of\ workers} \times 100$

Or, = $\frac{20}{100} = \frac{25+No.of\ accessions\ (joinings)}{500}$

Or, 100(25+No.of Accessions) = 10,000

Or, 25+No. of Accessions = 100

Thus, No. of Accessions = 100-25=75

Accordingly,

(i) Workers recruited and Joined = 75

(ii) Workers left and discharged = 25

(iii) Average number of workers on roll = 500

Question 8

A company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers, which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in Rs.)	40	50	60
Productions in units:			
- **Product A**	210	-	600
- **Product B**	360	-	1350
- **Product C**	460	250	-
Standard time allowed per unit of each product is:			

For the purpose of piece rate, each minute is valued at Rs. 1/- You are required to COMPUTE 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.)

(iii) Premium bonus basis where the worker received bonus based on Rowan scheme. (MTP 5 Marks May '20, RTP May'19)(Same concept different figures MTP 5 Marks Nov'21)

Answer 8

(i) **Computation of Wages of Each Worker Under Guaranteed Hourly Rate Basis**

Worker	Actual hours worked (Hours)	Hourly wage rate (Rs.)	Wages (Rs.)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(ii) **Computation of Wages of each worker under piece work earning basis**

Product	Piece rate per unit (Rs.)	Worker-I		Worker-II		Worker-III	
		Units	Wages (Rs.)	Units	Wages (Rs.)	Units	Wages (Rs.)
A	15	210	3,150	-	-	600	9,000
B	20	360	7,200	-	-	1,350	27,000
C	30	460	13,800	250	7,500	-	-
Total			24,150		7,500		36,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-I, II and III will be paid the wages as computed i.e. Rs. 24,150, Rs. 7,500 and Rs. 36,000 respectively.

Working Note:

a. **Piece rate per unit**

Product	Standard time per unit in minute	Piece rate each minute (Rs.)	Piece rate per unit (Rs.)
A	15	1	15
B	20	1	20
C	30	1	30

(ii) Computation of wages of each worker under Premium bonus basis (where each worker receives bonus based on Rowan Scheme

Worker	Time Allowed (Hr.)	Time Taken (Hr.)	Time saved (Hr.)	Wage Rate per hour (Rs.)	Earnings (Rs.)	Bonus (Rs.)*	Total Earning (Rs.)
I	402.5	380	22.5	40	15,200	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

Working Note:

1. **Time allowed to each worker**

Worker	Product-A	Product-B	Product-C	Total Time (Hours)
I	210 units × 15 = 3,150	360 units × 20 = 7,200	460 units × 30 = 13,800	24,150/60 = 402.50
II	-	-	250 units × 30	7,500/60

			= 7,500	= 125
III	600 units × 15	1, 350 units × 20	-	36,000/60
	= 9,000	= 27,000		= 600

Time Taken / Time Allowed X Time Saved × Wage Rate

Worker-I= $\frac{380}{402.5} \times 22.5 \times 40 = 850$

Worker-II = $\frac{100}{125} \times 25 \times 50 = 1,000$

Worker-III = $\frac{540}{600} \times 60 \times 60 = 3,240$

Question 9

In a factory, the basic wage rate is Rs. 300 per hour and overtime rates are as follows:

Before and after normal working hours	180% of basic wage rate
Sundays and holidays	230% of basic wage rate
During the previous year, the following hours were worked	
- Normal time	1,00,000 hours
- Overtime before and after working hours	20,000 hours
Overtime on Sundays and holidays	5,000 hours
Total	1,25,000 hours

The following hours have been worked on job 'A'

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

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

(i) Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.

(ii) Where overtime is worked irregularly to meet the requirements of production.

(iii) Where overtime is worked at the request of the customer to expedite the job. (MTP 10 Marks, Oct.'20) (Same concept different figures RTP Nov'21, Old & New SM)

Answer 9

Workings Basic wage rate: 300 per hour Overtime wage rate before and after working hours : 300 × 180% = 540 per hour Overtime wage rate for Sundays and holidays: Rs. 300 × 230% = 690 per hour

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

Particulars	Amount (Rs.)
Annual wages for the previous year for normal time (1,00,000 hrs. × Rs. 300)	3,00,00,000
Wages for overtime before and after working hours (20,000 hrs. × Rs. 540)	1,08,00,000
Wages for overtime on Sundays and holidays (5,000 hrs. × Rs. 690)	34,50,000
Total wages for 1,25,000 hrs.	**4,42,50,000**

Average inflated wage rate = $\frac{Rs\ 4\ 42\ 50\ 000}{1,25,000\ hours}$ = 354

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

The overtime premium is treated as a part of employee cost and job is charged at an inflated wage

rate. Hence, employee cost chargeable to job 'A'

= Total hours × Inflated wage rate   = 1,125 hrs. × Rs. 354 = Rs. 3,98,250

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

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

Employee cost chargeable to Job 'A': 1,125 hours @ Rs.300 per hour = Rs.3,37,500 Factory overhead:

{100 hrs. × Rs. (540 − 300)} + {25 hrs. × Rs. (690 − 300)}

= {Rs. 24,000 + Rs. 9,750} = Rs. 33,750

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

Job 'A' Employee cost	1,125 hrs. @ Rs. 300	=	3,37,500
Overtime premium	100 hrs. @ Rs. (540 − 300)	=	24,000
	25 hrs. @ Rs. (690 − 300)	=	9,750
Total			**3,71,250**

Question 10

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 5 Marks, Apr'21, RTP May 23) (Same concept but different figures as RTP May'20, PYP 10 Marks May'18)

Answer 10

(i)   Separation Method:

$$\frac{\text{no. of workers left} + \text{no. of workers discharge}}{\text{average no. of workers}} * 100$$

$$\frac{40 + 160}{(3800 + 4200)/2} * 100 = \frac{200}{4000} * 100 = 5\%$$

(ii)   Replacement method

$$\frac{\text{no. of workers replced}}{\text{average no. of workers}} * 100 = \frac{150}{4000} * 100 = 3.75\%$$

(iii)   New recruitment method

$$\frac{\text{no. of workers newly recruted}}{\text{average no. of workers}} * 100$$

$$\frac{\text{no. of recrutments} - \text{no. of replacement}}{\text{average no. of workers}} * 100$$

$$\frac{600 - 150}{4000} * 100 = \frac{450}{4000} * 100 = 11.25\%$$

(iv)   Flux method:

$$\frac{\text{no. of seperation} + \text{no. of accession}}{\text{average no. of workers}} * 100$$

$$\frac{(200 + 600)}{(3800 + 4200)/2} * 100 = \frac{800}{4000} * 100 = 20\%$$

Question 11

ABC Ltd. has its factory at two locations viz Noida and Patparganj. Rowan plan is used at Noida factory and Halsey plan at Patparganj factory.

Standard time and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Normal working hours is 9 hours per day in a 5 day week.

Job at Noida factory is completed in 36 hours while at Patparganj factory it has taken 33 hours 45 minutes. Conversion costs at Noida and Patparganj are Rs. 6,084 and Rs. 5,569 respectively. Overheads account for Rs. 25 per hour. **(MTP 10 Marks, Oct'21, PYP Nov'19 10 Marks)**

REQUIRED:

(i) To find out the normal wage; and

(ii) To compare the respective conversion costs.

Answer 11

Particulars	Noida	Patparganj
Hours worked	36 hr.	33.75 hr.
Conversion Costs	Rs. 6,084	Rs. 5,569
Less: Overheads	Rs. 900 (Rs. 25 × 36 hr.)	Rs.Rs.844 (Rs.25 × 33.75 hr.)
Labour Cost	Rs.5,184	Rs.Rs.4,725

(i) Finding of Normal wage rate:

Let Wage rate be Rs. R per hour, this is same for both the Noida and Patparganj factory.

Normal wage rate can be found out taking total cost of either factory.

Noida: Rowan Plan

Total Labour Cost = Wages for hours worked + Bonus as per Rowan plan

Rs.5184 = hours worked * rate per hour + $(\frac{Time\ saved}{Time\ allowed}$ * Hours worked * Rate per hour)

Or, Rs. 5184= Hours worked * Rate per hour + $(\frac{45-36}{45} * 36 * R)$

Or, Rs. 5184= 36R+7.2R

R = 120

Normal wage = 36 hours * Rs.120 = Rs.4,320

OR

Patparganj: Halsey Plan

Total Labour Cost = Wages for hours worked + Bonus as per Halsey plan

Rs. 4,725	= Hours worked × Rate per hour + (50%×Hours saved × Rate per hour)
Rs.4,725	= 33.75 hr. × R + 50% × (45 hr. − 33.75 hr.) × R
Rs.4,725	= 39.375 R
	R = Rs.120
Normal Wage	= 33.75 hrs × Rs.120 = Rs.4,050

(ii) Comparison of conversion costs:

Particulars	Noida (Rs.)	Patparganj (Rs.)
Normal Wages (36 x 120)	4,320	
(33.75 x 120)		4,050
Bonus (7.2 x 120)	864	
(5.625 x 120)		675

Chapter 3 Employee Cost and Direct Expenses

Overhead	900	844
	6,084	5,569

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical question relating to the topic 'Employee Cost'. The question comprised of two parts viz. (i) to find out normal wage rate using Rowan / Halsey plan and (ii) to compare the respective conversion costs. Very well answered by some of the examinees and these examinees have obtained full marks. Overall performance of the examinees in this question was average.

Question 12

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. (MTP 10 Marks March '22)

Answer 12

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×F)	₹ 19,200	₹ 12,060	₹ 6,660
H.	Earnings per hour (G÷B)	₹ 75	₹ 100.50	₹ 277.50

Working Notes:

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

Question 13

R Ltd. is facing increasing employee turnover in the factory and before analyzing the causes and taking remedial steps; the management wants to have an idea of the profit foregone as a result of employee turnover in the last year. Last year sales amounted to ₹ 99,63,960 and P/V ratio was 20%.

The total number of actual hours worked by the direct employee force was 5.34 lakhs. The actual direct employee hours included 36,000 hours attributable to training new recruits, out of which half of the hours were unproductive. As a result of the delays by the Personnel Department in filling vacancies due to employee turnover, 1,20,000 potentially productive hours (excluding unproductive training hours) were lost. The costs incurred consequent on employee turnover revealed, on analysis, the following: Settlement cost due to leaving   ₹ 52,584

Recruitment costs	₹ 32,088
Selection costs	₹ 15,300
Training costs	₹ 36,588

Assuming that the potential production lost as a consequence of employee turnover could have been sold at prevailing prices, FIND the profit foregone last year on account of employee turnover. (MTP 5 Marks April '22) (Same concept different figures Old & New SM)

Answer 13

Workings:

(i)	Computation of productive hours	
	Actual hours worked	5,34,000
	Less: Unproductive training hours	18,000
	Actual productive hours	5,16,000
(ii)	Productive hours lost:	

Loss of potential productive hours + Unproductive training hours

= 1,20,000 + 18,000 = 1,38,000 hours

(iii)   Loss of contribution due to unproductive hours:

Sales value / Actual productive hours ×Total unproductive hours =

₹ 99,63,960 / 5,16,000 hrs × 1,38,000 hours = ₹ 26,64,780

Contribution lost for 1,38,000 hours = Rs. 26,64,780/100 × 20= ₹ 5,32,956

Computation of profit forgone on account of employee turnover

	(₹)
Contribution foregone (as calculated above)	5,32,956
Settlement cost due to leaving	52,584
Recruitment cost	32,088
Selection cost	15,300
Training costs	36,588
Profit foregone	6,69,516

Question 14

BRIEF OUT advantages and disadvantages of Halsey Premium Plan. (MTP 4 Marks April '22)

Answer 14

Advantages	Disadvantages
1. Time rate is guaranteed while there is opportunity for increasing earnings by increasing production.	1. Incentive is not so strong as with piece rate system. In fact the harder the worker works, the lesser he gets per piece.
2. The system is equitable in as much as the employer gets a direct return for his efforts in improving production methods and providing better equipment.	2. The sharing principle may not be liked by employees.

Question 15

Archika Tyre Manufacturing Private Limited has four workers Ram, Shyam, Mohan & Kundan who are paid wages on the basis of ₹ 100 per day, ₹ 120 per day, ₹ 130 per day & ₹ 2500 per month respectively. Standard working days in a week are six of 8 hours per day. For the month of October 2022, there was only one holiday other than Sunday for which no payment was made to employees except Kundan who was paid for full month. Sundays are considered paid holidays i.e. employees are paid for Sunday also even there is no working on that day. Provident fund contribution is 8% of monthly wages by employer and employee each. ESI contribution is 5% of monthly wages by employer and 4% of monthly wages by employee.

On the basis of above information, you are required to CALCULATE (regarding the month of October 2022):

(i) Amount of net wages receivable by each employee from the employer.

(ii) What is the total amount of Provident Fund required to be deposited by employer?

(iii) What is the total amount of ESI required to be deposited by employer?

(iv) What is the total labour cost to employer?

(v) If total material cost is ₹ 20,000 for October 2022 and overheads are charged equal to labour cost, calculate total cost for the month. **(MTP 10 Marks Sep'22)**

Answer 15

(i) **Calculation of net wages receivable by each employee from the employer (October 2022):**

	Ram (₹)	Shyam (₹)	Mohan (₹)	Kundan (₹)	Total (₹)
Wages for October 2022	3,000 (₹ 100 x 30 days)	3,600 (₹ 120 x 30 days)	3,900 (₹ 130 x 30 days)	2,500	13,000
Less: Employee Contribution to PF @ 8%	240	288	312	200	1,040
Less: Employee Contribution to ESI @ 4%	120	144	156	100	520
Net Wages Receivable	2,640	3,168	3,432	2,200	11,440

(ii) **Calculation of total amount of Provident Fund required to be deposited by employer (October 2022):**

	(₹)
Total Wages for the month	13,000
Employer's Contribution to Provident Fund @8% of ₹ 13,000	1,040
Add: Employee's Contribution to Provident Fund @8% of ₹ 13,000	1,040
Total amount of Provident Fund required to be deposited by employer	**2,080**

(iii) **Calculation of total amount of ESI required to be deposited by employer (October 2022):**

	(₹)

Total Wages for the month	13,000
Employer's Contribution to ESI @5% of ₹ 13,000	650
Add: Employee's Contribution to ESI @4% of ₹ 13,000	520
Total amount of ESI required to be deposited by employer	**1,170**

(iv) Total labour cost to employer (October 2022):

	(₹)
Total Wages for the month	13,000
Add: Employer's Contribution to Provident Fund @8% of ₹ 13,000	1,040
Add: Employer's Contribution to ESI @5% of ₹ 13,000	650
Total labour cost to employer	**14,690**

(v) Calculation of Total Cost for October 2022

	(₹)
Total Material Cost	20,000
Total Labour Cost	14,690
Total Overheads (Equal to Labour Cost)	14,690
Total Cost	**49,380**

Question 16

STATE various causes of and treatment of Overtime Premium in Cost Accounting. (MTP 5 Marks Oct'22)

Answer 16

Causes and Treatment of Overtime premium in cost accounting

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

Question 17

The rate of change of labour force in a company during the year ending 31st March, 2023 was calculated as 13%,8% and 5% respectively under 'Flux Method', 'Replacement method' and 'Separation method'. The number of workers separated during the year is 40.

You are required to calculate:

(i)   Average number of workers on roll.

(ii)   Number of workers replaced during the year.

(iii)   Number of new accessions i.e. new recruitment.

Number of workers at the beginning of the year.(MTP 5 Marks Oct '23)

Answer 17

(i) Labour Turnover Rate(Separation Method)

$$= \frac{No.of\ workers\ separated}{Average\ no.of\ workers\ on\ roll}$$

Or, $\frac{5}{100} = \frac{40}{Average\ no.of\ workers\ on\ roll}$

Or, Average no. of workers on roll = 800

(ii) Labour Turnover Rate (Replacement method)

$$= \frac{No.of\ workers\ \text{replaced}}{Average\ no.of\ workers\ on\ roll}$$

Or, $\frac{8}{100} = \frac{No.of\ workers\ replaced}{800}$

Or, No. of workers replaced = 64

(iii) Labour Turnover Rate (Flux Method)

$$\frac{No.of\ Separations + No.of\ accessions\ (New\ recruitments)}{Average\ No.of\ workers\ on\ roll}$$

Or, $\frac{13}{100} = \frac{40 + No.of\ accessions\ (New\ recruitments)}{800}$

Or, 100 (40 + No. of Accessions) = 10,400

Or, No. of new accessions = 64

(iv) No. of workers at the beginning of the year

Let workers at the beginning of the year were 'X'

Average no. of workers on roll = $\frac{workers\ at\ the\ begining + workers\ at\ the\ end}{2}$

$800 = \frac{X + (X + New\ accessions - Separations)}{2}$

$800 = \frac{X + (X + 64 - 40)}{2}$

$800 = = \frac{X + (X + 24)}{2}$

2 X = 1,600 − 24 or, X = 788 workers

Question 18

ADV Pvt. Ltd. manufactures a product which requires skill and precision in work to get quality products. The company has been experiencing high labour cost due to slow speed of work. The management of the company wants to reduce the labour cost but without compromising with the quality of work. It wants to introduce a bonus scheme but is indifferent between the Halsey and Rowan scheme of bonus. For the month of November 2019, the company budgeted for 24,960 hours of work. The workers are paid '80 per hour.

Required:

CALCULATE and suggest the bonus scheme where the time taken (in %) to time allowed to complete the works is (a) 100% (b) 75% (c) 50% & (d) 25% of budgeted hours. (RTP Nov'19)

Answer 18

The Cost of labour under the bonus schemes are tabulated as below:

Time Allowed	Time taken	Wages (₹)	Bonus (₹)		Total Wages (₹)		Earning per hour (₹)	
			Halsey*	Rowan**	Halsey	Rowan	Halsey	Rowan
(1)	(2)	(3) = (2) ×₹ 80	(4)	(5)	(6) = (3) + (4)	(7) = (3) + (5)	(8) = (6)/(2)	(9) = (7)/(2)

24,960	24,960	19,96,800	-	-	19,96,800	19,96,800	80.00	80.00
24,960	18,720	14,97,600	2,49,600	3,74,400	17,47,200	18,72,000	93.33	100.00
24,960	12,480	9,98,400	4,99,200	4,99,200	14,97,600	14,97,600	120.00	120.00
24,960	6,240	4,99,200	7,48,800	3,74,400	12,48,000	8,73,600	200.00	140.00

* Bonus under Halsey Plan = 50% of (Time Allowed – Time Taken) × Rate per hour

** Bonus under Rowan Plan =

$$\frac{\text{Time taken}}{\text{Time allowed}} \text{ Time saved} \times \text{Rate per hour}$$

Rowan scheme of bonus keeps checks on speed of work as the rate of incentive increases only upto 50% of time taken to time allowed but the rate decreases as the time taken to time allowed comes below 50%. It provides incentives for efficient workers for saving in time but also puts check on careless speed. On implementation of Rowan scheme, the management of ADV Pvt. Ltd. would resolve issue of the slow speed work while maintaining the skill and precision required maintaining the quality of product.

Question 19

A job can be executed either through workman A or B. A takes 32 hours to complete the job while B finishes it in 30 hours. The standard time to finish the job is 40 hours.

The hourly wage rate is same for both the workers. In addition workman A is entitled to receive bonus according to Halsey plan (50%) sharing while B is paid bonus as per Rowan plan. The works overheads are absorbed on the job at ₹ 7.50 per labour hour worked. The factory cost of the job comes to ₹ 2,600 irrespective of the workman engaged.

INTERPRET the hourly wage rate and cost of raw materials input. Also show cost against each element of cost included in factory cost. (RTP Nov.'18)

Answer 19

Calculation of:

1. **Time saved and wages:**

Workmen	A	B
Standard time (hrs.)	40	40
Actual time taken (hrs.)	32	30
Time saved (hrs.)	8	10
Wages paid @ ₹ x per hr. (₹)	32x	30x

2. **Bonus Plan:**

	Halsey	Rowan
Time saved (hrs.)	8	10
Bonus (₹)	4x	7.5 x
	$\left[\dfrac{8 hrs \times X}{2}\right]$	$10\left[\dfrac{hrs}{40\,hrs} \times 30 hrs. \times 'X\right]$

3. **Total wages:**

Workman A: 32x + 4x = ₹ 36x

Workman B: 30x + 7.5x = ₹ 37.5x

Statement of factory cost of the job

Workmen	A (₹)	B (₹)
Material cost (assumed)	y	y
Wages (shown above)	36x	37.5x
Works overhead	240	225
Factory cost (given)	2,600	2,600
The above relations can be written as follows:		

36x+y+240=2,600   (i)

37.5x+y+225=2,600   (ii)

Subtracting (i) from (ii) we get $1.5x - 15 = 0$

Or, $1.5x = 15$

Or, $x = ₹ 10$ per hour

On substituting the value of x in (i) we get y = ₹ 2,000

Hence the wage rate per hour is ₹ 10 and the cost of raw material is ₹ 2,000 on the job.

Question 20

GZ Ld. pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee:

(a)	Basic salary per day	₹1,000
(b)	Dearness allowance (DA)	20% of basic salary
(c)	House rent allowance	16% of basic salary
(d)	Transport allowance	₹50 per day of actual work
(e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8th hours.
(f)	Work of holiday and Sunday	Double of per day basic rate provided works atleast 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.
(h)	Earned leave & Casual leave	These are paid leave.
(h)	Employer's contribution to Provident fund	12% of basic and DA
(i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr.Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked for 5 and 6 hours respectively without lunch break.

On 5th and 13th August he worked for 10 and 9 hours respectively. During the month Mr. Z worked for 100 hours on Job no.HT200. You are required to CALCULATE:

(i)   Earnings per day

(ii) Effective wages rate per hour of Mr. Z.

(iii) Wages to be charged to Job no.HT200. (RTP Nov '20)

Answer 20

Workings:

1. Normal working hours in a month = (Daily working hours − lunch break) × no. of days

    = (8 hours − 0.5 hours) × 26 days = 195 hours

2. Hours worked by Mr.Z = No. of normal days worked + Overtime + holiday/ Sunday worked

    = (21 days × 7.5 hours) + (9.5 hours + 8.5 hours) + (5 hours + 6 hours)

    = 157.5 hours + 18 hours + 11 hours = 186.50 hours.

(i) Calculation of earnings per day

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Dearness allowance (20% of basic salary)	5,200
	31,200
House rent allowance (16% of basic salary)	4,160
Employer's contribution to Provident fund (12% × ₹31,200)	3,744
Employer's contribution to Pension fund (7% × ₹31,200)	2,184
	41,288
No. of working days in a month (days)	26
Rate per day	1,588
Transport allowance per day	50
Earnings per day	**1,638**

(ii) Calculation of effective wage rate per hour of Mr. Z:

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Additional basic salary for Sunday & holiday (₹1,000 × 2 days)	2,000
Dearness allowance (20% of basic salary)	5,600
	33,600
House rent allowance (16% of basic salary)	4,480
Transport allowance (₹50 × 23 days)	1,150
Overtime allowance (₹160 × 2 × 2 hours)*	640
Employer's contribution to Provident fund (12% × ₹33,600)	4,032
Employer's contribution to Pension fund (7% × ₹33,600)	2,352
Total monthly wages	46,254
Hours worked by Mr. Z (hours)	186.5
Effective wage rate per hour	**248**

*(Daily Basic + DA) ÷ 7.5 hours

= (1,000+200) ÷ 7.5 = ₹160 per hour

(iii) Calculation of wages to be charged to Job no. HT200

= ₹ 248 × 100 hours = ₹ 24,800

Question 21

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. 1st January 2021. At the end of the month December 2020, the accountant of the company has wrongly calculated wages to these two workers taking ₹ 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 21

Workings Notes:

Calculation of Total hours saved:

	M	J
No. of garments assigned (Pieces.)	15	21
Hour allowed per piece (Hours)	8	8
Total hours allowed (Hours)	120	168
Hours Taken (Hours)	100	140
Hours Saved (Hours)	20	28

(i)   Calculation of loss incurred due to incorrect rate selection:

(While calculating loss only excess rate per hour has been taken)

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Halsey Scheme) (50% of Time Saved × Excess Rate)	120 (50% of 20 Hrs. × ₹12)	168 (50% of 28 Hrs. × ₹12)	288
Excess Wages Paid	1,320	1,848	3,168

(ii)   Calculation of loss incurred due to incorrect rate selection had Rowan scheme of bonus payment followed:

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Rowan Scheme) $\left(\dfrac{Time\ Taken}{Time\ Allowed} \times Time\ Saved \times Excess\ Rate\right)$	200 $\left(\dfrac{100}{120} \times 20 \times Rs.\,12\right)$	280 $\left(\dfrac{140}{168} \times 28 \times Rs.\,12\right)$	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.

Question 22

A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively). The hours devoted by both the workers individually on daily basis for this particular job are given below:

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 5 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 5 hours worked).

Semi-skilled and skilled worker is paid ordinary wage @ ₹ 400 and ₹ 600 respectively per day of 8 hours labour. Further, the workers are also paid dearness allowance @ 20%.

Extra hours worked over and above 8 hours are also paid at ordinary wage rate however, overtime premium of 100% of ordinary wage rate is paid if a worker works for more than 9 hours in a day AND 48 hours in a week.

You are required to COMPUTE the wages payable to Mr. Deep (Semi-skilled) and Mr. Sam (Skilled). (RTP May '22)

Answer 22

Calculation of total normal hours to be paid for Mr. Deep (Semi-skilled):

Day	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
	A	**B**	**C**	**D = C×2**	**E = A+B+D**
Monday	8	1	1½	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10
Friday	8	1	1½	3	12
Saturday	--	--	--	--	--
Total	40	4	5	10	54

Calculation of total normal hours to be paid for Mr. Sam (Skilled):

Day	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
	A	**B**	**C**	**D = C×2**	**E = A+B+D**
Monday	8	1	1½	3	12
Tuesday	8	---	---	---	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10

Friday	8	1	1½	3	12
Saturday	5	3* + 1	1**	2	11
Total	**45**	**8**	**6**	**12**	**65**

*Mr. Sam will be paid for equivalent 8 normal working hours at ordinary wage rate, though 5 hours of working is required on Saturday. Further, extra 9th hour worked will also be paid at ordinary wage rate.

** Overtime of 1 hour worked over and above 9 hours will be paid at overtime rate.

Wages payable:

	Mr. Deep	Mr. Sam
Basic Wages per hour (₹ 400/8, ₹ 600/8) (₹)	50	75
Dearness allowance per hour (@ 20%) (₹)	10	15
Hourly rate (₹)	60	90
Total equivalent normal hours	54	65
Total Wages payable (₹)	**3,240**	**5,850**

Question 23

HR Ltd. is progressing in its legal industry. One of its trainee executives, Mr. H, in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method.

Following is the data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end
Records clerk	810	1,620	90	2,340
Human Resource Manager	?	30	90	60
Legal Secretary	?	90	---	?
Staff Attorney	?	30	30	?
Associate Attorney	?	30	---	45
Senior Staff Attorney	6	---	---	18
Senior Records clerk	12	---	---	51
Litigation attorney	?	---	---	?
Employees transferred from the Subsidiary Company				
Senior Staff Attorney	---	12	---	---
Senior Records clerk	---	39	---	---
Employees transferred to the Subsidiary Company				
Litigation attorney	---	---	90	---
Associate Attorney	---	---	15	---

At the beginning of the year there were total 1,158 employees on the payroll of the company. The opening strength of the Legal Secretary, Staff Attorney and Associate Attorney were in the ratio of 3 : 3 : 2.

The company has decided to abandon the post of Litigation attorney and consequently all the Litigation attorneys were transferred to the subsidiary company.

The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to:

(a) CALCULATE Labour Turnover rate using Replacement method and Separation method.

(b) VERIFY the Labour turnover rate calculated under Flux method by Mr. H (RTP Nov'22)

Answer 23

Working Notes:

(i) Calculation of no. of employees at the beginning and end of the year

	At the Beginning of the year	At the end of the year
Records clerk	810	2,340
Human Resource Manager [Left- 90 + Closing- 60 – Joined- 30]	120	60
Legal Secretary*	45	135
Staff Attorney*	45	45
Associate Attorney*	30	45
Senior Staff Attorney	6	18
Senior Records clerk	12	51
Litigation attorney	90	0
Total	1,158	2,694

(*) At the beginning of the year:

Strength of Legal Secretary, Staff Attorney and Associate Attorney =

[1158 – {810 + 120 + 6 + 12 + 90} employees] or [1158 – 1038 = 120 employees]

[{Legal Secretary - $120 \times \frac{3}{8}$ = 45, Staff Attorney - $120 \times \frac{3}{8}$ = 45 & Associate Attorney - $120 \times \frac{3}{8}$ = 30}

employees]

At the end of the year:

[Legal Secretary -(Opening 45 + 90 Joining) = 135; Staff Attorney - (Opening 45 + 30 Joined – 30 Left) = 45]

(ii) No. of Employees Separated, Replaced and newly recruited during the year

Particulars	Separations	New Recruitment	Replacement	Total Joining
Records clerk	90	1,530	90	1,620
Human Resource Manager	90	--	30	30
Legal Secretary	--	90	--	90
Staff Attorney	30	--	30	30
Associate Attorney	15	15	15	30
Senior Staff Attorney	--	12	--	12
Senior Records clerk	--	39	--	39
Litigation attorney	90	--	--	--
Total	315	1,686	165	1,851

(Since, HR Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer-out are treated as recruitment and separation respectively.)

(a) **Calculation of Labour Turnover rate:**
Replacement Method=

$$\frac{\text{No. of employees replaced during the yea}}{\text{Average no. of employees on roll}} \times 100$$

$$\frac{165}{(1,158+2,694)/2} \times 100 = \frac{165}{1,926} \times 100 = 8.57\%$$

Separation Method=

$$\frac{\text{No. of employees separated during the yea}}{\text{Average no. of employees on roll}} \times 100$$

Chapter 3 Employee Cost and Direct Expenses

$$\frac{315}{1,926} \times 100 = 16.36\%$$

(b) La**bour Turnover rate under Flux Method:**

$$\frac{\text{No. of employees(Joined + Separated)duringthe year}}{\text{Averageno. of employees on roll}} \times 10$$

$$\frac{\text{No. of employees (Replaced + New recruited + Separated) during the year}}{\text{Average no. of employees on roll}} \times 100$$

$$\frac{1,851+315}{1,926} \times 100 = 112.46\%$$

Labour Turnover rate calculated by Mr. H is incorrect as it seems he has not taken the No. of new recruitment while calculating the labour turnover rate under Flux method.

Question 24

A skilled worker is paid a guaranteed wage rate of ` 120 per hour. The standard time allowed for a job is 6 hour. He took 5 hours to complete the job. He is paid wages under Rowan Incentive Plan.

(i) Calculate his effective hourly rate of earnings under Rowan Incentive Plan.

(ii) If the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings, calculate the time in which he should complete the job.**(RTP Nov '23)**

Answer 24

(i) Effective hourly rate of earnings under Rowan Incentive Plan

Earnings under Rowan Incentive plan =

(Actual time taken X wage rate) + $\frac{Time\ saved}{Time\ Allowed} \times$ Time taken × Wage rate

= (5 hours X Rs. 120) + $\left(\frac{1\ hour}{6\ hours} \times 5\ hours \times Rs.\ 120\right)$

= Rs. 600 +Rs. 100 = Rs. 700

(ii) Let time taken = X

∴ Effective hourly rate = $\frac{Earnings\ under\ Halsay\ Scheme}{Time\ taken}$

Or, Effective hourly rate under Halsey Incentive plan =

$\frac{(Time\ taken \times Rate)+50\%\ of\ Rate\times(Time\ allowed-Time\ taken)}{Time\ taken}$

Or, Rs.140 = $\frac{(X \times Rs.120)+50\%\ of\ Rs.120\times(6-X)}{X}$

Or, 140X = 120X + 360 − 60X

Or, 80X = 360

Or, X = $\frac{360}{80}$ = 4.5 hours

Therefore, to earn effective hourly rate of `140 under Halsey Incentive Scheme worker has to complete the work in 4.5 hours.

Question 25

How would you account for idle capacity cost in Cost Accounting? **(RTP Nov '23)**

Answer 25

Idle capacity costs are treated in the following ways in Cost Accounts:

(i) If the idle capacity cost is due to unavoidable reasons: A supplementary overhead rate may be used to recover the idle capacity cost. In this case, the costs are charged to the production capacity utilised.

(ii) If the idle capacity cost is due to avoidable reasons: Such as faulty planning, etc. the cost should be charged to Costing Profit and Loss Account.

(iii) If the idle capacity cost is due to trade depression, etc.: Being abnormal in nature the cost should also be charged to the Costing Profit and Loss Account.

(iv) If the idle capacity cost is due to seasonal factors, then the cost should be charged to cost of production by inflating overhead rate.

Question 26

Explain the treatment of over and under absorption of overheads in cost accounts. (RTP Nov '23)

Answer 26

Treatment of over and under absorption of overheads are:

(i) Writing off to costing P&L A/c: Small difference between the actual and absorbed amount should simply be transferred to costing P&L A/c, if difference is large then investigate the causes and after that abnormal loss/ gain shall be transferred to costing P&L A/c.

(ii) Use of supplementary Rate: Under this method the balance of under and over absorbed overheads may be charged to cost of W.I.P., finished stock and cost of sales proportionately with the help of supplementary rate of overhead.

(iii) Carry Forward to Subsequent Year: Difference should be carried forward in the expectation that next year the position will be automatically corrected.

Question 27

Distinguish between cost allocation and cost absorption. (RTP Nov '23)

Answer 27

Distinguish between Cost allocation and Cost absorption:

Cost allocation is the allotment of whole item of cost to a cost centre or a cost unit. In other words, it is the process of identifying, assigning or allowing cost to a cost centre or a cost unit.

Cost absorption is the process of absorbing all indirect costs or overhead costs allocated or apportioned over particular cost center or production department by the units produced.

Question 28

M/s Zeba Private Limited allotted a standard time of 40 hours for a job and the rate per hour is ₹ 75. The actual time taken by a worker is 30 hours.

You are required to calculate the total earnings under the following plans:

  (i) Halsey Premium Plan (Rate 50%)   **(ii)   Rowan Plan**

  (iii) Time Wage System   **(iv)   Piece Rate System**

  (v) Emerson Plan (PYP May '19, 5 Marks)

Answer 28

(i) Halsey Premium plan:

= (Time taken × Rate per hour) + ($\frac{1}{2}$ × Time saved × Rate per hour)

(30 hours × ₹ 75) + ($\frac{1}{2}$ × 10 hours × ₹ 75)

= ₹ 2,250 + ₹ 375 = ₹ 2,625

(ii) Rowan Premium plan :

= (Time taken × Rate per hour) + $\left(\frac{Time\ Saved}{Time\ allowed} \times Time\ saved\ \times Rate\ per\ hour \right)$

= (30 hours × ₹ 75) + (40 × 30 × ₹ 75)

= ₹ 2,250 + ₹ 375 = ₹ 2,625

= ₹ 2,250 + ₹ 562.5 = ₹ 2,812.5 or ₹ 2,813

(iii) Time wage system :

= Time taken × Rate per hour

= 30 × ₹ 75 = ₹ 2,250

(iv)   Piece Rate System :

= Std. Time × Rate per hour

= 40 × ₹ 75 = ₹ 3,000

(v) Emerson plan :

Efficiency level = 40/30 = 133.33% Time taken × (120% + 33.33%) of Rate

= 30 hours × 153.33% of ₹ 75

= ₹ 3,450

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this numerical problem of 'Employee Cost' students were asked to calculate earnings under various plans. Candidate failed to calculate earnings in job/piece rate system and Emerson's plan. Performance of the examinees was average.

Question 29

Following data have been extracted from the books of M/s. ABC Private Limited:

(i)   **Salary (each employee, per month)   ₹ 30,000**

(ii)   **Bonus   25% of salary**

(iii)   **Employer's contribution to PF, ESI etc.   15% of salary**

(iv)   **Total cost at employees' welfare activities   ₹ 6,61,500 per annum**

(v)   **Total leave permitted during the year   30 days**

(vi)   **No. of employees   175**

(vii)   **Normal idle time   70 hours per annum**

(viii)   Abnormal idle time (due to failure of power supply)   50 hours

(ix)   Working days per annum   310 days of 8 hours

You are required to calculate:

1.   Annual cost of each employee

2.   Employee cost per hour

3.   Cost of abnormal idle time, per employee   (PYP Nov '18, 5 Marks)

Answer 29

1.

Annual cost of each employee	₹
1. Salary (30,000×12)	3,60,000
2. Bonus (25% of Salary)	90,000
3. Employees Contribution to PF (15% of Salary)	54,000
4. Employers welfare (661500/175)	3,780
Total Annual Cost	5,07,780

2.

Effective Working hours (310 days × 8 hours)		2480 hours
Less: Leave days (30 days × 8 hours)	240 hours*	

Available Working hours		2240 hours
Less: Normal Loss @		70 hours
		2170 hours

Employee Cost per hour $\frac{507780}{2170}$ = Rs. 234

*It is assumed 310 working days are without taking leave permitted into consideration

3. **Cost of abnormal idle time per employee = ₹ 234× 50 hours= ₹ 11700 Alternative solution for Part (2) and (3)**

(2) Calculation of Employee cost per hour:

Working hours per annum	2,480 *
Less: Normal Idle time hours	70
Effective hours	2,410
Employee cost	5,07,780
Employee cost per hour	210.70

*It is assumed 310 working days are after adjusting leave permitted during the year.

(3) Cost of Abnormal idle time per employee:

Abnormal Idle time hours	50
Employee cost per hour	210.70
Cost of Abnormal idle time (210.70 ×50)	10,534.85

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

The Sub part (i) was numerical question on employees cost. Most of the examinees did not answer in the correct line.

Question 30

A worker takes 15 hours to complete a piece of work for which time allowed is 20 hours. His wage rate is ₹ 5 per hour. Following additional information are also available:

Material cost of work	**₹ 50**
Factory overheads	**100% of wages**

Calculate the factory cost of work under the following methods of wage payments:

(i) **Rowan Plan**

(ii) **Halsey Plan (PYP May '18, 5 Marks)**

Answer 30

		₹
(i)	Rowan Plan: Normal time wage = 15 hours @ ₹ 5 =	75
	Bonus = Time saved /Time allowed × (Time taken × Time rate)	
	= 5/20 x (15 x 5)	18.75
		93.75
(ii)	Halsey Plan: Normal time wage = 15 hours @ ₹ 5 =	75
	Bonus = 50% of (Time saved x Time rate) = 50% of (5x5) =	12.5
		87.5

Statement of Comparative Factory cost of work

	Rowan Plan	Halsey Plan
	₹	₹
Materials	50	50
Direct Wages	93.75	87.5
Prime Cost	143.75	137.5

| Factory Overhead (100% of Direct wages) | 93.75 | 87.5 |
| Factory Cost | 237.5 | 225 |

Question 31

Following are the particulars of two workers 'R' and 'S' for a month:

Particulars	R	S
(i) Basic Wages (₹)	15,000	30,000
(ii) Dearness Allowance	50%	50%
(iii) Contribution to EPF (on basic wages)	7%	7.5%
(iv) Contribution to ESI (on basic wages)	2%	2%
(v) Overtime (hours)	20	-

The normal working hours for the month are 200 hrs. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to State Insurance and Provident Fund are at equal rates with employees' contributions.

Both workers were employed on jobs A, B and C in the following proportions:

Jobs	A	B	C
R	75%	10%	15%
S	40%	20%	40%

Overtime was done on job 'A'. You are required to :

(i)   Calculate ordinary wage rate per hour of 'R' and 'S'.

(ii) Allocate the worker's cost to each job 'A', 'B' and 'C'. (PYP 6 Marks Nov 20, Old & New SM)

Answer 31

(i)   Calculation of Net Wages paid to Worker 'R' and 'S'

Particulars	R (₹)	S (₹)
Basic Wages	15,000.00	30,000.00
Dearness Allowance (DA) (50% of Basic Wages)	7,500.00	15,000.00
Overtime Wages (Refer to Working Note 1)	4,500.00	----
Gross Wages earned	27,000.00	45,000.00
Less: Provident Fund (7% × ₹ 15,000); (7.5% × ₹ 30,000)	(1,050.00)	(2,250.00)
Less: ESI (2% × ₹ 15,000); (2% × ₹ 30,000)	(300.00)	(600.00)
Net Wages paid	**25,650.00**	**42,150.00**

Calculation of ordinary wage rate per hour of Worker 'R' and 'S'

	R (₹)	S (₹)
Gross Wages (Basic Wages + DA) (excluding overtime)	22,500.00	45,000.00
Employer's contribution to P.F. and E.S.I.	1,350.00	2,850.00
	23,850.00	47,850.00
Ordinary wages Labour Rate per hour (₹ 23,850 ÷ 200 hours); (₹ 47,850 ÷ 200 hours)	**119.25**	**239.25**

(ii)   Statement Showing Allocation of workers cost to each Job

	Total Wages	Jobs		
		A	B	C
Worker R				
Ordinary Wages (15:2:3)	23,850.00	17,887.50	2,385.00	3577.50

Overtime	4500.00	**4500.00**	-	--
Worker S				
Ordinary Wages (2:1:2)	47,850.00	19,140.00	9,570.00	19,140.00
	76,200.00	**41,527.50**	**11,955.00**	**22,717.50**

Working Note:

Normal Wages are considered as basic wages.

Over Time = $\frac{2\times(Basic\ wage+D.A.)\times 20 hours}{200 hours}$ = $2\times \frac{Rs.22,500}{200} \times 20 hours$ = Rs. 4,500

Question 32

Discuss any four objectives of 'Time keeping' in relation to attendance and payroll procedures. **(PYP 4 Marks Nov 20)**

Answer 32

The objectives of time-keeping in relation to attendance and payroll procedures are as follows:

(i)   For the preparation of payrolls.

(ii) For calculating overtime.

(iii) For ascertaining and controlling employee cost.

(iv) For ascertaining idle time.

(v)   For disciplinary purposes.

(vi) For overhead distribution

Question 33

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	**1.975 hours**
performance (this may be taken as time allowed)	
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 incentivizing workers and also to adjust with the increase in demand.   (PYP 10 Marks Jan 21) (Same concept different figures Old & New SM)

Answer 33

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 = $\frac{Time\ taken}{Time\ allowed} \times Time\ Saved \times hourly\ rate$

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

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 Notes 1, 2 and 3)

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

= $\frac{Rs.\,4,80,000 + Rs.\,62,175}{9,600\ hours}$ = Rs. 56.48

Effective increase in earnings of worker(in %) = $\frac{Rs.\,56.48 - Rs.\,50}{Rs.\,50} \times 100$ = 2.96%

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

(Refer to Working Notes 1, 2 and 4)

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

= $\frac{Rs.\,4,80,000 + Rs.\,96,875}{9,600\ hours}$ = Rs. 60.29

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

(ii) (a) Saving in terms of direct labour cost per unit under Halsey scheme: (Refer to Working Note 3)

Labour cost per unit (under time wage scheme)

= 1.975 hours × ₹ 50 = ₹ 98.75

Labour cost per unit (under Halsey scheme)

= $\frac{Total\ wages\ paid\ under\ the\ schem}{Total\ number\ of\ units\ produced}$ = $\frac{Rs.\,5,42,175}{6,120}$ = Rs.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 Hours worked/Unit per Hour	4,861
(9,600/1.975) 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%.

Question 34

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 Rates for (i) above, given that the organization was setup on 31st January, 2021. (PYP 5 Marks July '21)

Answer 34

(i) Employee Turnover rate:

Using Separation method:

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

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

Using Flux method:

$$= \frac{Number\ of\ employees\ Separated + Number\ of\ employees\ Replaced\ During\ the\ Period}{Average\ number\ of\ employees\ during\ the\ period\ on\ roll} \times 100$$

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

(ii) Equivalent Employee Turnover Rate:

$$= \frac{Employee\ Turn\ over\ rate\ for\ the\ period}{Number\ of\ Days\ in\ the\ period} \times 365$$

Using Separation method = 5/60 X 365 = 30.42%

Or, = 5/60 X 360 = 30%

Or, 5/2 X 12 = 30%

Using Flux method = 15/60 × 365 =91.25%

Or, = 15/60 X 360 = 30%

Or, 15/2 X 12 = 30%

Question 35

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. **(PYP 5 Marks July 21)**

Answer 35

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

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

$$Bonus = \frac{Time\ taken}{Time\ allowed} \times Time\ Saved \times hourly\ rate$$

Example explaining highly efficient worker and less efficient worker obtaining same bonus:

Time rate (per Hour)	₹ 60
Time allowed	8 hours.
Time taken by 'X'	6 hours.
Time taken by 'Y'	2 hours.

$$Bonus = \frac{Time\ taken}{Time\ allowed} \times Time\ Saved \times hourly\ rate$$

For 'X' $= \frac{2\ hours}{8\ hours} \times 6\ hours \times Rs.\ 60 =$ **Rs. 90**

For 'Y' $= \frac{6\ hours}{8\ hours} \times 2\ hours \times Rs.\ 60 =$ **Rs. 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.

Question 36

A skilled worker is paid a guaranteed wage rate of ₹ 150 per hour. The standard time allowed for a job is 10 hours. He took 8 hours to complete the job. He has been paid the wages under Rowan Incentive Plan.

You are required to:

(i) Calculate an effective hourly rate of earnings under Rowan Incentive Plan.

(ii) Calculate the time in which he should complete the job, if the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings. **(PYP 5 Marks**

Dec '21)

Answer 36

(i) Calculation of Effective hourly rate of earnings under Rowan Incentive Plan:

Standard time allowed = 10 hours

Time taken = 8 hours; Time saved = 2 hours

	Particulars	Amount (₹)
A	Basic guaranteed wages (₹150 × 8 hours)	1,200
B	Add: Bonus for time saved (2 /10 × 8 × ₹ 150)	240
C	Total earnings (A+B)	1,440
D	Hours worked	8 hours
E	Effective hourly rate (C÷D)	180

(ii) Let the time taken to complete the job is "T" and the time saved is 10-T Effective hourly rate under the Halsey Incentive scheme

$$= \frac{(Rate \times Hours\ Worked)+(Rate \times 50\%\ of\ Time\ Saved)}{Hours\ Worked} = ₹\ 180$$

$$\frac{(Rs.150 \times T)+Rs.150 \times 50\%\ (10-T)}{T} = Rs.\ 180$$

150T + 750 -75T = 180T

180T-75T = 750

$T = \frac{750}{105}$ = 7.14 hours

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This Numerical question tested the conceptual knowledge of examinees under Rowan incentive plan for the calculation of effective hourly rates. On the basis of calculated effective hourly rate, examinees had to calculate time required to complete job under Halsey incentive scheme. Most of the examinees did will in the first part but failed to equate with the effective hourly rate in the second part of the question. The performance was above average.

Question 37

Discuss the steps involved in setting labour time standards. (PYP 5 Marks Dec '21)

Answer 37

Procedure of Setting Labour Time Standards

The following are the steps involved in setting labour standards:

(a) **Standardization:** Products to be produced are decided based on production plan and customer's order.

(b) **Labour specification:** Types of labour and labour time is specified. Labour time specification is based on past records and it takes into account normal wastage of time.

(c) **Standardization of methods:** Selection of proper machines to use proper sequence and method of operations.

(d) **Manufacturing layout:** A plan of operation for each product listing the operations to be performed is prepared.

(e) **Time and motion study:** It is conducted for selecting the best way of completing the job or motions to be performed by workers and the standard time which an average worker will take for each job. This also takes into account the learning efficiency and learning effect.

(f) **Training and trial:** Workers are trained to do the work and time spent at the time of trial run is noted

down.

Question 38

PQR Limited has replaced 72 workers during the quarter ended 31st March 2022. The labour rates for the quarter are as follows:

Flux method	16%
Replacement method	8%
Separation method	5%

You are required to ascertain:

(i) **Average number of workers on roll (for the quarter),**

(ii) **Number of workers left and discharged during the quarter,**

(iii) **Number of workers recruited and joined during the quarter,**

(iv) **Equivalent employee turnover rates for the year. (PYP 5 Marks May'22, Old & New SM)**

Answer 38

Working Note:

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

Employee Turnover rate using Replacement method

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

$$\text{Or,} \frac{8}{10} = \frac{72}{= \text{Average number of workers on roll} \times} \times 100$$

Or, Average number of workers on roll $\frac{72 \times 100}{= \text{Average number of workers on roll} \times} = 900$

(ii) Number of workers left and discharged:
Employee turnover rate (Separation method

$$\frac{\text{No of Separations(S)}}{= \text{Average number of workers on roll} \times} \times 100 = \frac{5}{10} = \frac{S}{900}$$ Or, S = 45 Hence, number of workers left and discharged comes to 45

(iii) Number of workers recruited and joined:

Employee turnover rate (Flux method)

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

Or, $\frac{16}{10} - \frac{45+A}{900}$ Or, $\left[\frac{1,44,00}{100} - 45\right] = 99$

Using Flux method $= \frac{16\%}{1} \times 4 = 64\%$

Using Replacement method $= \frac{8\%}{1} \times 4 = 32\%$

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

Question 39

    Explain the treatment of Overtime Premium in following situations:

(i)   **SV & Co. wants to grab some special orders, and overtime is required to meet the same.**

(ii)   **Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.**

(iii)   **S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.**

(iv)   **Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.**

(v)   **A customer requested the company MN Ltd. to expedite the job because of his urgency of work. (PYP 5 Marks May'22)**

Answer 39

Treatment of Overtime premium in different situations

Situation	Treatment
(i) SV & Co. wants to grab some special orders, and overtime is required to meet the same.	If overtime is required to cope with general production programmes or for meeting urgent orders, the overtime premium should be treated as overhead cost of the particular department or cost centre which works overtime.
(ii) Dept. X has to work overtime to make up a shortfall in production due to some fault of management in dept. Y.	If overtime is worked in a department due to the fault of another department, the overtime premium should be charged to the latter department (Y).
(iii) S Ltd. has to work overtime regularly throughout the year as a policy due to the workers' shortage.	The overtime premium is treated as a part of employee cost and job is charged at an effective average wage rate.
(iv) Due to flood in Odisha, RS Ltd. has to work overtime to complete the job.	Overtime worked on account of abnormal conditions such as flood, earthquake etc., should not be charged to cost, but to Costing Profit and Loss Account.
(v) A customer requested the company MN Ltd. to expedite the job because of his urgency of work.	Where overtime is worked at the request of the customer, overtime premium is also charged to the job/customer directly.

Question 40

    A skilled worker, in PK Ltd., is paid a guaranteed wage rate of ₹ 15.00 per hour in a 48- hour week. The standard time to produce a unit is 18 minutes. During a week, a skilled worker -Mr. 'A' has produced 200 units of the product. The Company has taken a drive for cost reduction and wants to reduce its labour cost.

    You are required to:

        (i)   **Calculate wages of Mr. 'A' under each of the following methods:**

            (A)   **Time rate,**

            (B)   **Piece -rete with a guaranteed weekly wage,**

            (C)   **Halsey Premium Plan**

            (D)   **Rowan Premium Plan**

        (ii)   **Suggest which bonus plan i.e. Halsey Premium Plan or Rowan Premium Plan, the company should follow. (PYP 6 Marks Nov 22)**

Answer 40

(i) **Calculation of wages of Mr. 'A' under different wage schemes:**

A. **Time rate**

Wages = Time Worked × Rate for the time

= 48 hours x ₹ 15

= ₹ 720

B. **Piece rate with a guaranteed weekly wage**

Wages = Number of units produced × Rate per unit

= 200 units x ₹ 4.50*

= ₹ 900

*(₹ 15 / 60 minutes) x 18 minutes = ₹ 4.50

C. **Halsey Premium Plan**

Wages = Time taken × Time rate + 50% of time saved × Time rate

Wages = Time taken × Time rate + 50% (Standard time − Actual time) × Time rate

= (48 hours x ₹ 15) + 50% of (60 hours# − 48 hours) x ₹ 15

= ₹ 720 + ₹ 90

= ₹ 810

#(200 units x 18 minutes) / 60 minutes = 60 hours

D. **Rowan Premium Plan**

Wages = Time taken X Rate per hour + $\frac{Time\ Saved}{Time\ Allowed}$ X Time taken X Rate per hour

=(48 hours X Rs. 15) + ($\frac{60-48\ hours}{60 hours}$ X 48 hours X Rs. 15)

= Rs. 720 + Rs. 144

= Rs. 864

(ii) The company may follow Halsey Premium Plan over Rowan Premium Bonus Plan as the total wages paid is lower than that of Rowan Premium Bonus Plan.

Question 41

SMC Company Limited is producing a particular design of toys under the following existing incentive system:

Normal working hours in the week	**48 hours**
Late shift hours in the week	**12 hours**
Rate of payment	**Normal working: ` 150 per hour**
	Late shift: ` 300 per hour

Average output per operator for 60 hours per week (including late shift hours): 80 toys.

The company's management has now decided to implement a system of labour cost payment with either the Rowan Premium Plan or the Halsey Premium Plan in order to increase output, eliminate late shift overtime, and reduce the labour cost.

The following information is obtained:

The standard time allotted for ten toys is seven and half hours.

Time rate: ` 150 per hour (as usual).

Assuming that the operator works for 48-hours in a week and produces 100 toys, you are required to calculate the weekly earnings for one operator under-

(i) The existing Time Rate,

(ii) Rowan Premium Plan and,

(iii) Halsey Premium Plan (50%). (5 Marks, May '23)

Answer 41

Working Notes:

(1) Effective rate per hour:
Incentive for 60 hours = (` 150 × 48 hours + ` 300 × 12 hours)

= 7,200 + 3,600 = ` 10,800

= ` 10,800 ÷ 60 hours = ` 180 per hour

(2) Time taken/ Allowed to produce 100 toys:

= (60 hours ÷ 80 toys) × 100 toys = 75 hours

(3) Time saved = Time Allowed – Time Taken

= 75 hours – 48 hours = 27 hours

(i) Calculation of weekly earnings for one operator under the existing time rate:

= (48 hours x ` 150) + (12 hours x ` 300) = ` 10,800

Alternative solution

= Effective rate per hour (WN-1) × Time required for 100 toys (WN-2)

= ` 180 × 75 hours = ` 13,500

(ii) Calculation of weekly earnings for one operator under Rowan Premium plan:

(Time taken × Rate per hour) + (Time Saved/ Time Allowed × Time taken × Rate per hour)

= (48 hours × ` 150) + [(27 ÷ 75) × 48 × ` 150]

= 7,200 + 2,592 = ` 9,792

(iii) Calculation of weekly earnings for one operator under Halsey Premium plan:

(Time taken × Rate per hour) + (50% of Time Saved × Rate per hour)

= (48 hours × ` 150) + (50% of 27 hours × ` 150)

= ` 7,200 + ` 2,025 = ` 9,225

Question 42

How does the high employee turnover increase the cost of production? Explain. (5 Marks, May '23)

Answer 42

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

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

Chapter 4
Overheads-Absorption Costing Method

Question 1

From the details furnished below you are required to COMPUTE a comprehensive machine -hour rate:

Original purchase price of the machine (subject to depreciation at 10% per annum on original cost)	Rs. 6,48,000

Normal working hours for the month 200 hours

(The machine works for only 75% of normal capacity)

Wages to Machine-man	Rs. 400 per day (of 8 hours)
Wages to Helper (machine attendant)	Rs. 275 per day (of 8 hours)
Power cost for the month for the time worked	Rs. 65,000
Supervision charges apportioned for the machine center for the month	Rs.18,000
Electricity & Lighting for the month	Rs. 9,500
Repairs & maintenance (machine) including Consumable stores per month Rs.17,500	
Insurance of Plant & Building (apportioned) for the year	Rs. 18,250
Other general expense per annum	Rs. 17,500

The workers are paid a fixed Dearness allowance of Rs. 4,575 per month. Production bonus payable to workers in terms of an award is equal to 33.33% of basic wages and dearness allowance. Add 10% of the basic wage and dearness allowance against leave wages and holidays with pay to arrive at a comprehensive labour-wage for debit to production. (MTP 10 Marks ,March'19 & Sep '23)

Answer 1

Effective machine hours = 200 hours × 75% = 150 hours

Computation of Comprehensive Machine Hour Rate

Fixed cost	Permonth (Rs.)	Per hour (Rs.)
Supervision charges	18,000.00	
Electricity and lighting	9,500.00	
Insurance of Plant and building (Rs.18,250 ÷12)	1,520. 83	
Other General Expenses (Rs.17,500÷12)	1,458.33	
Depreciation (Rs.64,800÷12)	5,400.00	
Direct Cost	35,879.16	239.19
Repairs and maintenance	17,500.00	116.67
Power	65,000.00	433.33
Wages of machine man		139.27
Wages of Helper		109.41
Machine Hour rate (Comprehensive)		1,037.87

Wages per machine hour

	Machine man	Helper
Wages for 200 hours		
Machine-man (Rs.400 × 25)	Rs.10,000.00	---
Helper (Rs.275 × 25)	---	Rs.6,875.00
Dearness Allowance (DA)	Rs.4,575.00	Rs.4,575.00
	Rs. 14,575.00	Rs. 11,450.00
Production bonus (1/3 of Basic and DA)	4,858.33	3,816.67
Leave wages (10% of Basic and DA)	1,457.50	1,145.00

Question 2

A machine shop cost centre contains three machines of equal capacities.

To operate these three machines nine operators are required i.e. three operators on each machine. Operators are paid ₹ 20 per hour. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the fourty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four-weekly period. The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

- Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is ₹ 52,000.
- Maintenance and repairs per week per machine is ₹ 60.
- Consumable stores per week per machine are ₹ 75.
- Power : 20 units per hour per machine at the rate of 80 paise per unit.
- Apportionment to the cost centre : Rent per annum ₹ 5,400, Heat and Light per annum ₹ 9,720, foremanȷ's salary per annum ₹ 12,960 and other miscellaneous expenditure per annum ₹ 18,000.

Required:

      (i)   CALCULATE the cost of running one machine for a four-week period.
     (ii) CALCULATE machine hour rate.   (MTP March '18,10 Marks)

Answer 2

Effective Machine hour for four-week period
= Total working hours – unproductive set-up time
= {(48 hours × 4 weeks) – {(4 hours × 4 weeks)} = (192 – 16) hours) = 176 hours.

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

	(₹)	(₹)
(A) Standing charges (per annum)		
Rent	5,400.00	
Heat and light	9,720.00	
Forman's salary	12,960.00	
Other miscellaneous expenditure	18,000.00	
Standing charges (per annum)	46,080.00	
Total expenses for one machine for four week period $$\frac{₹46,080}{3\ machines\ \times 13\ four-week\ period}$$		1,181.54
Wages (48 hours × 4 weeks × ₹ 20 × 3 operators)		11,520.00
Bonus {(176 hours × ₹ 20 × 3 operators) x 10%}		1,056.00
Total standing charges		13,757.54
(B) Machine Expenses		
Depreciation $= \left(52{,}000 \times 10\% \times \frac{1}{13\ four-week\ period}\right)$		400.00
Repairs and maintenance (₹ 60 x 4 weeks)		240.00
Consumable stores (₹ 75 x 4 weeks)		300.00
Power (176 hours x 20 units x ₹ 0 .80)		2,816.00
Total machine expenses		3,756.00
(C) Total expenses (A) + (B)		17,513.54

   (ii)   Machine hour rate = $\frac{17{,}513.54}{176\ hours}$ = 99.51

Question 3

Explain Single and Multiple Overhead Rates.   (MTP March '18, 5 Marks, Old & New SM)

Answer 3

Single and Multiple Overhead Rates:

Single overhead rate: It is one single overhead absorption rate for the whole factory.

It may be computed a s follows:

Single overhead rate = $\dfrac{Overhead\ costs\ for\ the\ entire\ factory}{Total\ quantity\ of\ the\ base\ selected}$

The base can be total output, total labour hours, total machine hours, etc.

The single overhead rate may be applied in factories which produces only one major product on a continuous basis. It may also be used in factories where the work performed in each department is fairly uniform and standardized. Multiple overhead rate: It involves computation of separate rates for each production department, service department, cost center and each product for both fixed and variable overheads. It may be computed as follows:

Multiple overhead rate$= \dfrac{Overhead\ allocated\ /\ apportioned\ to\ each\ department\ /\ cost\ centre\ or\ product}{Corresponding\ base}$

Under multiple overhead s rate, jobs or products are charged with varying amount of factory overheads depending on the type and number of departments through which they pass.

However, the number of overheads rate which a firm may compute would depend upon two opposing factors viz. the degree of accuracy desired and the clerical cost involved.

Question 4

In a factory, a machine is considered to work for 208 hours in a month. It includes maintenance time of 8 hours and set up time of 20 hours. The expense data relating to the machine are as under:

Cost of the machine is Rs. 5,00,000. Life 10 years. Estimated scrap value at the end of life is Rs. 20,000. (Rs.)

- **Repairs and maintenance per annum**   **60,480**
- **Consumable stores per annum**   **47,520**
- **Rent of building per annum**
  (The machine under reference occupies 1/6 of the area)   **72,000**
- **Supervisor's salary per month (Common to three machines)**   **6,000**
- **Wages of operator per month per machine**   **2,500**
- **General lighting charges per month allocated to the machine**   **1,000**
- **Power 25 units per hour at Rs. 2 per unit**
  Power is required for productive purposes only. Set up time, though productive, does not require power. The Supervisor and Operator are permanent. Repairs and maintenance and consumable stores vary with the running of the machine.
  Required
  COMPUTE a two-tier machine hour rate for (a) set up time, and (b) running time. (MTP Aug.'18, 10 Marks)

Answer 4

Working Notes:

1. (i) Effective hours for standing charges (208 hours – 8 hours) = 200 hours
   (ii) Effective hours for variable costs (208 hours – 28 hours) = 180 hours

2. **Standing Charges per hour**

	Cost per month (Rs.)	Cost per hour (Rs.) (Cost per month ÷ 200 hours)
Supervisor's salary $\left(\dfrac{Rs.6,000}{3\ machines}\right)$	2,000	10.00
Rent of building $\left(\dfrac{1}{6} \times \dfrac{Rs.72,000}{12\ month}\right)$	1,000	5.00
General lighting	1,000	5.00
Total Standing Charges	4,000	20.00

3. **Machine running expenses per hour**

	Cost per month (Rs.)	Cost per hour (Rs.)
Depreciation $\left(\dfrac{Rs.\ (5,00,000 - 20,000)}{10\ years} \times \dfrac{1}{12\ months}\right)$	4,000	20.00 $\left(\dfrac{Rs.\ 4,000}{200 hours}\right)$
Wages	2,500	12.50

		$\left(\dfrac{Rs.\,2,500}{200\,hours}\right)$
Repairs & Maintenance	5,040	28.00
$\left(\dfrac{Rs.\,60,480}{12\,Months}\right)$		$\left(\dfrac{Rs.\,5,040}{180\,hours}\right)$
Consumable stores	3,960	22.00
$\left(\dfrac{Rs.\,47,520}{12\,Months}\right)$		$\left(\dfrac{Rs.\,3,960}{180\,hours}\right)$
Power (25 units × Rs.2 × 180 hours)	9,000	50.00
Total Machine Expenses	24,500	132.50

Computation of Two – tier machine hour rate	Set up time rate per machine hour	Running time rate per machine hour
	(Rs.)	(Rs.)
Standing Charges	20.00	20.00
Machine expenses :		
Depreciation	20.00	20.00
Repair and maintenance	–	28.00
Consumable stores	–	22.00
Power	–	50.00
Machine hour rate of overheads	40.00	140.00
Wages	12.50	12.50
Comprehensive machine hour rate	52.50	152.50

Question 5

V Ltd. manufactures luggage trolleys for airports. The factory, in which the company undertakes all of its production, has two production departments- 'Fabrication' and 'Assembly', and two service departments- 'Stores' and 'Maintenance'.

The following information have been extracted from the company's budget for the financial year ended 31st March, 2019:

Particulars		Rs.
Allocated Overhead Costs		
Fabrication Department		15,52,000
Assembly Department		7,44,000
Stores Department		2,36,000
Maintenance Department		1,96,000
Other Overheads		
Factory rent		15,28,000
Factory building insurance		1,72,000
Plant & machinery insurance		1,96,000
Plant & Machinery Depreciation		2,65,000
Subsidy for staffs' canteen		4,48,000
Direct Costs	Rs.	Rs.
Fabrication Department:		
Material	63,26,000	
Labour	8,62,000	71,88,000
Assembly Department:		
Material	1,42,000	
Labour	13,06,000	14,48,000

The following additional information is also provided:

	Fabrication Department	Assembly Department	Stores Department	Maintenance Department

Floor area (square meters)	24,000	10,000	2,500	3,500
Value of plant & machinery (Rs.)	16,50,000	7,50,000	75,000	1,75,000
No. of stores requisitions	3,600	1,400	-	-
Maintenance hours required	2,800	2,300	400	-
No. of employees	120	80	38	12
Machine hours	30,00,000	60,000		
Labour hours	70,000	26,00,000		

Required:

(i)   PREPARE a table showing the distribution of overhead costs of the two service departments to the two production departments using step method; and

(ii)   Calculate the most appropriate overhead recovery rate for each department.

(iii)   Using the rates calculated in part (ii) above, CALCULATE the full production costs of the following job order:

Job number IGI2019

Direct Materials   Rs. 2,30,400

Direct Labour:

       Fabrication Department   240 hours @ Rs. 50 per hour

       Assembly Department   180 hours @ Rs. 50 per hour

Machine hours required:

       Fabrication Department   210 hours

       Assembly Department   180 hours   (MTP Oct. '19 & April '23 10 Marks)

Answer 5

(i)   Table of Primary Distribution of Overheads

Particulars	Basis of Apportionment	Total Amount	Production Department		Service Departments	
			Fabrication	Assembly	Stores	Maintenance
Overheads Allocated		27,28,000	15,52,000	7,44,000	2,36,000	1,96,000
Direct Costs Other Overheads:	Actual	86,36,000	71,88,000	14,48,000	—	—
Factory rent	Floor Area (48:20:5:7)	15,28,000	9,16,800	3,82,000	95,500	1,33,700
Factory building insurance	Floor Area (48:20:5:7)	1,72,000	1,03,200	43,000	10,750	15,050
Plant & Machinery insurance	Value of Plant & Machinery (66:30:3:7)	1,96,000	1,22,038	55,472	5,547	12,943
Plant & Machinery Depreciation	Value of Plant & Machinery (66:30:3:7)	2,65,000	1,65,000	75,000	7,500	17,500
Canteen Subsidy	No. of Employees (60:40:19:6)	4,48,000	2,15,040	1,43,360	68,096	21,504
		1,39,73,000	1,02,62,078	28,90,832	4,23,393	3,96,697

Re-distribution of Service Departments' Expenses:

Particulars	Basis of Apportionment	Production Department	Service Departments

Overheads as per Primary distribution	As per Primary distribution	Fabrication	Assembly	Stores	Maintenance
		1,02,62,078	28,90,832	4,23,393	3,96,697
Maintenance Department Cost	Maintenance Hours (28:23:4:-)	2,01,955	1,65,891	28,851	(3,96,697)
		1,04,64,033	30,56,723	4,52,244	—
Stores Department	No. of Stores Requisition (18:7:-:-)	3,25,616	1,26,628	(4,52,244)	
		1,07,89,649	31,83,351	—	—

(ii) Overhead Recovery Rate

Department	Apportioned Overhead (Rs.) (I)	Basis of Overhead Recovery Rate (II)	Overhead Recovery Rate (Rs.) [(I) ÷ (II)]
Fabrication	1,07,89,649	30,00,000 Machine Hours	3.60 per Machine Hour
Assembly	31,83,351	26,00,000 Labour Hours	1.22 per Labour Hour

(iii)

Calculation of full production costs of Job no. IGI2019. Particulars	Amount (Rs.)
Direct Materials	2,30,400
Direct Labour:	
Fabrication Deptt. (240 hours × Rs.50)	12,000
Assembly Deptt. (180 hours × Rs.50)	9,000
Production Overheads:	
Fabrication Deptt. (210 hours × Rs. 3.60)	756
Assembly Deptt. (180 hours × Rs. 1.22)	220
Total Production Cost	2,52,376

Question 6

You are given the following information of the three machines of a manufacturing department of X Ltd.:

Preliminary estimates of expenses (per annum)

	Total (Rs.)	Machines		
		A (Rs.)	B (Rs.)	C (Rs.)
Depreciation	20,000	7,500	7,500	5,000
Spare parts	10,000	4,000	4,000	2,000
Power	40,000			
Consumable stores	8,000	3,000	2,500	2,500
Insurance of machinery	8,000			
Indirect employee cost	20,000			
Building maintenance expenses	20,000			
Annual interest on capital outlay	50,000	20,000	20,000	10,000
Monthly charge for rent and rates	10,000			
Salary of foreman (per month)	20,000			
Salary of Attendant (per month)	5,000			

(The foreman and attendant control all the three machines and spend equal time on each of them.)
The following additional information is also available:

Machines

	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to:

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates.   (MTP Oct. '18, 10 Marks, RTP Nov 20)

Answer 6

Computation of Machine Hour Rate

		Basis of apportionment	Total (₹)		Machines	
(A)	Standing Charges			A (₹)	B (₹)	C (₹)
	Insurance	Depreciation Basis				
	Indirect employee cost	(3:3:2) Direct Labour hours	8,000	3,000	3,000	2,000
		(2:3:3)	24,000	6,000	9,000	9,000
	Building maintenance expenses	Floor Space (2:2:1)	20,000	8,000	8,000	4,000
	Rent and Rates	Floor Space (2:2:1)	1,20,000	48,000	48,000	24,000
	Salary of foreman	Equal	2,40,000	80,000	80,000	80,000
	Salary of attendant	Equal	60,000	20,000	20,000	20,000
	Total standing charges			1,65,000	1,68,000	1,39,000
	Hourly rate for standing charges			84.70	86.24	71.36
(B)	Machine Expenses:					
	Depreciation	Direct	20,000	7,500	7,500	5,000
	Spare parts	Final estimates	13,225	4,600	5,750	2,875
	Power	K.W. rating (3:2:3)	40,000	15,000	10,000	15,000
	Consumable Stores	Direct	8,000	3,000	2,500	2,500
	Total Machine expenses		81,225	30,100	25,750	25,375
	Hourly Rate for Machine expenses			15.45	13.22	13.03
	Total (A + B)		553,225	1,95,100	1,93,750	1,64,375
Machine Hour rate				100.15	99.46	84.38

Working Notes:

(i) **Calculation of effective working hours:**

No. of full off-days = No. of Sunday + No. of holidays

= 52 + 12 = 64 days

No. of half working days   = 52 days – 2 holidays = 50 days

No. of full working days   = 365 days – 64 days – 50 days = 251 days

Total working Hours   = {(251 days × 8 hours) + (50 days × 4 hours)}

= 2,008 hours + 200 = 2,208 hours.

Total effective hours   = Total working hours × 90% - 2% for break-down

= 2,208 hours × 90% - 2% (2,208 hours × 90%)

= 1,987.2 hours – 39.74 hours

= 1947.46 or Rounded up to 1948 hours.

(ii)   **Amount of spare parts is calculated as under:**

	A (₹)	B (₹)	C (₹)
Preliminary estimates	4,000	4,000	2,000
Add: Increase in price @ 15%	600	600	300
	4,600	4,600	2,300
Add: Increase in consumption @ 25%	-	1,150	575
Estimated cost	4,600	5,750	2,875

(iii)   **Amount of Indirect employee cost is calculated as under:**

	(₹)
Preliminary estimates	20,000
Add: Increase in wages @ 20%	4,000
	24,000

(iv)   Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

Question 7

EXPLAIN the difference between Allocation and Apportionment of expenses. (MTP Oct. '18, 5 Marks, Old & New SM)

Answer 7

The difference between the allocation and apportionment is important to understand because the purpose of these two methods is the identification of the items of cost to cost units or centers. However, the main difference between the above methods is given below.

(1) Allocation deals with the whole items of cost, which are identifiable with any one department. For example, indirect wages of three departments are separately obtained and hence each department will be charged by the respective amount of wages individually.

On the other hand, apportionment deals with the proportions of an item of cost for example; the cost of the benefit of a service department will be divided between those departments which has availed those benefits.

(2) Allocation is a direct process of charging expenses to different cost centres whereas apportionment is an indirect process because there is a need for the identification of the appropriate portion of an expense to be borne by the different departments benefited.

(3) The allocation or apportionment of an expense is not dependent on its nature, but the relationship between the expense and the cost centre decides that whether it is to be allocated or apportioned.

(4) Allocation is a much wider term than apportionment.

Question 8

A Ltd. manufactures two products- A and B. The manufacturing division consists of two production departments P_1 and P_2 and two service departments S_1 and S_2. Budgeted overhead rates are used in the production departments to absorb factory overheads to the products. The rate of Department P_1 is based on direct machine hours, while the rate of Department P_2 is based on direct Labour hours. In applying overheads, the pre-determined rates are multiplied by actual hours. (10 Marks, Oct.'2020)

For allocating the service department costs to production departments, the basis adopted is as follows:

(i)   **Cost of Department S_1 to Department P_1 and P_2 equally, and**

(ii)   **Cost of Department S_2 to Department P_1 and P_2 in the ratio of 2:1 respectively. The following budgeted and actual data are available:**
Annual profit plan data:

Factory overheads budgeted for the year:

Departments	P_1	27,51,000	S_1	8,00,000
	P_2	24,50,000	S_2	6,00,000

Budgeted output in units: Product A 50,000; B 30,000.

Budgeted raw-material cost per unit: Product A ₹ 120; Product B ₹ 150.

Budgeted time required for production per unit:

| Department P_1 : | Product A : 1.5 machine hours |
| | Product B : 1.0 machine hour |

Department P_2 :	
	Product A : 2 Direct Labour hours
	Product B : 2.5 Direct Labour hours

Average wage rates budgeted in Department P_2 are:

Product A - ₹ 72 per hour and Product B – ₹ 75 per hour. All materials are used in Department P_1 only.

Actual data (for the month of Jan, 2020):

| Units actually produced: | Product A : 4,000 units |
| | Product B : 3,000 units |

Actual direct machine hours worked in Department P_1:

On Product A 6,100 hours, Product B 4,150 hours. Actual direct Labour hours worked in Department P_2:

On Product A 8,200 hours, Product B 7,400 hours.

Costs actually incurred:		Product A		Product B
Raw materials		₹ 4,89,000		₹ 4,56,000
Wages		5,91,900		5,52,000
Overheads: Department	P_1	2,50,000	S_1	80,000
	P_2	2,25,000	S_2	60,000

You are required to:

(i) COMPUTE the pre-determined overhead rate for each production department.

(ii) PREPARE a performance report for Jan, 2020 that will reflect the budgeted costs and actual costs. **(MTP 10 Marks, Oct'20) (Same concept different figures Old & New SM)**

Answer 8

(i) Computation of pre-determined overhead rate for each production department from budgeted data

	Production Department		Service Department	
	P_1	P_2	S_1	S_2
Budgeted factory overheads for the year (₹)	27,51,000	24,50,000	8,00,000	6,00,000
Allocation of service department S_1's costs to production departments P_1 and P_2 equally (₹)	4,00,000	4,00,000	(8,00,000)	--
Allocation of service department S_2's costs to production departments P_1 and P_2 in the ratio of 2:1 (₹)	4,00,000	2,00,000	–	(6,00,000)
Total	35,51,000	30,50,000	--	--

Budgeted machine hours in department P_1 (working note-1)	1,05,000	--		
Budgeted labour hours in department P_2 (working note-1)	--	1,75,000		
Budgeted machine/ labour hour rate	33.82	17.43		

(ii) Performance report for Jan, 2020

(When 4,000 and 3,000 units of Products A and B respectively were actually produced)

	Budgeted (₹)	Actual (₹)
Raw materials used in Dept. P_1:		
A : 4,000 units × Rs.120	4,80,000	4,89,000
B : 3,000 units × Rs.150	4,50,000	4,56,000
Direct Labour cost		
(on the basis of Labour hours worked in department P_2)		
A : 4,000 units × 2 hrs. × Rs. 72	5,76,000	5,91,900
B : 3,000 units × 2.5 hrs. × Rs. 75	5,62,500	5,52,000
Overhead absorbed on machine hour basis in Dept. P_1:		
A : 4,000 units × 1.5 hrs. × Rs.33.82	2,02,920	1,96,420*
B : 3,000 units × 1 hr. × Rs.33.82	1,01,460	1,33,630*
Overhead absorbed on Labour hour basis in Dept. P_2:		
A : 4,000 units × 2 hrs. × Rs.17.43	1,39,440	1,49,814**
B : 3,000 units × 2.5 hrs. × Rs.17.43	1,30,725	1,35,198**
	26,43,045	27,03,962

* (Refer to working note 4) ** (Refer to working note 5)

Working notes

1.

	Product A	Product B	Total
Budgeted output (units)	50,000	30,000	
Budgeted machine hours in Dept. P_1	75,000 (50,000×1.5 hrs.)	30,000 (30,000×1 hr.)	1,05,000
Budgeted Labour hours in Dept. P_2	1,00,000 (50,000×2 hrs.)	75,000 (30,000×2.5 hrs.)	1,75,000

2.

	Product A	Product B	Total
Actual output (units)	4,000	3,000	
Actual machine hours utilized in Dept. P_1	6,100	4,150	10,250
Actual labour hours utilised in Dept. P_2	8,200	7,400	15,600

3. **Computation of actual overhead rates for each production department from actual data**

	Production Department		Service Department	
	P_1	P_2	S_1	S_2
Actual factory overheads for the month of Jan, 2020 (₹)	2,50,000	2,25,000	80,000	60,000
Allocation of service Dept. S_1's costs to production Dept. P_1 and P_2 equally (₹)	40,000	40,000	(80,000)	？

Allocation of service Dept. S_2's costs to production Dept. P_1 and P_2 in the ratio of 2:1 (₹)	40,000	20,000		⬚	(60,000)
Total	3,30,000	2,85,000		--	--
Actual machine hours in Dept. P_1 (working note 2)	10,250	--			
Actual labour hours in Dept. P_2 (working note 2)	--	15,600			
Actual machine/ labour hour rate (₹)	32.20	18.27			

4. Actual overheads absorbed (based on machine hours)

A : 6,100 hrs × Rs.32.20 = 1,96,420

B : 4,150 hrs ×R s . 32.20=1,33,630

5. Actual overheads absorbed (based on labour hours)

A: 8,200 hrs × Rs.18.27 = 1,49,814

B: 7,400 hrs × Rs.18.27 =1,35,198

Question 9

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. (MTP 10 Marks, Mar 21)(Same concept

different figures MTP 10 Marks Nov'21)

Answer 9

Primary Distribution of Overheads

Item	Basis	Total Amount (Rs.)	Production Departments			Service Departments	
			X (Rs.)	Y (Rs.)	Z (Rs.)	A (Rs.)	B (Rs.)
Indirect Material	Actual	2,50,000	40,000	60,000	90,000	50,000	10,000
Indirect Labour	Actual	5,20,000	90,000	1,00,000	1,40,000	1,20,000	70,000
Supervisor's Salary	Actual	1,92,000	-	-	1,92,000	-	-
Fuel & Heat	Radiator Sections {2:4:6:5:3}	30,000	3,000	6,000	9,000	7,500	4,500
Power	Kilowatt Hours {7:8:6:3:-}	3,60,000	1,05,000	1,20,000	90,000	45,000	-
Rent & Rates	Area (Sq. ft.) {22:20:15:12:6}	3,00,000	88,000	80,000	60,000	48,000	24,000
Insurance	Capital Value of Assets {4:6:5:1:2}	36,000	8,000	12,000	10,000	2,000	4,000
Canteen Charges	No. of Employees {6:7:12:3:2}	1,20,000	24,000	28,000	48,000	12,000	8,000
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)x10]

b = 1,80,500 + 0.20 a

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 × 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

Question 10

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 5 Marks, Apr.'2021)(RTP Nov '23)

Answer 10

Working Notes:

(i) Total Productive hours = Estimated Working hours – Machine Maintenance hours

= 2,200 hours – 200 hours = 2,000 hours

(ii) Depreciation per annum = Rs. 1,00,000 – Rs. 10,000 / 10years = Rs. 9000

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

(iv) Wages of attendants (per annum)= Rs. 1,200 × 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 (30,000/2,000)		15.00
B. Machine Expense		
(iii) Depreciation	9,000	4.50
(iv) Electricity($\frac{Rs.0.9 \times 16 units \times 1,900 hours}{2,000 hours}$)	-	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**

Question 11

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: **(10 Marks, Apr.'2021)**

	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 10 Marks, Apr.'21)**

Answer 11

(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:

$$= \frac{80,000}{6 \times 6,750 + 3 \times 14,000 + 1 \times 77,500}$$

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

$$= 80,000 / 1,60,000 \qquad = 0.5$$

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	21,000	38,750	80,000
	(Rs.3 x 6,750)	(Rs.1.5 x 14,000)	(Rs.0.5 x 77,500)	
Works cost	47,750	86,750	3,93,750	5,28,250
Add: General & administration overheads (1:1:1)	16,000	16,000	16,000	48,000
Add: Selling expenses	9,550	17,350	78,750	1,05,650
	(Rs.47,750 x 0.20)	(Rs.86,750 x 0.20)	(Rs. 3,93,750 x 0.20)	
Cost of sales	73,300	1,20,100	4,88,500	6,81,900
Profit (Balancing figure)	95,450	89,900	1,31,500	3,16,850
Sales	1,68,750	2,10,000	6,20,000	9,98,750
	(Rs.25 x 6,750)	(Rs.15 x 14,000)	(Rs.8 x 77,500)	

Question 12

A machine costing ₹ 10 lakhs, was purchased on 01-04-2021. The expected life of the machine is 10 years. At the end of this period its scrap value is likely to be ₹ 10,000. The total cost of all the machines including new one was ₹ 90 lakhs.

The other information is given as follows:
(i) Working hours of the machine for the year was 4,200 including 200 non-productive hours.
(ii) Repairs and maintenance for the new machine during the year was ₹ 6,000.
(iii) Insurance Premium was paid for all the machine ₹ 9,000.
(iv) New machine consumes 8 units of electricity per hour, the rate per unit being ₹ 3.75
(v) The new machine occupies $1/10^{th}$ area of the department. Rent of the department is Rs.2,400 per month.
(vi) Depreciation is charged on straight line basis.

COMPUTE machine hour rate for the new machine. (MTP 5 Marks, Oct.'21)

Answer 12

Computation of machine hour rate of new Machine

	Total (₹)	Per hour (₹)
A. <u>Standing Charges</u> I. Insurance Premium ₹ 9,000 * 1/9	1,000	
II. Rent 1/10 × ₹2,400 ×12 months	2,880	
B. Machine expenses	**3,880**	**0.97***
I. Repairs and Maintenance (₹ 6,000 ÷ 4,000 hours)		1.50
Depreciation =10,00,000-10,000/ 10 years* 4000 hr		24.75
III. Electricity (8 units x ₹ 3.75)		30.00
Machine hour rate		57.22

Working Note

Calculation of productive Machine hour rate

Total hours	4,200
Less: Non-Productive hours	200
Effective machine hours	4,000

* ₹ 3,880 ÷ 4,000 hours = ₹ 0.97

Question 13

M/s Avyukt Automobile Parts has four identical machines in its factory. Cost of each machine is ₹ 5,00,000 with expected scrap value of 10% at the end of its effective life (9 years). The expected annual running hours of machine is expected to run for 2,200 hours. The other details in respect of the machine shop are:

(I) **Factory Rent** ₹ 5,000 per month

(II) **Lighting of Factory** ₹ 3,000 per month

(III) **Operator Wages (Two operators and each operator is in charge of two machines)** ₹10,000 per month (per Operator)

(IV) **Fixed repairs and maintenance charges per machine** 2,000 per quarter

(V) **Insurance premium for the machine (Annual)** 3% of cost

(VI) **Forman's salary (Devoted 1/6th of his time to this factory)** ₹ 2,500 per month

(VII) **Other factory overhead (Annual)** ₹40,000

(VIII) **Power Consumption per machine per hour** 80 units

(IX) **Rate of Power** ₹ 150 for 100 units

(X) **Unproductive Hours lost during repairs** 50 per annum

(XI) **Unproductive Hours Lost while Job Setting** 650 per annum

You are required to COMPUTE a comprehensive machine hour rate assuming power is used during operating time only. (MTP 10 Marks April '22)

Answer 13

Computation of Comprehensive Machine Hour Rate per Machine

Particulars	Per Annum (₹)	Per Hour (₹)
Standing Charges:		
Depreciation (Working Note 2)	50,000	
Factory Rent (₹ 5,000 x 12 months / 4)	15,000	
Lighting of Factory (₹ 3,000 x 12 months / 4)	9,000	
Operator Wages (₹ 10,000 x 12 months / 2)	60,000	
Repairs and maintenance (₹ 2,000 x 4)	8,000	
Insurance premium (₹ 5,00,000 x 3%)	15,000	
Forman's salary (₹ 2,500 x 12 x ⅙ / 4)	1,250	
Other factory overhead (₹ 40,000 / 4)	10,000	
	1,68,250	
Standing Charges per hour (₹ 1,68,250 / 1,500 hours)		112.17

Running Charges:		
Power (80 units x ₹ 150 / 100)		120.00
Comprehensive Machine Hour Rate		232.17

Working Notes:

1. **Computation of Total Operative Hours**

   Total Running Hours: 2,200

   Less: Unproductive hours lost during repairs   50

   Less: Unproductive hours Lost while Job Setting   650

   Total Operative Hours   1,500 per annum

2. **Calculation of Annual Depreciation**

   Annual Depreciation $= \dfrac{Purchase\ Cost - Estimated\ Scrap\ Value}{Effective\ life\ in\ years}$

   $= \dfrac{Rs.5,00,000 - Rs.50,000}{9\ Years}$ = Rs. 50,000

Question 14

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

	P1	P2	P3	S1	S2
Direct wages (₹)	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 P 1, 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. (MTP 10 Marks March '22) (Same concept different figures PYP 10 Marks Nov'20 & Old & New SM)

Answer 14

Statement Showing Distribution of Overheads of PM Ltd.

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

Redistribution of Service Department's Expenses over Production Departments

	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 × 4 hrs.) + (₹ 40.38 × 5 hrs.) + (₹ 100.54 × 3 hrs.) = ₹ 240.62 + ₹ 201.90 + ₹ 301.62 = ₹ 744.14

Question 15

A work-shop has 8 identical machines operated by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ₹ 64,00,000. The following particulars are furnished for a six months' period:

Normal available hours per operator	1,248
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20
Normal unavoidable idle time-hours per operator	10
Production bonus estimated	10% on wages

Power consumed	₹ 80,500
Supervision and Indirect Labour	₹ 33,000
Lighting and Electricity	₹ 12,000
Average rate of wages per day of 8 hours per operator	₹ 200

The following particulars are given for a year:

Insurance	₹ 7,20,000
Sundry work Expenses	₹ 1,00,000
Management Expenses allocated	₹ 10,00,000
Depreciation	10% on the original cost

Repairs and Maintenance (including consumables): 5% of the value of all the machines. Prepare a statement showing the comprehensive machine hour rate for the machine shop.
(MTP 10 Marks Sep'22)

Answer 15

Workings:

Particulars	Six months 6 operators (Hours)
Normal available hours half yearly (1,248 x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours (A)	7,380
Less: Leave hours (20 x 6 operators)	(120)
Less: Normal idle time (10 x 6 operators)	(60)
Effective working hours	7,200

Computation of Comprehensive Machine Hour Rate

Particulars	Amount for six months (₹)
Operators' wages (7,380/8 x200)	1,84,500
Production bonus (10% on wages)	18,450
Power consumed	80,500
Supervision and indirect labour	33,000
Lighting and Electricity	12,000
Repair and maintenance {(5% × ₹ 64,00,000)/2}	1,60,000
Insurance (₹ 7,20,000/2)	3,60,000
Depreciation {(₹ 64,00,000 × 10%)/2}	3,20,000
Sundry Work expenses (₹ 1,00,000/2)	50,000
Management expenses (₹ 10,00,000/2)	5,00,000
Total Overheads for 6 months	17,18,450
Comprehensive Machine Hour Rate = ₹ 17,18,450/7,200 hours	₹ 238.67

Question 16

Madhu Ltd has calculated a predetermined overhead rate of ₹22 per machine hour for its Quality Check (QC) department. This rate has been calculated for the budgeted level of activity and is considered as appropriate for absorbing overheads. The following overhead expenditures at various activity levels had been estimated.

Total overheads	Number of machine hours
₹3,38,875	14,500
₹3,47,625	15,500
₹3,56,375	16,500

You are required to:

(i)   **COMPUTE the variable overhead absorption rate per machine hour.**

(ii)   **COMPUTE the estimated total fixed overheads.**

(iii) **CALCULATE the budgeted level of activity in machine hours.**

CALCULATE the amount of under/over absorption of overheads if the actual machine hours were 14,970 and actual overheads were ₹3,22,000. (MTP Oct'22, MTP May'20, April '19, 5 Marks)

Answer 16

(i)   **Computation of variable overhead absorption rate:**

Variable overhead absorption rate =

$$= \frac{Difference\ in\ Total\ Overheads}{Difference\ in\ levels\ in\ terms\ of\ machine\ hours}$$

$$= \frac{Rs.\,3,47,625 - Rs.\,3,38,875}{15,500\ hours\ -\ 14\ hours}$$

= ₹ 8.75 per Machine hour.

(ii)   **Computation of Total fixed overheads**

Total overheads at 14,500 hours	3,38,875
Less: Variable overheads (Rs. 8.75 × 14,500)	(1,26,875)
Total fixed overheads	2,12,000

(iii) Calculation of Budgeted level of activity in machine hours: Let budgeted level of activity = X

Then,

$$\frac{(Rs.8.75X+Rs.2,12,000)}{X}=Rs.22$$

8.75X + Rs.2,12,000 = 22X

13.25X = 2,12,000

X =16,000

Thus, budgeted level of activity = 16,000 machine hours.

(iv) Calculation of Under / Over absorption of overheads:

	(Rs.)
Actual overheads	3,22,000
Absorbed overheads (14,970 hours × Rs. 22 per hour)	3,29,340
Over-absorption (3,29,340 – 3,22,000)	7,340

Question 17

STATE Direct Expenses with examples. (MTP 5 Marks Oct'22)

Answer 17

Expenses other than direct material cost and direct employee cost, which are incurred to manufacture a product or for provision of service and can be directly traced in an economically feasible manner to a cost object. The following costs are examples for direct expenses:

(a) Royalty paid/ payable for production or provision of service;

(b) Hire charges paid for hiring specific equipment;

(c) Cost for product/ service specific design or drawing;

(d) Cost of product/ service specific software;

(e) Other expenses which are directly related with the production of goods or provision of service.

Question 18

PLR Ltd. manufacturers a single product and recovers the overheads by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory for the FY 2019-20 are Rs.

50,40,000 and budgeted machine hours are 6,000.

For a period of first six months of the financial year 2019?20, following information were extracted from the books:

Actual production overheads	**Rs. 34,08,000**
Amount included in the production overheads:	
Paid as per court's order	**Rs. 4,50,000**
Expenses of previous year booked in current year	**Rs. 1,00,000**
Paid to workers for strike period under an award	**Rs. 4,20,000**
Obsolete stores written off	**Rs. 36,000**
Production and sales data of the concern for the first six months are as under:	
Production:	
Finished goods	**1,10,000 units**
Works-in-progress (50% complete in every respect)	**80,000 units**
Sale:	
Finished goods	**90,000 units**

The actual machine hours worked during the period were 3,000 hours. It is revealed from the analysis of information that 40% of the over/under-absorption was due to defective production policies and the balance was attributable to increase in costs.

You are required:

(i) **to determine the amount of over/ under absorption of production overheads for the period,**

(ii) **to show the accounting treatment of over/ under-absorption of production overheads, and**

(iii) **to apportion the over/ under-absorbed overheads over the items. (RTP Nov'19, PYP 10 Marks Nov'19) (Same concept different figures RTP May'18)**

Answer 18

(i) Amount of over/ under absorption of production overheads during the period of first six months of the year 2019-20:

	Amount (Rs.)	Amount (Rs.)
Total production overheads actually incurred during the period		34,08,000
Less: Amount paid to worker as per court order	4,50,000	
Expenses of previous year booked in the current year	1,00,000	
Wages paid for the strike period under an award	4,20,000	
Obsolete stores written off	36,000	10,06,000
		24,02,000
Less: Production overheads absorbed as per machine hour rate (3,000 hours × Rs. 840*)		25,20,000
Amount of over absorbed production overheads		1,18,000

*BudgetedMachine hour rate (Blanket rate) = 50,40,000 / 6,000hours = Rs. 840 per hour

(ii) Accounting treatment of over absorbed production overheads: As, 40% of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account = Rs. 1,18,000× 40% = Rs. 47,200.

Balance of over absorbed production overheads should be distributed over Works in progress, Finished goods and Cost of sales by applying supplementary rate*. Amount to be distributed = Rs. 1,18,000× 60%

= Rs. 70,800

Supplementary rate = $\frac{Rs.70,800}{1,50,000\, units}$ = Rs. 0.472 per unit

(iii) Apportionment of over absorbed production overheads over WIP, Finished goods and Cost of sales:

	Equivalent completed units	Amount (Rs.)
Work-in-Progress (80,000 units × 50% ×0.472)	40,000	18,880
Finished goods (20,000 units × 0.472)	20,000	9,440
Cost of sales (90,000 units × 0.472)	90,000	42,480
Total	1,50,000	70,800

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> This was a numerical problem from the topic 'Overhead'. The question required to ascertain under absorbed production overhead, treatment and apportionment of the same. Performance of the examinees was above average.

Question 19

The Union Ltd. has the following account balances and distribution of direct charges on 31st March, 2019.

	Total	Production Depts.		Service Depts.	
		Machine Shop	**Packing**	**General Plant**	**Stores**
Allocated Overheads:	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Indirect labour	29,000	8,000	6,000	4,000	11,000
Maintenance Material	9,900	3,400	1,600	2,100	2,800
Misc. supplies	5,900	1,500	2,900	900	600
Supervisor's salary	16,000	--	--	16,000	--
Cost & payroll salary	80,000	--	--	80,000	--

Overheads to be apportioned:

Power	78,000
Rent	72,000
Fuel and Heat	60,000
Insurance	12,000
Taxes	8,400
Depreciation	1,20,000

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space	Radiator Section	No. of employees	Investment	H.P. hours
Machine Shop	2,000 Sq. ft.	45	20	8,00,000	3,500
Packing	800 Sq. ft.	90	12	2,40,000	500
General Plant	400 Sq. ft.	30	4	80,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	1,60,000	1,000

Expenses charged to the stores departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%;

General Plant overheads is distributed on the basis of number of employees.

(a) **PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution.**

(b) **DETERMINE the service department distribution by simultaneous equation method.(RTP May '19) (Same concept different figures Old & New SM)**

Answer 19

(a) **Overhead Distribution Statement**

	Production Departments		Service Departments	
	Machine Shops	Packing	General Plant	Stores
Allocated Overheads:	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Indirect labour	8,000	6,000	4,000	11,000
Maintenance Material	3,400	1,600	2,100	2,800
Misc. supplies	1,500	2,900	900	600
Supervisor's salary	—	—	16,000	—
Cost & payroll salary	—	—	80,000	—
Total allocated overheads	12,900	10,500	1,03,000	14,400
Add: Apportioned Overheads (As per Schedule below)	1,84,350	70,125	22,775	73,150
	1,97,250	**80,625**	**1,25,775**	**87,550**

Schedule of Apportionment of Overheads

Item of Cost	Basis	Production Departments		Service Departments	
		Machine Shops (Rs.)	Packing (Rs.)	General Plant (Rs.)	Stores (Rs.)
Power	HP hours (7 : 1 : - : 2)	54,600	7,800	--	15,600
Rent	Floor space (5 : 2 : 1 : 4)	30,000	12,000	6,000	24,000
Fuel & Heat	Radiator sec. (3 : 6 : 2 : 4)	12,000	24,000	8,000	16,000
Insurance	Investment (10 : 3 : 1 : 2)	7,500	2,250	750	1,500
Taxes	Investment (10 : 3 : 1 : 2)	5,250	1,575	525	1,050
Depreciation	Investment (10 : 3 : 1 : 2)	75,000	22,500	7,500	15,000
		1,84,350	70,125	22,775	73,150

(b) **Re-distribution of Overheads of Service Departments to Production Departments:**

Let, the total overheads of General Plant = ' a' and the total overheads of Stores = 'b'

$a = 1,25,775 + 0.3b$ ....(i)

$b = 87,550 + 0.2a$ ....(ii)

Putting the value of 'b' in equation no. (i) $a = 1,25,775 + 0.3(87,550 + 0.2a)$

Or $a = 1,25,775 + 26,265 + 0.06a$

Or $0.94a = 1,52,040$ Or $a = 1,61,745$ (appx.)

Putting the value of a = 1,61,745 in equation no. (ii) to get the value of 'b'

b = 87,550 + 0.2 × 1,61,745 = 1,19,899

Secondary Distribution Summary

Particulars	Total (Rs.)	Machine Shops (Rs.)	Packing (Rs.)
Allocated and Apportioned overheads as per Primary distribution	2,77,875	1,97,250.00	80,625.00
- General Plant	1,61,745	80,872.50 $\left(1,61,745 \times \frac{5}{10}\right)$	48,523.50 $\left(1,61,745 \times \frac{3}{10}\right)$
- Stores	1,19,899	59,949.50 (1,19,899 × 50%)	23,979.80 (1,19,899 × 20%)
		3,38,072.00	1,53,128.30

Question 20

SreeAjeet Ltd. having fifteen different types of automatic machines furnishes information as under for 20X8-20X9

(i) Overhead expenses: Factory rent Rs. 1,80,000 (Floor area 1,00,000 sq. ft.), Heat and gas Rs. 60,000 and supervision Rs. 1,50,000.

(ii) Wages of the operator are Rs. 200 per day of 8 hours. Operator attends to one machine when it is under set up and two machines while they are under operation.

In respect of machine B (one of the above machines) the following particulars are furnished:

(i) Cost of machine Rs. 1,80,000, Life of machine- 10 years and scrap value at the end of its life Rs. 10,000

(ii) Annual expenses on special equipment attached to the machine are estimated as Rs. 12,000

(iii) Estimated operation time of the machine is 3,600 hours while set up time is 400 hours per annum

(iv) The machine occupies 5,000 sq. ft. of floor area.

(v) Power costs Rs. 5 per hour while machine is in operation.

ESTIMATE the comprehensive machine hour rate of machine B. Also find out machine costs to be absorbed in respect of use of machine B on the following two work orders

	Work order-1	Work order-2
Machine set up time (Hours)	15	30
Machine operation time (Hours)	100	190

(RTP Nov.'18)

Answer 20

Sree Ajeet Ltd.

Statement showing comprehensive machine hour rate of Machine B

(Rs.)

Standing Charges:

Factory rent {(Rs. 1,80,000/1,00,000 sq. ft.) × 5,000 Sq. ft.}	9,000	
Heat and Gas (Rs. 60,000/15 machines)	4,000	
Supervision (Rs. 1,50,000/ 15 machines)	10,000	
Depreciation [(Rs. 1,80,000 – Rs. 10,000)/ 10 years]	17,000	
Annual expenses on special equipment	12,000	
	52,000	
Fixed cost per hour (Rs. 52,000/ 4,000 hrs.)	13/-	
	Set up rate	**Operational rate**

	Per hour (Rs.)	Per hour (Rs.)
Fixed cost	13.00	13.00
Power	—	5.00
Wages	25.00	12.50
Comprehensive machine hour rate per hr.	38.00	30.50

Statement of 'B' machine costs

to be absorbed on the two work orders

	Work order-1			Work order-2		
	Hours	Rate	Amount	Hours	Rate	Amount
		Rs.	Rs.	Rs.	Rs.	Rs.
Set up time cost	15	38	570	30	38	1,140
Operation time cost	100	30.5	3,050	190	30.5	5,795
Total cost			3,620			6,935

Question 21

A manufacturing unit has purchased and installed a new machine at a cost of Rs. 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realise Rs. 90,000 as scrap value at the end of its working life.

Other relevant data are as follows:

(i) Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set -up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.

(ii) An estimated cost of maintenance of the machine is Rs. 2,40,000 p.a.

(iii) The machine requires a component to be replaced every week at a cost of Rs. 2,400.

(iv) There are three operators to control the operations of all the 6 machines. Each operator is paid Rs. 30,000 per month plus 20% fringe benefits.

(v) Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is Rs. 6.

(vi) Departmental and general works overhead allocated to the operation during last year was Rs. 5,00,000. During the current year it is estimated to increase by 10%.

Required:

COMPUTE the machine hour rate. (RTP May '21)

Answer 21

Working Note:

1. Effective machine hour:

= Budgeted working hours – Machine Set-up time

= 2,496 hours – 312 hours = 2,184 hours.

2. Operators' salary per annum:

Salary (3 operators × Rs.30,000 × 12 months)	Rs. 10,80,000
Add: Fringe benefits (20% of Rs.10,80,000)	Rs. 2,16,000
	Rs. 12,96,000

3. Depreciation per annum

$\dfrac{Rs.24,90,000 - Rs.90,000}{12\ Years}$ = Rs. 2,00,000

Computation of Machine hour Rate

	Amount p.a. (Rs.)	Amount per hour (Rs.)
Standing charges		
Operators' Salary $\left(\dfrac{Rs.\,12,96,000}{6\ machines} \times \dfrac{1}{2,184\ hours}\right)$	12,96,000	98.90
Departmental and general overheads:		
(Rs. 5,00,000 × 110%) $\left(\dfrac{Rs.\,5,50,000}{6\ machines} \times \dfrac{1}{2,184\ hours}\right)$	5,50,000	41.97
(A)	18,46,000	140.87
Machine Expenses		
Depreciation $\left(\dfrac{Rs.\,2,00,000}{2,184\ hours}\right)$	2,00,000	91.58
Electricity:		
During working hours (2,496 hours × 60 units ×Rs.6)	8,98,560	411.43
During maintenance hours (416 hours × 10 units ×Rs.6)	24,960	11.43
Component replacement cost (2,400 × 52 weeks)	1,24,800	57.14
Machine maintenance cost	2,40,000	109.89
(B)	14,88,320	681.47
Machine Hour Rate (A + B)		822.34

Question 22

PL Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of October, 2020:

	(Rs.)
Rent and rates	12,50,000
General lighting	1,50,000
Indirect Wages	3,75,000
Power	5,00,000
Depreciation on machinery	10,00,000
Insurance of machinery	4,00,000

Other Information:

	P1	P2	P3	S1	S2
Direct wages (Rs.)	7,50,000	5,00,000	7,50,000	3,75,000	1,25,000
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (Rs.)	60,00,000	80,00,000	1,00,00,000	5,00,000	5,00,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5

Production hours worked	6,225	4,050	4,100	-	-

<div align="center">Expenses of the service departments S₁ and S₂ are reapportioned as below:</div>

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

Required:

(i) COMPUTE overhead absorption rate per production hour of each production department.

(ii) DETERMINE the total cost of product X which is processed for manufacture in department P₁, P₂ and P₃ for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is Rs. 12,500 and direct labour cost is Rs. 7,500. (RTP Nov '21)(Same concepts different figures RTP May'20)

Answer 22

<div align="center">Primary Distribution Summary</div>

Item of cost	Basis of apportionment	Total (Rs.)	P1 (Rs.)	P2 (Rs.)	P3 (Rs.)	S1 (Rs.)	S2 (Rs.)
Direct wages	Actual	5,00,000	--	--	--	3,75,000	1,25,000
Rent and Rates	Floor area (4 : 5 : 6 : 4 : 1)	12,50,000	2,50,000	3,12,500	3,75,000	2,50,000	62,500
General lighting	Light points (2 : 3 : 4 : 2 : 1)	1,50,000	25,000	37,500	50,000	25,000	12,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	3,75,000	1,12,500	75,000	1,12,500	56,250	18,750
Power	Horse Power of machines used (6 : 3 : 5 : 1)	5,00,000	2,00,000	1,00,000	1,66,667	33,333	-
Depreciation of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	10,00,000	2,40,000	3,20,000	4,00,000	20,000	20,000
Insurance of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	4,00,000	96,000	1,28,000	1,60,000	8,000	8,000
		41,75,000	9,23,500	9,73,000	12,64,167	7,67,583	2,46,750

Overheads of service cost centres

Let S₁ be the overhead of service cost centre S₁ and S₂ be the overhead of service cost centre S₂.

S_1 = 7,67,583 + 0.10 S_2

S_2 = 2,46,750 + 0.10 S_1

Substituting the value of S₂ in S₁ we get S_1 = 7,67,583 + 0.10 (2,46,750 + 0.10 S₁)

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

0.99 S_1 = 7,92,258

S_1 = Rs. 8,00,260

S_2 = 2,46,750 + 0.10 X 8,00,260

= Rs. 3,26,776

Secondary Distribution Summary

Particulars	Total (Rs.)	$P_1(rs.)$	$P_2(rs.)$	$P_3(rs.)$
Allocated and Apportioned	31,60,667	9,23,500	9,73,000	12,64,167

over-heads as per primary distribution				
S_1	8,00,260	1,60,052	2,40,078	3,20,104
S_2	3,26,776	1,30,710	65,355	98,033
		12,14,262	12,78,433	16,82,304

(i) Overhead rate per hour

	P1	P2	P3
Total overheads cost (Rs.)	12,14,262	12,78,433	16,82,304
Production hours worked	6,225	4,050	4,100
Rate per hour (Rs.)	195.06	315.67	410.32

(ii) Cost of Product X

	(Rs.)
Direct material	12,500.00
Direct labour	7,500.00
Prime cost	20,000.00
Production on overheads	
P1 5 hours X Rs. 195.06 = 975.30	
P2 3 hours X Rs. 315.67 = 947.01	
P3 4 hours X Rs. 410.32 = 1,641.28	3,563.59
Factory cost	23,563.59

Question 23

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 (₹)	X (₹)	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:					
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
Service 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)

Answer 23

(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. × 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	=	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':**

	Service 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 expenses 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 expenses 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)	-

Question 24

SE Limited manufactures two products- A and B. The company had budgeted factory overheads amounting to ` 36,72,000 and budgeted direct labour hour of 1,80,000 hours. The company uses pre-determined overhead recovery rate for product costing purposes.

The department-wise break-up of the overheads and direct labour hours were as follows:

Particulars	Budgeted overheads	Budgeted direct labour hours	Rate per direct labour hour
Department Pie	` 25,92,000	90,000 hours	` 28.80
Department Qui	` 10,80,000	90,000 hours	` 12.00
Total	` 36,72,000	1,80,000 hours	

Additional Information:

Each unit of product A requires 4 hours in department Pie and 1 hour in department Qui. Also, each unit of product B requires 1 hour in department Pie and 4 hours in department Qui.

This was the first year of the company's operation. There was no WIP at the end of the year. However, 1,800 and 5,400 units of Products A and B were on hand at the end of the year.

The budgeted activity has been attained by the company. You are required to:

(i) DETERMINE the production and sales quantities of both products 'A' and 'B' for the above year.

(ii) ASCERTAIN the effect of using a pre-determined overhead rate instead of department-wise overhead rates on the company's income due to its effect on stock value.

(iii) CALCULATE the difference in the selling price due to the use of pre-determined overhead rate instead of using department-wise overhead rates. Assume that the direct costs (material and labour costs) per unit of products A and B were ` 25 and ` 40 respectively and the selling price is fixed by adding 40% over and above these costs to cover profit and selling and administration overhead. (RTP Nov'22)

Answer 24

  i.   **Computation of production and sales quantities:**

The products processing times are as under –

Product	A	B	Total
Department Pie	4 hours	1 hour	90,000 hours
Department Qui	1 hour	4 hours	90,000 hours

Let X and Y be the number of units (production quantities) of the two products. Converting these into equations, we have –
4X + Y = 90,000 & X + 4Y = 90,000
Solving the above, we get X = 18,000; Y = 18,000

Hence, the Production and Sales Quantities are determined as under –

Product	Production Quantity	Closing Stock (Given)	Sales Quantity (Balancing Figure)
A	18,000 units	1,800 units	16,200 units
B	18,000 units	5,400 units	12,600 units

  ii. **Effect of using pre-determined rate of overheads on the company's profit**

Product	Closing Stock	Overhead included using pre-	Overhead included using department rate	Difference in overhead in

	Quantity	detesrmined rate		closing stock value / Effect on closing stock value
A	1,800 units	1,800 x 5 hours x `20.40 = `1,83,600	Pie = 1,800 units x 4 hours x `28.80 = `2,07,360 Qui = 1,800 units x 1 hour x `12 = `21,600	(-) `45,360
B	5,400 units	5,400 x 5 hours x `20.40 = `5,50,800	Pie = 5,400 units x 1 hour x `28.80 = `1,55,520	(+) `1,36,080
			Qui = 5,400 units x 4 hours x `12 = `2,59,200	
Total		`7,34,400	`6,43,680	(+) `90,720

Use of pre-determined overhead rate has resulted in over valuation of stock by `90,720 due to which the company's income would be affected (increase) by `90,720. Profit would be affected only to the extent of Overhead contained in closing finished goods and closing WIP, if any.

iii. Effect **of** using pre-determined on the products' selling prices

Particulars	Product A	Product B
Selling Price per unit if pre-determined overhead rate is used	`177.80	`198.80
Selling Price per unit if department wise rate is used	`213.08	`163.52
Difference	`35.28	`35.28
	Under-Priced	Over-Priced

Workings:

1. Pre-determined overhead recovery rate

$$= \frac{`36,72,,000}{1,80,000 \, hours} = `20.40 \text{ per direct labour}$$

2. If pre-determined recovery rate is used

Particulars	Product A in `	Product B in `
Materials & Labour	25.00	40.00
Add: Production Overhead A = 5 hours x `20.40 per hour B = 5 hours x `20.40 per hour	102.00	102.00
Cost of production	127.00	142.00
Add: 40% of margin	50.80	56.80
	177.80	198.50

(1) If department-wise recovery rate is used

Particulars	Product A in `	Product B in `
Materials & Labour	25.00	40.00
Add: Production Overhead	127.20	76.80
A = Pie = 4 hours x `28.80 Qui = 1 hour x `12 B = Pie = 1 hour x `28.80 Qui = 4 hours x `12		
Cost of production	152.20	116.80
Add: 40% of margin	60.88	46.72
Selling Price per unit	213.08	163.52

Question 25

SANDY Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2022:

	Total (`)	A (`)	B (`)	C (`)	X (`)	Y (`)
Direct material		1,60,000	3,20,000	6,40,000	3,20,000	1,60,000
Direct wages		8,00,000	3,20,000	12,80,000	1,60,000	3,20,000
Factory rent	6,40,000					
Power	4,00,000					
Depreciation	1,60,000					
Other overheads	14,40,000					
Additional information:						
Area (Sq. ft.)		800	400	800	400	800
Capital value of assets (`) lakhs)		32	64	32	16	16
Machine hours		1,600	3,200	6,400	1,600	1,600
Horsepower of machines		80	64	32	24	40

Apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X'	72	24	48	–	16
Service Dept. 'Y'	96	56	–	8	–

Required:

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

(ii) PREPARE a statement showing re-distribution of service departments expenses to production departments using Repeated Distribution method. Also CALCULATE machine hour rate of the production departments 'A', 'B', 'C'. (RTP May 23)

Answer 25

(i) Overhead Distribution Summary

	Basis	Total (`)	A (`)	B (`)	C (`)	X (`)	Y (`)
Direct materials	Direct	–	–	–	–	3,20,000	1,60,000
Direct wages	Direct	–	–	–	–	1,60,000	3,20,000
Factory rent (2:1:2:1:2)	Area	6,40,000	1,60,000	80,000	1,60,000	80,000	1,60,000
Power (10:16:16:3:5)*	H.P. × Machine Hrs.	4,00,000	80,000	1,28,000	1,28,000	24,000	40,000
Depreciation (2:4:2:1:1)	Capital value of assets	1,60,000	32,000	64,000	32,000	16,000	16,000
Other overheads (1:2:4:1:1)	Machine hrs.	14,40,000	1,60,000	3,20,000	6,40,000	1,60,000	1,60,000

Total		26,40,000	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000

*{(1600×80) : (3200×64) : (6400×32) : (1600×24) : (1600×40)}

(1,28,000 : 2,04,800 : 2,04,800 : 38,400 : 64,000)

(10:16:16:3:5)

(ii) Redistribution of service department's expense using repeated distribution Method:

	A (`)	B (`)	C (`)	X (`)	Y (`)
Total overheads	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	3,42,000	1,14,000	2,28,000	-7,60,000	76,000
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	5,59,200	3,26,200	-	46,600	-9,32,000
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	20,970	6,990	13,980	-46,600	4,660
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	2,796	1,631	-	233	-4,660
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	105	35	70	-233	23
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	15	8	-	-	-23
	13,57,086	10,40,864	12,02,050	-	-

Calculation of machine hour rate

		A	B	C
A	Total overheads (`)	13,57,086	10,40,864	12,02,050
B	Machine hours	1,600	3,200	6,400
C	Machine hour rate (`) [A ÷ B]	848.18	325.27	187.82

Question 26

M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

	Production Dept.		Service Dept.	
	A	B	X	Y
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the quarter ended September 2018	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to ₹ 12.60 lakhs out of which ₹ 4.20 lakhs was considered as fixed cost.

Service department X renders services to departments A, B, and Y in the ratio of 6:4:2 whereas department Y renders services to department A and B in the ratio of 4: 1.

The direct labour hours of department A and B are 67500 hours and 48750 hours respectively.

Required:

1 **Prepare overheads distribution sheet.**

2 **Calculate factory overhead per labour hour for the dept. A and dept. B. (PYP Nov '18, 5 Marks)**

Answer 26

(1) Overheads distribution Sheet

Item	Basis	Total Amount (₹)	Production Departments		Service Departments	
			A (₹)	B (₹)	X (₹)	Y (₹)
Variable overheads	Horse Power	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
(₹ 12.60 lakhs-₹ 4.20 lakhs)	hours used					
Fixed Overheads	Horse power for Capacity production	4,20,000	1,20,000	1,50,000	90,000	60,000
Total Overheads		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Service dept X allocated to A, B & Y	As per the ratio given 6:4:2	(2,70,000)	1,35,000	90,000		45,000
Service dept Y allocated to A & B	As per the ratio of 4:1	(1,80,000+4 5000=2,25,000)	1,80,000	45,000		
Total Overheads of Production departments			6,75,000	5,85,000		

(2) Calculation of Factory overhead per labour hour Item Production Departments

	A (₹)	B (₹)
Total overheads	6,75,000	5, 85,000
Direct labour hours	67,500	48,750
Factory overheads per hour	10	12

Question 27

State the bases of apportionment of following overhead costs:

(i) **Air-conditioning**

(ii) **Time keeping**

(iii) **Depreciation of plant and machinery**

(iv) **Power/steam consumption**

(v) **Electric power (Machine operation) (PYP Nov '18, 5 Marks)**

Answer 27

Overhead Cost	Bases of Apportionment
(i) Air- conditioning	Floor area, or volume of department
(ii) Time keeping	Number of workers
(iii) Depreciation of plant and machinery	Capital values
(iv) Power/steam consumption	Technical estimates
(v) Electric power (machine operation)	Horse power of machines, or Number of machine hour, or value of machines or units consumed. Kilo-watt hours.

Question 28

Explain Blanket Overhead Rate and Departmental Overhead Rate. How they are calculated? State the conditions required for the application of Blanket Overhead Rate. (PYP 5 Marks Jan 21, Old & New SM)

Answer 28

Blanket Overhead Rate: Blanket overhead rate refers to the computation of one single overhead rate for the whole factory.

This overhead rate is computed as follows:

Blanket Rate = Total overheads for the factory / Total number of units of base for the factory

Departmental Overhead Rate: It refers to the computation of one single overhead rate for a particular production unit or department.

This overhead rate is determined by the following formula:

Departmental overhead Rate = Overheads of department or cost centre / Corresponding base

Conditions required for the Application of Blanket Overhead:

A blanket rate should be applied in the following cases:

(1) Where only one major product is being produced.

(2) Where several products are produced, but

   (a) All products pass through all departments; and

   (b) All products are processed for the same length of time in each department.

Question 29

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

Departments	Expenses (in ₹)	Area in (Sq. Mtr)	Number of Employees
Main Department:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	1700
Distribution Department	3,50,000	7	700
Service Departments:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Metres' and 'Number of Employees' respectively.

You are required to:

(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, given that, the Purchase Department, Packing Department and Distribution Department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays. (PYP 5 Marks July 21)

Answer 29

(i) Schedule Showing the Distribution of Expenses of Service Departments using Step ladder 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	8,760	2,920
	(12 x 365)	(24 x 365)	(8 x 365)
Expenses rate per hour (₹)	181.74	143.95	189.38

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This practical problem was based on distribution of overheads by using step ladder method and calculation of rate per hour. Many examinees faced hardship to understand the concept of step ladder method; hence the overhead distribution was not done correctly leading to wrong calculation of overhead rate per hour. Performance of the examinees was below average.

Question 30

XYZ Ltd. manufactures a single product. It recovers factory overheads at a pre - determined rate of ₹ 20 per man-day.

During the year 2020-21, the total factory overheads incurred and the man-days actually worked were ₹ 35.50 lakhs and 1.50 lakh days respectively. Out of the amount of ₹ 35.50 lakhs, ₹ 2.00 lakhs were in respect of wages for stick period and ₹ 1.00 lakh was in respect of expenses of previous year booked in this current year. During the period, 50,000 units were sold. At the end of the period, 12,000 completed units were held in stock but there was no opening stock of finished goods. Similarly, there was no stock of uncompleted units at the beginning of the period but at the end of the period there were 20,000 uncompleted units which may be treated as 65% complete in all respects.

On investigation, it was found that 40% of the unabsorbed overheads were due to factory inefficiency and the rest were attributable to increase in the cost of indirect materials and indirect labour. You are required to:

(i)   Calculate the amount of unabsorbed overheads during the year 2020 -21.

(ii) Show the accounting treatment of unabsorbed overheads in cost accounts and pass journal entry. (PYP 10 Marks Dec '21)

Answer 30

(i)   Amount of under-absorption of overheads during the year 2020-21

		(₹)
Total production overheads actually incurred during the year 2020-21		35,50,000
Less: Wages paid during strike period	₹2,00,000	
Wages of previous year booked in current year	₹ 1,00,000	3,00,000

Net production overheads actually incurred: (A)		32,50,000
Production overheads absorbed by 1.50 lakh man-days @ ₹ 20 per man-day: (B)		30,00,000
Amount of under-absorption of production overheads: [(A)–(B)]		2,50,000

(ii) Accounting treatment of under absorption of production overheads: It is given in the statement of the question that 62,000 units (50,000 sold + 12,000 closing stock – 0 opening stock) were completely finished and 20,000 units were 65% complete, 40% of the under-absorbed overheads were due to factory inefficiency and the rest were attributable to increase in cost of indirect materials and indirect labour.

	(₹)
1. (40% of ₹2,50,000) i.e. ₹ 1,00,000 of under – absorbed overheads were due to factory inefficiency. This being abnormal, should be debited to the Costing Profit and Loss A/c	1,00,000
2. Balance (60% of ₹ 2,50,000) i.e. ₹ 1,50,000 of under – absorbed overheads should be distributed over work-in- progress, finished goods and cost of sales by using supplementary rate	1,50,000
Total under-absorbed overheads	2,50,000

Apportionment of unabsorbed overheads of ₹1,50,000 over work-in-progress, finished goods and cost of sales.

	Equivalent Completed units	(₹)
Work-in-progress (13,000 units × ₹ 2) (Refer to Working Note)	20000 * 65% = 13,000	26,000
Finished goods (12,000 units × ₹ 2)	12,000	24,000
Cost of sales (50,000 units × ₹ 2)	50,000	1,00,000
	75,000	1,50,000

Journal entry:

Work-in-progress control A/c	Dr.	₹ 26,000
Finished goods control A/c	Dr.	₹ 24,000
Cost of Sales A/c	Dr.	₹ 1,00,000
Costing Profit & Loss A/c	Dr.	₹ 1,00,000
To Overhead control A/c		₹ 2,50,000

Working Note:

Supplementary overhead absorption rate $= \dfrac{Rs.1,50,000}{75,000\ units}$ = Rs. 2 per unit

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

The question tested the knowledge of examinees on the treatment of unabsorbed Overheads in cost accounting. Examinees had to calculate unabsorbed overheads and pass journal entry after allocating them to Cost of Sales, WIP, and Finished stock by using supplementary rate. Performance of the examinees was above average.

Question 31

In a manufacturing company, the overhead is recovered as follows: Factory Overheads: a fixed percentage basis on direct wages and Administrative overheads: a fixed percentage basis on factory cost.

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

	Job 1(₹)	Job 2(₹)
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Selling price	3,33,312	2,52,000
Profit percentage on total cost	12%	20%

You are required to:

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

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

(iii) Using the above recovery rates, determine the selling price to be quoted for job 3. Additional data pertaining to Job 3 is as follows:

Direct materials	₹ 68,750
Direct wages	₹ 22,500
Profit percentage on selling price	15%

(PYP 10 Marks May'22) (Same concept different figures Old & New SM) (MTP 10 Marks Oct '23)

Answer 31

Computation of percentage recovery rates of factory overheads and administrative overheads.

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

Factory Cost of Jobs:

Direct materials + Direct wages + Factory overhead For Job 1 = ₹ 1,08,000 +₹ 84,000 + ₹ 84,000F

For Job 2 = ₹ 75,000 +₹ 60,000 + ₹ 60,000F

Total Cost of Jobs:

Factory cost + Administrative overhead

For Job 1 = (₹ 1,92,000 + ₹ 84,000F) + (₹ 1,92,000 + ₹ 84,000F) A = ₹ 2,97,600* For Job-2 = (₹ 1,35,000 + ₹ 60,000F) + (₹1,35,000+ ₹ 60,000F) A = ₹ 2,10,000**

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

1,92,000 + 84,000F + 1,92,000A + 84,000AF	=	₹ 2,97,600	…………eqn (i)
1,35,000 + 60,000F + 1,35,000A + 60,000AF	=	₹ 2,10,000	……..…eqn (ii)

Multiply equation (i) by 5 and equation (ii) by 7

9,60,000 + 4,20,000F + 9,60,000A + 4,20,000AF	=	₹14,88,000	...eqn (iii)
9,45,000 + 4,20,000F + 9,45,000A + 4,20,000AF	=	₹ 14,70,000	...eqn (iv)
- - - -		-	
15,000 + 15,000A	=	₹18,000	

15,000 A = 18,000 – 15,000

A = 0.20

Now putting the value of A in equation (i) to find the value of F

1,92,000 + 84,000F + (1,92,000 × 0.20) + (84,000 F × 0.20)= ₹ 2,97,600

Or

1,92,000 + 84,000F+38,400+16,800 F = ₹2,97,600

1,00,800 F = 67,200

F = 0.667

On solving the above relations: F = 0.667 and A = 0.20 Hence, percentage recovery rates of:

Factory overheads = 66.7% or 2/3rd of wages and Administrative overheads = 20% of factory cost.

Working note:

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

*For Job 1 =

$\dfrac{₹\ 3,33,312}{(100\% + 12\%)}$= ₹ 2,97,600

**For Job 2

$\dfrac{₹2,52,000}{(100\% + 10\%)}$== ₹ 2,10,000

(ii) **Statement of jobs, showing amount of factory overheads, administrative overheads and profit:**

	Job 1	Job 2
	(₹)	(₹)
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Prime cost	1,92,000	1,35,000
Factory overheads		
2/3rd of direct wages	56,000	40,000
Factory cost	2,48,000	1,75,000
Administrative overheads		
20% of factory cost	49,600	35,000
Total cost	2,97,600	2,10,000
Profit (12% & 20% respectively)	35,712	42,000
Selling price	3,33,312	2,52,000

(iii) Selling price of Job 3

	(₹)
Direct materials	68,750
Direct wages	22,500
Prime cost	91,250
Factory overheads (2/3rd of Direct Wages)	15,000
Factory cost	1,06,250
Administrative overheads (20% of factory cost)	21,250
Total cost	1,27,500
Profit margin (balancing figure)	22,500
Selling price $\left(\dfrac{Total\ Cost}{85\%}\right)$	1,50,000

Question 32

USP Ltd. is the manufacturer of 'double grip motorcycle tyres'. In the manufacturing process, it undertakes three different jobs namely, Vulcanising, Brushing and Striping. All of these jobs require the use of a special machine and also the aid of a robot when necessary. The robot is hired from outside and the hire charges paid for every six months is₹ 2,70,000. An estimate of overhead expenses relating to the special machine is given below:

- Rent for a quarter is ₹ 18,000.

- The cost of the special machine is ₹ 19,20,000 and depreciation is charged @10% per annum on straight line basis.

- Other indirect expenses are recovered at 20% of direct wages.

The factory manager has informed that in the coming year, the total direct wages will be ₹ 12,00,000 which will be incurred evenly throughout the year.

During the first month of operation, the following details are available from the job book: Number of hours the special machine was used

Jobs	Without the aid of the robot	With the of the robot
Vulcanising	500	400
Brushing	1000	400
Striping	-	1200

You are required to:

(i) Compute the Machine Hour Rate for the company as a whole for a month (A) when the robot is used and (B) when the robot is not used.

(ii) Compute the Machine Hour Rate for the individual jobs i.e. Vulcanising, Brushing and Striping. (PYP 10 Marks Nov 22, Old & New SM)

Answer 32

Working notes:

(I)	Total machine hours use (500 + 1,000 + 400 + 400 + 1,200)	3,500
(II)	Total machine hours without the use of robot (500 + 1,000)	1,500
(III)	Total machine hours with the use of robot (400 + 400 + 1,200)	2,000
(IV)	Total overheads of the machine per month Rent (₹ 18,000 ÷ 3 months)	6,000
	Depreciation [(₹ 19,20,000 x 10%) ÷ 12 months]	16,000
	Indirect expenses [(₹ 12,00,000 x 20%) ÷ 12 months]	20,000
	Total	42,000
(V)	Robot hire charges for a month (₹ 2,70,000 ÷ 6 months)	₹ 45,000

(VI) Overheads for using machines without robot

$$= \frac{Rs.42,000}{3,500\ hrs.} \text{ X 1,500 hrs. =} \qquad Rs.\ 18,000$$

(VII) Overheads for using machines with robot

$$= \frac{Rs.42,000}{3,500\ hrs.} \text{ X 1,500 hrs. =} \qquad Rs.\ 18,000$$

(i) Computation of Machine hour rate for the individual job

(A)   When the robot was used : $\dfrac{Rs.69,000}{2,000\ hours}$ = Rs. 34.50 per hour

(B)   When the robot was not used : $\dfrac{Rs.18,000}{1500\ hours}$ = Rs. 12 Per hour

(ii)

	Rate per hour	Job					
		Vulcanising		Brushing		Striping	
	(₹)	Hrs.	(₹)	Hrs.	(₹)	Hrs.	(₹)
Overheads							
Without robot	12.00	500	6,000	1,000	12,000	-	-
With robot	34.50	400	13,800	400	13,800	1,200	41,400
Total		900	19,800	1,400	25,800	1,200	41,400
Machine hour rate			22		18.43		34.50

Chapter 5
Activity Based Costing

Question 1

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets.

(i)   General Supermarket Chains

(ii)   Drugstore Chains

(iii)   Chemist Shops

The following data for the month of April in respect of RST Limited has beenreported:

	General Supermarket Chains (`)	Drugstore Chains (`)	Chemist Shops (`)
Average revenue per delivery	84,975	28,875	5,445
Average cost of goods sold perdelivery	82,500	27,500	4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate therelative profitability of its distribution channels. The company plans to use activity –based costing for analysing the profitability of its distribution channels.

The Activity analysis of RST Limited is as under:

Activity Area	Cost Driver
Customer purchase order processing	Purchase orders by customers
Line-item ordering	Line-items per purchase order
Store delivery	Store deliveries
Cartons dispatched to stores	Cartons dispatched to a store perdelivery
Shelf-stocking at customer store	Hours of shelf-stocking

The April month's operating costs (other than cost of goods sold) of RST Limited are ` 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis usedin that area for the month of April are as follows:

Activity Area	Total costs (`)	Total Units of CostAllocation Base
Customer purchase orderprocessing	2,20,000	5,500 orders
Line-item ordering	1,75,560	58,520 line items
Store delivery	1,95,250	3,905 store deliveries
Cartons dispatched tostore	2,09,000	2,09,000 cartons
Shelf-stocking at customer store	28,160	1,760 hours

Other data for the month of April include the following:

	General Supermarket Chains	Drugstore Chains	Chemist Shops
Total number of orders	385	990	4,125
Average number of line itemsper order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons	300	80	16

shipped per store delivery			
Average number of hours of shelf-stocking per storedelivery	3	0.6	0.1

Required:

(i) COMPUTE gross-margin percentage for each of its three distributionchannels and compute RST Limited's operating income.

(ii) COMPUTE the rate per unit of the cost-allocation base for each of thefive activity areas.

(iii) COMPUTE the operating income of each distribution channel using the activity-based costing information. Comment on the results. What new insights are available with the activity-based cost information?

(iv) DESCRIBE four challenges one would face in assigning the total operating costs of ` 8,27,970 to five activity areas. (Old & New SM) (Same concept different figures RTP May'22) (MTP 10 Marks Sep '23)

Answer 1

(i) **RST Limited's**

Statement of operating income and gross margin percentagefor each of its three distribution channel

Particulars	General Super Market Chains	DrugstoreChains	Chemist Shops	Total
Revenues: (`)	2,80,41,750 (330 × ` 84,975)	2,38,21,875 (825 × ` 28,875)	1,49,73,750 (2,750 × ` 5,445)	6,68,37,375
Less: Cost of goods sold: (`)	2,72,25,000 (330 × ` 82,500)	2,26,87,500 (825 × ` 27,500)	1,36,12,500 (2,750 × ` 4,950)	635,25,000
Gross Margin:(`)	8,16,750	11,34,375	13,61,250	33,12,375
Less: Other operating costs: (`)				8,27,970
Operating income: (`)				24,84,405
Gross Margin	2.91%	4.76 %	9.09%	4.96%
Operatingincome %				3.72

(ii) **Computation of rate per unit of the cost allocation base foreach of the five activity areas for the month of April**

	(`)
Customer purchase order processing(` 2,20,000/ 5,500 orders)	40 per order
Line item ordering (` 1,75,560/ 58,520 line items)	3 per line item order
Store delivery (` 1,95,250/ 3,905 store deliveries)	50 per delivery
Cartons dispatched (` 2,09,000/ 2,09,000 dispatches)	1 per dispatch
Shelf-stocking at customer store (`)(` 28,160/ 1,760 hours)	16 Per hour

(iii) **Operating Income Statement of each distribution channel in April (Using the Activity based Costing information)**

	General Super Market	Drugstore Chains	Chemist Shops

	Chains		
Gross margin (`) : (A) (Refer to (i) part of the answer)	8,16,750	11,34,375	13,61,250
Operating cost (`): (B) (Refer to working note)	1,62,910	1,90,410	4,74,650
Operating income (`): (A–B)	6,53,840	9,43,965	8,86,600
Operating income (in %) (Operating income/Revenue) ×100	2.33	3.96	5.92

Comments and new insights: The activity-based cost information highlights, how the 'Chemist Shops' uses a larger amount of RST Ltd.'s resources per revenue than do the other two distribution channels. Ratio of operating costs to revenues, across these markets is:

General supermarket chains (` 1,62,910/ ` 2,80,41,750) × 100	0.58%
Drug store chains (` 1,90,410/ ` 2,38,21,875) × 100	0.80%
Chemist shops (` 4,74,650/ ` 1,49,73,750) ×100	3.17%

Working note:

Computation of operating cost of each distribution channel:

	General Super Market Chains (`)	Drugstore Chains (`)	Chemist Shops (`)
Customer purchase order processing	15,400 (` 40 × 385 orders)	39,600 (` 40 × 990 orders)	1,65,000 (` 40 ×4125 orders)
Line item ordering	16,170 (` 3 × 14 x 385)	35,640 (` 3 × 12 x 990)	1,23,750 (` 3 × 10 × 4125)
Store delivery	16,500 (` 50 × 330 deliveries)	41,250 (` 50 × 825 deliveries)	1,37,500 (` 50 × 2750 deliveries)
Cartons dispatched	99,000 (`1× 300 cartons × 300 deliveries)	66,000 (`1 × 80 cartons × 825 deliveries)	44,000 (`1 × 16 cartons × 2,750 deliveries)
Shelf stocking	15,840 (` 16 × 330 deliveries × 3 Av. hrs.)	7,920 (` 16 × 825 deliveries × 0.6 Av. hrs)	4,400 (` 16 × 2,750 deliveries × 0.1 Av. hrs)
Operating cost	1,62,910	1,90,410	4,74,650

(iv)   Challenges faced in assigning total operating cost of ` 8,27,970:

- Choosing an appropriate cost driver for activity area.

- Developing a reliable data base for the chosen cost driver.

- Deciding, how to handle costs that may be common across several activities.

- Choice of the time period to compute cost rates per cost driver.

- Behavioral factors.

Question 2

Linex Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

Machine Department expense	18,48,000
Assembly Department expenses	6,72,000
Setup costs	90,000
Stores receiving cost	1,20,000
Order processing and dispatch	1,80,000
Inspect and Quality control cost	36,000

The date related to the three products during the period are as under:

	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40		

Required

PREPARE a statement showing details of overhead costs allocated to each product type using activity based costing. (MTP March '19, 10 Marks)

Answer 2

Calculation of "Activity Rate"

Cost Pool	Cost (Rs.) [A]	Cost Driver [B]	Cost Driver Rate (Rs.) [C] = [A]÷[B]
Machine Department Expenses	18,48,000	Machine Hours (1,32,000 hrs.)	14.00
Assembly Department Expenses	6,72,000	Assembly Hours (42,000 hrs.)	16.00
Setup Cost	90,000	No. of Production Runs (450*)	200.00
Stores Receiving Cost	1,20,000	No. of Requisitions Raised on the Stores (120)	1,000.00
Order Processing and Dispatch	1,80,000	No. of Customers Orders Executed (3,750)	48.00
Inspection and Quality Control Cost	36,000	No. of Production Runs (450*)	80.00
Total (Rs.)	29,46,000		

*Number of Production Run is 450 (150 + 120 + 180)

Statement Showing "Overheads Allocation"

Particulars of Cost	Cost Driver	P	Q	R	Total
Machine Department Expenses	Machine Hours	4,20,000 (30,000 × Rs.14)	6,72,000 (48,000 × Rs.14)	7,56,000 (54,000 × Rs.14)	18,48,000
Assembly	Assembly Hours	2,40,000	---	4,32,000	6,72,000

Department Expenses		(15,000 × Rs.16)		(27,000 × Rs.16)	
Setup Cost	No. of Production Runs	30,000 (150 × Rs.200)	24,000 (120 × Rs.200)	36,000 (180 × Rs.200)	90,000
Stores Receiving Cost	No. of Requisitions Raised on the Stores	40,000 (40 × Rs.1,000)	30,000 (30 × Rs.1,000)	50,000 (50 × Rs.1,000)	1,20,000
Order Processing and Dispatch	No. of Customers Orders Executed	60,000 (1,250 × Rs.48)	48,000 (1,000 × Rs.48)	72,000 (1,500 × Rs.48)	1,80,000
Inspection and Quality Control Cost	No. of Production Runs	12,000 (150 × Rs.80)	9,600 (120 × Rs.80)	14,400 (180 × Rs.80)	36,000
Overhead (Rs.)		8,02,000	7,83,600	13,60,400	29,46,000

Question 3

Bank of Surat operated for years under the assumption that profitability can be increased by increasing Rupee volume. But that has not been the case. Cost analysis has revealed the following:

Activity	Activity Cost (₹)	Activity Driver	Activity Capacity
Providing ATM Service	1,00,000	No. of Transactions	2,00,000
Computer Processing	10,00,000	No. of Transactions	25,00,000
Issuing Statements	8,00,000	No. of Statements	5,00,000
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000

The following annual information on three products was also made available:

Activity Driver	Checking Accounts	Personal Loans	Gold Visa
Units of Product	30,000	5,000	10,000
ATM Transactions	1,80,000	0	20,000
Computer Transactions	20,00,000	2,00,000	3,00,000
Number of Statements	3,00,000	50,000	1,50,000
Telephone Minutes Required	3,50,000	90,000	1,60,000

(i)   CALCULATE rates for each activity.

(ii) Using the rates computed in requirement (i), Calculate the cost of each product. (MTP March '18, 5 Marks)

Answer 3

(i)   Statement Showing "Activity Rate"

Activity	Activity Cost [a] (₹)	Activity Driver	No. of Units of Activity Driver [b]	Activity Rate [a] / [b] (₹)
Providing ATM Service	1,00,000	No. of ATM Transactions	2,00,000	0.50

Computer Processing	10,00,000	No. of Computer Transactions	25,00,000	0.40
Issuing Statements	8,00,000	No. of Statements	5,00,000	1.60
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000	0.60

(ii)   Statement Showing "Cost of Product"

Activity	Checking Accounts (₹)	Personal Loans (₹)	Gold Visa (₹)
Providing ATM Service	90,000 (1,80,000 tr.× ₹ 0.50)	---	10,000 (20,000 tr. × ₹ 0.50)
Computer Processing	8,00,000 (20,00,000 tr. × ₹ 0.40)	80,000 (2,00,000 tr. × ₹ 0.40)	1,20,000 (3,00,000 tr. × ₹ 0.40)
Issuing Statements	4,80,000 (3,00,000 st. × ₹ 1.60)	80,000 (50,000 st. × ₹1.60)	2,40,000 (1,50,000 st. × ₹ 1.60)
Customer Inquiries	2,10,000 (3,50,000 min. × ₹ 0.60)	54,000 (90,000 min. × ₹ 0.60)	96,000 (1,60,000 min. × ₹ 0.60)
Total Cost [a]	₹ 15,80,000	₹ 2,14,000	₹ 4,66,000
Units of Product [b]	30,000	5,000	10,000
Cost of each Product [a] / [b]	52.67	42.80	46.60

Question 4

Asian Mfg. Co. has decided to increase the size of the store. It wants the information about the probability of the individual product lines: Lemon, Grapes and Papaya. It provides the following data for the 2018 for each product line:

Particulars	Lemon	Grapes	Papaya
Revenues (Rs.)	79,350	2,10,060	1,20,990
Cost of goods sold (Rs.)	60,000	1,50,000	90,000
Cost of bottles returned (Rs.)	1,200	0	0
Number of purchase orders placed	36	84	36
Number of deliveries received	30	219	66
Hours of shelf stocking time	54	540	270
Items sold	12,600	1,10,400	30,600

Asian Mfg. Co. also provides the following information for the year 2018:

Activity	Description of Activity	Total Costs (Rs.)	Cost Allocation Basis
Bottle returns	Returning of empty bottles to the store	1,200	Direct tracing to product line
Ordering	Placing of orders of purchases	15,600	156 purchase orders
Delivery	Physical delivery and the receipts of merchandise	25,200	315 deliveries
Self- stocking	Stocking of merchandise on store shelves and ongoing restocking	17,280	864 hours of time
Customer support	Assistance provided to customers including bagging and checkout	30,720	1,53,600 items sold

Required

(i) **Asian Mfg. Co. currently allocates store support costs (all costs other than the cost of goods sold) to the product line on the basis of the cost of goods sold of each product line. CALCULATE the operating income and operating income as the percentage of revenue of each product line.**

(ii) **If Asian Mfg. Co. allocates store support costs (all costs other than the cost of goods sold) to the product lines on the basis of ABC system, CALCULATE the operating income and operating**

income as the percentage of revenue of each product line.

(iii) SHOW a comparison statement. (MTP Oct. '19, 10 Marks)

Answer 4

(i)   **Absorption Costing System Operating Income-**

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	4,10,400
Less: Cost of Goods Sold	60,000	1,50,000	90,000	3,00,000
Less: Store Support Cost	18,000	45,000	27,000	90,000
Operating Income	1,350	15,060	3,990	20,400
Operating Income (%)	1.70	7.17	3.30	4.97

(ii)   **ABC System Overhead Allocation Rate-**

Activity	Total Costs (Rs.)	Quantity of Cost Allocation Base	Overhead Allocation Rate (Rs.)
Ordering	15,600	156 Purchase Orders	100.00
Delivery	25,200	315 Delivering Orders	80.00
Shelf Stocking	17,280	864 Self Stocking Hours	20.00
Customer Support	30,720	1,53,600 Items Sold	0.20

Store Support Cost-

Particulars	Cost Driver	Lemon	Grapes	Papaya	Total
Bottle Returns	Direct	1,200	0	0	1,200
Ordering	Purchase Orders	3,600	8,400	3,600	15,600
Delivery	Deliveries	2,400	17,520	5,280	25,200
Self -Stocking	Hours of time	1,080	10,800	5,400	17,280
Customer Support	Items Sold	2,520	22,080	6,120	30,720
Grand Total		10,800	58,800	20,400	90,000

Operating Income-

Particulars	Lemon	Grapes	Papaya	Total
Revenue	79,350	2,10,060	1,20,990	410,400
Less: Cost of Goods Sold	60,000	1,50,000	90,000	300,000
Less: Store Support Cost	10,800	58,800	20,400	90,000
Operating Income	8,550	1,260	10,590	20,400
Operating Income (%)	10.78	0.60	8.75	4.97

(iii)   **Comparison**

Particulars	Lemon	Grapes	Papaya	Total
Under Traditional Costing System	1.70%	7.17%	3.30%	4.97%
Under ABC System	10.78%	0.60%	8.75%	4.97%

Question 5

Wool mark Ltd. manufactures three types of products namely P, Q and R. The data relating to a period are as under:

Particulars	P	Q	R

Machine hours per unit	10	18	14
Direct Labour hours per unit @ Rs. 20	4	12	8
Direct Material per unit (Rs.)	90	80	120
Production (units)	3,000	5,000	20,000

Currently the company uses traditional costing method and absorbs all production overheads on the basis of machine hours. The machine hour rate of overheads is Rs. 6 per hour. The company proposes to use activity based costing system and the activity analysis is as under:

Particulars	P	Q	R
Batch size (units)	150	500	1,000
Number of purchase orders per batch	3	10	8
Number of inspections per batch	5	4	3
The total production overheads are analyzed as under:			
Machine set up costs	20%		
Machine operation costs	30%		
Inspection costs	40%		
Material procurement related costs	10%		
Required:			

(i) Calculate the cost per unit of each product using traditional method of absorbing all production overheads on the basis of machine hours.

(ii) Calculate the cost per unit of each product using activity based costing principles. (MTP Oct.'18, 10 Marks, Old & New SM)(Same concept different figures MTP 10 Marks Mar'22)

Answer 5

(i) Statement Showing "Cost per unit - Traditional Method"

Particulars of Costs	P (Rs.)	Q (Rs.)	R (Rs.)
Direct Materials	90	80	120
Direct Labour [(4, 12, 8 hours) X Rs.20]	80	240	160
Production Overheads [(10, 18, 14 hours) X Rs.6]	60	108	84
Cost per unit	230	428	364

(ii) Statement Showing "Cost per unit - Activity Based Costing"

Products	P	Q	R
Production (units)	3,000	5,000	20,000
	(Rs.)	(Rs.)	(Rs.)
Direct Materials (90, 80, 120)	2,70,000	4,00,000	24,00,000
Direct Labour (80, 240, 160)	2,40,000	12,00,000	32,00,000
Machine Related Costs @ Rs.1.80 per hour (30,000, 90,000, 2,80,000)	54,000	1,62,000	5,04,000
Setup Costs @ Rs.9,600 per setup (20, 10, 20)	1,92,000	96,000	1,92,000
Inspection Costs @ Rs.4,800 per inspection (100, 40, 60)	4,80,000	1,92,000	2,88,000
Purchase Related Costs @ Rs.750 per purchase (60, 100, 160)	45,000	75,000	1,20,000
Total Costs	12,81,000	21,25,000	67,04,000
Cost per unit(Total Cost ÷Units)	427.00	425.00	335.20

Workings

Number of Batches, Purchase Orders, and Inspections-

	Particulars		P	Q	R	Total
A.	Production (units)		3,000	5,000	20,000	
B.	Batch Size (units)		150	500	1,000	
C.	Number of Batches	[A ÷B]	20	10	20	50
D.	Number of Purchase Order per batch		3	10	8	
E.	Total Purchase Orders	[C ÷ D]	60	100	160	320
F.	Number of Inspections per batch		5	4	3	
G.	Total Inspections	[C ÷ F]	100	40	60	200

Total Machine Hours-

	Particulars		P	Q	R
A.	Machine Hours per unit		10	18	14
B.	Production (units)		3,000	5,000	20,000
C.	Total Machine Hours	[A ⊠ B]	30,000	90,000	2,80,000

Total Machine Hours = 4,00,000

Total Production Overheads-

= 4,00,000 hrs. X Rs. 6= Rs. 24,00,000

Cost Driver Rates-

Cost Pool	%	Overheads (Rs.)	Cost Driver (Units)	Cost Driver Rate (Rs.)
Setup	20%	4,80,000	50	9,600 per Setup
Inspection	40%	9,60,000	200	4,800 per Inspection
Purchases	10%	2,40,000	320	750 per Purchase
Machine Hours	30%	7,20,000	4,00,000	1.80 per Machine Hour

Question 6

ZA Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Product A	Product B	Product C	
Direct Materials	100	80	80	Rs./u
Direct Labour @Rs.10/ hour	30	40	50	Rs./u
Production Overheads	30	40	50	Rs./u
Total Cost	160	160	180	Rs./u
Quantity Produced	20,000	40,000	60,000	Units

ZA Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (Rs.)
Stores Receiving	Purchase Requisitions	5,92,000
Inspection	Number of Production Runs	17,88,000
Dispatch	Orders Executed	4,20,000
Machine Setup	Number of Setups	24,00,000

The following information is also supplied:

Details	Product A	Product B	Product C
No. of Setups	360	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	750	1,050	1,200
No. of Purchase Requisitions	300	450	500

Required:

CALCULATE activity based production cost of all the three products. (MTP 10 Marks May '20, RTP May 18)

Answer 6

The total production overheads are Rs.52,00,000: Product A: 20,000 ×

Rs.30 =   Rs.6,00,000 Product B: 40,000 ×

Rs.40 =   Rs.16,00,000 Product C: 60,000 ×

Rs.50 =   Rs.30,00,000

On the basis of ABC analysis this amount will be apportioned as follows: **Statement Showing**

"Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (Rs.)	A (Rs.)	B (Rs.)	C (Rs.)
Stores Receiving	Purchase Requisition	6:9:10	5,92,000	1,42,080	2,13,120	2,36,800
Inspection	Production Runs	5:7:8	17,88,000	4,47,000	6,25,800	7,15,200
Dispatch	Orders Executed	6:9:10	4,20,000	1,00,800	1,51,200	1,68,000
Machine Setups	Setups	12:13:15	24,00,000	7,20,000	7,80,000	9,00,000
Total Activity Cost				14,09,880	17,70,120	20,20,000
Quantity Produces				20,000	40,000	60,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				130	120	130
Total				200.49	164.25	163.67

Question 7

BABYSOFT is a global brand created by Bio-organic Ltd. The company manufactures three range of beauty soaps i.e. BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond. The budgeted costs and production for the month of December, 2019 are as follows:

	BABYSOFT- Gold		BABYSOFT- Pearl		BABYSOFT- Diamond	
Production of soaps (Units)	4,000		3,000		2,000	
Resources per Unit:	Qty	Rate	Qty	Rate	Qty	Rate
- **Essential Oils**	60 ml	₹ 200 / 100 ml	55 ml	₹ 300 / 100 ml	65 ml	₹ 300 / 100 ml
- **Cocoa Butter**	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g	20 g	₹ 200 / 100 g
- **Filtered Water**	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml	30 ml	₹ 15 / 100 ml
- **Chemicals**	10 g	₹ 30 / 100 g	12 g	₹ 50 / 100 g	15 g	₹ 60 / 100 g
- **Direct Labour**	30 minutes	₹ 10 / hour	40 minutes	₹ 10 / hour	60 minutes	₹ 10 / hour

Bio-organic Ltd. followed an Absorption Costing System and absorbed its production overheads, to its products using direct Labour hour rate, which were budgeted at ₹ 1,98,000.

Now, Bio-organic Ltd. is considering adopting an Activity Based Costing system. For this, additional information regarding budgeted overheads and their cost drivers is provided below:

Particulars	(₹)	Cost drivers
Forklifting cost	58,000	Weight of material lifted
Supervising cost	60,000	Direct labour hours
Utilities	80,000	Number of Machine operations

The number of machine operators per unit of production are 5, 5, and 6 for BABYSOFT- Gold, BABYSOFT- Pearl, and BABYSOFT- Diamond respectively.

(Consider (i) Mass of 1 litre of Essential Oils and Filtered Water equivalent to 0.8 kg and 1 kg respectively (ii) Mass of output produced is equivalent to the mass of input materials taken together.) You are requested to:

(i) PREPARE a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) PREPARE a statement showing the product costs of each product using the ABC approach.

(iii) STATE what are the reasons for the different product costs under the two approaches? (MTP 10 Marks, Oct.'2020, Old & New SM)

Answer 7

Traditional Absorption Costing

	BABYSOFT - Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
(a)Production of soaps (Units)	4,000	3,000	2,000	9,000
(b) Direct Labour (minutes)	30	40	60	-
(c)Direct Labour hours (a × b)/60 minutes	2,000	2,000	2,000	6,000

Overhead rate per direct Labour hour:

= Budgeted overheads / Budgeted Labour hours

= Rs.1,98,000 / 6,000 hours

= Rs.33 per direct Labour hour

Unit Costs:

	BABYSOFT- Gold (Rs.)	BABYSOFT- Pearl (Rs.)	BABYSOFT- Diamond (Rs.)
Direct costs	5.00	6.67	10.00
Direct Labour	$(\frac{10*30}{60})$	$(\frac{10*40}{60})$	$(\frac{10*60}{60})$
Direct Material (refer working note 1)	167.50	251.50	248.50
Production overhead	16.50 $(\frac{33*30}{60})$	22.00 $(\frac{33*40}{60})$	33.00 $(\frac{33*60}{60})$
Total unit costs	189.00	244.17	291.50
Number of units	4,000	3,000	2,000
Total costs	**7,56,000**	**7,32,510**	**5,83,000**

Working note-1
Calculation of Direct material cost

	BABYSOFT- Gold (₹)	BABYSOFT- Pearl (₹)	BABYSOFT- Diamond (₹)
	120.00	165.00	195.00

Essential oils	(200*60)/100	(300*55)/100	(300*65)/100
Cocoa Butter	40.00 (200*20)/100	40.00 (200*20)/100	40.00 (200*20)/100
Filtered water	4.50 (15*30)/100	4.50 (15*30)/100	4.50 (15*30)/100
Chemicals	3.00 (30*10)/100	6.00 (50*12)/100	9.00 60*15/100
Total costs	**167.50**	**215.50**	**248.50**

Activity Based Costing

	BABYSOFT- Gold	BABYSOFT- Pearl	BABYSOFT- Diamond	Total
Quantity (units)	4,000	3,000	2,000	-
Weight per unit (grams)	108 {(60×0.8)+20+30+10}	106 {(55×0.8)+20+30+12}	117 {(65×0.8)+20+30+15}	-
Total weight (grams)	4,32,000	3,18,000	2,34,000	9,84,000
Direct Labour (minutes)	30	40	60	-
Direct Labour hours	2,000 (4,000*30)/60	2,000 (3,000*40)/60	2,000 (2,000*60)/60	6,000
Machine operations per unit	5	5	6	-
Total operations	20,000	15,000	12,000	47,000

Forklifting rate per gram	=	Rs. 58,000/9,84,000 grams = Rs.0.06 per gram
Supervising rate per direct Labour hour	=	Rs. 60,000 / 6,000 hours Labour hour = Rs.10 per
Utilities rate per machine operations	=	Rs. 80,000/ 47,000 machine operations
		= Rs. 1.70 per machine operations

Unit Costs Under ABC:

	BABYSOFT- Gold (Rs.)	BABYSOFT- Pearl (Rs.)	BABYSOFT- Diamond (Rs.)
Direct Costs:			
- Direct Labour	5.00	6.67	10.00
- Direct material	167.50	215.50	248.50
Production Overheads:			
Forklifting cost	6.48 (0.06* 108)	6.36 (0.06 *106)	7.02 (0.06* 117)
Supervising cost	5.00 (10* 30)/60	6.67 (10 *40)/60	10.00 (10 *60)/60
Utilities	8.50 (1.70 * 5)	8.50 (1.70 * 5)	10.20 (1.70 * 6)

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Total unit costs	192.48	243.70	285.72
Number of units	4,000	3,000	2,000
Total costs	**7,69,920**	**7,31,100**	**5,71,440**

(ii) **Comments:** The difference in the total costs under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.

Question 8

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:

i. CALCULATE the total cost of each product, if all overhead costs are absorbed on machine- hour rate basis.

ii. CALCULATE the total cost of each product using activity-based costing (MTP 10 Marks, Mar 2021)

Answer 8

(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.= $\frac{Rs. 4,42,369}{12,228\ M./hours}$ = 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
Cost per unit:	(Rs.)	(Rs.)	(Rs.)	(Rs.)
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 RUN 96

(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 batches.

(4) Computation of Cost driver rates

Activity	Activity Cost (Rs.)	Cost driver	Quantity	Cost driver rate
Set-up	80,000 + 1,12,000 = 1,92,000	No. of production run	96	Rs. 2,000 per production run
Store-receiving	60,000 + 84,000 = 1,44,000	Requisition raised	50 * 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

Question 9

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 10 Marks, Apr.'2021)

Answer 9

Computation showing Rates for each Activity

Activity	Activity Cost (Rs.) (A)	Activity driver	Activity Capacity (B)	Activity Rate (A/B)
Marketing Expenses	2,25,000	Number of Customer Contacts	7,50,000	0.30
Website Maintenance Expenses	1,50,000	Number of Customer Online orders	6,00,000	0.25
Credit Card Processing Fees	1,35,000	Number of Credit card transactions	2,70,000	0.50
Cleaning Equipment Cost	3,15,000	Number of Square Feet	10,500	30.00
Inspecting and Testing Cost	2,62,500	Number of Tests	52,500	5.00
Setting up machine's cost	4,50,000	Number of set-ups	900	500.00

Activity based Cost for each Department

Activity	Premium Hall (Rs.)	Recliner Hall (Rs.)	7D Hall (Rs.)	Cafeteria (Rs.)
Marketing Expenses	78,750	90,000	45,000	11,250
	(2,62,500 x 0.3)	(3,00,000 x 0.3)	(1,50,000 x 0.3)	(37,500 x 0.3)
Website Maintenance Expenses	52,500	61,875	30,000	5,625
	(2,10,000 x 0.25)	(2,47,500 x 0.25)	(1,20,000 x 0.25)	(22,500 x 0.25)
Credit Card Processing Fees	37,500	45,000	30,000	22,500
	(75,000 x 0.5)	(90,000 x 0.5)	(60,000 x 0.5)	(45,000 x 0.5)
Cleaning Equipment Cost	90,000	1,35,000	67,500	22,500
	(3,000 x 30)	(4,500 x 30)	(2,250 x 30)	(750 x 30)
Inspecting and	60,000	90,000	75,000	37,500
	(12,000 x 5)	(18,000 x 5)	(15,000 x 5)	(7,500 x 5)

Testing Cost				
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%).

Question 10

Breeze Ltd has decided to analyses the profitability of its five new customers. It buys soft drink bottles in cases at ₹ 54 per case and sells them to retail customers at a list price of ₹ 64.80 per case. The data pertaining to five customers are given below:

Particulars	Customers				
	Aey	Bee	Cee	Dee	Eey
Number of Cases Sold	9,360	14,200	62,000	38,000	9,800
List Selling Price (₹)	64.80	64.80	64.80	64.80	64.80
Actual Selling Price (₹)	64.80	64.08	58.80	60.24	58.32
Number of Purchase Orders	30	50	60	50	60
Number of Customers visits	4	6	12	4	6
Number of Deliveries	20	60	120	80	40
Kilometers travelled per delivery	40	12	10	20	60
Number of expedite Deliveries	0	0	0	0	2

Its five activities and their cost drivers are:

Activity	Cost Driver
Order taking	₹ 240 per purchase order
Customer visits	₹ 360 per each visit
Deliveries	₹ 4.80 per delivery km travelled
Product Handling	₹ 2.40 per case sold
Expedited deliveries	₹ 120 per such delivery

You are REQUIRED to:

(i) Compute the customer level operating income of each of five retail customers by using the Cost Driver rates.

(ii) **Examine the results to give your comments on Customer 'Dee' in comparison with Customer 'Cee' and on Customer 'Eye' in comparison with Customer 'Aye'. (MTP 10 Marks, Oct.'2021, PYP Nov '19, 10 Marks)**

Answer 10

Working note: Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particulars	Customers				
	Aye	Bee	Cee	Dee	Eye
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800
Revenues (at listed price) (₹): (b) {(a) × ₹ 64.80)}	6,06,528	9,20,160	40,17,600	24,62,400	6,35,040
Discount (₹): (c) {(a) × Discount per case}	-	10,224 (14,200 cases × ₹ 0.72)	3,72,000 (62,000 cases × ₹ 6)	1,73,280 (38,000 cases × ₹ 4.56)	63,504 (9,800 cases × ₹ 6.48)
Cost of goods sold (₹): (d) {(a) × ₹ 54}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Customer level operating activities costs					
Order taking costs (₹): (No. of purchase × ₹ 240)	7,200	12,000	14,400	12,000	14,400
Customer visits costs (₹) (No. of customer visits × ₹ 360)	1,440	2,160	4,320	1,440	2,160
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 4.80 per km.)	3,840	3,456	5,760	7,680	11,520
Product handling costs (₹) {(a) × ₹ 2.40}	22,464	34,080	1,48,800	91,200	23,520
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 120}	-	-	-	-	240
Total cost of customer level operating activities (₹)	34,944	51,696	1,73,280	1,12,320	51,840

I. **Computation of Customer level operating income**

Particulars	Customers				
	Aey (₹)	Bee (₹)	Cee (₹)	Dee (₹)	Eey (₹)
Revenues (At list price) (Refer to working note)	6,06,528	9,20,160	40,17,600	24,62,400	6,35,040
Less: Discount (Refer to working note)	-	10,224	3,72,000	1,73,280	63,504
Revenue (At actual price)	6,06,528	9,09,936	36,45,600	22,89,120	5,71,536
Less: Cost of goods sold (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Gross margin	1,01,088	1,43,136	2,97,600	2,37,120	42,336
Less: Customer level operating activities costs (Refer to working note)	34,944	51,696	1,73,280	1,12,320	51,840

Customer level operating income	66,144	91,440	1,24,320	1,24,800	(9,504)

II. Comments

Customer Dee in comparison with Customer Cee: Operating income of Customer Dee is more than that of Customer Cee, despite having only 61.29% (38,000 units) of the units' volume sold in comparison to Customer Cee (62,000 units). Customer Cee receives a higher percent of discount i.e. 9.26% (₹ 6) while Customer Dee receive a discount of 7.04% (₹ 4.56). Though the gross margin of customer Cee (₹ 2,97,600) is more than that of Customer Dee (₹ 2,37,120) but total cost of customer level operating activities of Cee (₹ 1,73,280) is more in comparison to Customer Dee (₹ 1,12,320). As a result, operating income is more in case   of Customer Dee.

Customer Eey in comparison with Customer Aey: Customer Eey is not profitable while Customer Aey is profitable. Customer Eey receives a discount of 10% (₹ 6.48) while Customer Aey doesn't receive any discount. Sales Volume of Customer Aey and Eey is almost same. However, total cost of customer level operating activities of Eey is far more (₹ 51,840) in comparison to Customer Aey (₹ 34,944). This has resulted in occurrence of loss in case of Customer Eey.

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> This was a numerical problem from the topic 'Concepts of Activity Based Costing (ABC)' which required preparing customer level operating income using cost driver rates and examining the result and commenting on the customer by comparison of result/ other parameters. Performance of the examinees was above average.

Question 11

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

Overhead expenses are apportioned to the products on the following basis: Machine

Department On the basis of machine hours

Assembly Department On the basis of labour hours

After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	32,20,000	Machine hours	9,20,000 hours
Assembly services	22,00,000	Direct labour hours	11,00,000 hours
Set-up costs	4,50,000	Machine set-ups	9,000 set-ups

Order processing	3,60,000	Customer orders	7,200 orders
Purchasing	2,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to PREPARE a product-wise profit statement using:

(i)   Absorption costing method;

(ii) Activity-based method. (MTP 10 Marks Nov '21) (RTP May '21)

Answer 11

(i)   Profit Statement using Absorption costing method:

	Particulars	Product			Total
		X	Y	Z	
A.	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B.	Selling price per unit (₹)	45	90	70	
C.	Sales Value (₹) [A×B]	45,00,000	72,00,000	42,00,000	1,59,00,000
D.	Direct cost per unit (₹)	25	45	50	
E.	Direct Cost (₹) [A×D]	25,00,000	36,00,000	30,00,000	91,00,000
F.	Overheads:				
(i)	Machine department (₹) (Working note-1)	12,00,000	12,80,000	12,00,000	36,80,000
(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×B]	45,00,000	72,00,000	42,00,000	1,59,00,000
D.	Direct cost per unit (₹)	25	45	50	
E.	Direct Cost (₹) [A×D]	25,00,000	36,00,000	30,00,000	91,00,000
F.	Overheads: (Refer working note-3)				
(i)	Machining services (₹)	10,50,000	11,20,000	10,50,000	32,20,000
(ii)	Assembly services (₹)	12,00,000	6,40,000	3,60,000	22,00,000
(iii)	Set-up costs (₹)	2,25,000	1,50,000	75,000	4,50,000
(iv)	Order processing (₹)	1,10,000	1,20,000	1,30,000	3,60,000
(v)	Purchasing (₹)	75,000	87,500	37,500	2,00,000
G.	Total Cost (₹) [E+F]	51,60,000	57,17,500	46,52,500	1,55,30,000
H.	Profit (₹) (C-G)	(6,60,000)	14,82,500	(4,52,500)	3,70,000

Working Notes:

1.

		Products			
		X	**Y**	**Z**	**Total**
A.	Production (units)	1,00,000	80,000	60,000	
B.	Machine hours per unit	3	4	5	
C.	Total Machine hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D.	Rate per hour (₹)	4	4	4	
E.	**Machine Dept. cost [C×D]**	**12,00,000**	**12,80,000**	**12,00,000**	**36,80,000**
F.	Labour hours per unit	6	4	3	
G.	Total labour hours [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
H.	Rate per hour (₹)	2.5	2.5	2.5	
I	**Assembly Dept. cost [G×H]**	**15,00,000**	**8,00,000**	**4,50,000**	**27,50,000**

Machine hour rate = Rs. 36,80,000 / 9,20,000 hours = ₹ 4

Labour hour rate = Rs. 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	250.00

3. Calculation of activity-wise cost

		Products			
		X	**Y**	**Z**	**Total**
A.	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B.	Machine hour rate (₹) (Refer Working note-2)	3.5	3.5	3.5	
C.	**Machining services cost (₹) [A×B]**	**10,50,000**	**11,20,000**	**10,50,000**	**32,20,000**
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×E]**	**12,00,000**	**6,40,000**	**3,60,000**	**22,00,000**
G.	Machine set-ups	4,500	3,000	1,500	9,000
H.	Rate per set-up (₹) (Refer Working note-2)	50	50	50	
I.	**Set-up cost (₹) [G×H]**	**2,25,000**	**1,50,000**	**75,000**	**4,50,000**
J.	Customer orders	2,200	2,400	2,600	7,200

K.	Rate per order (₹) (Refer Working note-2)	50	50	50	
L.	**Order processing cost (₹) [J×K]**	**1,10,000**	**1,20,000**	**1,30,000**	**3,60,000**
M.	Purchase orders	300	350	150	800
N.	Rate per order (₹) (Refer Working note-2)	250	250	250	
O.	**Purchasing cost (₹) [M×N]**	**75,000**	**87,500**	**37,500**	**2,00,000**

Question 12

Discuss with example the level of activity method of segregating semi-variable costs into fixed and variable costs. (MTP Oct. '18, 5 Marks)

Answer 12

Level of activity method: Under this method, the variable overhead may be determined by comparing two levels of output with the amount of expenses at those levels. Since the fixed element does not change, the variable element may be ascertained with the help of the following formula.

$$\frac{Change\ in\ the\ amount\ of\ expense}{Change\ in\ the\ quantity\ of\ output}$$

Suppose the following information is available:

	Production Units	Semi-variable expenses (₹)
January	100	260
February	140	300
Difference	40	40

The variable cost : $\dfrac{Change\ in\ semi-variable\ expense}{Change\ in\ production\ volume} = \dfrac{40}{40\ units}$ = Re. 1/unit

Thus, in January, the variable cost will be 100 × Re. 1 = ₹ 100 and the fixed cost element will be (₹ 260 – ₹ 100) or ₹ 160. In February, the variable cost will be 140 × Re. 1 = ₹ 140 whereas the fixed cost element will remain the same, i.e., ₹ 160.

Question 13

'Humara - Apna' bank offers three products, viz., deposits, Loans and Credit Cards. The bank has selected 4 activities for a detailed budgeting exercise, following activity based costing methods.

The bank wants to know the product wise total cost per unit for the selected activities, so that prices may be fixed accordingly.

The following information is made available to formulate the budget:

Activity	Present Cost (Rs.)	Estimation for the budget period
ATM Services:		
(a) Machine Maintenance	4,00,000	All fixed, no change.
(b) Rents	2,00,000	Fully fixed, no change.
(c) Currency	1,00,000	Expected to double during budget period.
Replenishment Cost	7,00,000	(This activity is driven by no. of ATM transactions)

Computer Processing	5,00,000	Half this amount is fixed and no change is expected. The variable portion is expected to increase to three times the current level. (This activity is driven by the number of computer transactions)
Issuing Statements	18,00,000	Presently, 3 lakh statements are made. In the budget period, 5 lakh statements are expected. For every increase of one lakh statement, one lakh rupees is the budgeted increase. (This activity is driven by the number of statements)
Computer Inquiries	2,00,000	Estimated to increase by 80% during the budget period. (This activity is driven by telephone minutes)

The activity drivers and their budgeted quantifies are given below:

Activity Drivers	Deposits	Loans	Credit Cards
No. of ATM Transactions	1,50,000	---	50,000
No. of Computer Processing Transactions	15,00,000	2,00,000	3,00,000
No. of Statements to be issued	3,50,000	50,000	1,00,000
Telephone Minutes	3,60,000	1,80,000	1,80,000

The bank budgets a volume of 58,600 deposit accounts, 13,000 loan accounts, and 14,000 Credit Card Accounts.

Required

(i) CALCULATE the budgeted rate for each activity.

(ii) PREPARE the budgeted cost statement activity wise.

(iii) COMPUTE the budgeted product cost per account for each product using (i) and (ii) above. (MTP 10 Marks April '19 & Oct '23, Old & New SM) (Same concepts different figures MTP 10 Marks Apr'22)

Answer 13

Statement Showing "Budgeted Cost per unit of the Product"

Activity	Activity Cost (Budgeted (Rs.)	Activity Driver	No. of Units of Activity Driver (Budget)	Activity Rate (Rs.)	Deposits	Loans	Credit Cards
ATM Services	8,00,000	No. of ATM Transaction	2,00,000	4.00	6,00,000	---	2,00,000
Computer Processing	10,00,000	No. of Computer Transaction	20,00,000	0.50	7,50,000	1,00,000	1,50,000
Issuing Statements	20,00,000	No. of Statements	5,00,000	4.00	14,00,000	2,00,000	4,00,000

Customer Inquiries	3,60,000	Telephone Minutes	7,20,000	0.50	1,80,000	90,000	90,000
Budgeted Cost	41,60,000				29,30,000	3,90,000	8,40,000
Units of Product (as estimated in the budget period)					58,600	13,000	14,000
Budgeted Cost per unit of the product					50	30	60

Working Note

Activity	Budgeted Cost (Rs.)	Remark
ATM Services:		
(a) Machine Maintenance	4,00,000	– All fixed, no change.
(b) Rents	2,00,000	– Fully fixed, no change.
(c) Currency Replenishment Cost	2,00,000	– Doubled during budget period.
Total	8,00,000	
Computer Processing	2,50,000	– Rs.2,50,000 (half of Rs.5,00,000) is fixed and no change is expected.
	7,50,000	– Rs.2,50,000 (variable portion) is expected to increase to three times the current level.
Total	10,00,000	
Issuing Statements	18,00,000	– Existing.
	2,00,000	– 2 lakh statements are expected to be increased in budgeted period. For every increase of one lakh statement, one lakh rupees is the budgeted increase.
Total	20,00,000	
Computer Inquiries	3,60,000	- Estimated to increase by 80% during the budget period. (Rs.2,00,000 x 180%)
Total	3,60,000	

Question 14

SMD Limited manufactures four products namely A, B, C and D using the same production and process facilities. The company has been following conventional method of costing and wishes to shift to activity-based costing system.

The data pertaining to four products are:

Product	Units produced	Material per unit (₹)	Labour hours per unit	Machine hours per unit
A	1,500	140	1	3
B	2,500	90	3	2
C	10,000	180	2	6
D	6,000	150	1.5	4

The following activity volumes are associated to the production process for the relevant period -

	Number of Inspections	Number of Material Movements	Number of set-ups
A	200	15	100

B	250	20	125
C	900	100	600
D	650	85	400

The cost data also states that:

- Direct Labour cost: ₹ 60 per hour

- Machine hour rate: ₹ 280 per hour

- Production overheads are absorbed on machine hour basis.

- For activity-based costing, a thorough, analysis of the production process revealed that:
Costs relating to set-ups and inspection bears the equal percentage while costs relating to machinery accounts for 20% of the production overhead.
Costs relating to material handling stands at 50% of costs relating to machinery. You are required to:

(i) Prepare a statement showing the unit costs and total costs of each product using the absorption costing method.

(ii) Prepare a statement showing the unit costs and total costs of each product using activity - based costing system.
(MTP 10 Marks Sep'22)

Answer 14

(i) Cost per unit - Conventional Costing: Absorption rate method

Particulars	A (₹)	B (₹)	C (₹)	D (₹)
Material	140	90	180	150
Labour @ ₹ 60 per labour hour	60	180	120	90
Overheads @ ₹ 280 per machine hour	840	560	1680	1120
Cost per unit (in ₹)	1,040	830	1,980	1,360
No of units	1,500	2,500	10,000	6,000
Total cost (₹)	15,60,000	20,75,000	1,98,00,000	81,60,000

(ii) Statement of apportionment of overheads:

Amount (₹)

Type of Cost	Cost Driver	A	B	C	D
Setups	No of Setups	7,48,000 (100 x 7,480)	9,35,000 (125x7,480)	44,88,000 (600 x 7,480)	29,92,000 (400 x7,480)
Machinery	Machine hours	2,52,000 (4,500 x 56)	2,80,000 (5,000 x 56)	33,60,000 (60,000 x 56)	13,44,000 (24,000 x 56)
Material Handling	No. of Movements of material	1,78,500 (15 x 11,900)	2,38,000 (20 x 11,900)	11,90,000 (100 x 11,900)	10,11,500 (85 x 11,900)
Inspection	No. of Inspections	9,16,300 (200x4,581.50)	11,45,375 (250x4,581.50)	41,23,350 (900x4,581.50)	29,77,975 (650x4,581.50)
Total		20,94,800	25,98,375	1,31,61,350	83,25,475
Output Units		1,500	2,500	10,000	6,000
Overhead/ unit		1,396.53	1,039.35	1,316.14	1,387.58

Statement showing Cost per unit and Total cost using Activity Based Costing

Particulars	A (₹)	B (₹)	C (₹)	D (₹)
Material	140.00	90.00	180.00	150.00
Labour	60.00	180.00	120.00	90.00
Total	200.00	270.00	300.00	240.00
No. of units	1,500	2,500	10,000	6,000
Total cost (excluding overheads)	3,00,000	6,75,000	30,00,000	14,40,000

Add: Overheads (as calculated)	20,94,800	25,98,375	1,31,61,350	83,25,475
Total cost	23,94,800	32,73,375	1,61,61,350	97,65,475
Cost per unit	1,596.53	1,309.35	1,616.14	1,627.58

Working Notes:

1. **Calculation of Total machine hours**

Particulars	A	B	C	D
(a) Machine hours per unit	3	2	6	4
(b) Production(units)	1,500	2,500	10,000	6,000
(c) Total machine hours (a) x(b)	4,500	5,000	60,000	24,000

Total Machine hours = 93,500

Total production overheads= 93,500 x 280 = ₹ 2,61,80,000

2. **Calculation** of cost driver rate

Cost pool	Amount of cost (₹)	Cost Driver (basis)	Cost Driver (units)	Cost Driver Rate (₹)
Setups	91,63,000	No. of Setups	1,225	7,480 per set up
Machinery	52,36,000	Machine Hrs.	93,500	56 per machine hour
Material Handlings	26,18,000	No. of Material Movements	220	11,900 per material movement
Inspection	91,63,000	No. of Inspections	2,000	4,581.50 per inspection
	2,61,80,000			

Question 15

WRITE DOWN the corresponding cost drivers related to the following activity cost pools: Inspecting and testing costs, Setting-up machines cost, Machining costs, Supervising Costs, Ordering and Receiving Materials cost (MTP 5 Marks Sep'22)

Answer 15

Activity Cost Pools	Related Cost Drivers
Inspecting and testing costs	Number of tests
Setting up machines cost	Number of set-ups
Machining costs	Machine hours
Supervising Costs	Direct labour hours
Ordering and Receiving Materials cost	Number of purchase orders

Question 16

ANI Limited is a trader of a Product Z. It has decided to analyse the profitability of its five new customers. It buys Z article at ₹5,400 per unit and sells to retail customers at a listed price of ₹6,480 per unit. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Units sold	4,500	6,000	9,500	7,500	12,750
Listed Selling Price	₹6,480	₹6,480	₹6,480	₹6,480	₹6,480
Actual Selling Price	₹6,480	₹6,372	₹5,940	₹6,264	₹5,832
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30

Number of expedited deliveries	0	0	0	0	1

Its five activities and their cost drivers are:

Activity	Cost Driver Rate
Order taking	₹4,500 per purchase order
Customer visits	₹3,600 per customer visit
Deliveries	₹7.50 per delivery Km travelled
Product handling	₹22.50 per case sold
Expedited deliveries	₹13,500 per expedited delivery

Required:

(i) COMPUTE the customer-level operating income of each of five retail customers (A, B, C, D and E).

(ii) STATE the factors ANI Limited should consider in deciding whether to drop a customer.

(MTP 10 Marks Oct'22)

Answer 16

Working note:

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

	Customers				
	A	B	C	D	E
Units sold: (a)	4,500	6,000	9,500	7,500	12,750
Revenues (at listed price) (Rs.): (b) {(a) ×Rs.6,480)}	2,91,60,000	3,88,80,000	6,15,60,000	4,86,00,000	8,26,20,000
Revenues (at listed price) (Rs.): (c) {(a) ×Actual selling price)}	2,91,60,000 (4,500×6,480)	3,82,32,000 (6,000×6,372)	5,64,30,000 (9,500×5,940)	4,69,80,000 (7,500×6,264)	7,43,58,000 (12,750×5,832)
Discount (Rs.) (d) {(b) − (c)}	0	6,48,000	51,30,000	16,20,000	82,62,000
Cost of goods sold (Rs.) : (d) {(a) x Rs.5,400}	2,43,00,000	3,24,00,000	5,13,00,000	4,05,00,000	6,88,50,000
Customer level operating activities costs					
Order taking costs (Rs.): (No. of purchase orders × Rs. 4,500)	67,500	1,12,500	1,35,000	1,12,500	1,35,000
Customer visits costs (Rs.) (No. of customer visits x Rs. 3,600)	7,200	10,800	21,600	7,200	10,800
Delivery vehicles travel costs (Rs.) (Kms travelled by delivery vehicles x Rs. 7.50 per km.)	1,500	1,350	2,250	3,000	4,500
Product handling costs (Rs.) {(a) x Rs. 22.50}	1,01,250	1,35,000	2,13,750	1,68,750	2,86,875

Cost of expediting deliveries (Rs.) {No. of expedited deliveries x Rs. 13,500}	-	-	-	-	13,500
Total cost of customer level operating activities (Rs.)	1,77,450	2,59,650	3,72,600	2,91,450	4,50,675

(i) Computation of Customer level operating income

	Customers				
	A	B	C	D	E
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)
Revenues (At list price) (Refer to working note)	2,91,60,000	3,82,32,000	5,64,30,000	4,69,80,000	7,43,58,000
Less: Cost of goods sold (Refer to working note)	(2,43,00,000)	(3,24,00,000)	(5,13,00,000)	(4,05,00,000)	(6,88,50,000)
Gross margin	48,60,000	58,32,000	51,30,000	64,80,000	55,08,000
Less: Customer level operating activities costs (Refer to working note)	(1,77,450)	(2,59,650)	(3,72,600)	(2,91,450)	(4,50,675)
Customer level operating income	46,82,550	55,72,350	47,57,400	61,88,550	50,57,325

(ii) Factors to be considered for dropping a customer:

Dropping customers should be the last resort to be taken by an entity. Factors to be considered should include:

- What is the expected future profitability of each customer?
- Are the currently least profitable or low profitable customers are likely to be highly profitable in the future?
- What costs are avoidable if one or more customers are dropped?
- Can the relationship with the "problem" customers be restructured so that there is at "win- win" situation

Question 17

Bopanna Ltd. produces three products Zm, Rm and Pm using the same plant and resources. It has given the following information for the year ended on 31st March 2022:

	Zm	Rm	Pm
Production Quantity (units)	6000	7200	9840
Cost per unit:			
Direct Material (₹)	450	420	880
Direct Labour (₹)	80	150	200

Budgeted direct labour rate was ₹40 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	2,50,000	No. of orders	No. of orders was 30 units for each product.
Set-up	1,50,000	No. of production Runs	All the three products are produced in production runs of 50 units.
Quality Control	1,00,000	No. of Inspections	Done for each production run.
Maintenance	3,00,000	Maintenance hours	Total maintenance hours were 10,000 and was allocated in the ratio of 2:1:2 between X, Y & Z.

Required:

(i) CALCULATE the total cost per unit of each product using the Absorption Costing Method.

(ii) CALCULATE the total cost per unit of each product using the Activity Based Costing Method. (MTP 10 Marks March '23)(Same concept different figures PYP 10 Marks Jan'21)

Answer 17

(i) Traditional Absorption Costing

	Zm	Rm	Pm	Total
(a) Quantity (units)	6,000	7,200	9,840	23,040
(b) Direct labour per unit (₹)	80	150	200	-
(c) Direct labour hours (a × b)/₹ 40	12,000	27,000	49,200	88,200

Overhead rate per direct labour hour = Budgeted overheads / Budgeted labour hours

= (₹2,50,000 + ₹1,50,000 + ₹ 1,00,000 + ₹3,00,000) / 88,200 hours

= ₹8,00,000 / 88,200 hours

= ₹9 per direct labour hour(approx.)

Calculation of Cost per Unit

	Zm	Rm	Pm
Direct Costs:			
Direct Material	450	420	880
Direct Labour (₹)	80	150	200
Production Overhead: (₹)	18	33.75	45
	(80× 9/40)	(150× 9/40)	(200× 9/40)
Total cost per unit (₹)	548	603.75	1125

(ii) Calculation of Cost-Driver level under Activity Based Costing

	Zm	Rm	Pm	Total
Quantity (units)	6,000	7,200	9,840	-
No. of orders (to be rounded off for fraction)	200 (6,000 / 30)	240 (7,200 / 30)	328 (9,840 / 30)	768
No. of production runs	120 (6,000 / 50)	144 (7,200 / 50)	197 (9,840 / 50)	461

No. of Inspections (done for each production run)	120	144	197	461
Maintenance hours	4,000	2,000	4,000	10,000

Calculation of Cost-Driver rate

Activity	Budgeted Cost (₹)	Cost-driver level	Cost Driver rate (₹)
	(a)	(b)	(c) = (a) / (b)
Material procurement	2,50,000	768	325.5
Set-up	1,50,000	461	325.5
Quality control	1,00,000	461	217.0
Maintenance	3,00,000	10,000	30.0

Calculation of total cost of products using Activity Based Costing

Particulars	Product		
	Zm (₹)	Rm (₹)	Pm (₹)
Direct Material	450	420	880
Direct Labour	80	150	200
Prime Cost per unit (A)	530	570	1080
Material procurement	10.85 (325.5×200/6000)	10.85 (325.5×240/7200)	10.85 (325.5×328/9840)
Set-up	6.51 (325.5×120/6000)	6.51 (325.5×144/7200)	6.51 (325.5×196.8/9840)
Quality control	4.34 (217×120/6000)	4.34 (217×144/7200)	4.34 (217×196.8/9840)
Maintenance	20.0 (4000×30/6000)	8.3 (2000×30/7200)	12.2 (4000×30/9840)
Overhead Cost per unit (B)	41.7	30.0	33.9
Total Cost per unit (A + B)	**571.7**	**600.0**	**1113.9**

Question 18

KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. of orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was ₹24,62,000 and wages ₹4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours

Set-ups	60
No. of inspections	18

Required:

(i) CALCULATE cost driver rates.

(ii) CALCULATE the total and unit cost for the batch. (MTP 5 Marks April '23) (Same concept different figures RTP Nov'20)

Answer 18

(i) Calculation of cost driver rate:

Cost pool	Budgeted overheads (₹)	Cost driver	Cost driver rate (₹)
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

(ii) Calculation of cost for the batch:

Particulars	Amount (₹)	Amount (₹)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
- Material procurement (₹1,535×56 orders)	85,960.00	
- Material handling (₹685.48×84 movements)	57,580.32	
- Maintenance (₹139.94×1,420 hours)	1,98,714.80	
- Set-up (₹628.97×60 set-ups)	37,738.20	
- Quality control (₹242.86×18 inspections)	4,371.48	3,84,364.80
Total Cost		33,14,864.80
No. of units		7,600
Cost per units		436.17

Question 19

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 20X7-X8 for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹ 39,67,500	₹1,05,03,000	₹ 60,49,500
Cost of goods sold	₹ 30,00,000	₹ 75,00,000	₹ 45,00,000
Cost of bottles returned	₹ 60,000	₹ 0	₹ 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000
Family store also provides the following information for the year 20X7-X8:			

Activity	Description of activity	Total Cost	Cost-allocation base

Bottles returns	Returning of empty bottles	₹ 60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	₹ 7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	₹ 12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and on-going restocking	₹ 8,64,000	8,640 hours of shelf-stocking time
Customer Support	Assistance provided to customers including check-out	₹ 15,36,000	15,36,000 items sold

Required:

(i) Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.

(ii) If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using and activity based costing system, Calculate the operating income and operating income as a % of revenues for each product line. (RTP Nov'18, RTP May'20, Nov'21, Old & New SM)

Answer 19

Statement of Operating income and Operating income as a percentage of revenues for each product line (When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft Drinks	Fresh Produce	Packaged Foods	Total
	(₹)	(₹)	(₹)	(₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: E= {(A)-(D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (E/A) × 100)	1.70%	7.17%	3.30%	4.97%

Working Notes

1. Total support cost:

	(₹)
Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total Cost of goods sold}} \times 100$$

$$= \frac{\text{Rs.45,00,000}}{\text{Rs.1,50,00,000}} \times 100 \quad = 30\%$$

3. Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	₹500 per purchase order
Delivery	12,60,000	3,150 deliveries	₹ 400 per delivery
Shelf-stocking	8,64,000	8,640 hours	₹ 100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	₹ 1 per item sold

(i) **Statement of Operating income and Operating income as a percentage of revenues for each product line**

(When support costs are allocated to product lines using an activity-based costing system)

	Soft drinks (₹)	Fresh Produce (₹)	Packaged Food (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost*	1,80,000	4,20,000	1,80,000	7,80,000
(360:840:360)				
Delivery cost*	1,20,000	8,76,000	2,64,000	12,60,000
(300:2190:660)				
Shelf stocking cost*	54,000	5,40,000	2,70,000	8,64,000
(540:5400:2700)				
Customer Support cost*	1,26,000	11,04,000	3,06,000	15,36,000
(1,26,000:11,04,000:3,06,000)				
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income C: {(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000
Operating income as a % of revenues	10.78%	0.60%	8.75%	4.97%
* Refer to working note 3				

Question 20

SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the month of September 2019, using the absorption costing method has been prepared:

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Production units	45,000	52,500	30,000
Material cost per unit (')	350	460	410
Wages per unit @ '80 per hour	240	400	560
Overhead cost per unit (')	240	400	560
Total cost per unit (')	830	1,260	1,530
Selling price (')	1,037.50	1,575	1,912.50

The following additional information is available relating to overhead cost drivers.

Cost driver	Product X	Product Y	Product Z	Total
No. of machine set-ups	40	160	400	600
No. of purchase orders	400	800	1,200	2,400
No. of customers	1,000	2,200	4,800	8,000

Actual production and budgeted production for the month is same. Workers are paid at standard rate.

Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material

ordering.

Required:

(i) COMPUTE overhead cost per unit using activity based costing method.

(ii) DETERMINE the selling price of each product based on activity-based costing with the same profit mark-up on cost. (RTP Nov'19)

Answer 20

Workings:

Total labour hours and overhead cost:

Particulars	Product X	Product Y	Product Z	Total
Production units	45,000	52,500	30,000	1,27,500
Hour per unit	3	5	7	
Total hours	1,35,000	2,62,500	2,10,000	6,07,500
Rate per hour				₹80.00
Total overhead				₹4,86,00,000

Cost per activity and driver

Activity	Machine Set-up	Customer order processing	Customer complaint management	Total
Total overhead (₹)	1,45,80,000	1,45,80,000	1,94,40,000	4,86,00,000
No. of drivers	600	2,400	8,000	
Cost per driver (₹)	24,300	6,075	2,430	

(i)   Computation of Overhead cost per unit:

Particulars	Product X	Product Y	Product Z
No. of machine set-ups	40	160	400
Cost per driver (₹)	24,300	24,300	24,300
Total Machine set-up cost (₹) [A]	9,72,000	38,88,000	97,20,000
No. of purchase orders	400	800	1,200
Cost per driver (₹)	6,075	6,075	6,075
Total order processing cost (₹) [B]	24,30,000	48,60,000	72,90,000
No. of customers	1,000	2,200	4,800
Cost per driver (₹)	2,430	2,430	2,430
Total customer complaint management cost (₹) [C]	24,30,000	53,46,000	1,16,64,000
Total Overhead cost (₹) [A+B+C]	58,32,000	1,40,94,000	2,86,74,000
Production units	45,000	52,500	30,000
Cost per unit (₹)	129.60	268.46	955.80

Determination of Selling price per unit

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Material cost per unit (')	350.00	460.00	410.00
Wages per unit @ '80 per hour	240.00	400.00	560.00
Overhead cost per unit (')	129.60	268.46	955.80
Total cost per unit (')	719.60	1,128.46	1,925.80
Profit (25% profit mark-up)(')	179.90	282.11	481.45
Selling price (')	899.50	1,410.57	2,407.25

Question 21

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost (Rs.)
Power	Kilowatt hours	50,000 kilowatt hours	40,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	60,00,000

The company makes three products M, S and T. For the year ended March 31, 20X 9, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

(i) PREPARE a statement showing cost allocation to each product from each activity.

(ii) CALCULATE the cost of unused capacity for each activity.

(iii) STATE the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate. (RTP May'19) (Same concept different figures Old & New SM)

Answer 21

Statement of cost allocation to each product from each activity

	Product			
	M (Rs.)	S (Rs.)	T (Rs.)	Total (Rs.)
Power	8,00,000	16,00,000	12,00,000	36,00,000
(Refer to working note)	(10,000 kWh × Rs.80)	(20,000 kWh × Rs.80)	(15,000 kWh × Rs.80)	
Quality Inspections	21,00,000	15,00,000	18,00,000	54,00,000
(Refer to working note)	(3,500 inspections × Rs.600)	(2,500 inspections × Rs.600)	(3,000 inspections × Rs.600)	

Working Note:

Rate per unit of cost driver:

Power : (Rs.40,00,000 ÷ 50,000 kWh) = Rs.80/kWh

Quality Inspection : (Rs.60,00,000 ÷ 10,000 inspections) = Rs.600 per inspection

(ii) Calculation of cost of unused capacity for each activity:

	(Rs.)
Power	4,00,000
(Rs.40,00,000 – Rs.36,00,000)	
Quality Inspections	6,00,000
(Rs.60,00,000 – Rs.54,00,000)	
Total cost of unused capacity	10,00,000

(ii) **Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate:**

- Effect on product costing & capacity management

- Effect on pricing decisions.

- Effect on performance evaluation

- Effect on financial statements

- Regulatory requirements.

- Difficulties in forecasting for any capacity level.

Question 22

The profit margin of BABY Hairclips Company were over 20% of sales producing BROWN and BLACK hairclips.

During the last year, GREEN hairclips had been introduced at 10% premium in selling price after the introduction of YELLOW hairclips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

Traditional Income Statement

(in `)

	Brown	Black	Yellow	Green	Total
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Direct Labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Overhead (3 times of direct labour)	60,00,000	48,00,000	10,80,000	1,20,000	1,20,00,000
Total Operating Income	20,00,000	16,00,000	4,14,000	60,000	40,74,000
Return on Sales (in%)	13.3%	13.3%	14.8%	18.2%	13.5%

It is a known fact that customers are ready to pay premium amount for YELLOW and GREEN hairclips for their attractiveness; and the percentage returns are also high on new products.

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner.

He provides support expenses category-wise as follows:

Support Expenses	(`)
Indirect Labour	40,00,000
Labour Incentives	32,00,000
Computer Systems	20,00,000
Machinery depreciation	16,00,000
Machine maintenance	8,00,000
Energy for machinery	4,00,000
Total	1,20,00,000

He provides following additional information for accomplishment of his interest: Incentives to be allocated @ 40% of labour expenses (both direct and indirect).

Indirect labours are involved mainly in three activities. About half of indirect labour is involved in handling production runs. Another 40% is required just for the physical changeover from one color hairclip to another because YELLOW hairclips require substantial labour for preparing the machine as compared to other colour hairclips. Remaining 10% of the time is spend for maintaining records of the products in four parts.

Another amount spent on computer system of ` 20,00,000 is for maintenance of documents relating to production runs and record keeping of the four products. In aggregate, approx.. 80% of the amount expend is involved in the production run activity and approx.. 20% is used to keep records of the products in four parts. Other overhead expenses i.e. machinery depreciation, machine maintenance and energy for machinery are incurred to supply machine capacity to produce all the hairclips (practical capability of 20,000 hours).

Activity Cost Drivers:

Particulars	Brown	Black	Yellow	Green	Total
Sales Volume (units)	1,00,000	80,000	18,000	2,000	2,00,000

Selling Price (`)	150	150	155	165	
Material cost (`)	50	50	52	55	
Machine hours per unit (Hrs)	0.10	0.10	0.10	0.10	20,000
Production runs	100	100	76	24	300
Setup time per run (Hrs)	4	1	6	4	

You are required to –

(i) **CALCULATE** operating income and operating income as per percentage of sales using activity-based costing system.

(i) **STATE** the reasons for different operating income under traditional income system and activity-based costing system. **(RTP Nov'22)**

Answer 22

Calculation of operating income using Activity Based Costing Calculation of Cost-Driver rate

Activity	Overhead cost	Allocation	Overhead cost	Cost-driver level	Cost driver rate
	(`)		(`)		(`)
Indirect labour + 40% for incentives	56,00,000	50%	28,00,000	300 Production runs	9,333.33
		40%	22,40,000	1052* Setup hours	2,129.28
		10%	5,60,000	4 Number of parts	1,40,000
Computer Systems	20,00,000	80%	16,00,000	300 Production runs	5,333.33
		20%	4,00,000	4 Number of parts	1,00,000
Machinery depreciation	16,00,000	100%	16,00,000	20,000 Machine hours	80
Machine Maintenance	8,00,000	100%	8,00,000	20,000 Machine hours	40
Energy for Machinery	4,00,000	100%	4,00,000	20,000 Machine hours	20

* (100 x 4) + (100 x 1) + (76 x 6) + (24 x 4)

= (400 + 100 + 456 + 96) = 1052 setup hours

Activity Based Costing

	Brown	Black	Red	Green	Total
Quantity (units)	1,00,000	80,000	18,000	2,000	2,00,000
	(`)	(`)	(`)	(`)	(`)
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Less: Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Less: Direct labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Less: 40% incentives on direct labour	8,00,000	6,40,000	1,44,000	16,000	16,00,000
(A)	72,00,000	57,60,000	13,50,000	1,64,000	1,44,74,000
Overheads					
Indirect labour + incentives					

- 50% based on Production runs	9,33,333 (9,333.33 x 100)	9,33,333 (9,333.33 x 100)	7,09,334 (9,333.33 x 76)	2,24,000 (9,333.33 x 24)	28,00,000
- 40% based on Setup hours	8,51,711 (2,129.28 x 400)	2,12,928 (2,129.28 x 100)	9,70,951 (2,129.28 x 456)	2,04,410 (2,129.28 x 96)	22,40,000
- 10% based on number of parts	1,40,000 (1,40,000 x 1)	1,40,000	1,40,000	1,40,000	5,60,000
Computer Systems					
- 80% based on Production runs	5,33,333 (5,333.33 x 100)	5,33,333 (5,333.33 x 100)	4,05,334 (5,333.33 x 76)	1,28,000 (5,333.33 x 24)	16,00,000
- 20% based on number of parts	1,00,000 (1,00,000 x 1)	1,00,000	1,00,000	1,00,000	4,00,000
Machinery depreciation	8,00,000 (80 x 0.1 x 1,00,000)	6,40,000 (80 x 0.1 x 80,000)	1,44,000 (80 x 0.1 x 18,000)	16,000 (80 x 0.1 x 2,000)	16,00,000
Machine Maintenance	4,00,000 (40 x 0.1 x 1,00,000)	3,20,000 (40 x 0.1 x 80,000)	72,000 (40 x 0.1 x 18,000)	8,000 (40 x 0.1 x 2,000)	8,00,000
Energy for Machinery	2,00,000 (20 x 0.1 x 1,00,000)	1,60,000 (20 x 0.1 x 80,000)	36,000 (20 x 0.1 x 18,000)	4,000 (20 x 0.1 x 2,000)	4,00,000
Total Overheads (B)	39,58,377	30,39,594	25,77,619	8,24,410	1,04,00,000
Operating Income (A-B)	32,41,623	27,20,406	(12,27,619)	(6,60,410)	40,74,000
Return on Sales (%)	21.61	22.67	(44.00)	(200.12)	13.53

The difference in the operating income under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more accurate.

Question 23

Hygiene Care Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Hand Wash	Detergent Powder	Dishwasher
Direct Materials (` / Pu)	150	120	120
Direct Labour @`10/ hour (` / Pu)	45	60	75
Production Overheads (` / Pu)	40	50	40
Total Cost (` / Pu)	235	230	235
Quantity Produced (Units)	30,000	60,000	90,000

Hygiene Care Ltd. was absorbing overheads on the basis of direct labour hours. Management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (`)
Goods Receiving	Number of Dispatch Order	8,88,000
Inspecting and Testing costs	Number of Production Runs	26,82,000
Dispatching	Number of dispatch order	6,30,000
Storage Cost	Number of Batches of material	36,00,000

The following information is also supplied:

Details	Hand Wash	Detergent Powder	Dishwasher
Batches of material	720	780	900
Number of dispatch order	360	540	600
No. of Production Runs	1,500	2,100	2,400
Number of Dispatch Orders	600	900	1,000

Required:

CALCULATE activity-based production cost of all the three products. (RTP May 23)

Answer 23

1. The Total Production Overhead are 78,00,000

Items	Labour Hour	Overheads allocation on the basis of direct Labour Hour (`)
Labour Hour Ratio	(4.5:6:7.5)	
Hand Wash	1,35,000	9,00,000
Detergent Powder	3,60,000	24,00,000
Dishwasher	6,75,000	45,00,000
Total	11,70,000	78,00,000

2. On the basis of ABC analysis this amount will be apportioned as follows: Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (`)	Hand Wash (`)	Detergent Powder (`)	Dishwasher (`)
Goods Receiving	Dispatch order	06:09:10	8,88,000	2,13,120	3,19,680	3,55,200
Inspecting and Testing costs	Production Runs	05:07:08	26,82,000	6,70,500	9,38,700	10,72,800
Dispatching	Dispatch Order	06:09:10	6,30,000	1,51,200	2,26,800	2,52,000
Storage Cost	Batches of material	12:13:15	36,00,000	10,80,000	11,70,000	13,50,000
Total Activity Cost				21,14,820	26,55,180	30,30,000
Quantity Produces				30,000	60,000	90,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				195	180	195
Total				265.49	224.25	228.67

Note: This question can also be solved by using cost driver rate

Question 24

L Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

	`
Machine Department expenses	18,48,000
Assembly Department expenses	6,72,000
Setup costs	90,000
Stores receiving cost	1,20,000
Order processing and dispatch	1,80,000
Inspect and Quality control cost	36,000

The data related to the three products during the period are as under:

	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40	30	50

Prepare a statement showing details of overhead costs allocated to each product type using activity-based costing. (RTP Nov '23)

Answer 24

Calculation of "Activity Rate"

Cost Pool	Cost (`) [A]	Cost Driver [B]	Cost Driver Rate (`) [C] = [A]÷[B]
Machine Department Expenses	18,48,000	Machine Hours (1,32,000 hrs.)	14.00
Assembly Department Expenses	6,72,000	Assembly Hours (42,000 hrs.)	16.00
Setup Cost	90,000	No. of Production Runs (450*)	200.00
Stores Receiving Cost	1,20,000	No. of Requisitions Raised on the Stores (120)	1,000.00
Order Processing and Dispatch	1,80,000	No. of Customers Orders Executed (3,750)	48.00
Inspection and Quality Control Cost	36,000	No. of Production Runs (450*)	80.00
Total (`)	29,46,000		

*Number of Production Run is 450 (150 + 120 + 180)

Statement Showing "Overheads Allocation"

Particulars of Cost	Cost Driver	P	Q	R	Total

Machine Department Expenses	Machine Hours	4,20,000 (30,000 × `14)	6,72,000 (48,000 × `14)	7,56,000 (54,000 × `14)	18,48,000
Assembly Department Expenses	Assembly Hours	2,40,000 (15,000 × `16)	---	4,32,000 (27,000 × `16)	6,72,000
Setup Cost	No. of Production Runs	30,000 (150 × `200)	24,000 (120 × `200)	36,000 (180 × `200)	90,000
Stores Receiving Cost	No. of Requisitions Raised on the Stores	40,000 (40 × `1,000)	30,000 (30 × `1,000)	50,000 (50 × `1,000)	1,20,000
Order Processing and Dispatch	No. of Customers Orders Executed	60,000 (1,250 × `48)	48,000 (1,000 × `48)	72,000 (1,500 × `48)	1,80,000
Inspection and Quality Control Cost	No. of Production Runs	12,000 (150 × `80)	9,600 (120 × `80)	14,400 (180 × `80)	36,000
Overhead (`)		8,02,000	7,83,600	13,60,400	29,46,000

Question 25

MNO Ltd. manufactures two types of equipment A and B and absorbs overheads on the basis of direct labour hours. The budgeted overheads and direct labour hours for the month of March 2019 are ₹ 15,00,000 and 25,000 hours respectively. The information about the company's products is as follows:

	Equipment	
	A	B
Budgeted Production Volume	3,200 units	3,850 units
Direct Material Cost	₹ 350 per unit	₹ 400 per unit
Direct Labour Cost		
A: 3 hours @ ₹ 120 per hour	₹ 360	
B: 4 hours @ ₹ 120 per hour		₹ 480

Overheads of ₹ 15,00,000 can be identified with the following three major activities:

Order Processing: ₹ 3,00,000

Machine Processing: ₹ 10,00,000

Product Inspection: ₹ 2,00,000

These activities are driven by the number of orders processed, machine hours worked and inspection hours respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection hours
A	400	22,500	5,000
B	200	27,500	15,000
Total	600	50,000	20,000

Required:

(i) Prepare a statement showing the manufacturing cost per unit of each product using the absorption

costing method assuming the budgeted manufacturing volume is attained.

(ii) Determine cost driver rates and prepare a statement showing the manufacturing cost per unit of each product using activity based costing, assuming the budgeted manufacturing volume is attained.

(iii) MNO Ltd.'s selling prices are based heavily on cost. By using direct labour hours as an application base, calculate the amount of cost distortion (under costed or over costed) for each equipment. (PYP May '19, 10 Marks) (Same concept different figures Old & New SM)

Answer 25

(i)	Overheads application base: Direct labour hours	Equipment	Equipment
		A (₹)	B (₹)
	Direct material cost	350	400
	Direct labour cost	360	480
	Overheads*	180	240
		890	1120

*Pre-determined rate $= \dfrac{\text{Budgeted overheads}}{\text{Budgeted Direct labour hours}} = \dfrac{\text{Rs.15,00,000}}{\text{25,000hours}} = $ Rs. 60

(ii) Estimation of Cost-Driver rate

Activity	Overhead cost	Cost-driver level	Costdriverrate
	(₹)		(₹)
Order processing		600	
	3,00,000	Orders processed	500
Machine processing		50,000	
	10,00,000	Machine hours	20
Inspection		15,000	
	2,00,000	Inspection hours	10
		Equipment	Equipment
		A (₹)	B (₹)
Direct material cost		350	400
Direct labour cost		360	480
Prime Cost(A)		710	880
Overhead Cost			
Order processing 400: 200		**2,00,000**	**1,00,000**
Machine processing 22,500: 27,500		**4,50,000**	**5,50,000**
Inspection 5,000: 15,000		**50,000**	**1,50,000**
Total overhead cost		7,00,000	8,00,000

(Overheads cost per unit for each overhead can also be calculated)

Per unit cost	A (₹)	B (₹)
7,00,000 /3,200 **(B)-A**	218.75	
8,00,000/ 3,850 **(B)-B**		207.79
Unit manufacturing cost **(A+B)**	928.75	1,087.79

(iii) Calculation of Cost Distortion

	Equipment A (₹)	Equipment B (₹)
Unit manufacturing cost–using direct labour hours as an application base	890.00	1,120.00
Unit manufacturing cost-using activity based costing	928.75	1,087.79
Cost distortion	**-38.75**	**32.21**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this numerical question related to 'Activity Based Costing', students were asked to calculate cost per unit based on absorption costing & Activity based costing method, cost distortion and cost driver. Performance of the students was above average in this question. Overall performance in this question was average

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Question 26

M/s. HMB Limited is producing a product in 10 batches each of 15000 units in a year and incurring following overheads their on:

	Amount (₹)
Material procurement	22,50,000
Maintenance	17,30,000
Set-up	6,84,500
Quality control	5,14,800

The prime costs for the year amounted to ₹ 3,01,39,000.

The company is using currently the method of absorbing overheads on the basis of prime cost. Now it wants to shift to activity-based costing. Information relevant to Activity drivers for a year are as under:

Activity Driver	Activity Volume
No. of purchase orders	1500
Maintenance hours	9080
No. of set-ups	2250
No. of inspections	2710

The company has produced a batch of 15000 units and has incurred ₹ 26,38,700 and ₹ 3,75,200 on materials and wages respectively.

The usage of activities of the said batch are as follows:

Materials orders	48 orders
Maintenance hours	810 hours
No. of set-ups	40
No. of inspections	5
You are required to:	

(i)   find out cost of product per unit on absorption costing basis for the said batch.

(ii) determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity based costing. (PYP Nov '18, 10 Marks)

Answer 26

Working Note:

Overhead Absorption Rate = $\frac{51,79,300}{3,01,39,000}$ ×100 = 17.18%

(i)   **Cost of Product Under Absorption Costing**

Item of Cost	Amount (₹)

Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Overheads: $\frac{51,79,300}{3,01,39,000}$ x 30,13,900	5,17,930
Total Cost	35,31,830
Units	15,000
Cost per unit	235.46

(ii) Cost driver rate, total cost and cost per unit on the basis of activity-based costing method
 Absorption Costing

Calculation of Cost Driver rate:

Activity	₹.	Activity Volume	Cost Driver Rate
Material Procurement	22,50,000	1500	1500
Maintenance	17,30,000	9080	190.53
Setup	6,84,500	2250	304.22
Quality Control	5,14,800	2710	189.96

Calculation of total Cost and cost per unit:

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Material Purchase 22,50,000 / 1,500 × 48	72,000
Maintenance 17,30,000 / 9,080 ×810	1,54,328
Setup 6,84,500 / 2,250 × 40	12,169
Quality Control 5,14,800 / 2,710 × 25	4,749
Total Cost	32,57,146
Unit	15,000
Cost per unit	217.14

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this question, Part (i) was related to the calculation of cost per unit on absorption costing basis, in which most of the examinees did not understand the concept of calculation of absorption rate. Part (ii) is related to the Activity based costing and significant number of examinees answered in correct line and obtained 4 to 6 marks.

Question 27

Explain 'Activity Based Budgeting'. (PYP Nov '18, 5 Marks)

Answer 27

Activity Based Budgeting (ABB)

- Activity based budgeting analyse the resource input or cost for each activity.

- It provides a framework for estimating the amount of resources required in accordance with the budgeted level of activity.

- Actual results can be compared with budgeted results to highlight both in financial and non- financial terms those activities with major discrepancies from budget for potential reduction in supply of resources.

- It is a planning and control system which seeks to support the objectives of continuous improvement.
- It means planning and controlling the expected activities of the organization to derive a cost- effective budget that meet forecast workload and agreed strategic goals.
- ABB is the reversing of the ABC process to produce financial plans and budgets.

Question 28

PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:	
Particulars	₹
Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of: (i) Traditional method of charging overheads (ii) Activity based costing method and (iii) Find out the difference in cost per unit between both the methods. (PYP May '18, 10 Marks)

Answer 28

(i)   Statement Showing Overhead Cost per unit "Traditional Method"

	Gel Pen (₹)	Ball Pen (₹)
Units Overheads (₹)	5,500	24,000
(Refer to W.N.)	4,80,000	10,80,000
	(20 x 24,000 hrs.)	(20 x 54,000 hrs.)
Overhead Rate per	87.27	45
unit (₹)	(₹ 4,80,000 / 5,500 units)	(₹ 10,80,000 /24,000 units)

Working Notes:

Overhead Rate per Machine Hour

$$= \frac{\text{Total Overhead incurred by the Company}}{\text{Total Machine Hours}}$$

$$= \frac{4,75,020+5,79,888+5,04,992}{24,000 \text{ hours}+54,000 \text{ hours}}$$

$$= \frac{15,60,000}{78,000 \text{ hours}}$$

= ₹ 20 per machine hour

(ii)   Statement Showing "Activity Based Overhead Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (`)	Gel Pen (`)	Ball Pen (`)
Volume Related Activity Costs	Machine hours	24:54	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

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(iii)

	Gel Pen (`)	Ball Pen (`)
Overheads Cost per unit (`) (Traditional Method)	87.27	45
Overheads Cost per unit (`) (ABC)	95.39	43.13
Difference per unit	-8.12	+1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

Question 29

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:

- **Calculate cost driver's rate.**

- **Calculate total cost of each product using Activity Based Costing. (PYP 6 Marks Nov 20)**

Answer 29

(i) Calculation Cost-Driver's rate

Activity	Overhead cost (₹) (A)	Cost-driver level (B)	Cost driver rate (₹) (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	25,600	11,200
	(800 x 34)	(800 x 32)	(800 x 14)
Delivery cost	77,000	44,800	36,400
	(700 x 110)	(700 x 64)	(700 x 52)
Shelf stocking cost	21,890	31,840	33,830
	(199 x 110)	(199 x 160)	(199 x 170)
Overhead Cost (B)	1,26,090	1,02,240	81,430
Total Cost (A + B)	2,56,090	2,52,240	2,41,430

Question 30

Describe the various levels of activities under 'ABC' methodology. (PYP 4 Marks Nov 20, Old & New SM)

Answer 30

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.

Question 31

PQR Ltd. is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below:

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour hours	Labour hours	30,000 Labour hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. of Inspection	8000 Inspections	2,40,000

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. (PYP 10 Marks July 21)

Answer 31

(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 × ₹10)	80,000 (8,000 Labour hours × ₹10)	60,000 (6,000 Labour hours × ₹10)	2,40,000
Production runs (Refer to working note)	60,000 (200 Production runs × ₹ 300)	54,000 (180 Production runs × ₹ 300)	48,000 (160 Production runs × ₹ 300)	1,62,000
Quality Inspections (Refer to working note)	90,000 (3,000 Inspections × ₹30)	75,000 (2,500 Inspections × ₹ 30)	45,000 (1,500 Inspections × ₹ 30)	2,10,000

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 × ₹ 300)	4,500
Inspection Cost (250 Inspections × ₹ 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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

It was a practical problem testing the knowledge of examinees on the topic Activity Based Costing, requiring examinees to identify cost of allocated capacity and unused capacity on three products. It also required examinees to find out sales value of the offered new product by segregating cost into direct and indirect cost. First two sub parts i.e. allocation of cost and determination of cost of unused capacity were answered well, but examinees failed to segregate cost into direct and indirect in the third sub part. Performance of the examinees was above average.

Question 32

A Drug Store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. Due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for year 2020-21 for each product line:

	Drugs Types		
	A	**B**	**C**
Revenues (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos.)	560	810	630
Number of deliveries received	950	1,000	850
Hours of shelf-stocking time	900	1,250	2,350
Units sold (in Nos.)	1,75,200	1,50,300	1,44,500

Following additional information is also provided:

Activity	Description of activity	Total Cost (₹)	Cost-allocation base
Drug License fee	Drug License fee	5,00,000	To be distributed in ratio 2:3:5 between A, B and C
Ordering	Placing of orders for purchases	8,30,000	2,000 purchase orders
Delivery	Physical delivery and receipt of foods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time
Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

(i) Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:

(a) All the support costs (Other than cost of goods sold) are allocated in the ratio of cost of goods sold.

(b) All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.

(ii) **Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situations as above. (PYP 10 Marks Dec '21)**

Answer 32

(i)

(a) Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost of Goods sold (COGS): (B)	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Support cost (40% of COGS): (C) (Refer working notes)	16,57,800	27,26,700	48,25,500	92,10,000
Total cost: (D) = {(B) + (C)}	58,02,300	95,43,450	1,68,89,250	3,22,35,000
Operating income: E = {(A)-(D)}	16,47,700	16,31,550	17,35,750	50,15,000
Operating income as a % of revenues: (E/A) × 100	22.12%	14.60%	9.32%	13.46%

Working notes:

1. **Total support cost:**

	(₹)
Drug Licence Fee	5,00,000
Ordering	8,30,000
Delivery	18,20,000
Shelf stocking	32,40,000
Customer support	28,20,000
Total support cost	92,10,000

2. **Percentage of support cost to cost of goods sold (COGS):**

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \text{ X } 100$$

$$= \frac{\text{Rs.}92,10,000}{\text{Rs.}2,30,25,000} \text{ X } 100 = 40\%$$

3. **Cost for each activity cost driver:**

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	8,30,000	2,000 purchase orders	₹ 415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹ 650 per delivery
Shelf-stocking	32,40,000	4,500 hours	₹ 720 per stocking hour
Customer support	28,20,000	4,70,000 units sold	₹ 6 per unit sold

(b) **Statement of Operating income and Operating income as a percentage of revenues for each product line**

(When support costs are allocated to product lines using an activity-based costing system)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost & Goods sold	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Drug Licence Fee	1,00,000	1,50,000	2,50,000	5,00,000

Ordering cost* (560:810:630)	2,32,400	3,36,150	2,61,450	8,30,000
Delivery cost* (950:1000:850)	6,17,500	6,50,000	5,52,500	18,20,000
Shelf stocking cost* (900:1250:2350)	6,48,000	9,00,000	16,92,000	32,40,000
Customer Support cost* (175200:150300:144500)	10,51,200	9,01,800	8,67,000	28,20,000
Total cost: (B)	67,93,600	97,54,700	1,56,86,700	3,22,35,000
Operating income C: {(A) - (B)}	6,56,400	14,20,300	29,38,300	50,15,000
Operating income as a % of revenues	8.81%	12.71%	15.78%	13.46%

* Refer to working note 3

(i)   Comparison on the basis of operating income as per the percentage (%) of revenue:

(a) When support costs are allocated to product lines on the basis of cost of goods sold of each product

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Operating income as a % of revenues	22.12%	14.60%	9.32%	13.46%

On comparing the operating income as a % of revenue of each product, Drug A is the most profitable product line, though its revenue is least but with highest units sold.

(b) When support costs are allocated to product lines using an activity -based costing system

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Operating income as a % of revenues	8.81%	12.71%	15.78%	13.46%

On comparing the operating income as a % of revenue of each product, Drug C is the most profitable product line, though its unit sold is least but with highest revenue.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:
This Numerical Question tested the knowledge of examinees on the topic Activity Based Costing. The first part of the question required apportionment of overheads cost on the basis of cost of goods sold ratio and to calculate income as percentage of revenue for three products. In the second part, allocation of overheads based on activity based cost drivers and to calculate income as percentage of revenue for three products. Finally choose the best product in both methods on the basis of income as percentage of revenue. Most of the students answered will in the second part of the question. Performance of the examinees was good.

Question 33

Star Limited manufacture three products using the same production methods. A conventional product costing system is being used currently. Details of the three products for a typical period are:

Product	Labour Hrs. per unit	Machine Hrs. per unit	Materials per Unit1	Volume in Units
AX	1.00	2.00	35	7,500
BX	0.90	1.50	25	12,500
CX	1.50	2.50	45	25,000

Direct Labour costs ₹ 20 per hour and production overheads are absorbed on a machine hour basis. The overhead absorption rate for the period is ₹ 30 per machine hour.

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1 Material cost per unit

Management is considering using Activity Based Costing system to ascertain the cost of the products. Further analysis shows that the total production overheads can be divided as follows:

Particulars	%
Cost relating to set-ups	40
Cost relating to machinery	10
Cost relating to material handling	30
Costs relating to inspection	20
Total production overhead	100

The following activity volumes are associated with the product line for the period as a whole. Total activities for the period:

Product	No. of set-ups	No. of movements of Materials	No. of inspections
AX	350	200	200
BX	450	280	400
CX	740	675	900
Total	1,540	1,155	1,500

Required:

(i) Calculate the cost per unit for each product using the conventional method.

(ii) Calculate the cost per unit for each product using activity based costing method. (PYP 10 Marks May'22)

Answer 33

I. Statement showing "Cost per unit" using "conventional method"

Particulars of Costs	AX	BX	CX
	(₹)	(₹)	(₹)
Direct Materials	35	25	45
Direct Labour	20	18	30
Production Overheads	60	45	75
Cost per unit	115	88	150

II. Statement Showing "Cost per unit using "Activity Based Costing"

Products	AX	BX	CX
Production (units)	7,500	12,500	25,000
	(₹)	(₹)	(₹)
Direct Materials	2,62,500	3,12,500	11,25,000
Direct Labour	1,50,000	2,25,000	7,50,000
Machine Related Costs	45,000	56,250	1,87,500

Products	AX	BX	CX
Setup Costs	2,62,500	3,37,500	5,55,000
Material handling Cost	1,50,000	2,10,000	5,06,250
Inspection Costs	77,000	1,54,000	3,46,500
Total Costs	9,47,000	12,95,250	34,70,250
Cost per unit (Total Cost ÷ Units)	126.267	103.62	138.81

Working Notes:

Calculation of Total Machine hours

Particulars	AX	BX	X

(A) Machine hours per unit	2	1.5	2.5
(B) Production (units)	7,500	12,500	25,000
(C) Total Machine hours (A× B)	15,000	18,750	62,500

Total Machine hours = 96,250

Total Production overheads = 96,250 × 30 = ₹ 28,87,500

Calculation of Cost Driver Rate

Cost Pool	%	Overheads (₹)	Cost Driver (Basis)	Cost Driver (Units)	Cost Driver Rate (₹)
Set up	40	11,55,000	No of set ups	1,540	750 per set up
Machine Operation	10	2,88,750	Machine hours	96,250	3 per machine hour
Material Handling	30	8,66,250	No of material movement	1,155	750 per material movement
Inspection	20	5,77,500	No of inspection	1,500	385 per inspection

Question 34

XYZ Ltd. is engaged in manufacturing two products- Express Coffee and Instant Coffee. It furnishes the following data for a year:

Product	Actual Output (units)	Total Machine hours	Total Number of Purchase orders	Total Number of set ups
Express Coffee	**5,000**	**20,000**	**160**	**20**
Instant Coffee	**60,000**	**1,20,000**	**384**	**44**

The annual overheads are as under:

Particulars	₹
Machine Processing	**7,00,000**
costs Set up related	**7,68,000**
costs	**6,80,000**
Purchase related costs	

You are required to:

(i) Compute the costs allocated to each product – Express Coffee and Instant Coffee from each activity on the basis of Activity- Based Costing (ABC) method.

(ii) Find out the overhead cost per unit of each product – Express coffee and Instant coffee based on (i) above. (PYP 4 Marks Nov 22)

Answer 34

(i) **Estimation of Cost-Driver rate**

Activity	Overhead cost (₹)	Cost-driver level	Cost driver rate (₹)
Machine processing	7,00,000	1,40,000 Machine hours	5
Set up Costs	7,68,000	64 Number of set up	12,000
Purchase related Costs	6,80,000	544 Number of purchase order	1250

Cost Allocation under Activity based Costing

	Express Coffee	Instant Coffee
	(₹)	(₹)
Overhead Cost		
Machine processing (Cost Driver rate - ₹ 5) (or 20,000:1,20,000)	5 × 20,000 = 1,00,000	5 × 1,20,000 = 6,00,000
Set up Costs (Cost Driver rate - ₹ 12,000)) (or 20:44)	12,000 × 20 = 2,40,000	12,000 × 44 = 5,28,000
Purchase related Costs (Cost Driver rate - ₹ 1250) (or 160:384)	1,250 × 160 = 2,00,000	1,250 × 384 = 4,80,000
Total overhead cost	5,40,000	16,08,000

(ii) Overhead Cost per unit

Per unit Overhead cost	(₹)	(₹)
5,40,000 /5,000	108	
16,08,000/60,000		26.80

Question 35

PP Limited is in the process of implementation of Activity Based Costing System in the organisation. For this purpose, it has identified the following Business Functions in its organisation:

(i) Research and Development
(ii) Design of Products, Services and Procedures
(iii) Customer Service
(iv) Marketing
(v) Distribution

You are required to specify two cost drivers for each Business Function Identified above.

(PYP 5 Marks Nov 22)

Answer 35

Business functions	Cost Driver
Research and Development	• Number of research projects • Personnel hours on a project • Technical complexities of the project
Design of products, services and procedures	• Number of products in design • Number of parts per product • Number of engineering hours
Customer Service	• Number of service calls • Number of products serviced • Hours spent on servicing products
Marketing	• Number of advertisements • Number of sales personnel • Sales revenue
Distribution	• Number of units distributed • Number of customers • Weight of items distributed

(Any two cost drivers of each business function)

Chapter 6
Cost Sheet

Question 1

From the following figures, Calculate cost of production and profit for the month of March 20X9.

Stock on 1st March, 20X9	Amount (Rs.)		Amount (Rs.)
		Purchase of raw materials	28,57,000
- Raw materials	6,06,000	Sale of finished goods	1,34,00,000
- Finished goods	3,59,000	Direct wages	37,50,000
Stock on 31st March, 20X9		Factory expenses	21,25,000
- Raw materials	7,50,000	Office and administration expenses	10,34,000
- Finished goods	3,09,000	Selling and distribution expenses	7,50,000
Work-in-process:		Sale of scrap	26,000
- On 1st March, 20X9	12,56,000		
- On 31st March, 20X9	14,22,000		

(MTP March '19,5 Marks, RTP May'18)

Answer 1

Calculation of Cost of Production and Profit for the month ended March, 20X9: Particulars	Amount (Rs.)	Amount (Rs.)
Materials consumed:		
- Opening stock	6,06,000	
- Add: Purchases	28,57,000	
	34,63,000	
- Less: Closing stock	(7,50,000)	27,13,000
Direct wages		37,50,000
Prime cost		64,63,000
Factory expenses		21,25,000
		85,88,000
Add: Opening W-I-P		12,56,000
Less: Closing W-I-P		(14,22,000)
Factory cost		84,22,000
Less: Sale of scrap		(26,000)
Cost of Production		**83,96,000**
Add: Opening stock of finished goods		3,59,000
Less: Closing stock of finished goods		(3,09,000)
Cost of Goods Sold		84,46,000
Office and administration expenses		10,34,000
Selling and distribution expenses		7,50,000
Cost of Sales		1,02,30,000
Profit (balancing figure)		**31,70,000**
Sales		1,34,00,000

Question 2

From the following data of A Ltd., Calculate	
(i) Material Consumed; (ii) Prime Cost and (iii)Cost of production.	
	Amount (Rs.)
(i) Repair & maintenance paid for plant & machinery	9,80,500

(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000
(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000
(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production process	92,600
(xii)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000
(xiii)	Amount realized by selling scrap generated during the manufacturing process	9,200
(xiv)	Packing cost necessary to preserve the goods for further processing	10,200
(xv)	Salary paid to Director (Technical)	8,90,000
(MTP Oct. '19, 10 Marks, RTP May 20, Nov 18)		

Answer 2

Calculation of Cost of Production of A Ltd. for the period…..	
Particulars	**Amount (Rs.)**
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for inventories	26,000
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,43,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,47,000
Less: Amount realised by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,48,000
Notes:	
(i) Other administrative overhead does not form part of cost of production.	
(ii) Salary paid to Director (Technical) is an administrative cost.	

Question 3

State the advantages of Cost-Sheets. (MTP Oct. '18, 5 Marks)

Answer 3

Advantages of Cost sheet or Cost Statements

The main advantages of a Cost Sheet are as follows:

    (i)   It provides the total cost figure as well as cost per unit of production.

    (ii)   It helps in cost comparison.

    (iii)   It facilitates the preparation of cost estimates required for submitting tenders.

    (iv)   It provides sufficient help in arriving at the figure of selling price.

    (v)   It facilitates cost control by disclosing operational efficiency.

Question 4

Following figures has been extracted from the books of M/s A&R Brothers:

	Amount (Rs.)
Stock on 1st March, 2020	
- Raw materials	6,06,000
- Finished goods	3,59,000
Stock on 31st March, 2020	
- Raw materials	7,50,000
- Finished goods	3,09,000
Work-in-process:	
- On 1st March, 2020	12,56,000
- On 31st March, 2020	14,22,000
Purchase of raw materials	28,57,000
Sale of finished goods	1,34,00,000
Direct wages	37,50,000
Factory expenses	21,25,000
Office and administration expenses	10,34,000
Selling and distribution expenses	7,50,000
Sale of scrap	26,000

    You are required to COMPUTE:

(i)   **Value of material consumed**

(ii)   **Prime cost**

(iii)   **Cost of production**

(iv)   **Cost of goods sold**

(v)   **Cost of sales**

(vi)   **Profit/loss (MTP 10 Marks May 20 & Oct '23)**

Answer 4

Cost Sheet of M/s A&R Brothers for the month ended March 2020:

	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Materials consumed:		
	- Opening stock	6,06,000	
	- Add: Purchases	28,57,000	
		34,63,000	
	- Less: Closing stock	(7,50,000)	27,13,000
	Direct wages		37,50,000
(ii)	Prime cost		64,63,000
	Factory expenses		21,25,000
			85,88,000
	Add: Opening W-I-P		12,56,000
	Less: Closing W-I-P		(14,22,000)

	Factory cost		84,22,000
	Less: Sale of scrap		(26,000)
(iii)	Cost of Production		83,96,000
	Add: Opening stock of finished goods		3,59,000
	Less: Closing stock of finished goods		(3,09,000)
(iv)	Cost of Goods Sold		84,46,000
	Office and administration expenses		10,34,000
	Selling and distribution expenses		7,50,000
(v)	Cost of Sales		1,02,30,000
(vi)	Profit (balancing figure)		31,70,000
	Sales		1,34,00,000

Question 5

Aloe Ltd. has the capacity to produce 2,00,000 units of a product every month. Its works cost at varying levels of production is as under: (10 Marks,Oct.'2020)

Level	Works cost per unit (Rs.)
10%	400
20%	390
30%	380
40%	370
50%	360
60%	350
70%	340
80%	330
90%	320
100%	310

Its fixed administration expenses amount to Rs 3,60,000 and fixed marketing expenses amount to Rs 4,80,000 per month respectively. The variable distribution cost amounts to ₹ 30 per unit.

It can sell 100% of its output at ₹ 500 per unit provided it incurs the following further expenditure:

(i) It gives gift items costing ₹ 30 per unit of sale;

(ii) It has lucky draws every month giving the first prize of Rs. 60,000; 2ND prize of Rs. 50,000, 3rd. prize of Rs. 40,000 and ten consolation prizes of Rs. 5,000 each to customers buying the product.

(iii) It spends Rs.2,00,000 on refreshments served every month to its customers;

(iv) It sponsors a television programmer every week at a cost of Rs.20,00,000 per month.

It can market 50% of its output at ₹ 560 by incurring expenses referred from (ii) to (iv) above and 30% of its output at ₹ 600 per unit without incurring any of the expenses referred from (i) to (iv) above. **PREPARE a cost sheet for the month showing total cost and profit at 30%, 50% and 100% capacity level & COMPARE its profit.** (MTP 10 Marks,Oct.'2020) (Same concept different figures MTP 10 Marks Apr'22, Old & New SM)

Answer 5

Cost Sheet (For the month)

Level of Capacity	30%		50%		100%	
	60,000 units		1,00,000 units		2,00,000 units	
	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)
Works Cost	380.00	2,28,00,000	360.00	3,60,00,000	310.00	6,20,00,000

Particulars						
Add: Fixed administration expenses	6.00	3,60,000	3.60	3,60,000	1.80	3,60,000
Add: Fixed marketing expenses	8.00	4,80,000	4.80	4,80,000	2.40	4,80,000
Add: Variable distribution cost	30.00	18,00,000	30.00	30,00,000	30.00	60,00,000
Add: Special Costs:						
- Gift items costs	-	-	-	-	30.00	60,00,000
- Customers' prizes*	-	-	2.00	2,00,000	1.00	2,00,000
- Refreshments	-	-	2.00	2,00,000	1.00	2,00,000
- Television programme sponsorship cost	-	-	20.00	20,00,000	10.00	20,00,000
Cost of sales	**424.00**	**2,54,40,000**	**422.40**	**4,22,40,000**	**386.20**	**7,72,40,000**
Profit (Bal. fig.)	176.00	1,05,60,000	137.60	1,37,60,000	113.80	2,27,60,000
Sales revenue	**600.00**	**3,60,00,000**	**560.00**	**5,60,00,000**	**500.00**	**10,00,00,000**

* Customers' prize cost:

Particulars	Amount (₹)
1st Prize	60,000
2nd Prize	50,000
3rd Prize	40,000
Consolation Prizes (10 × ₹ 5,000)	50,000
Total	**2,00,000**

Comparison of Profit

30% capacity	50% capacity	100% capacity
Rs. 176/Rs. 600 × 100	Rs. 137.6 / Rs. 560 × 100	Rs.113.8 / Rs.500 × 100
29.33 %	**24.57%**	**22.76%**

Profit (in value as well as in percentage) is higher at 30% level of capacity than that at 50% and 100% level of capacity.

Question 6

A Ltd. has the following expenditures for the year ended 31st March 2021:

Sl. No.		Amount (Rs.)	Amount (Rs.)
(i)	Raw materials purchased		10,00,00,000
(ii)	Freight inward		11,20,600
(iii)	Wages paid to factory workers		29,20,000
(iv)	Royalty paid for production		1,72,600
(v)	Amount paid for power & fuel		4,62,000
(vi)	Job charges paid to job workers		8,12,000
(vii)	Stores and spares consumed		1,12,000
(viii)	Depreciation on office building		56,000

(ix)	Repairs & Maintenance paid for:		
	- Plant & Machinery	48,000	
	- Sales office building	18,000	66,000
(x)	Insurance premium paid for:		
	- Plant & Machinery	31,200	
	- Factory building	18,100	49,300
(xi)	Expenses paid for quality control check activities		19,600
(xii)	Research & development cost paid for improvement in production process		18,200
(xiii)	Expenses paid for pollution control and engineering & maintenance		26,600
(xiv)	Salary paid to Sales & Marketing mangers:		10,12,000
(xv)	Salary paid to General Manager		12,56,000
(xvi)	Packing cost paid for:		
	- Primary packing necessary to maintain quality	96,000	
	- For re-distribution of finished goods	1,12,000	2,08,000
(xvii)	Fee paid to independent directors		2,20,000
(xviii)	Performance bonus paid to sales staffs		1,80,000
(xix)	Value of stock as on 1st April, 2020:		
	- Raw materials	18,00,000	
	- Work-in-process	9,20,000	
	- Finished goods	11,00,000	38,20,000
(xx)	Value of stock as on 31st March, 2021:		
	- Raw materials	9,60,000	
	- Work-in-process	8,70,000	
	- Finished goods	18,20,000	36,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – Rs. 86,000/-

From the above data you are requested to PREPARE Statement of cost for A Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales. (MTP 10 Marks, March '21 & Sep '23, RTP May'21)(Same concept different figures MTP 10 Marks Nov'21 & April '23)

Answer 6

Statement of Cost of A Ltd. for the year ended 31st March, 2021:

Sl. No.	Particulars	Amount (Rs.)	Amount (Rs.)
(i)	Material Consumed:		
	- Raw materials purchased	10,00,00,000	
	- Freight inward	11,20,600	
	Add: Opening stock of raw materials	18,00,000	
	Less: Closing stock of raw materials	(9,60,000)	10,19,60,600
(ii)	Direct employee (labour) cost:		
	- Wages paid to factory workers		29,20,000
(iii)	Direct expenses:		
	- Royalty paid for production	1,72,600	
	- Amount paid for power & fuel	4,62,000	

	- Job charges paid to job workers	8,12,000	14,46,600
	Prime Cost		10,63,27,200
(iv)	Works/ Factory overheads:		
	- Stores and spares consumed	1,12,000	
	- Repairs & Maintenance paid for plant & machinery	48,000	
	- Insurance premium paid for plant & machinery	31,200	
	- Insurance premium paid for factory building	18,100	
	- Expenses paid for pollution control and engineering & maintenance	26,600	2,35,900
	Gross factory cost		10,65,63,100
	Add: Opening value of W-I-P		9,20,000
	Less: Closing value of W-I-P		(8,70,000)
	Factory Cost		10,66,13,100
(v)	Quality control cost:		
	- Expenses paid for quality control check activities		19,600
(vi)	Research & development cost paid for improvement in production process		18,200
(vii)	Less: Realisable value on sale of scrap and waste		(86,000)
(viii)	Add: Primary packing cost		96,000
	Cost of Production		10,66,60,900
	Add: Opening stock of finished goods		11,00,000
	Less: Closing stock of finished goods		(18,20,000)
	Cost of Goods Sold		10,59,40,900
(ix)	Administrative overheads:		
	- Depreciation on office building	56,000	
	- Salary paid to General Manager	12,56,000	
	- Fee paid to independent directors	2,20,000	15,32,000
(x)	Selling overheads:		
	- Repairs & Maintenance paid for sales office building	18,000	
	- Salary paid to Manager- Sales & Marketing	10,12,000	
	- Performance bonus paid to sales staffs	1,80,000	12,10,000
(xi)	Distribution overheads:		
	- Packing cost paid for re-distribution of finished goods		1,12,000
	Cost of Sales		10,87,94,900

Question 7

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 10 Marks Oct 21, PYP 10 Marks Nov 20)**

Answer 7

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	8.00	4,80,000
Direct wages (Working note- (ii))	4.00	2,40,000
Prime cost	12.00	7,20,000
Production overhead (Working note- (iii))	1.20	72,000
Factory Cost	13.20	7,92,000
Administration Overhead (200% of direct wages)	8.00	4,80,000
Cost of production	21.20	12,72,000
Less: Closing stock (60,000 units – 54,000 units)	-	1,27,200
Cost of goods sold i.e. 54,000 units	21.20	11,44,800
Selling cost	1.00	54,000
Cost of sales/ Total cost	22.20	11,98,800
Profit	7.80	4,21,200
Sales value (₹ 30 × 54,000 units)	30.00	16,20,000

Working Notes:

(i) Direct material cost per unit of 'Normal' = M Direct material cost per unit of 'Super' = 2M

Total Direct Material cost = 2M × 60,000 units + M × 1,80,000 units

Or, Rs. 12,00,000 = 1,20,000 M + 1,80,000 M

Or, M $= \dfrac{Rs.12,00,000}{3,00,000} = $ Rs. 4

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

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

wages per unit for 'Normal' = 0.6W

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

W = ₹ 4 per unit

(iii) Production overhead per unit = ₹ 2,88,000 (60,000 + 1,80,000) = Rs. 1.20

Production overhead for 'Super' = ₹ 1.20 × 60,000 units = ₹ 72,000

Notes:

1. Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the Question and hence to be considered in cost of production only.

2. Cash discount is treated as interest and finance charges; hence, it is ignored.

3. Penalty paid against the copyright infringement case is an abnormal cost; hence, not included

Question 8

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

Particulars	Amount (in ₹)
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
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 10 Marks March '22, PYP 10 Marks July '21)**

Answer 8

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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This practical problem required preparation of cost sheet. Various items were given for adjustment. Most of the examinees were confused about the treatment of some items like cost of special drawing, hire charges paid for plant, carriage on return and general overheads. Overall performance of the examinees was poor.

Question 9

The following data relates to the manufacturing project received for the budgeted output of 19,600 units. You are required to CALCULATE the selling price per unit covering a profit of 25% on the selling price.

Direct materials: 40 sq. m. per unit @ ₹ 10.60 per sq. m.

Direct wages: Bonding department 48 hours per unit @ ₹ 25 per hour Finishing

department 30 hours per unit @ ₹ 19 per hour

Budgeted costs and hours per annum- Variable overhead:

	(₹)	Total hours
Bonding department	15,00,000	10,00,000
Finishing department	6,00,000	6,00,000

Fixed overhead-

	(₹)
Production	15,68,000
Selling and distribution	7,84,000
Administration (General)	3,92,000

(10 Marks, March '22)

Answer 9

Decision making Cost Sheet (per unit)

Particulars	(Amount in ₹)	(Amount in ₹)
Direct materials 40 m2 at ₹ 10.60 per m2		424
Direct wages:		
Bonding department- 48 hours at ₹ 25 per hour	1,200	
Finishing department- 30 hours at ₹ 19 per hour	570	1,770
Prime Cost		**2,194**
Variable overhead:*		
Bonding department- 48 hours at ₹ 1.50 per hour	72	
Finishing department- 30 hours at ₹ 1.00 per hour	30	102
Variable production cost		**2,296**
Fixed production overhead#		80
Total production cost		**2,376**
Selling and distribution cost$	40	

Administration cost$		20	60
Total Cost			2,436

Selling price per unit = Rs. 2,436 X $\frac{100}{75}$ = Rs. 3,248

Working Notes:
* Variable overhead rates –

Bonding : $\frac{15,00,000}{10,00,000\ hours}$ = Rs. 1.50

Finishing : $\frac{6,00,000}{6,00,000\ hours}$ = Rs. 1.00

\# Fixed production overhead rate per unit of output = $\frac{15,68,000}{19,600\ hours}$ = Rs. 80

$ Selling and production cost per unit of output = $\frac{7,84,000}{19,600\ hours}$ = Rs. 40

Administration cost per unit of output = $\frac{3,92,000}{19,600\ hours}$ = Rs. 20

Question 10

The following information pertains to A Limited for the year 1st April 2021 to 31st March 2022:

Particulars	Amount (₹)
Sales	50,00,000
Direct labour	10,50,000
Administrative overheads (relating to production activity)	1,50,000
Selling expenses	2,50,000

Inventory details are as follows:

	As on 1st April 2021 (Amount in ₹)	As on 31st March 2022 (Amount in ₹)
Raw materials	5,00,000	6,30,000
Finished goods	9,80,000	10,50,000
Work in Progress	6,00,000	8,00,000

Additional Information:

- **Direct labour would be 175% of works overheads.**
- **Cost of goods sold would be ₹ 6,900 per unit**
- **Selling expenses would be ₹ 500 per unit.**

You are required to PREPARE a cost sheet for the year ended 31st March, 2022 showing:

- (i) **Value of material purchased**
- (ii) **Prime cost**
- (iii) **Works cost**
- (iv) **Cost of production**
- (v) **Cost of goods sold**
- (vi) **Cost of Sales**
- (vii) **Profit earned**
- (viii) **Profit as a percentage of sales (MTP 10 Marks Sep'22)**

Answer 10

Cost Sheet of A Limited for the year ended 31st March 2022

Particulars	Amount (₹)	Amount (₹)
Opening Stock of Raw materials	5,00,000	
Add: Purchases (balancing figure)	20,50,000	
Less: Closing stock of raw materials	6,30,000	
Direct material consumed (balancing figure)		19,20,000
Direct labour		10,50,000
Prime Cost		29,70,000
Add: Factory Overheads (10,50,000 / 175%)		6,00,000
Add: Opening Stock of Work in Progress		6,00,000
		41,70,000
Less: Closing Stock of Work in Progress		8,00,000
Works Cost		33,70,000
Add: Administrative Overheads (relating to production activity)		1,50,000
COST OF PRODUCTION		35,20,000
Add: Opening stock of finished goods		9,80,000
Cost of Goods available for sale		45,00,000
Less: Closing Stock of finished goods		10,50,000
COST OF GOODS SOLD (Working Note: (iv))		34,50,000
Add: Selling and Distribution Overhead		2,50,000
COST OF SALES		37,00,000
Add: Profit (Balancing figure) [Sales - Cost of Sales]		13,00,000
SALES		50,00,000

Profit as a % of sales

$=\frac{13\ Laksh}{50Laksh} \times 100 = 26\%$

Working Notes:

(i) The cost sheet is completed by Reverse Working. Purchases amount is the balancing figure.

(ii) Direct labour = 175% of factory overhead (given). Hence, if direct labour = 10,50,000, then Factory Overhead = 10,50,000 / 175% = ₹ 6,00,000

(iii) Selling Overhead ₹ 2,50,000 (total), selling per unit ₹ 500.

Number of units sold = ₹ 2,50,000/ ₹ 500 = 500 units

(iv) Cost of goods sold = 500 units x ₹ 6,900 = ₹ 34,50,000

Question 11

A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated costs of production are as under:

Direct material	₹300 per unit
Direct employee cost	₹160 per unit
Indirect expenses:	
- Fixed	₹32,50,000 per annum
- Variable	₹50 per unit

- Semi-variable   ₹20,000 per month up to 50% capacity and ₹2,500 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 ₹1,00,00,000 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 10 Marks Oct'22)

Answer 11

Statement of Cost

	First three months (Rs.)	Remaining nine months (Rs.)	Total (Rs.)
	37,500 units	1,68,750 units	2,06,250 units
Direct material	1,12,50,000	5,06,25,000	6,18,75,000
Direct employee cost	60,00,000	2,70,00,000	3,30,00,000
Indirect- variable expenses	18,75,000	84,37,500	1,03,12,500
Indirect – fixed expenses	8,12,500	24,37,500	32,50,000
Indirect- semi-variable expenses			
- For first three months @ Rs.20,000 p.m.	60,000		
- For remaining nine months @ Rs.25,000 p.m.		2,25,000	2,85,000
Total cost	1,99,97,500	8,87,25,000	10,87,22,500
Desired profit	-	-	1,00,00,000
Sales value	-	-	11,87,22,500
Average selling price per unit			575.62

Question 12

Following information obtained from the records of a Manufacturing Company for the month of March:

Direct labour cost ₹ 25,000 being 150% of works overheads.

Cost of goods sold excluding administrative expenses ₹ 75,000.

Inventory accounts showed the following opening and closing balances:

	March 1 (₹)	March 31 (₹)
Raw materials	11,600	15,370
Work-in-progress	15,225	21,025
Finished goods	25,520	27,550

Other information is as follows:	
	(₹)
Selling expenses	6,125
General and administration expenses	4,375
Sales for the month	1,05,250

Required to:

(i)   FIND out the value of materials purchased.

(ii) PREPARE a cost statement showing the various elements of cost and also the profit earned. (MTP 10 Marks March '23, Old & New SM)

Answer 12

(i) **Computation of the value of materials purchased**

To find out the value of materials purchased, reverse calculations from the given data can be presented as below:

Particulars	(₹)
Cost of goods sold	**75,000**
Add: Closing stock of finished goods	27,550
Less: Opening stock of finished goods	(25,520)
Cost of production	**77,030**
Add: Closing stock of work-in-progress	21,025
Less: Opening stock of work-in-progress	(15,225)
Works cost	**82,830**
Less: Factory overheads: [₹25,000×100/150]	(16,667)
Prime cost	**66,163**
Less: Direct labour	(25,000)
Raw material consumed	**41,163**
Add: Closing stock of raw materials	15,370
Raw materials available	56,533
Less: Opening stock of raw materials	(11,600)
Value of materials purchased	**44,933**

(ii) **Cost statement**

	(₹)
Raw material consumed [Refer to statement (i) above]	41,163
Add: Direct labour cost	25,000
Prime cost	**66,163**
Add: Factory overheads	16,667
Works cost	**82,830**
Add: Opening work-in-progress	15,225
Less: Closing work-in-progress	(21,025)
Cost of production	**77,030**
Add: Opening stock of finished goods	25,520
Less: Closing stock of finished goods	(27,550)
Cost of goods sold	**75,000**
Add: General and administration expenses	4,375
Add: Selling expenses	6,125
Cost of sales	**85,500**
Profit (sales i.e ₹1,05,250 – Cost of sales i.e ₹ 85,500)	19,750
Sales	**1,05,250**

Question 13

Following information relate to a manufacturing concern for the year ended 31st March, 2019:

	(₹)
Raw Material (opening)	**2,28,000**
Raw Material (closing)	**3,05,000**
Purchases of Raw Material	**42,25,000**
Freight Inwards	**1,00,000**
Direct wages paid	**12,56,000**

Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Work-in-progress (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	₹ 16 per unit
Finished Stock (opening)- 1,217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14,000 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14,153 units at a price of ₹ 618 per unit during the year. PREPARE cost sheet of the firm. (RTP May '19, PYP May'18, 10Marks)

Answer 13

Cost sheet for the year ended 31st March, 2019.

Units produced - 14,000 units Units sold - 14,153 units

Particulars	Amount (Rs.)
Raw materials purchased	42,25,000
Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3,05,000)
	42,48,000
Less: Sale of scrap of material	(8,000)
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock [Rs. 500(70,00,000/14,000) × 1,064] (1,217+ 14,000 − 14,153 = 1,064 units)	(5,32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (Rs.16 × 14,153 units)	2,26,448
Cost of Sales	73,02,948
Profit (Balancing figure)	14,43,606
Sales (Rs. 618 × 14,153 units)	87,46,554

Question 14

The following details are available from the books of R Ltd. for the year ending 31st March 2020:

Particulars	Amount (₹)
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600

Wages to foreman and store keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	7,20,000
Cost of power & fuel	28,00,000
Production planning office expenses	12,60,000
Salary to delivery staffs	14,30,000
Income tax for the assessment year 2019-20	2,80,000
Fees to statutory auditor	1,80,000
Fees to cost auditor	80,000
Fees to independent directors	9,40,000
Donation to PM-national relief fund	1,10,000
Value of sales	2,82,60,000
Position of inventories as on 01-04-2019:	
- Raw Material	6,20,000
- W-I-P	7,84,000
- Finished goods	14,40,000
Position of inventories as on 31-03-2020:	
- Raw Material	4,60,000
- W-I-P	6,64,000
- Finished goods	9,80,000

From the above information PREPARE a cost sheet for the year ended 31 st March 2020. (RTP Nov '20)

Answer 14

Statement of Cost of R Ltd. for the year ended 31st March, 2020:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	84,00,000	
	- Carriage inward	1,72,600	
	Add: Opening stock of raw materials	6,20,000	
	Less: Closing stock of raw materials	(4,60,000)	87,32,600
(ii)	Direct employee (labour) cost:		
	- Direct wages	60,00,000	
	- Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
(iii)	Direct expenses:		
	- Consumable materials	4,80,000	
	- Cost of power & fuel	28,00,000	32,80,000
	Prime Cost		1,87,32,600
(iv)	Works/ Factory overheads:		
	- Wages to foreman and store keeper	8,40,000	
	- Other indirect wages to factory staffs	1,35,000	9,75,000

	Gross factory cost		1,97,07,600
	Add: Opening value of W-I-P		7,84,000
	Less: Closing value of W-I-P		(6,64,000)
	Factory Cost		1,98,27,600
(v)	Research & development cost paid for improvement in production process		9,60,000
(vi)	Production planning office expenses		12,60,000
	Cost of Production		2,20,47,600
	Add: Opening stock of finished goods		14,40,000
	Less: Closing stock of finished goods		(9,80,000)
	Cost of Goods Sold		2,25,07,600
(vii)	Administrative overheads:		
	- Salary to accountants	7,20,000	
	- Fees to statutory auditor	1,80,000	
	- Fees to cost auditor	80,000	
	- Fee paid to independent directors	9,40,000	19,20,000
(viii)	Selling overheads& Distribution overheads:		
	- Salary to delivery staffs		14,30,000
	Cost of Sales		2,58,57,600
	Profit (balancing figure)		24,02,400
	Sales		2,82,60,000

Note: Income tax and Donation to PM National Relief Fund is avoided in the cost sheet.

Question 15

Impact Ltd. provides you the following details of its expenditures for the year ended 31st March, 2021:

S. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	GST paid under Composition scheme		10,00,000
(iii)	Freight inwards		5,20,600
(iv)	Trade discounts received		10,00,000
(v)	Wages paid to factory workers		15,20,000
(vi)	Contribution made towards employees' PF & ESIS		1,90,000
(vii)	Production bonus paid to factory workers		1,50,000
(viii)	Fee for technical assistance		1,12,000
(ix)	Amount paid for power & fuel		2,62,000
(x)	Job charges paid to job workers		4,50,000
(xi)	Stores and spares consumed		1,10,000
(xii)	Depreciation on:		
	Factory building	64,000	
	Office building	46,000	
	Plant & Machinery	86,000	1,96,000
(xiii)	Salary paid to supervisors		1,20,000
(xiv)	Repairs & Maintenance paid for:		

	Plant & Machinery	58,000	
	Sales office building	50,000	
	Vehicles used by directors	20,600	1,28,600
(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	28,100	59,300
(xvi)	Expenses paid for quality control check activities		25,000
(xvii)	Research & development cost paid for improvement in production process		48,200
(xviii)	Expenses paid for administration of factory work		1,38,000
(xix)	Salary paid to functional mangers:		
	Production control	4,80,000	
	Finance & Accounts	9,60,000	
	Sales & Marketing	12,00,000	26,40,000
(xx)	Salary paid to General Manager		13,20,000
(xxi)	Packing cost paid for:		
	Primary packing necessary to maintain quality	1,06,000	
	For re-distribution of finished goods	1,12,000	2,18,000
(xxii)	Interest and finance charges paid (for usage of non- equity fund)		3,50,000
(xxiii)	Fee paid to auditors		1,80,000
(xxiv)	Fee paid to legal advisors		1,20,000
(xxv)	Fee paid to independent directors		2,40,000
(xxvi)	Payment for maintenance of website for online sales		1,80,000
(xxvii)	Performance bonus paid to sales staffs		2,40,000
(xxviii)	Value of stock as on 1st April, 2020:		
	Raw materials	9,00,000	
	Work-in-process	4,00,000	
	Finished goods	7,00,000	20,00,000
(xxix)	Value of stock as on 31st March, 2021:		
	Raw materials	5,60,000	
	Work-in-process	2,50,000	
	Finished goods	11,90,000	20,00,000

Amount realized by selling of waste generated during manufacturing process – ₹ 66,000/-

From the above data, you are required to PREPARE Statement of cost of Impact Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales. (RTP Nov '21)

Answer 15

Statement of Cost of Impact Ltd. for the year ended 31st March, 2021:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		

	Raw materials purchased	5,00,00,000	
	GST paid under Composition scheme*	10,00,000	
	Freight inwards	5,20,600	
	Less: Trade discounts received	(10,00,000)	
	Add: Opening stock of raw materials	9,00,000	
	Less: Closing stock of raw materials	(5,60,000)	5,08,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	15,20,000	
	Contribution made towards employees' PF & ESIS	1,90,000	
	Production bonus paid to factory workers	1,50,000	18,60,000
(iii)	Direct expenses:		
	Fee for technical assistance	1,12,000	
	Amount paid for power & fuel	2,62,000	
	Job charges paid to job workers	4,50,000	8,24,000
	Prime Cost		**5,35,44,600**
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,10,000	
	Depreciation on factory building	64,000	
	Depreciation on plant & machinery	86,000	
	Repairs & Maintenance paid for plant & machinery	58,000	
	Insurance premium paid for plant & machinery	31,200	
	Insurance premium paid for factory building	28,100	
	Salary paid to supervisors	1,20,000	4,97,300
	Gross factory cost		**5,40,41,900**
	Add: Opening value of W-I-P		4,00,000
	Less: Closing value of W-I-P		(2,50,000)
	Factory Cost		**5,41,91,900**
(v)	Quality control cost:		
	Expenses paid for quality control check activities		25,000
(vi)	Research & development cost paid for improvement in production process		48,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,38,000	
	-Salary paid to Production control manager	4,80,000	6,18,000
(viii)	Less: Realisable value on sale of scrap and waste		(66,000)
(ix)	Add: Primary packing cost		1,06,000
	Cost of Production		**5,49,23,100**
	Add: Opening stock of finished goods		7,00,000
	Less: Closing stock of finished goods		(11,90,000)
	Cost of Goods Sold		**5,44,33,100**
(x)	Administrative overheads:		
	Depreciation on office building	46,000	
	Repairs & Maintenance paid for vehicles used by directors	20,600	
	Salary paid to Manager- Finance & Accounts	9,60,000	

	Salary paid to General Manager	13,20,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,40,000	28,86,600
(xi)	Selling overheads:		
	Repairs & Maintenance paid for sales office building	50,000	
	Salary paid to Manager- Sales & Marketing	12,00,000	
	Payment for maintenance of website for online sales	1,80,000	
	Performance bonus paid to sales staffs	2,40,000	16,70,000
(xii)	Packing cost paid for re-distribution of finished goods		1,12,000
(xiii)	Interest and finance charges paid		3,50,000
	Cost of Sales		**5,94,51,700**

* GST paid under Composition scheme would be included under cost of material as it is not eligible for input tax credit.

Question 16

A Ltd. produces a single product X. During the month of December 2021, the company has produced 14,560 tonnes of X. The details for the month of December 2021 are as follows:

(i) Materials consumed ₹ 15,00,000

(ii) Power consumed 13,000 Kwh @ ₹ 7 per Kwh

(iii) Diesels consumed 1,000 litres @ ₹ 93 per litre

(iv) Wages & salary paid – ₹ 64,00,000

(v) Gratuity & leave encashment paid – ₹ 44,20,000

(vi) Hiring charges paid for HEMM- ₹ 13,00,000

(vii) Hiring charges paid for cars used for official purpose – ₹ 80,000

(viii) Reimbursement of diesel cost for the cars – ₹ 20,000

(ix) The hiring of cars attracts GST under RCM @5% without credit.

(x) Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ₹ 7,000

(xi) AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ₹ 6,000 and ₹ 18,000 per month respectively.

(xii) TA/ DA and hotel bill paid for sales manager- ₹ 16,000

(xiii) The company has 180 employees works for 26 days in a month.

Required:

(a) PREPARE a Cost sheet for the month of December 2021.

(b) COMPUTE Earnings per manshift (EMS) and Output per manshift (OMS) for the month of December 2021.   (RTP May '22)

Answer 16

(a) **Cost Sheet of A Ltd. for the month of December 2021**

Particulars	Amount (₹)	Amount (₹)
Materials consumed		15,00,000
Wages & Salary	64,00,000	
Gratuity & leave encashment	44,20,000	1,08,20,000
Power cost (13,000 kwh × ₹ 7)	91,000	
Diesel cost (1,000 ltr × ₹ 93)	93,000	1,84,000

HEMM hiring charges		13,00,000
Prime Cost		**1,38,04,000**
AMC cost of CCTV installed at factory premises		18,000
Cost of Production/ Cost of Goods Sold		**1,38,22,000**
Hiring charges of cars	80,000	
Reimbursement of diesel cost	20,000	
	1,00,000	
Add: GST @5% on RCM basis	5,000	1,05,000
Maintenance cost for weighing bridge	7,000	
AMC cost of CCTV installed at weigh bridge	6,000	13,000
TA/ DA & hotel bill of sales manager		16,000
Cost of Sales		**1,39,56,000**

(b) Man shift = 180 employees × 26 days = 4,680 man shifts

Computation of earnings per man shift (EMS):

$$\text{EMS} = \frac{Total\ employee\ benefits\ paid}{Manshift}$$

$$= \frac{Rs.1,08,20,000}{4,680} = \text{Rs. 2,312}$$

Computation of Output per man shift (OMS):

$$\text{OMS} = \frac{Total\ Output\ /\ Production}{Manshift}$$

$$= \frac{14,560\ Tonne}{4,680} = 3.11\ \text{tonne}$$

Question 17

CT Limited is engaged in producing medical equipment. It has furnished following details related to its products produced during a month:

	Units	Amount (₹)
Raw materials		
Opening stock	1,000	90,00,000
Purchases	49,000	44,10,00,000
Closing stock	1,750	1,57,50,000
Works-in-progress		
Opening	2,000	1,75,50,000
Closing	1,000	94,50,000
Direct employees' wages, allowances etc.		6,88,50,000
Primary packaging cost (per unit)		1,440
R&D expenses & Quality control expenses		2,10,60,000
Consumable stores, depreciation on plant		3,42,00,000
Administrative overheads related to production		3,15,00,000
Selling expenses		4,84,30,800
Royalty paid for production		3,64,50,000
Cost of web-site (for online sale) maintenance		60,75,000
Secondary packaging cost (per unit)		225

There was a normal scrap of 250 units of direct material which realized ₹ 5,400 per unit. The entire finished product was sold at a profit margin of 20% on sales. You are required to PREPARE a cost sheet showing:

(i) **Prime cost**
(ii) **Gross works cost**
(iii) **Factory costs**

(iv) **Cost of production**
(v)   **Profit**
(vi) **Sales. (RTP Nov'22)**

Answer 17

Cost Sheet

Particulars	Units	Amount (₹)
Material		
Opening stock	1,000	90,00,000
Add: Purchases	49,000	44,10,00,000
Less: Closing stock	(1,750)	(1,57,50,000)
	48,250	43,42,50,000
Less: Normal wastage of materials realized @ ₹ 5,400 per unit	(250)	(13,50,000)
Material consumed		43,29,00,000
Direct employee's wages and allowances		6,88,50,000
Direct expenses- Royalty paid for production		3,64,50,000
Prime cost	48,000	53,82,00,000
Factory overheads - Consumable stores, depreciation etc.		3,42,00,000
Gross Works Cost	48,000	57,24,00,000
Add: Opening WIP	2,000	1,75,50,000
Less: Closing WIP	(1,000)	(94,50,000)
Factory/Works Cost	49,000	58,05,00,000
Administration Overheads related to production		3,15,00,000
R&D expenses and Quality control cost		2,10,60,000
Add: Primary packaging cost @ ₹ 1,440 per unit		7,05,60,000
Cost of production	49,000	70,36,20,000
Selling expenses		4,84,30,800
Cost of maintaining website for online sale		60,75,000
Secondary packaging cost @ ₹ 225 per unit	49,000	1,10,25,000
Cost of sales		76,91,50,800
Add: Profit @ 20% on sales or 25% of cost		19,22,87,700
Sales value		96,14,38,500

Question 18

From the following data of Motilal Ltd., CALCULATE Cost of production:

		(`)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000
(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000
(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production process	92,600
(xii)	Administrative cost for:	
	- Factory & production	9,00,000
	- Others	11,60,000

(xiii)	Amount realised by selling scrap generated during the manufacturing process	9,200
(xiv)	Packing cost necessary to preserve the goods for further processing	10,200
(xv)	Salary paid to Director (Technical)	8,90,000

(RTP May 23)

Answer 18

Calculation of Cost of Production of Motilal Ltd for the period.....

Particulars	(`)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4,46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for inventories	26,000
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,43,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6,02,100)
	1,05,47,000
Less: Amount realized by selling scrap	(9,200)
Add: Primary packing cost	10,200
Cost of Production	1,05,48,000

Notes:

(i)   Other administrative overhead does not form part of cost of production.

(ii)   Salary paid to Director (Technical) is an administrative cost.

Question 19

A Ltd. produces a single product X. During the month of July 2023, the company has produced 14,560 tonnes of X. The details for the month of July 2023 are as follows:

(i)   Materials consumed ` 15,00,000

(ii)   Power consumed in operating production machinery 13,000 Kwh @ ` 7 per Kwh

(iii)   Diesels consumed in operating production machinery 1,000 litres @ ` 93 per litre

(iv)   Wages & salary paid – ` 64,00,000

(v)   Gratuity & leave encashment paid – ` 44,20,000

(vi)   Hiring charges paid for Heavy Earth Moving machines (HEMM) engaged in production - ` 13,00,000. Hiring charges is paid on the basis of production.

(vii)   Hiring charges paid for cars used for official purpose – ` 80,000

(viii) **Reimbursement of diesel cost for the cars – ` 20,000**

(ix) **The hiring of cars attracts GST under RCM @5% without credit.**

(x) **Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ` 7,000**

(xi) **AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ` 6,000 and ` 18,000 per month respectively.**

(xii) **TA/ DA and hotel bill paid for sales manager- ` 16,000**

(xiii) **The company has 180 employees works for 26 days in a month. Required:**

PREPARE a Cost sheet for the month of July 2023. (RTP Nov 23)

Answer 19

Cost Sheet of A Ltd. for the month of July 2023

Particulars	Amount (`)	Amount (`)
Materials consumed		15,00,000
Wages & Salary	64,00,000	
Gratuity & leave encashment	44,20,000	1,08,20,000
Power cost (13,000 kwh × ` 7)	91,000	
Diesel cost (1,000 ltr × ` 93)	93,000	1,84,000
HEMM hiring charges		13,00,000
Prime Cost		**1,38,04,000**
AMC cost of CCTV installed at factory premises		18,000
Cost of Production/ Cost of Goods Sold		**1,38,22,000**
Hiring charges of cars	80,000	
Reimbursement of diesel cost	20,000	
	1,00,000	
Add: GST @5% on RCM basis	5,000	1,05,000
Maintenance cost for weighing bridge	7,000	
AMC cost of CCTV installed at weigh bridge	6,000	13,000
TA/ DA & hotel bill of sales manager		16,000
Cost of Sales		**1,39,56,000**

Question 20

M/s Areeba Private Limited has a normal production capacity of 36,000 units of toys per annum. The estimated costs of production are as under:

(i) **Direct Material ₹ 40 per unit**

(ii) **Direct Labour ₹ 30 per unit (subject to a minimum of ₹ 48,000 p.m.)**

(iii) **Factory Overheads:**

    (a) **Fixed ₹ 3,60,000 per annum**

    (b) **Variable ₹ 10 per unit**

    (c) **Semi-variable ₹ 1,08,000 per annum up to 50% capacity and additional ₹ 46,800 for every 20% increase in capacity or any part thereof.**

(iv) **Administrative Overheads ₹ 5, 18,400 per annum (fixed)**

(v) **Selling overheads are incurred at ₹ 8 per unit.**

(vi) **Each unit of raw material yields scrap which is sold at the rate of ₹ 5 per unit.**

(vii) **In year 2019, the factory worked at 50% capacity for the first three months but it was expected that it**

would work at 80% capacity for the remaining nine months.

(viii) During the first three months, the selling price per unit was ₹ 145.

You are required to :

(i) Prepare a cost sheet showing Prime Cost, Works Cost, Cost of Production and Cost of Sales.

(ii) Calculate the selling price per unit for remaining nine months to achieve the total annual profit of ₹ 8,76,600. (PYP May '19, 10 Marks)

Answer 20

(i) **Cost Sheet of M/s Areeba Pvt. Ltd. for the year 2019.**

Normal Capacity: 36,000 units p.a.

Particulars	3 Months 4,500 Units		9 Months 21,600 units	
	Amount(₹)	Cost per unit (₹)	Amount(₹)	Cost per unit (₹)
Direct material	1,80,000		8,64,000	
Less: Scrap	(22,500)	(1,08,000)		
Materials consumed	1,57,500	35	7,56,000	35
Direct Wages	1,44,000	32	6,48,000	30
Prime Cost	**3,01,500**	67	**14,04,000**	65
Factory overheads:				
- Fixed	90,000		2,70,000	
- Variable	45,000		2,16,000	
- Semi variable	27,000	36	1,51,200	29.50
Works Cost	**4,63,500**	103	**20,41,200**	94.50
Add: Administrative overheads	1,29,600	28.80	3,88,800	18
Cost of Production	**5,93,100**	131.80	**24,30,000**	112.5
Selling Overheads	36,000	8	1,72,800	8
Cost of Sales	**6,29,100**	139.80	**26,02,800**	120.5

Working Notes:

1. **Calculation of Costs**

Particulars	4,500 units	21,600 units
	Amount (₹)	Amount (₹)
Material	1,80,000 (₹ 40 × 4,500 units)	8,64,000 (₹ 40 × 21,600 units)
Wages	1,44,000 (Max. of ₹ 30 × 4,500 units	6,48,000 (21600 Units × 30)
	= ₹ 1,35,000 and ₹ 48,000 × 3 months	
	= ₹ 1,44,000)	
Variable Cost	45,000 (₹ 10 × 4,500 units)	2,16,000 (₹ 10 × 21,600 units)
Semi-variable Cost	27,000 (Rs. 1,08,000 /12 Months × 3 $Months$)	1,51,200 (Rs. 1,08,000/ 12 Months × 9 $months$)
		+46,800 (For 20% increase) +23,400 (For 10% increase)
Selling Overhead	36,000 (Rs. 8 X 4,500 units)	1,72,800(Rs. 8 X 21,600 units)

Notes:

1. Alternatively scrap of raw material can also be reduced from Work cost.

2. Administrative overhead may be treated alternatively as a part of general overhead.

In that case, Works Cost as well as Cost of Production will be same i.e. ₹ 4,63,500 and Cost of Sales will remain same as ₹ 6,29,100.

(ii) Calculation of Selling price for nine months period	
Particulars	Amount (₹)
Total Cost of sales ₹ (6,29,100 +26,02,800)	32,31,900

Add: Desired profit	8,76,600
Total sales value	41,08,500
Less: Sales value realised in first three months (₹ 145 × 4,500 units)	(6,52,500)
Sales Value to be realised in next nine months	**34,56,000**
No. of units to be sold in next nine months	21,600
Selling price per unit (₹ 34,56,000 ÷ 21,600 units)	**160**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:
This was a numerical question on preparation of 'Cost Sheet'. Many examinees made mistake in calculation of number of units to be produced at different capacity levels. The performance of the candidate in this sub part of the question is below Average.

Question 21

Following details are provided by M/s ZIA Private limited for the quarter ending 30 September 2018:

(i)	**Direct expenses**	**₹ 1,80,000**
(ii)	**Direct wages being 175% of factory overheads**	**₹ 2,57,250**
(iii)	**Cost of goods sold**	**₹ 18,75,000**
(iv)	**Selling & distribution overheads**	**₹ 60,000**
(v)	**Sales**	**₹ 22,10,000**
(vi)	**Administration overheads are 10% of factory overheads**	
Stock details as per Stock Register:		

Particulars	30.06.2018 ₹	30.09.2018 ₹
Raw material	2,45,600	2,08,000
Work-in-progress	1,70,800	1,90,000
Finished goods **You are required to prepare a cost sheet showing:**	3,10,000	2,75,000

(i) **Raw material consumed**

(ii) **Prime cost**

(iii) **Factory cost**

(iv) **Cost of goods sold**

(v) **Cost of sales and profit**   **(PYP Nov '18, 10 Marks)**

Answer 21

Cost Sheet

	(for the quarter ending 30 September 2018)	Amount (₹)
(i)	**Raw materials consumed**	
	Opening stock of raw materials	2,45,600
	Add: Purchase of materials	12,22,650*
	Less: Closing stock of raw materials	(2,08,000)
	Raw materials consumed	12,60,250
	Add: Direct wages (1,47,000×175%)	2,57,250
	Direct Expenses	1,80,000
(ii)	**Prime cost**	**16,97,500**
	Add: Factory overheads (2,57,250/175%)	1,47,000

	Gross Factory cost	18,44,500
	Add: Opening work-in-process	1,70,800
	Less: Closing work-in-process	(1,90,000)
(iii)	**Factory cost**	**18,25,300**
	Add: Administration overheads (10% of factory overheads)	14,700
	Add: Opening stock of finished goods	3,10,000
	Less: Closing stock of finished goods	(2,75,000)
(iv)	**Cost of goods sold**	**18,75,000**
	Add: Selling & distribution overheads	60,000
	Cost of sales	19,35,000
(v)	**Net Profit**	**2,75,000**
	Sales	22,10,000

*(18,75,000 + 2,75,000 – 3,10,000– (1,47,000× 10%)+ 1,90,000–1,70,800– (2,57,250× 100/175%) - 1,80,000
– 2,57,250 + 2,08,000 – 2,45,600)= 12,22,650

Working notes:

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material Raw

material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = 2,57,250*100/175

Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods
– Administrative overheads

Net Profit = Sales - Cost of sales

Alternative solution

Cost Sheet

(for the quarter ending 30 September 2018)

(i)   Raw materials consumed

Raw materials consumed	Amount (₹)
Opening stock of raw materials	2,45,600
Add: Purchase of materials	12,37,350*
Less: Closing stock of raw materials	(2,08,000)
Raw materials consumed	12,74,950
Add: Direct wages (1,47,000×175%)	2,57,250
Direct Expenses	1,80,000

(ii)	**Prime cost**	**17,12,200**
	Add: Factory overheads (2,57,250/175%)	1,47,000
	Gross Factory cost	18,59,200
	Add: Opening work-in-process	1,70,800
	Less: Closing work-in-process	(1,90,000)
(iii)	**Factory cost/work cost /Cost of production**	**18,40,000**
	Add : Opening stock of finished goods	3,10,000
	Less: Closing stock of finished goods	(2,75,000)
(iv)	**Cost of goods sold**	**18,75,000**
	Add: Administration overheads (10% of factory overheads)	14,700

	Add: Selling & distribution overheads	60,000
	Cost of Sales	19,49,700
(v)	**Net Profit**	**2,60,300**
	Sales	22,10,000

*(18,75,000 + 2,75,000 – 3,10,000+ 1,90,000–1,70,800–1,47,500- 1,80,000– 2,57,250 + 2,08,000 – 2,45,600)= 12,37,350

Working notes:

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = 2,57,250*100/175
Prime cost = Factory cost + Closing WIP – Opening WIP – Factory overheads
Factory Cost = Cost of Production goods sold + Closing stock of Finished goods – Opening stock of finished goods – Administrative overheads
Net Profit = Sales - Cost of sales

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:
This question was related to preparation of Cost Sheet. The performance of the examinees in this sub part of the question is very good and many secured 9 to 10 marks out of 10 marks.

Question 22

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. (PYP 10 Marks Jan 21)

Answer 22

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 $(\frac{Rs.1,20,000}{120}X100)$	(1,00,000)
Prime cost	2,80,000
Less: Direct labour	(1,20,000)
Raw material consumed	1,60,000

2. Computation of the raw material purchased

Particulars	(₹)
Closing stock of Raw Material	25,000
Add: Raw Material consumed	1,60,000
Less: Opening stock of Raw Material	(20,000)
Raw Material purchased	1,65,000

Question 23

XYZ a manufacturing firm, has revealed following information for September ,2019:

	1st September	30th September
	(₹)	(₹)
Raw Materials	2,42,000	2,92,000
Works-in-progress	2,00,000	5,00,000

The firm incurred following expenses for a targeted production of 1,00,000 units during the month:

	(₹)
Consumable Stores and spares of factory	3,50,000
Research and development cost for process improvements	2,50,000
Quality control cost	2,00,000
Packing cost (secondary) per unit of goods sold	2
Lease rent of production asset	2,00,000
Administrative Expenses (General)	2,24,000
Selling and distribution Expenses	4,13,000
Finished goods (opening)	Nil
Finished goods (closing)	5000 units

Defective output which is 4% of targeted production, realizes ₹ 61 per unit. Closing stock is valued at cost of production (excluding administrative expenses) Cost of goods sold, excluding administrative expenses amounts to ₹ 78,26,000. Direct employees cost is 1/2 of the cost of material consumed. Selling price of the output is ₹ 110 per unit. You are required to :

(i) Calculate the Value of material purchased

(ii) Prepare cost sheet showing the profit earned by the firm. (PYP 10 Marks Nov '19)

Answer 23

Workings:

1. **Calculation of Sales Quantity:**

Particular	Units
Production units	1,00,000
Less: Defectives (4%×1,00,000 units)	4,000
Less: Closing stock of finished goods	5,000
No. of units sold	91,000

2. **Calculation of Cost of Production**

Particular	Amount (₹)
Cost of Goods sold (given)	78,26,000
Add: Value of Closing finished goods $(\frac{Rs.78,26,000}{91,000\ units} \times 5,000\ units)$	4,30,000
Cost of Production	82,56,000

3. **Calculation of Factory Cost**

Particular	Amount (₹)
Cost of Production	82,56,000
Less: Quality Control Cost	(2,00,000)
Less: Research and Development Cost	(2,50,000)
Add: Credit for Recoveries/Scrap/By-Products/ misc. income (1,00,000 units × 4% × ₹ 61)	2,44,000

Factory Cost	80,50,000

4. Calculation of Gross Factory Cost

Particular	Amount (₹)
Cost of Factory Cost	80,50,000
Less: Opening Work in Process	(2,00,000)
Add: Closing Work in Process	5,00,000
Cost of Gross Factory Cost	83,50,000

5. Calculation of Prime Cost

Particular	Amount (₹)
Cost of Gross Factory Cost	83,50,000
Less: Consumable stores & spares	(3,50,000)
Less: Lease rental of production assets	(2,00,000)
Prime Cost	78,00,000

6. Calculation of Cost of Materials Consumed & Labour cost

Let Cost of Material Consumed = M and Labour cost = 0.5M

Prime Cost = Cost of Material Consumed + Labour Cost 78,00,000 = M + 0.5M
M = 52,00,000

Therefore, Cost of Material Consumed = ₹ 52,00,000 and Labour Cost = ₹ 26,00,000

(i) Calculation of Value of Materials Purchased

Particular	Amount (₹)
Cost of Material Consumed	52,00,000
Add: Value of Closing stock	2,92,000
Less: Value of Opening stock	(2,42,000)
Value of Materials Purchased	**52,50,000**

Cost Sheet

Sl.	Particulars	Total Cost (₹)
1.	Direct materials consumed:	
	Opening Stock of Raw Material	2,42,000
	Add: Additions/ Purchases [balancing figure as per requirement (i)]	**52,50,000**
	Less: Closing stock of Raw Material	(2,92,000)
	Material Consumed	**52,00,000**
2.	Direct employee (labour) cost	**26,00,000**
3.	**Prime Cost (1+2)**	78,00,000
4.	Add: Works/ Factory Overheads	
	Consumable stores and spares	3,50,000
	Lease rent of production asset	**2,00,000**
5.	Gross Works Cost (3+4)	83,50,000
6.	Add: Opening Work in Process	2,00,000
7.	Less: Closing Work in Process	(5,00,000)
8.	**Works/ Factory Cost (5+6-7)**	80,50,000

9.	Add: Quality Control Cost	2,00,000
10.	Add: Research and Development Cost	2,50,000
11.	Less: Credit for Recoveries/Scrap/By-Products/misc. income	(2,44,000)
12.	**Cost of Production (8+9+10-11)**	**82,56,000**
13.	Add: Opening stock of finished goods	-
14.	Less: Closing stock of finished goods (5000 Units)	(4,30,000)
15.	**Cost of Goods Sold (12+13-14)**	78,26,000
16.	Add: Administrative Overheads (General)	2,24,000
17.	Add: Secondary packing	1,82,000
18.	Add: Selling Overheads& Distribution Overheads	4,13,000
19.	**Cost of Sales (15+16+17+18)**	**86,45,000**
20.	**Profit**	**13,65,000**
21.	**Sales 91,000 units@ ₹ 110 per unit**	**1,00,10,000**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical problem from the topic 'Elements of Cost and Preparation of Cost Sheet'. This question required to calculate value of material purchased, prepare cost sheet and calculate profit of the firm based on information provided. Most of the examinees were unable to calculate value of material purchased using reverse calculation. Poor performance was observed.

Question 24

G Ltd. manufactures leather bags for office and school purposes. The following information is related with the production of leather bags for the month of September, 2021.

(1) Leather sheets and cotton clothes are the main inputs and the estimated requirement per bag is two metres of leather sheets and one metre of cotton cloth. 2,000 metre of leather sheets and 1,000 metre of cotton cloths are purchased at ₹ 3,20,000 and ₹ 15,000 respectively. Freight paid on purchases is ₹ 8,500.

(2) Stitching and finishing need 2,000 man hours at ₹ 80 per hour.

(3) Other direct costs of ₹ 10 per labour hour is incurred.

(4) G Ltd. have 4 machines at a total cost of ₹ 22,00,000. Machines have a life of 10 years with a scrap value of 10% of the original cost. Depreciation is charged on a straight-line method.

(5) The monthly cost of administration and sales office staffs are ₹ 45,000 and ₹ 72,000 respectively. G Ltd. pays ₹ 1,20,000 per month as rent for a 2,400 sq. feet factory premises. The administrative and sales office occupies 240 sq. feet and 200 sq. feet respectively of factory space.

(6) Freight paid on delivery of finished bags is ₹ 18,000.

(7) During the month, 35 kgs of scrap (cuttings of leather and cotton) are sold at ₹ 150 per kg.

(8) There are no opening and closing stocks of input materials. There is a finished stock of 100 bags in stock at the end of the month.

You are required to prepare a cost sheet in respect of above for the month of September 2021 showing:

(i) Cost of Raw Material Consumed

(ii) Prime Cost

(iii) Works/Factory Cost

(iv) Cost of Production

(v) Cost of Goods Sold

(vi) Cost of Sales (10 Marks Dec '21, RTP Nov'19)

Answer 24

No. of bags manufactured = 1,000 units

Cost sheet for the month of September 2021

	Particulars	Total Cost (₹)	Cost per unit (₹)
1.	Direct materials consumed:		
	- Leather sheets	3,20,000	320.00
	- Cotton cloths	15,000	15.00
	Add: Freight paid on purchase	8,500	8.50
	(i) Cost of material consumed	3,43,500	343.50
2.	Direct wages (₹80 × 2,000 hours)	1,60,000	160.00
3.	Direct expenses (₹10 × 2,000 hours)	20,000	20.00
4.	**(ii) Prime Cost**	5,23,500	523.50
5.	Factory Overheads: Depreciation on machines {(₹ 22,00,000 × 90%) ÷ 120 months}	16,500	16.50
	Apportioned cost of factory rent	98,000	98.00
6.	**(iii) Works/ Factory Cost**	6,38,000	638.00
7.	Less: Realisable value of cuttings (₹150×35 kg.)	(5,250)	(5.25)
8.	**(iv) Cost of Production**	6,32,750	632.75
9.	Add: Opening stock of bags	0	
10.	Less: Closing stock of bags (100 bags × ₹632.75)	(63,275)	
11.	**(v) Cost of Goods Sold**	5,69,475	632.75
12.	Add: Administrative Overheads:		
	- Staff salary	45,000	50.00
	- Apportioned rent for administrative office	12,000	13.33
13.	Add: Selling and Distribution Overheads		
	- Staff salary	72,000	80.00
	- Apportioned rent for sales office	10,000	11.11
	- Freight paid on delivery of bags	18,000	20.00
14.	**(vi) Cost of Sales**	7,26,475	807.19

Apportionment of Factory rent:

To factory building {(₹ 1,20,000 ÷ 2400 sq. feet) × 1,960 sq. feet} = ₹ 98,000

To administrative office {(₹ 1,20,000 ÷ 2400 sq. feet) × 240 sq. feet} = ₹ 12,000

To sale office {(₹ 1,20,000 ÷ 2400 sq. feet) × 200 sq. feet} = ₹ 10,000

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This Numerical problem on preparation of Cost Sheet; Cost of raw material consumed, Prime Cost, Works cost, Production Cost, Cost of Goods Sold and Cost of sales were required to be calculated after making adjustments for given relevant items. Most of the examinees were not well versed about the treatment of some items like sale of scrap, office rent and valuation of closing stock. Overall performance of the examinees was poor.

Question 25

The following data are available from the books and records of A Ltd. for the month of April 2022:

Particulars	Amount (₹)
Stock of raw materials on 1st April 2022	10,000
Raw materials purchased	2,80,000
Manufacturing wages	70,000
Depreciation on plant	15,000
Expenses paid for quality control check activities	4,000
Lease Rent of Production Assets	10,000
Administrative Overheads (Production)	15,000
Expenses paid for pollution control and engineering & maintenance	1,000
Stock of raw materials on 30th April 2022	40,000
Primary packing cost	8,000
Research & development cost (Process related)	5,000
Packing cost for redistribution of finished goods	1,500
Advertisement expenses	1,300

Stock of finished goods as on 1st April 2022 was 200 units having a total cost of ₹ 28,000. The entire opening stock of finished goods has been sold during the month Production during the month of April, 2022 was 3,000 units. Closing stock of finished goods as on 30th April, 2022 was 400 units.

You are required to:

I. Prepare a Cost Sheet for the above period showing the:

    (i)   **Cost of Raw Material consumed**

    (ii)   **Prime Cost**

    (iii) **Factory Cost**

    (iv) **Cost of Production**

    (v)   **Cost of goods sold**

    (vi) **Cost of Sales**

II. Calculate selling price per unit, if sale is made at a profit of 20% on sales. (PYP 10 Marks May'22)

Answer 25

Statement of Cost (for the month of April, 2022)

S. No.	Particulars	Amount (₹)	Amount (₹)
	Opening stock of Raw material	10,000	
	Add: Purchase of Raw material	2,80,000	
	Less: Closing stock of raw materials	(40,000)	
(i)	Raw material consumed		2,50,000
	Manufacturing wages		70,000
(ii)	Prime Cost		3,20,000
	Factory/work overheads:		
	Depreciation on plant	15,000	
	Lease rent of production Asset	10,000	
	Expenses paid for pollution control and engineering & Maintenance	1,000	26,000
(iii)	Factory/Work Cost		3,46,000
	Expenses paid for quality control check activity		4,000

	Research and Development Cost	5,000
	Administration Overheads (Production)	15,000
	Primary Packing Cost	8,000
(iv)	Cost of Production	3,78,000
	Add: Opening stock of finished goods	28,000
	Less: Closing stock of finished goods	(50,400)
(v)	Cost of Goods Sold	3,55,600
	Advertisement expenses	1,300
	Packing cost for re-distribution of finished goods sold	1,500
(vi)	Cost of Sales	3,58,400

Note: Valuation of Closing stock of finished goods

$\frac{₹3,78,000}{300\ units} \times 400$ units

= ₹50,400

Cost per unit sold = $\frac{₹3,58,400}{200+3,000,+400}$ = ₹ 128 per unit

∴Selling Price = $\frac{128}{80\%}$

= ₹160 per unit

Question 26

PNME Ltd. manufactures two types of masks- 'Disposable Masks' and 'Cloth Masks'. The cost data for the year ended 31stMarch, 2022 is as follows:

	₹
Direct Materials	12,50,000
Direct Wages	7,00,000
Production Overhead	4,00,000
Total	23,50,000

It is further ascertained that:

- Direct material cost per unit of Cloth Mask was twice as much of Direct material cost per unit of Disposable Mask.
- Direct wages per unit for Disposable Mask were 60% of those for Cloth Mask.
- Production overhead per unit was at same rate for both the types of the masks.
- Administration overhead was 50% of Production overhead for each type of mask.
- Selling cost was ₹ 2 per Cloth Mask.
- Selling Price was ₹ 35 per unit of Cloth Mask.
- No. of units of Cloth Masks sold- 45,000
- No. of units of Production of

  Cloth Masks: 50,000

  Disposable Masks: 1,50,000

You are required to prepare a cost sheet for Cloth Masks showing:

(i)   Cost per unit and Total Cost.

(ii)   Profit per unit and Total Profit. (PYP 10 Marks Nov 22)

Answer 26

Preparation of Cost Sheet for Cloth Masks

No. of units produced = 50,000 units No. of

units sold = 45,000 units

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	10.00	5,00,000
Direct wages (Working note- (ii))	5.00	2,50,000
Prime cost	15.00	7,50,000
Production overhead (Working note- (iii))	2.00	1,00,000
Factory Cost	17.00	8,50,000
Administration Overhead* (50% of Production Overhead)	1.00	50,000
Cost of production	18.00	9,00,000
Less: Closing stock (50,000 units – 45,000 units)	-	(90,000)
Cost of goods sold i.e. 45,000 units	18.00	8,10,000
Selling cost	2.00	90,000
Cost of sales/ Total cost	20.00	9,00,000
Profit	15.00	6,75,000
Sales value (₹ 35 × 45,000 units)	35.00	15,75,000

Working Notes:

(i) Direct material cost per unit of Disposable Mask = M Direct

material cost per unit of Cloth Mask = 2M

Total Direct Material cost = 2M × 50,000 units + M × 1,50,000

units Or, ₹ 12,50,000 = 1,00,000 M + 1,50,000 M

Or, M = $\frac{Rs.12,50,000}{2,50,000}$ = Rs. 5

Therefore, Direct material Cost per unit of Cloth Mask = 2 × ₹ 5 = ₹ 10

(ii) Direct wages per unit for Cloth Mask = W

Direct wages per unit for Disposable Mask= 0.6W

So, (W x 50,000) + (0.6W x 1,50,000) = ₹ 7,00,000

W = ₹5 per unit

Therefore, Direct material Cost per unit of Cloth Mask = ₹ 5

(iii) Production overhead per unit = $\frac{Rs.4,00,000}{(50,000+1,50,000)}$ = Rs. 2

Production overhead for Cloth Mask = ₹ 2 × 50,000 units = ₹ 1,00,000

* Administration overhead is related to production overhead in the question and hence to be considered in cost of production only.

Question 27

The following information is available from SN Manufacturing Limited's for the month of April 2023.

	April 1	April 30
Opening and closing inventories data:		
Stock of finished goods	**2,500 units**	**?**
Stock of raw materials	**`42,500**	**`38,600**

Work-in progress	`42,500	`42,800
Other data are:		
Raw materials Purchased		`6,95,000
Carriage inward		`36,200
Direct wages paid		`3,22,800
Royalty paid for production		`35,800
Purchases of special designs, moulds and patterns (estimated life 12 Production cycles)		`1,53,600
Power, fuel and haulage (factory)		`70,600
Research and development costs for improving the production process (amortized)		`31,680
Primary packing cost (necessary to maintain quality)		`6920
Administrative Overhead		`46,765
Salary and wages for supervisor and foremen		`28,000

Other information:

• **Opening stock of finished goods is to be valued at `8.05 per unit.**

• **During the month of April, 1,52,000 units were produced and 1,52,600 units were sold. The closing stock of finished goods is to be valued at the relevant month's cost of production. The company follows the FIFO method.**

• **Selling and distribution expenses are to be charged at 20 paisa per unit.**

• **Assume that one production cycle is completed in one month.**

Required:

(i) Prepare a cost sheet for the month ended on April 30, 2023, showing the various elements of cost (raw material consumed, prime cost, factory cost, cost of production, cost of goods sold, and cost of sales).

(ii) Calculate the selling price per unit if profit is charged at 20 percent on sales. (10 Marks, May '23)

Answer 27

Cost Sheet for the month of April 2023

Particulars	Amount (`)	Amount (`)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (`153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost*		11,77,100
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		42,500
		(42,800)

Particulars	Amount (`)	Amount (`)
Less: Closing stock of WIP		12,04,800
Factory/ Works Cost		
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		12,43,400
Add: Opening stock of finished goods (` 8.05 × 2,500 units)		20,125
Less: Value of closing stock [(2,500+152,000 -1,52,600) × (12,43,400÷152000)		(15,542)
Cost of Goods Sold		12,47,983
Add: Administrative overheads		46,765
Add: Selling and distribution expenses (` 0.20 × 1,52,600)		30,520
Cost of Sales		13,25,268
Add: Profit (20% on Sales or 25% on cost of sales)		3,31,317
Sales value		16,56,585
Selling price per unit (` 16,56,585 ÷ 1,52,600 units)		10.86

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be ` 11,06,500.

Alternative Solution (Based on work-in-progress figure of ` 45,500 as on 1st April 2023 as per Hindi part of Question paper)

Particulars	Amount (`)	Amount (`)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (` 153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost		11,77,100
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		45,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		12,07,800
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		12,46,400
Add: Opening stock of finished goods (` 8.05 × 2,500 units)		20,125
Less: Value of closing stock [(2,500+1,52,000 -1,52,600) × (12,46,400÷1,52,000)		(15,580)
Cost of Goods Sold		12,50,945
Add: Administrative overheads		46,765
		30,520

Add: Selling and distribution expenses (`0.20 × 1,52,600)		13,28,230
Cost of Sales		
Add: Profit (20% on Sales or 25% on cost of sales)		3,32,058
Sales value		16,60,288
Selling price per unit (`16,60,288 ÷ 1,52,600 units)		10.88

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be `11,06,500.

Chapter 7
Cost Accounting System

Question 1

A manufacturing company disclosed a net loss of Rs.3,47,000 as per their cost accounts for the year ended March 31,20X8. The financial accounts however disclosed a net loss of Rs. 5,10,000 for the same period. The following information was revealed because of scrutiny of the figures of both the sets of accounts.

		(Rs.)
(i)	Factory Overheads under-absorbed	40,000
(ii)	Administration Overheads over-absorbed	60,000
(iii)	Depreciation charged in Financial Accounts	3,25,000
(iv)	Depreciation charged in Cost Accounts	2,75,000
(v)	Interest on investments not included in Cost Accounts	96,000
(vi)	Income-tax provided	54,000
(vii)	Interest on loan funds in Financial Accounts	2,45,000
(viii)	Transfer fees (credit in financial books)	24,000
(ix)	Stores adjustment (credit in financial books)	14,000
(x)	Dividend received	32,000
	PREPARE a memorandum Reconciliation Account.	

(MTP March '19, 5 Marks, RTP Nov 20) (Same concept different figures MTP 5 Marks Mar 21, Old & New SM, MTP Oct'19 5 Marks)

Answer 1

Memorandum Reconciliation Accounts

Dr.   Cr.

	(Rs.)		(Rs.)
To Net Loss as per Costing books	3,47,000	By Administration overheads over Recovered in cost accounts	60,000
To Factory overheads under absorbed in Cost Accounts	40,000	By Interest on investment not included in Cost Accounts	96,000
To Depreciation under charged in Cost Accounts	50,000	By Transfer fees in Financial books	24,000
To Income- Tax not provided in Cost Accounts	54,000	By Stores adjustment(Credit in financial books)	14,000
To Income- Tax not provided in Cost Account	54,000	By Dividend received in financial books	32,000
To Interest on Loan Funds in Financial Accounts	2,45,000		
		By Net loss as per Financial books	5,10,000
	7,36,000		7,36,000

Question 2

"Is reconciliation of cost accounts and financial accounts necessary in case of integrated accounting system?" EXPLAIN. (MTP 5 Marks ,March'19 , March '23 , April '23 & Sep '23)(RTP May '22)

Answer 2

In integrated accounting system cost and financial accounts are kept in the same set of books.

Such a system will have to afford full information required for Costing as well as for Financial Accounts. In other words, information and data should be recorded in such a way so as to enable the firm to ascertain the cost (together with the necessary analysis) of each product, job, process, operation or any other identifiable activity. It also ensures the ascertainment of marginal cost, variances, abnormal losses and gains. In fact all information that management requires from a system of Costing for doing its work properly is made available. T he integrated accounts give full information in such a manner so that the profit and loss account and the balance sheet can be prepared according to the requirements of law and the management maintains full control over the liabilities and assets of its business.

Since, only one set of books are kept for both cost accounting and financial accounting purpose so there is no necessity of reconciliation of cost and financial accounts.

Question 3

Following information have been extracted from the cost records of XYZ Pvt. Ltd.	
Stores:	**(₹)**
Opening balance	1,08,000
Purchases	5,76,000
Transfer from WIP	2,88,000
Issue to WIP	5,76,000
Issue for repairs	72,000
Deficiency found in stock	21,600
Work-in-process:	**(₹)**
Opening balance	2,16,000
Direct wages applied	2,16,000
Overheads charged	8,64,000
Closing balance	1,44,000
Finished Production:	**(₹)**
Entire production is sold at a profit of 15% on cost of WIP	
Wages paid	2,52,000
Overheads incurred	9,00,000

PREPARE Stores Ledger Control Account, Work-in-Process Control Account, Overheads Control Account and Costing Profit and Loss Account. (MTP March'18,10Marks) (Same concept but different figures MTP Oct'18 10 Marks)

Answer 3

Stores Ledger Control A/c			
Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	1,08,000	By Work in Process A/c	5,76,000
To General Ledger			
Adjustment A/c	5,76,000	By Overhead Control A/c	72,000
To Work in Process A/c	2,88,000	By Overhead Control A/c	21,600*
		(Deficiency)	
		By Balance c/d	3,02,400
	9,72,000		**9,72,000**

*Deficiency assumed as normal (alternatively can be treated as abnormal loss)

Work in Process Control A/c			
Particulars	**(₹)**	**Particulars**	**(₹)**
To Balance b/d	2,16,000	By Stores Ledger Control a/c	2,88,000
To Stores Ledger Control A/c	5,76,000	By Costing P/L A/c	14,40,000

		(Balancing figures being Cost of finished goods)	
To Wages Control A/c	2,16,000	By Balance c/d	1,44,000
To Overheads Control A/c	8,64,000		
	18,72,000		**18,72,000**
		Overheads Control A/c	

Overheads Control A/c

Particulars	(₹)	Particulars	(₹)
To Stores Ledger Control A/c	72,000	By Work in Process A/c	8,64,000
To Stores Ledger Control A/c	21,600	By Balance c/d	1,65,600
		(Under absorption)	
To Wages Control A/c			
(₹ 2,52,000- ₹ 2,16,000)	36,000		
To Gen. Ledger Adjust. A/c	9,00,000		
	10,29,600		**10,29,600**

Costing Profit & Loss A/c

Particulars	(₹)	Particulars	(₹)
To Work in process	14,40,000	By Gen. ledger Adjust. A/c	16,56,000
		(Sales) (₹ 14,40,000 × 115%)	
To Gen. Ledger Adjust. A/c (Profit)	2,16,000		
	16,56,000		**16,56,000**

Question 4

The Trading and Profit and Loss Account of a company for the year ended 31-03-2020 is as under:

Trading and Profit and Loss Account

Particulars	Rs.	Particulars	Rs.
To Materials	26,80,000	By Sales (50,000 units)	62,00,000
To Wages	17,80,000	By Closing stock (2,000 units)	1,50,000
To Factory expenses	9,50,000	By Dividend received	80,000
To General administrative expenses	4,80,200		
To Selling Expenses	2,50,000		
To Preliminary expenses written off	70,000		
To Net profit	2,19,800		
	64,30,000		**64,30,000**

In the Cost Accounts:

(i) Factory expenses have been allocated to production at 20% of Prime Cost.

(ii) General administrative expenses absorbed at 10% of factory cost.

(iii) Selling expenses charged at Rs.10 per unit sold. Required:

PREPARE the Costing Profit and Loss Account of the company and RECONCILE the Profit/Loss with the profit as shown in the Financial Accounts. (MTP 10 Marks May 20, Aug 18)

Answer 4

Workings:

Preparation of Cost Sheet/ Cost Statement

Particulars	Amount (Rs.)
Materials	26,80,000
Wages	17,80,000
Prime Cost	44,60,000
Add: Factory expenses (20% of Rs. 44,60,000)	8,92,000
Factory Cost / Cost of Production	53,52,000
Less: Closing Stock ($Rs. 53,52,000 / 52,000\ units \times 2,000 units$)	(2,05,846)
Cost of Goods Sold	51,46,154
Add: General administrative expenses (10% of Rs.53,52,000)	5,35,200
Add: Selling expenses (Rs.10 × 50,000 units)	5,00,000
Cost of Sales	61,81,354
Profit (Balancing figure)	18,646
Sales Value	62,00,000

Costing Profit and Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Materials	26,80,000	By Sales	62,00,000
To Wages	17,80,000	By Closing stock	2,05,846
To Factory expenses	8,92,000		
To General administrative expenses	5,35,200		
To Selling expenses	5,00,000		
To Profit (Balancing figure)	18,646		
	64,05,846		64,05,846

Reconciliation of profit as per Cost Accounts and as per Financial Accounts

Particulars	Amount (Rs.)
Profit as per Cost Accounts Additions:	18,646
Additions:	
General administrative expenses (Over-absorbed) (Rs. 5,35,200 – Rs.4,80,200)	55,000
Selling expenses (Overcharged) (Rs. 5,00,000 – Rs. 2,50,000)	2,50,000
Dividend received	80,000
	4,03,646
Deductions:	
Factory expenses (Under -absorbed) (Rs.9,50,000 – 8,92,000)	58,000
Closing stock (Over-valued) (Rs.2,05,846 – Rs. 1,50,000)	55,846
Preliminary expenses written off	70,000
Profit as per Financial Accounts	1,83,846
	2,19,800

Question 5

LIST five financial expenses that causes differences in Financial and Cost Accounts. (MTP 5 Marks, Oct.'20, MTP 5 Marks Sep'22)

Answer 5

Financial expenses causing differences in Financial and Cost Accounts:

(i) Interest on loans or bank mortgages.

(ii) Expenses and discounts on issue of shares, debentures etc.

(iii) Other capital losses i.e., loss by fire not covered by insurance etc.

(iv) Losses on the sales of fixed assets and investments.

(v) Goodwill written off.

(vi) Preliminary expenses written off.

(vii) Income tax, donations, subscriptions.

(viii) Expenses of the company's share transfer office, if any.

Question 6

A manufacturing company disclosed a net profit ₹10,20,000 as per their cost accounts for the year ended 31st March, 2023. The financial accounts however disclosed a net profit of ₹ 6,94,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	(₹)
(i) Factory Overheads under-absorbed	80,000
(ii) Administration Overheads over-absorbed	1,20,000
(iii) Depreciation charged in Financial Accounts	6,50,000
(iv) Depreciation charged in Cost Accounts	5,50,000
(v) Interest on investments not included in Cost Accounts	1,92,000
(vi) Income-tax provided	1,08,000
(vii) Interest on loan funds in Financial Accounts	4,90,000
(viii) Transfer fees (credit in financial books)	48,000
(ix) Stores adjustment (credit in financial books)	28,000
(x) Dividend received	64,000

PREPARE a Reconciliation statement. (MTP 5 Marks April 23, March '21 & March '19)

Answer 6

Statement of Reconciliation

Particulars	Amount (₹)	Amount (₹)
Net profit as per Cost accounts		10,20,000
Add:		
Administration Overheads over-absorbed	1,20,000	
Interest on investments	1,92,000	
Transfer fees	48,000	
Stores adjustment	28,000	
Dividend received	64,000	4,52,000
Less:		
Factory Overheads under-absorbed	80,000	
Depreciation under charged	1,00,000	
Income-tax provided	1,08,000	
Interest on loan funds	4,90,000	(7,78,000)
Net profit as per Financial accounts		6,94,000

Question 7

The following figures have been taken from the financial accounts of a manufacturing firm for the year ended 31st March, 2021:

	(Rs.)
Direct material consumption	20,00,000
Direct wages	12,00,000
Factory overheads	6,40,000
Administrative overheads	2,80,000
Selling and distribution overheads	3,84,000
Bad debts	32,000
Preliminary expenses written off	16,000
Legal charges	4,000
Dividend received	40,000
Interest on fixed deposit	8,000
Sales - 48,000 units	48,00,000
Closing stock:	
- Finished stock - 4,000 units	3,20,000
- Work-in-process	96,000

The cost accounts for the same period reveal that the Direct Material consumption was Rs. 22,40,000; Factory overhead is recovered at 20% on prime cost; Administration overhead is recovered @ Rs. 4.8 per unit of production; and Selling and Distribution overheads are recovered at Rs. 6.40 per unit sold.

Required:

PREPARE Costing and Financial Profit & Loss Accounts and RECONCILE the difference in the profit as arrived at in the two sets of accounts. (MTP 10 Marks, Apr.'21) (Same concept different figures Old & New SM)

Answer 7

Costing Profit and Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Direct Material consumed	22,40,000	By Sales	48,00,000
To Direct Wages	12,00,000	By Closing Work-in-process	96,000
Prime Cost	34,40,000	By Closing Finished stock $\left(\dfrac{Rs.\,41,28,000 - Rs.\,96,000}{52,000\ units} \times 4,000\right)$	3,10,154
To Factory overheads (20% of prime cost)	6,88,000		
	41,28,000		
To Administrative overheads (Rs. 4.80 × 52,000* units)	2,49,600		
To Selling & distribution overheads (Rs.6.40 × 48,000 units)	3,07,200		
To Net profit (balancing figure)	5,21,354		
	52,06,154		52,06,154

* Units produced = Units sold + Closing stock - Opening stock

= 48,000 + 4,000 - 0 = 52,000 units

Financial Profit and Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Direct Material consumed	20,00,000	By Sales	48,00,000
To Direct Wages	12,00,000	By Dividend received	40,000
To Factory overheads	6,40,000	By Interest on fixed deposit	8,000
To Administrative overheads	2,80,000	By Closing Work-in-process	96,000
To Selling & distribution overheads	3,84,000	By Closing Finished stock	3,20,000
To Bad debts	32,000		
To Preliminary expenses	16,000		
To Legal charges	4,000		
To Net profit (balancing figure)	7,08,000		
	52,64,000		52,64,000

Reconciliation Statement

	Particulars	Amount (Rs.)	Amount (Rs.)
	Net profit as per Financial Profit & Loss A/c		7,08,000
Add:	Administrative overheads (2,80,000 - 2,49,600)	30,400	
	Selling & Distribution overheads (3,84,000 - 3,07,200)	76,800	
	Bad debts	32,000	
	Preliminary expenses	16,000	
	Legal charges	4,000	1,59,200
			8,67,200
Less:	Difference in value of materials consumed (22,40,000 - 20,00,000)	2,40,000	
	Factory overheads (6,88,000 - 6,40,000)	48,000	
	Dividend received	40,000	
	Interest on fixed deposit	8,000	
	Closing stock (3,20,000 - 3,10,154)	9,846	(3,45,846)
	Profit as per Costing Profit & Loss A/c		5,21,354

Question 8

XYZ Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2020-21:

Particulars	Amount ('000)
Opening balances:	
- **Stores ledger control A/c**	48,000
- **Work-in-process control A/c**	12,000
- **Finished goods control A/c**	2,58,000
- **Building construction A/c**	6,000
- **Cost ledger control A/c**	3,24,000
During the year following transactions took place:	
Materials:	
- **Purchased**	24,000
- **Issued to production**	30,000
- **Issued to general maintenance**	3,600
- **Issued to building construction**	2,400
Wages:	

- Gross wages paid		90,000
- Indirect wages paid		24,000
- For building construction		6,000
Factory overheads:		
- Actual amount incurred (excluding items shown above)		96,000
- Absorbed in building construction		12,000
- Under-absorbed		4,800
Royalty paid		3,000
Selling distribution and administration overheads		15,000
Sales		2,70,000

At the end of the year, the stock of raw material and work-in-process was ₹ 33,00,000, and ₹15,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required: PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company. (MTP 10 Marks Nov '21) (RTP Nov '21 & May 22) (Same concept different figures Old & New SM)

Answer 8

Cost Ledger Control Account

Particulars	(₹in '000)	Particulars	(₹in '000)
To Costing P&L A/c	2,70,000	By Balance b/d	3,24,000
To Building Construction A/c	26,400	By Stores Ledger control A/c	24,000
To Balance c/d	2,89,800	By Wages Control A/c	90,000
		By Factory overhead control A/c	96,000
		By Royalty A/c	3,000
		By Selling. Distribution and Administration overheads	15,000
		By Costing P&L A/c	34,200
	5,86,200		5,86,200

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	48,000	By WIP control A/c	30,000
To Cost Ledger control A/c	24,000	By Factory overheads control A/c	3,600
		By Building construction A/c	2,400
		By Factory overhead control A/c (loss) (bal. fig.)	3,000
		By Balance c/d	33,000
	72,000		72,000

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	90,000	By Factory overhead control A/c	24,000
		By Building Construction A/c	6,000
		By WIP Control A/c (bal. fig.)	60,000
	90,000		90,000

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	3,600	By Building Construction A/c	12,000
To Wages Control A/c	24,000	By Costing P&L A/c	4,800
To Cost Ledger control A/c	96,000	By WIP Control A/c (bal. fig)	1,09,800
To Stores Ledger control A/c (loss)	3,000		
	1,26,600		1,26,600

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	3,000	By WIP Control A/c	3,000
	3,000		3,000

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	12,000	By Finished goods control A/c (bal. fig)	1,99,800
To Stores Ledger control A/c	30,000		
To Wages Control A/c	60,000		
To Factory overhead control A/c	1,09,800		
To Royalty A/c	3,000	By Balance c/d	15,000
	2,14,800		2,14,800

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	2,58,000	By Cost of Goods Sold A/c (Refer working note)	2,16,000
To WIP control A/c	1,99,800	By Balance c/d	2,41,800
	4,57,800		4,57,800

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	2,16,000	By Cost of sales A/c	2,16,000
	2,16,000		2,16,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	15,000	By Cost of sales A/c	15,000
	15,000		15,000

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	2,16,000	By Costing P&L A/c	2,31,000
To Selling, Distribution and Administration A/c	15,000		
	2,31,000		2,31,000

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	2,31,000	By Cost Ledger control A/c	2,70,000
To Factory overhead control A/c	4,800		
To Cost Ledger control A/c	34,200		
	2,70,000		2,70,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Cost Ledger control A/c	26,400
To Stores Ledger control A/c	2,400		
To Wages Control A/c	6,000		
To Factory overhead control A/c	12,000		
	26,400		26,400

Trial Balance

Particulars	Dr.	Cr.
	(₹ in '000)	(₹ in '000)
Stores Ledger Control A/c	33,000	
WIP Control A/c	15,000	
Finished Goods Control A/c	2,41,800	
Cost Ledger Control A/c		2,89,800
	2,89,800	2,89,800

Working Note:

Cost of Goods sold = $\frac{Rs. 2,70,000 \times 80}{100}$ = Rs. 2,16,000

Question 9

BRIEF OUT advantages of Integrated Accounts. (MTP 5 Marks April '22, Old & New SM)

Answer 9

Advantages of Integrated Accounts are as follows:

(i) No need for Reconciliation- The Question of reconciling costing profit and financial profit does not arise, as there is only one figure of profit.

(ii) Less efforts- Due to use of one set of books, there is a significant saving in efforts made.

(iii) Less time consuming- No delay is caused in obtaining information as it is provided from books of original entry.

(iv) Economical process- It is economical also as it is based on the concept of "Centralisation of Accounting function".

Question 10

SHOW Journal entries for the following transactions assuming cost and financial accounts are integrated:

(1) Materials issued:	
Direct	**Rs. 6,50,000**
Indirect (to factory)	**Rs. 2,30,000**

(2) Allocation of wages (25% indirect)	Rs. 9,00,000
(3) Under/Over absorbed overheads:	
Factory (Over)	Rs. 60,000
Administration (Under)	Rs. 50,000
(4) Payment to Creditors (Trade payables)	Rs. 9,00,000
(5) Collection from Debtors (Trade receivables)	Rs. 8,00,000

(MTP 5 Marks May 20)

Answer 10

Journal Entries under Integrated system of accounting

Particulars		Rs.	Rs.
(i) Work-in-Progress Control A/c	Dr.	6,50,000	
Factory Overhead Control A/c	Dr.	2,30,000	
To Stores Ledger Control A/c			8,80,000
(Being issue of Direct and Indirect materials)			
(ii) Work-in Progress Ledger Control A/c Factory	Dr.	6,75,000	
Overhead control A/c	Dr.	2,25,000	
To Wages Control A/c			9,00,000
(Being allocation of Direct and Indirect wages)			
(iii) Factory Overhead Control A/c	Dr.	60,000	
To Costing Profit & Loss A/c			60,000
(Being transfer of over absorption of Factory overhead)			
Costing Profit & Loss A/c	Dr.	50,000	
To Administration Overhead Control A/c			50,000
(Being transfer of under absorption of Administration overhead)			
(iv) Trade Payables A/c	Dr.	9,00,000	
To Cash/ Bank A/c			9,00,000
(Being payment made to creditors)			
v) Cash/ Bank A/c	Dr.	8,00,000	
To Trade receivables A/c			8,00,000
(Being payment received from debtors)			

Question 11

The following are the balances existed in the books of JPG Ltd. for the year ended, 31st March, 2019:

Particulars	Dr.	Cr.
	(₹)	(₹)
Stores Ledger Control A/c	30,00,000	
WIP Control A/c	15,00,000	
Finished Goods Control A/c	25,00,000	
Manufacturing Overheads Control A/c		1,50,000
Cost Ledger Control A/c		68,50,000
During the year 2019-20, the following transactions took place:		
Particulars		Amount (₹)
Finished product (at cost)		22,50,000
Manufacturing Overhead incurred		8,50,000

Raw material purchased		12,50,000
Factory wages		4,00,000
Indirect labour		2,00,000
Cost of sales		17,50,000
Materials issued to production		13,50,000
Sales returned (at cost)		90,000
Material returned to suppliers		1,30,000
Manufacturing overhead charged to production		8,50,000
Required:		

PREPARE the following control accounts and Trial balance at the end of the year:

Cost Ledger, Stores Ledger, Work-in-process, Finished Stock, Manufacturing Overhead, Wages and Cost of Sales. (RTP May'20) (Same concepts but different figures to RTP Nov 19, RTP May 18, MTP Oct'22 10 Marks, Old & New SM)

Answer 11

Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Stores Ledger control A/c	1,30,000	By Balance b/d	68,50,000
To Costing Profit & Loss A/c	17,10,000	By Stores Ledger control A/c	12,50,000
By Wages Control A/c	6,00,000		
To Balance c/d	77,10,000	By Manufacturing overhead control A/c	8,50,000
	95,50,000		**95,50,000**

Store Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	30,00,000	By WIP Control A/c	13,50,000
To Cost Ledger control A/c	12,50,000	By Cost Ledger control A/c (return)	1,30,000
		By Balance c/d	27,70,000
	42,50,000		42,50,000

WIP Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	15,00,000	By Finished Stock Control A/c	22,50,000
To Wages Control A/c	4,00,000		
To Stores Ledger control A/c	13,50,000		
To Manufacturing overhead control A/c	8,50,000	By Balance c/d	18,50,000
	41,00,000		41,00,000

Finished Stock Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,00,000	By Cost of Sales A/c	17,50,000
To WIP Control A/c	22,50,000		
To Cost of Sales A/c (sales return)	90,000	By Balance c/d	30,90,000
	48,40,000		48,40,000

Manufacturing Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	8,50,000	By Balance b/d	1,50,000
To Wages Control A/c	2,00,000	By WIP Control A/c	8,50,000

		By Costing P&L A/c (under recovery)	50,000
	10,50,000		10,50,000

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	6,00,000	By WIP Control A/c	4,00,000
		By Manufacturing overhead control A/c	2,00,000
	6,00,000		6,00,000

Cost of Sales Account

Particulars	(₹)	Particulars	(₹)
To Finished Stock Control A/c	17,50,000	By Finished Stock Control A/c (sales return)	90,000
		By Costing Profit & Loss A/c	16,60,000
	17,50,000		17,50,000

Trial Balance

Particulars	Dr.	Cr.
	(₹)	(₹)
Stores Ledger Control A/c	27,70,000	
WIP Control A/c	18,50,000	
Finished Goods Control A/c	30,90,000	
Cost Ledger Control A/c		77,10,000
	77,10,000	77,10,000

Working:

Costing P&L Account

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	16,60,000	By Cost Ledger control A/c	17,10,000
To Manufacturing overhead control A/c	50,000		
	17,10,000		17,10,000

Question 12

The following is the summarized Trading and Profit and Loss Account of XYZ Ltd. for the year ended 31st March 2019:

Particulars	Amount (₹)	Particulars	Amount (₹)	
Direct Material	14,16,000	Sales (30,000 units)		30,00,000
Direct wages	7,42,000	Finished stock (2,000units)		1,67,500
Works overheads	4,26,000	Work-in-progress:		
Administration overheads	1,50,000	- Materials	34,000	
Selling and distribution overheads	1,65,000	- Wages	16,000	
Net profit for the year	3,22,500	- Works overhead	4,000	54,000
	32,21,500			32,21,500

The company's cost records show that in course of manufacturing a standard unit (i) works overheads have been charged @ 20% on prime cost, (ii) administration overheads are related with production activities and are recovered at ₹ 5 per finished unit, and (iii) selling and distribution overheads are recovered at ₹ 6 per unit sold.

You are required to PREPARE:

(i) Costing Profit and Loss Account indicating the net profits,

(ii) A Statement showing reconciliation between profit as disclosed by the Cost Accounts and

Financial Accounts. (RTP May'19)

Answer 12

(i) Costing Profit and Loss Account for the year ended 31st March 2019:

Particulars	Amount (₹)	Particulars	Amount (₹)
Material consumed	14,16,000	Sales (30,000 units)	30,00,000
Direct wages	7,42,000		
Prime Cost	21,58,000		
Works overheads	4,31,600		
(20% of Prime cost)	25,89,600		
Less: Work in progress	(54,000)		
Factory cost	25,35,600		
Administration overheads	1,60,000		
(₹5×32,000 units)			
Cost of production	26,95,600		
Less: Finished stock	(1,68,475)		
Cost of goods sold	25,27,125		
Selling and distribution	1,80,000		
overheads (₹ 6 × 30,000 unit)			
Cost of sales	27,07,125		
Profit (balancing figure)	2,92,875		
	30,00,000		30,00,000

(ii) Statement reconciling the profit as per costing profit and loss account with the profit as per financial accounts

Particulars	Amount (₹)	Amount (₹)
Profit as per cost records		2,92,875
Add: Overheads over-absorbed:		
- Works overheads (₹ 4,31,600 − ₹ 4,26,000)	5,600	
- Administration OH (₹ 1,60,000 − ₹ 1,50,000)	10,000	
- Selling and Distribution (₹ 1,80,000 − ₹ 1,65,000)	15,000	30,600

Less: Closing stock overvalued (₹ 1,68,475 − ₹ 1,67,500)   (975)

Profit as per financial accounts   3,22,500

*It is assumed that the number of units Produced

= Number of units sold + Finished stock = 30,000 + 2,000 = 32,000 units.

Question 13

The financial books of a company reveal the following data for the year ended 31st March, 2023:

	(`)
Opening Stock:	
Finished goods 625 units	1,06,250
Work-in-process	92,000
01.04.2022 to 31.03.2023	
Raw materials consumed	16,80,000
Direct Labour	12,20,000

Factory overheads	8,44,000
Administration overheads (production related)	3,96,000
Dividend paid	2,44,000
Bad Debts	36,000
Selling and Distribution Overheads	1,44,000
Interest received	76,000
Rent received	92,000
Sales 12,615 units	45,60,000
Closing Stock: Finished goods 415 units	91,300
Work-in-process	82,400

The cost records provide as under:

➢ Factory overheads are absorbed at 70% of direct wages.

➢ Administration overheads are recovered at 15% of factory cost.

➢ Selling and distribution overheads are charged at ` 6 per unit sold.

➢ Opening Stock of finished goods is valued at ` 240 per unit.

➢ The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

(i) Prepare statements for the year ended 31st March, 2023 showing:

➢ the profit as per financial records

➢ the profit as per costing records.

(ii) Prepare a statement reconciling the profit as per costing records with the profit as per financial records. (RTP Nov '23 & Nov '22) (Same concept different figures RTP Nov'18, RTP May'21)

Answer 13

(for the year ended March 31, 2023)

	(`)		(`)
To Opening stock of Finished Goods	1,06,250	By Sales	45,60,000
To Work-in-process	92,000	By Closing stock of finished Goods	91,300
To Raw materials consumed	16,80,000	By Work-in-Process	82,400
To Direct labour	12,20,000	By Rent received	92,000
To Factory overheads	8,44,000	By Interest received	76,000
To Administration overheads	3,96,000		
To Selling & distribution overheads	1,44,000		
To Dividend paid	2,44,000		
To Bad debts	36,000		
To Profit	1,39,450		
	49,01,700		49,01,700

Statement of Profit as per costing records (for the year ended March 31,2023)

	(`)
Sales revenue (A) (12,615 units)	45,60,000
Cost of sales:	
Opening stock (625 units × ` 240)	1,50,000
Add: Cost of production of 12,405 units (Refer to working note 2)	43,28,140
Less: Closing stock	(1,44,795)
$\left(\dfrac{Rs.\,43,28,140 \times 415\ units}{12,405\ units}\right)$	
Production cost of goods sold (12,615 units)	43,33,345
Selling & distribution overheads (12,615 units × `6)	75,690
Cost of sales: (B)	44,09,035
Profit: {(A) – (B)}	1,50,965

(ii) **Statement of Reconciliation**

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

	(`)	(`)
Profit as per Cost Accounts		1,50,965
Add: Administration overheads over absorbed (`5,64,540 – `3,96,000)	1,68,540	
Opening stock overvalued (`1,50,000 – ` 1,06,250)	43,750	
Interest received	76,000	
Rent received	92,000	
Factory overheads over recovered (` 8,54,000 – ` 8,44,000)	10,000	3,90,290
		5,41,255
Less: Selling & distribution overheads under recovery (` 1,44,000 – ` 75,690)	68,310	
Closing stock overvalued (`1,44,795 – ` 91,300)	53,495	
Dividend	2,44,000	
Bad debts	36,000	(4,01,805)
Profit as per financial accounts		1,39,450

Working notes:

1. **Number of units produced**

	Units
Sales	12,615
Add: Closing stock	415
Total	13,030
Less: Opening stock	(625)
Number of units produced	12,405

2. **Cost Sheet**

	(`)
Raw materials consumed	16,80,000

Direct labour	12,20,000
Prime cost	29,00,000
Factory overheads (70% of direct wages)	8,54,000
Factory cost	37,54,000
Add: Opening work-in-process	92,000
Less: Closing work-in-process	(82,400)
Factory cost of goods produced	37,63,600
Administration overheads (15% of factory cost)	5,64,540
Cost of production of 12,405 units (Refer to working note 1)	43,28,140

Cost of production per unit:

$$= \frac{Total\ Cost\ of\ Production}{No.of\ units\ Produced} = \frac{Rs.43,28,140}{12,045units} = \text{Rs. 348.90}$$

Question 14

The financial records of Riva Private Limited showed a net profit of `1,69,500 for the year ended 31st March, 2022. The cost accounts, however, disclosed a net loss of ` 88,500 for the same period. The following information were revealed as a result of scrutiny of the figures of cost accounts and financial accounts:

		(`)
(i)	(Administrative overhead under recovered	63,750.0
(ii)	Factory overhead over recovered	3,37,500.0
(iii)	Depreciation under charged in Cost Accounts	65,000.0
(iv)	Dividend received	50,000.0
(v)	Loss due to obsolescence charged in Financial Accounts	42,000.0
(vi)	Income tax provided	1,09,000.0
(vii)	Bank interest credited in Financial Accounts	34,000.0
(viii)	Value of opening stock:	
	In Cost Accounts	4,12,500.0
	In Financial Accounts	3,62,500.0
(ix)	Value of closing stock:	
	In Cost Accounts	3,13,750.0
	In Financial Accounts	3,30,000.0
(x)	Goodwill written-off in Financial Accounts	62,500.0
(xi)	Notional rent of own premises charged in Cost Accounts	1,50,000.0
(xii)	Provision for doubtful debts in Financial Accounts	37,500.0

Prepare a reconciliation statement by taking costing net loss as base. (RTP May 23) (Same concept different figures MTP April '19, 10 Marks)

Answer 14

Statement of Reconciliation

Sl. No.	Particulars	(`)	(`)
	Net loss as per Cost Accounts		(88,500)
	Additions		

1	Factory O/H over recovered	3,37,500	
2	Dividend Received	50,000	
3	Bank Interest received	34,000	
4	Difference in Value of Opening Stock	50,000	
	(4,12,500 – 3,62,500)		
5	Difference in Value of Closing Stock	16,250	
	(3,30,000 – 3,13,7500)		
6	Notional Rent of own Premises	1,50,000	6,37,750
	Deductions		
1	Administration O/H under recovered	63,750	
2	Depreciation under charged	65,000	
3	Loss due to obsolescence	42,000	
4	Income tax Provided	1,09,000	
5	Goodwill written-off	62,500	
6	Provision for doubtful debts	37,500	(3,79,750)
	Net Profit as per Financial A/c.		1,69,500

Question 15

Explain integrated accounting system and state its advantages (PYP May '19, 5 Marks)

Answer 15

Integrated Accounting System: Integrated Accounts is the name given to a system of accounting, whereby cost and financial accounts are kept in the same set of books.

Obviously, then there will be no separate sets of books for Costing and Financial records.

Integrated accounts provide or meet out fully the information requirement for Costing as well as for Financial Accounts. For Costing it provides information useful for ascertaining the cost of each product, job, and process, operation of any other identifiable activity and for carrying necessary analysis. Integrated accounts provide relevant information which is necessary for preparing profit and loss account and the balance sheets as per the requirement of law and also helps in exercising effective control over the liabilities and assets of its business.

Advantages of Integrated Accounting System

The main advantages of Integrated Accounts are as follows:

(i) **No need for Reconciliation** - The question of reconciling costing profit and financial profit does not arise, as there is only one figure of profit.

(ii) **Less efforts** - Due to use of one set of books, there is a significant saving in efforts made.

(iii) **Less time consuming** - No delay is caused in obtaining information as it is provided from books of original entry.

(iv) **Economical process** - It is economical also as it is based on the concept of "Centralization of Accounting function".

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This theoretical question was related to advantages of 'Integrated Accounting'. Average performance of the examinees was observed.

Question 16

M/s Abid Private Limited disclosed a net profit of Rs. 48,408 as per cost books for the year ending 31st March 2019. However, financial accounts disclosed net loss of Rs. 15,000 for the same period. On scrutinizing both the set of books of accounts, the following information was revealed:

Works Overheads under-recovered in Cost Books   48,600

Office Overheads over-recovered in Cost Books 11,500

Dividend received on Shares	17,475
Interest on Fixed Deposits	21,650
Provision for doubtful debts	17,800
Obsolescence loss not charged in Cost Accounts	17,200
Stores adjustments (debited in Financial Accounts)	35,433
Depreciation charged in financial accounts	30,000
Depreciation recovered in Cost Books	35,000
Prepare a Memorandum Reconciliation Account.	(PYP May '19, 5 Marks)

Answer 16

Memorandum Reconciliation Account

Dr. Cr.

Particulars	(Rs.)	Particulars	(Rs.)
To Works overheads under recovered		By Net profit as per Costing books	48,408
in Cost Accounts	48,600	By Office overheads over covered	
To Provision for doubtful debts	17,800	in cost accounts	11,500
To Obsolescence loss	17,200	By Dividend received on shares	17,475
To Store adjustment (Debit)	35,433	By Interest on fixed deposit	21,650
		By Depreciation overcharged	5,000
		By Net loss as per financial accounts	15,000
	1,19,033		1,19,033

[Note: This question may also be solved by taking net loss as per financial accounts as basis.]

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical problem on 'Reconciliation of profit of cost account and financial account'. Performance of the examinees was above average. Overall performance in this compulsory question was average.

Question 17

GK Ltd. showed net loss of Rs. 2,43,300 as per their financial accounts for the year ended 31st March, 2018. However, cost accounts disclosed net loss of Rs. 2,48,300 for the same period. On scrutinizing both the set of books of accounts, the following information were revealed:

		Rs.
(i)	Works overheads over recovered 30,400	30,000
(ii)	Selling overheads under recovered	20,300
(iii)	Administrative overheads under recovered	27,700
(iv)	Depreciation over charged in cost accounts	35,100
(v)	Bad debts w/off in financial accounts	15,000
(vi)	Preliminary Exp. w/off in financial accounts	5,000
(vii)	Interest credited during the year in financial accounts	7,500

Prepare a reconciliation statement reconciling losses shown by financial and cost accounts by taking costing net loss as base. (PYP May'18, 5 Marks)

Answer 17

Reconciliation Statement

Particulars	₹	₹
Loss as per Cost Accounts		(2,48,300)
Add: Works overheads over recovered	30,400	
Depreciation over charged in cost accounts	35,100	

	Interest credited during the year in financial accounts	7,500	73,000
Less:	Selling overheads under recovered	20,300	
	Administrative overheads under recovered	27,700	
	Bad debts w/off in financial accounts	15,000	
	Preliminary Exp. w/off in financial accounts	5,000	(68,000)
Loss as per Financial Accounts			**(2,43,300)**

Question 18

Explain what are the pre-requisites of integrated accounting. (PYP 5 Marks Nov 20, RTP May'23) (SM May 22, MTP 5 Marks Mar'22)

Answer 18

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.

Question 19 (Also includes concepts of Cost Sheet)

The Profit and Loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit and Loss account

(for the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales (15000 units)	15,00,000
To Direct Wages	3,50,000	By Dividend received	9,000
To Factory overheads	2,60,000		
To Administrative overheads	1,05,000		
To Selling overheads	85,000		
To Loss on sale of investments	2,000		
To Net Profit	57,000		
	15,09,000		15,09,000

- **Factory overheads are 50% fixed and 50% variable.**

- **Administrative overheads are 100% fixed.**

- **Selling overheads are completely variable.**

- **Normal production capacity of ABC Ltd. is 20,000 units.**

- **Indirect Expenses are absorbed in the cost accounts on the basis of normal production capacity.**

- **Notional rent of own premises charged in Cost Accounts is amounting to ₹ 12,000. You are required to:**

(i) **Prepare a Cost Sheet and ascertain the Profit as per Cost Records for the year ended 31st March, 2021.**

(ii) **Reconcile the Profit as per Financial Records with Profit as per Cost Records. (PYP 10 Marks July 21)**

Answer 19

Cost Sheet
(for the year ended 31st March, 2021)

	(₹)	(₹)
Direct material		6,50,000
Direct wages		3,50,000
Prime cost		**10,00,000**
Factory Overheads:		
Variable (50% of ₹ 2,60,000)	1,30,000	
Fixed (₹ 1,30,000 × 15,000/20,000)	97,500	2,27,500
Works cost		**12,27,500**
Administrative Overheads (₹ 1,05,000 × 15,000/20,000)		78,750
Notional Rent		12,000
Cost of production		**13,18,250**
Selling Overheads		85,000
Cost of Sales		**14,03,250**
Profit (Balancing figure)		96,750
Sales revenue		**15,00,000**

(ii) **Statement of Reconciliation**

(Reconciling profit shown by Financial and Cost Accounts)

	(₹)	(₹)
Profit as per Cost Account		96,750
Add: Dividend received	9,000	
Add: Notional Rent	12,000	21,000
Less: Factory Overheads under-charged in Cost Accounts (₹ 2,60,000 − ₹ 2,27,500)	32,500	
Less: Administrative expenses under-charged in Cost Accounts (₹ 1,05,000 − ₹ 78,750)	26,250	
Less: Loss on sale of Investments	2,000	(60,750)
Profit as per Financial Accounts		**57,000**

(Note: Solution can be done considering base profit as per Financial Accounts)

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

It was a practical problem requiring preparation of cost sheet and reconciling profit as per financial records with profit as per cost records. In the preparation of the cost sheet, examinees faced problems in the identification of absorbed indirect expenses on the basis of normal production capacity. Performance of the examinees was below average.

Question 20

Journalise the following transactions, in cost books under Non- Integrated system of Accounting.

(iii) **Credit Purchase of Material**   Rs. 27,000

(iv) **Manufacturing overhead charged to Production**   Rs. 6,000

(v) **Selling and Distribution overheads recovered from Sales**   Rs. 4,000

(vi) **Indirect wages incurred**   Rs. 8,000

(vii) Material returned from production to stores Rs. 9,000 (PYP Nov'19,5 Marks, MTP 5 Marks, Oct '21)

Answer 20

Journal entries are as follows:			
		Dr.	Cr.
		(Rs.)	(Rs.)
(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. Overhead Control A/c			4,000
(iv) (1) Wage Control A/c…………………… Dr.		8,000	
To Cost Ledger Control A/c			8,000
(2) Manufacturing Overhead Control A/c……… Dr.		8,000	
To Wages Control A/c			8,000

OR

Manufacturing Overhead Control A/c…………….   Dr.

To Cost Ledger Control A/c   8,000   8,000

(v)   Stores Ledger Control A/c ……………………   Dr.   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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a theoretical question based on Non-Integrated system of accounting. Average performance was observed by the examinees.

Question 21

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. (PYP 5 Marks Dec '21)

Answer 21

Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per 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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

Question was on preparation of reconciliation statement to calculate the profit as per financial records. This sub part can be considered as an easy one and most of the examinees attempted in the correct line. Performance of the examinees was good.

Question 22

The following balances were extracted from a Company's ledger as on 30th June, 2018:

Particulars	Debit (Rs.)	Credit (Rs.)
Raw material control a/c	2,82,450	
Work-in-progress control a/c	2,38,300	
Finished stock control a/c	3,92,500	
General ledger adjustment a/c		9,13,250
Total	9,13,250	9,13,250

The following transactions took place during the quarter ended 30th September, 2018:

		Rs.
(i)	Factory overheads - allocated to work-in-progress	1,36,350
(ii)	Goods furnished - at cost	13,76,200
(iii)	Raw materials purchased	12,43,810
(iv)	Direct wages - allocated to work-in-progress	2,56,800
(v)	Cost of goods sold	14,56,500
(vi)	Raw materials - issued to production	13,60,430
(vii)	Raw materials - credited by suppliers	27,200
(viii)	Raw materials losses - inventory audit	6,000
(ix)	Work-in-progress rejected (with no scrap value)	12,300
(x)	Customer's returns (at cost) of finished goods	45,900
You are required to prepare:		

(i)   Raw material control a/c

(ii)   Work-in-progress control a/c

(iii) Finished stock control a/c

(iv)   General ledger adjustment a/c   (PYP Nov '18, 10 Marks)

Answer 22

(i)   Raw Material Control A/c (Rs.)   (Rs.)

	To Balance b/d	2,82,450	By General Ledger Adjustment A/c	27,200
	" General Ledger	12,43,810	" Work-in-progress Control A/c	13,60,430

		Adjustment A/c			
				Costing P & L A/c	6,000
				(Loss) (OR GLA)	
				″ Balance c/d	1,32,630
			15,26,260		15,26,260
(ii)	**Work-in-Progress Control A/c**				
			(Rs.)		(Rs.)
	To Balance b/d		2,38,300		
	″ Raw Material Control A/c		13,60,430	″ Finished Goods Control A/c	13,76,200
	″ Wages Control A/c		2,56,800	Costing P&L A/c (OR GLA)	12,300
	″ Factory OH Control A/c		1,36,350	″ Balance c/d	6,03,380
			19,91,880		19,91,880

(iii) Finished Goods Control A/c

		(₹)			(₹)
To	Balance b/d	3,92,500	By	Cost of goods sold A/c (OR GLA)	14,56,500
	General Ledger Adjustment A/c	45,900			
″	Work-in-process Control A/c	13,76,200	″	Balance c/d	3,58,100
		18,14,600			18,14,600

(iv) General Ledger Adjustment A/c

	(Rs.)		(Rs.)
To Costing P&L A/c (sales) (Balancing figure)	25,68,910	By Balance b/d	9,13,250
″ Raw Material Control A/c	27,200	″ Raw Material Control A/c	12,43,810
		"Wages Control A/c	2,56,800
		"Factory OH Control A/c	1,36,350
		"Finished Goods Control A/c	45,900
	25,96,110		25,96,110

OR

General ledger adjustment account

		(Rs.)		(Rs.)
To	Raw Material Control A/c	27,200	By Balance b/d	9,13,250
″	Raw Material control account(loss)	6,000	″ Raw Material Control A/c	12,43,810
″	WIP control Account (rejection)	12,300	″ Wages Control A/c	2,56,800
"	Finished stock Control Account	14,56,500	″ Factory OH Control A/c	1,36,350
""	Balance c/d	10,94,110	″ Finished Goods Control A/c	45,900
		25,96,110		25,96,110

Working:

Factory Overhead Control A/c

		(₹)			(₹)
To	General Ledger Adjustment A/c	1,36,350	By	Work-in-progress A/c	1,36,350
		1,36,350			1,36,350

Question 23

Answer any four of the following:

Briefly explain the essential features of a good Cost Accounting System. (PYP 5 Marks May'22, RTP Nov'18, MTP 5 Marks Oct'22)

Answer 23

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

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

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

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

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

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

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

Question 24

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 Chargers 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.

(PYP 5 Marks Nov 22)

Answer 24

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	5,26,580
	Over recovery of production overhead in cost accounts	10,200	
	Profit on sale of Assets	30,000	
	Profit as per Cost Accounts		1,14,420

Question 25

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. (PYP 5 Marks Nov 22)**

Answer 25

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
(vii)	Loss on the sales of Fixed Assets	Financial Accounts
(viii)	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

Question 40

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

(PYP 5 Marks May'22)

Answer 40

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 Overhead 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	
To Administration Overhead Control A/c			1,55,000
(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)

Chapter 8
Unit & Batch Costing

Question 1

STATE the differences between Job costing and Batch costing (MTP 5Marks, May 20, Oct 19, Old & New SM, RTP Nov '21, RTP Nov '18, RTP May '23)

Answer 1

Differences between Job costing and Batch costing:

Sr. No	Job Costing	Batch Costing
1	Method of costing used for non- standard and non- repetitive products produced as per customer specifications and against specific orders.	Homogeneous products produced in a continuous production flow in lots.
2	Cost determined for each Job.	Cost determined in aggregate for the entire Batch and then arrived at on per unit basis.
3	Jobs are different from each other and independent of each other. Each Job is unique.	Products produced in a batch are homogeneous and lack of individuality.

Question 2

A jobbing factory has undertaken to supply 300 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 8 per piece. From the following data CALCULATE the cost and profit per piece of each batch order and overall position of the order for 1,800 pieces.

Month	Batch Output	Material cost (₹)	Direct wages (₹)	Direct labour hours
January	310	1150	120	240
February	300	1140	140	280
March	320	1180	150	280
April	280	1130	140	270
May	300	1200	150	300
June	320	1220	160	320

The other details are:

Month	Chargeable expenses (₹)	Direct labour (Hours)
January	12,000	4,800
February	10,560	4,400
March	12,000	5,000
April	10,580	4,600
May	13,000	5,000
June	12,000	4,800

(MTP 5 Marks, Oct.'2020) (Same concept different figures MTP 5 Marks Mar'21, RTP May'23)

Answer 2

Particulars	Jan.	Feb.	March	April	May	June	Total
Batch output (in units)	310	300	320	280	300	320	1,830
Sale value (₹)	2,480	2,400	2,560	2,240	2,400	2,560	14,640
Material cost (₹)	1,150	1,140	1,180	1,130	1,200	1,220	7,020

Direct wages (₹)	120	140	150	140	150	160	860
Chargeable expenses* (₹)	600	672	672	621	780	800	4,145
Total cost (₹)	1,870	1,952	2,002	1,891	2,130	2,180	12,025
Profit per batch (₹)	610	448	558	349	270	380	2,615
Total cost per unit (₹)	6.03	6.51	6.26	6.75	7.10	6.81	6.57
Profit per unit (₹)	1.97	1.49	1.74	1.25	0.90	1.19	1.43

Overall position of the order for 1,200 units

Sales value of 1,800 units @ ₹ 8 per unit   ₹ 14,400

Total cost of 1,800 units @ ₹ 6.57 per unit   ₹ 11,826

Profit   ₹ 2,574

* Chargeable expenses / Direct labour hour for the month X Direct labour hours for batch

Question 3

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 5 Marks, Oct'21) (Same concept different figures MTP 5 Marks Apr 19, MTP 5 Marks Mar 19 but different figures)

Answer 3

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

Where,   D   = Annual demand i.e. 2.15% of 8,00,00,000 = 17,20,000 units

         S   = Set-up cost per run = ₹ 4,500

         C   = Inventory holding cost per unit per annum

            = ₹ 2.5 × 12 months = ₹ 30

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

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

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

Question 4

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake atleast 50 units of any item at a time. A customer has given an order for 600 cakes. To process a batch of 50 cakes, the following cost would be incurred:

Direct materials   - Rs. 5,000

Direct wages   - Rs.   500

Oven set-up cost   Rs.   750

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads.

AC requires a profit margin of 25% of sales value. Required:

(i)   DETERMINE the price to be charged for 600 cakes.

(ii)   CALCULATE cost and selling price per cake.

(iii) DETERMINE what would be selling price per unit If the order is for 605 cakes. (MTP 5 Marks Aug '18 & March '23) (RTP May '18) (Same concept different figures Old & New SM)

Answer 4

Statement of cost per batch and per order

No. of batch = 600 units ÷ 50 units = 12 batches

	Particulars	Cost per batch (Rs.)	Total Cost (Rs.)
	Direct Material Cost	5,000.00	60,000
	Direct Wages	500.00	6,000
	Oven set-up cost	750.00	9,000
	Add: Production Overheads (20% of Direct wages)	100.00	1,200
	Total Production cost	6,350.00	76,200
	Add: S&D and Administration overheads (10% of Total production cost)	635.00	7,620
	Total Cost	6,985.00	83,820
	Add: Profit (1/3rd of total cost)	2,328.33	27,940
(i)	**Sales price**	**9,313.33**	**1,11,760**
	No. of units in batch	50 units	
(ii)	**Cost per unit** (Rs.6,985 ÷ 50 units)	**139.70**	
	Selling price per unit (9,313.33 ÷ 50 units)	**186.27**	

(iii)   If the order is for 605 cakes, then selling price per cake would be as below:

Particulars	Total Cost (Rs.)
Direct Material Cost	60,500
Direct Wages	6,050
Oven set-up cost	9,750
Add: Production Overheads (20% of Direct wages)	1,210
Total Production cost	77,510
Add: S&D and Administration overheads (10% of Total production cost)	7,751
Total Cost	85,261
Add: Profit (1/3rd of total cost)	28,420
Sales price	**1,13,681**
No. of units	605 units
Selling price per unit (Rs.1,13,681 ÷ 605 units)	**187.90**

Question 5

In Batch Costing, STATE how is Economic Batch Quantity determined? (MTP 4 Marks Mar 22, Mar 18)

Answer 5

The economic batch size or Economic Batch Quantity may be determined by calculating the total cost for a series of possible batch sizes and checking which batch size gives the minimum cost. The objective here being to determine the production lot (Batch size) that optimizes on both set up and inventory holding cots formula. The mathematical formula usually used for its determination is as follows:

$$(EBQ) = \sqrt{\frac{2 \times D \times S}{C}}$$

Where,

D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production

Question 6

Arnav Ltd. operates in beverages industry where it manufactures soft -drink in three sizes of Large (3 litres), Medium (1.5 litres) and Small (600 ml) bottles. The products are processed in batches. The 5,000 litres capacity processing plant consumes electricity of 90 Kilowatts per hour and a batch takes 1 hour 45 minutes to complete. Only symmetric size of products can be processed at a time. The machine set-up takes 15 minutes to get ready for next batch processing. During the set-up, power consumption is only 20%.

(I) The current price of Large, Medium and Small are ₹ 150, ₹ 90 and ₹ 50 respectively.

(II) To produce a litre of beverage, 14 litres of raw material-W and 25 ml of Material-C are required which costs ₹ 0.50 and ₹1,000 per litre respectively.

(III) 20 direct workers are required. The workers are paid ₹ 880 for 8 hours shift of work.

(IV) The average packing cost per bottle is ₹3

(V) Power cost is ₹ 7 per Kilowatt -hour (Kwh)

(VI) Other variable cost is ₹ 30,000 per batch.

(VII) Fixed cost (Administration and marketing) is ₹ 4,90,00,000.

(VIII) The holding cost is ₹ 1 per bottle per annum.

The marketing team has surveyed the following demand (bottle) of products:

Large	Medium	Small
3,00,000	7,50,000	20,00,000

Required:
CALCULATE net profit/ loss of the organization and also COMPUTE Economic Batch Quantity (EBQ). (MTP 10 Marks April '22)

Answer 6

Workings:

1. Maximum number of bottles that can be processed in a batch:

$$= \frac{5,000 \text{ Itrs}}{\text{Bottle volume}}$$

Large		Medium		Small	
Qty (ltr)	Max bottles	Qty (ltr)	Max bottles	Qty (ml)	Max bottles
3	1,666	1.5	3,333	600	8,333

For simplicity of calculation small fractions has been ignored.

2. Number of batches to be run:

		Large	Medium	Small	Total
A	Demand	3,00,000	7,50,000	20,00,000	
B	Bottles per batch (Refer WN-1)	1,666	3,333	8,333	
C	No. of batches [A÷B]	180	225	240	645

For simplicity of calculation small fractions has been ignored.

3. Quantity of Material-W and Material C required to meet demand:

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	
B	Qty per bottle (Litre)	3	1.5	0.6	
C	Output (Litre) [A×B]	9,00,000	11,25,000	12,00,000	32,25,000
D	Material-W per litre of output (Litre)	14	14	14	
E	Material-W required (Litre) [C×D]	1,26,00,000	1,57,50,000	1,68,00,000	4,51,50,000
F	Material-C required per litre of output (ml)	25	25	25	
G	Material-C required (Litre) [(C×F)÷1000]	22,500	28,125	30,000	80,625

4. No. of Man-shift required:

		Large	Medium	Small	Total
A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	2	2	2	
C	Total hours required (Hours) [A×B]	360	450	480	1,290
D	No. of shifts required [C÷8]	45	57	60	162
E	Total manshift [D×20 workers]	900	1,140	1,200	3,240

For simplicity of calculation small fractions has been ignored.

5. Power consumption in Kwh

		Large	Medium	Small	Total
	For processing				
A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	1.75	1.75	1.75	1.75
C	Total hours required (Hours) [A×B]	315	393.75	420	1,128.75
D	Power consumption per hour (Kwh)	90	90	90	90
E	Total Power consumption (Kwh) [C×D]	28,350	35,437.5	37,800	1,01,587

F	Per batch consumption* (Kwh) [E÷A]	157.5	157.5	157.5	157.5
For set-up					
G	Hours required per batch (Hours)	0.25	0.25	0.25	0.25
H	Total hours required (Hours) [A×G]	45	56.25	60	161.25
I	Power consumption per hour (Kwh) [20%×90]	18	18	18	18
J	Total Power consumption (Kwh) [H×I]	810	1,012.5	1,080	2,902.5
K	Per batch consumption* (Kwh) [J÷A]	4.5	4.5	4.5	4.5

* Per batch consumption can be directly calculated as [Hours required per batch x Power consumption per hour]

Calculation of Profit/ loss per batch:

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	30,50,000
B	Price per bottle (₹)	150	90	50	
C	Sales value (₹) [A×B]	4,50,00,000	6,75,00,000	10,00,00,000	21,25,00,000
	Direct Material cost:				
E	Material-W (₹) [Qty in WN-3 × ₹0.50]	63,00,000	78,75,000	84,00,000	2,25,75,000
F	Material-C (₹) [Qty in WN-3 × ₹1,000]	2,25,00,000	2,81,25,000	3,00,00,000	8,06,25,000
G	[E+F]	2,88,00,000	3,60,00,000	3,84,00,000	10,32,00,000
H	Direct Wages (₹) [Man-shift in WN-4 × × ₹880]	7,92,000	10,03,200	10,56,000	28,51,200
I	Packing cost (₹) [A×₹3]	9,00,000	22,50,000	60,00,000	91,50,000
	Power cost (₹)				
J	For processing (₹) [WN-5 × ₹7]	1,98,450	2,48,062.5	2,64,600	7,11,112.5
K	For set-up time (₹) [WN-5 × ₹7]	5,670	7,087.5	7,560	20,317.5
L	[J+K]	2,04,120	2,55,150	2,72,160	7,31,430
M	Other variable cost (₹) [No. of batch in WN-2 × ₹30,000]	54,00,000	67,50,000	72,00,000	1,93,50,000
N	Total Variable cost per batch [G+H+I+L+M]	3,60,96,120	4,62,58,350	5,29,28,160	13,52,82,630
O	Profit/ loss before fixed cost [C-N]	89,03,880	2,12,41,650	4,70,71,840	7,72,17,370
P	Fixed Cost				4,90,00,000
Q	Net Profit [O-P]				2,82,17,370

Computation of Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2X\ D\ XS}{C}}$$

D = Annual Demand for the Product = Refer A below

S = Set-up cost per batch = Refer D below

C = Carrying cost per unit per annum =Refer E below

	Particulars	Large	Medium	Small
A	Annual Demand (bottle)	3,00,000	7,50,000	20,00,000
B	Power cost for set-up time (₹) [Consumption per batch in WN-5 × ₹7]	31.50	31.50	31.50
C	Other variable cost (₹)	30,000	30,000	30,000
D	Total Set-up cost [B+C]	30,031.50	30,031.50	30,031.50
E	Holding cost:	1.00	1.00	1.00
F	EBQ (Bottle)	1,34,234	2,12,243	3,46,592

Question 7

Arnav Motors Ltd. manufactures pistons used in car engines. As per the study conducted by the Auto Parts Manufacturers Association, there will be a demand of 80 million pistons in the coming year. Arnav Motors Ltd. is expected to have a market share of 1.15% of the total market demand of the pistons in the coming year. It is estimated that it costs Rs.1.50 as inventory holding cost per piston per month and that the set-up cost per run of piston manufacture is Rs. 3,500.

(i) DETERMINE the optimum run size for piston manufacturing?

(ii) Assuming that the company has a policy of manufacturing 40,000 pistons per run, CALCULATE the extra costs company would be incurring as compared to the optimum run suggested in (i) above?

(iii) IDENTIFY variability of cost with respect to unit and batch level from the following cost:

(a) Inventory carrying cost; (b) Designing cost for a job; (c) Machine set-up cost to run production and (d) Depreciation of factory building. (MTP Oct '18, 10 Marks)

Answer 7

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

Where,	D	= Annual demand i.e. 1.15% of 8,00,00,000 = 9,20,000 units
	S	= Set-up cost per run = ₹ 3,500
	C	= Inventory holding cost per unit per annum = ₹ 1.5 × 12 months = ₹ 18

EBQ= $\sqrt{\dfrac{2 \times 9,20,000 \text{units} \times 3,500}{18}}$ = 18,915 units

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

	Batch size	No. of set-ups	Set-up Cost (Rs.)	Inventory holding cost (Rs.)	Total Cost (Rs.)
A	40,000 units	23 $\left(\dfrac{9,20,000}{40,000}\right)$	80,500 (23 × Rs. 3,500)	3,60,000 $\left(\dfrac{40,000 \times \text{Rs. } 18}{2}\right)$	4,40,500
B	18,915 units	49 $\left(\dfrac{9,20,000}{18,915}\right)$	1,71,500 (49 × Rs.3,500)	1,70,235 $\left(\dfrac{18,91 \times \text{Rs. } 18}{2}\right)$	3,41,735
	Extra Cost (A – B)				98,765

(iii)

	Costs	Unit level	Batch level
(a)	Inventory carrying cost	Variable cost	Variable cost

(b)	Designing cost for a job	Fixed cost	Variable cost, provided the entire job work is processed in a single batch.
(c)	Machine set-up cost to run production	Fixed cost	Variable cost
(d)	Depreciation of factory building	Fixed cost	Fixed cost

Question 8

M/s. KBC Bearings Ltd. is committed to supply 48,000 bearings per annum to M/s. KMR Fans on a steady daily basis. It is estimated that it costs Rs. 1 as inventory holding cost per bearing per month and that the set up cost per run of bearing manufacture is Rs. 3,200

(i) DETERMINE what would be the optimum run size of bearing manufacture?

(ii) DETERMINE What would be the interval between two consecutive optimum runs?

(iii) CALCULATE the minimum inventory cost? (MTP 5 Marks Oct '18, Old & New SM)

Answer 8

(i) Optimum batch size or Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48,000 \times 3,200}{12}} = 5,060 \text{ units}$$

(ii) Number of Optimum runs = 48,000 ÷ 5,060 = 9.49 or 10 runs Interval between 2 runs (in days) = 365 days ÷ 10 = 36.5 days

(iii) Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum Average Inventory = 5,060 units ÷ 2 = 2,530 units

Carrying Cost per unit per annum = Rs.1 × 12 months = Rs.12

Minimum Inventory Holding Costs = 2,530 units × Rs. 12 =

Rs.30,360

Question 9

DESCRIBE Unit Costing. WHAT kind of industries follow this method of costing? (MTP 5 Marks Sep'22)

Answer 9

Unit costing: It is that method of costing where the output produced is identical and each unit of output requires identical cost. Unit costing is synonymously known as single or output costing, but these are sub-division of unit costing method.

This method of costing is followed by industries which produce single output or few variants of a single output, therefore, this method of costing, finds its application in industries like paper, cement, steel works, mining, breweries etc. These types of industries produce identical products and therefore have identical costs.

Question 10

BTL LLP. manufactures glass bottles for HDL Ltd., a pharmaceutical company, which is ayurvedic medicines business.
BTL can produce 2,00,000 bottles in a month. Set-up cost of each production run is ₹ 5,200 and the cost of holding one bottle for a year is ₹1.50.
As per an estimate HDL Ltd. can order as much as 19,00,000 bottles in a year spreading evenly throughout the year.
At present the BTL manufactures 1,60,000 bottles in a batch.

Required:

(i) Compute the Economic Batch Quantity for bottle production.

(ii) Compute the annual cost saving to BTL by adopting the EBQ of a production. (RTP Nov'19)

Answer 10

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

Where, D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production

(i) Computation of EBQ:

$$= \sqrt{\dfrac{2 \times 19,00,000 \times Rs.5,200}{Rs.1.5}}$$

= 1,14,775 bottles

(ii) Computation of savings in cost by adopting EBQ:

Batch Size	No. of Batch	Set-up cost	Carrying cost	Total Cost
1,60,000 bottles	12	62,400 ('5,200× 12)	1,20,000 ('1.5×1,20,000½×1,60,000)	1,82,400
1,14,775 bottles	17	88,081.25 ('5,200 × 88,40017)	86,081.25 ('1.586,081.25 × ½ × 1,14,775)	1,74,481.25
		Saving		7,918.75

Question 11

A Ltd. manufactures mother boards used in smart phones. A smart phone requires one mother board. As per the study conducted by the Indian Cellular Association, there will be a demand of 180 million smart phones in the coming year. A Ltd. is expected to have a market share of 5.5% of the total market demand of the mother boards in the coming year. It is estimated that it costs ₹6.25 as inventory holding cost per board per month and that the set-up cost per run of board manufacture is ₹33,500.

(i) **COMPUTE the optimum run size for board manufacturing?**

(ii) **Assuming that the company has a policy of manufacturing 80,000 boards per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above? (RTP Nov '20) (MTP 5 Marks Sep '23)**

Answer 11

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

Where, D = Annual demand i.e. 5.5% of 18,00,00,000 = 99,00,000 units

S = Set-up cost per run = ₹33,500

C = Inventory holding cost per unit per annum

= ₹6.25 × 12 months = ₹75

EBQ = $\sqrt{\dfrac{2 \times 99,00,000 \text{Units} \times Rs.33,500}{Rs.75}}$

= 94,042.5 Units or 94,043 Units

Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-ups	Set-up Cost (₹)	Inventory holding cost (₹)	Total Cost (₹)
A	80,000 units	124 $\left(\dfrac{99,00,000}{80,000}\right)$	41,54,000 (124 × ₹33,500)	30,00,000 $\left(\dfrac{80,000 \times Rs.\,75}{2}\right)$	71,54,000

B	94,043 units	106 $\left(\dfrac{99,00,000}{94,043}\right)$	35,51,000 $(106 \times$ ₹33,500)	35,26,612.5 $\left(\dfrac{94,043 \times \text{Rs. }75}{2}\right)$	70,77,612.50
	Extra Cost (A – B)				76,387.50

Question 12

PS Ltd. manufactures articles in predetermined lots simultaneously. The following costs have been incurred for Batch No. 'PS143' in the month of March, 2022:

Units produced 1,000 units

Direct materials cost ₹ 2,00,000

Direct Labour -

Department A 800 labour hours @ ₹ 100 per hour.

Department B 1,400 labour hours @ ₹ 120 per hour.

Factory overheads are absorbed on labour hour basis and the rates are:

Department A @ ₹ 140 per hour.

Department B @ ₹ 80 per hour.

Administrative overheads are absorbed at 10% of selling price.

The firm expects 25% gross profit (sales value minus factory cost) for determining the selling price.

You are required to CALCULATE the selling price per unit of Batch No. 'PS143'. (RTP Nov'22)

Answer 12

Statement showing selling price per unit of Batch number 'PS143'

Particulars	Amount (₹)	Amount (₹)
Direct Materials		2,00,000
Direct Labour		
Department A 800 labour hours @ ₹100 per hour	80,000	
Department B 1400 labour hours @ ₹120 per hour	1,68,000	2,48,000
Factory overheads Department A 800 labour hours @ ₹140 per hour Department B 1400 labour hours @ ₹80 per hour	1,12,000 1,12,000	2,24,000
Factory Cost		6,72,000
Add: Administrative overheads (10% of selling price) (6,72,000/75% x 10%)		89,600
Cost of production		7,61,600
Add: Profit (15% of selling price) (6,72,000/75% x 15%)		1,34,400
Selling price of batch no 'PS143'		8,96,000
Selling price per unit (8,96,000 / 1000 units)		896

Alternatively, selling price calculation:-

Selling price assume X

25% = (X – factory cost) / X

or 0.25 X = X- 6,72,000

or 0.75 X = 6,72,000

hence X = ₹ 8,96,000

Question 13

Explain 'Job Costing' and 'Batch Costing'. (PYP May '18, 5 Marks)

Answer 13

Job costing: In this method of costing, cost of each job is ascertained separately. It is suitable in all cases where work is undertaken on receiving a customer's order like a printing press, motor work shop, etc. This method of costing is used for non- standard and non- repetitive products produced as per customer specifications and against specific orders. Jobs are different from each other and independent of each other. Each Job is unique.

Batch Costing: It is the extension of Job costing. Homogeneous products are produced in a continuous production flow in lots. A batch may represent a number of small orders passed through the factory in batch. Each batch here is treated as a unit of cost and thus separately costed. Here cost per unit is determined by dividing the cost of the batch by number of units produced in the batch.

Question 14

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? (PYP 5 Marks Jan '21) (Same concept different figures RTP May'22)

Answer 14

(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

$$EBQ = \sqrt{\dfrac{2 \times 10,00,000 \times Rs.225}{Rs.18}}$$

= 5,000 units of Stents

(ii) Minimum inventory holding cost

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

$$= (5,000 \div 2) \times ₹ 18$$

$$= ₹ 45,000$$

(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	$= \dfrac{10,00,000}{4,000} \times Rs.\,225$	$= \dfrac{10,00,000}{5,000} \times Rs.\,225$

	= ₹ 56,250	= ₹ 45,000
Total Carrying cost	½ × 4,000 × ₹ 18 = ₹ 36,000	½ × 5,000 × ₹ 18 = ₹ 45,000
Total Cost	**₹ 92,250**	**₹ 90,000**

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

Question 15

XYZ Ltd. has obtained an order to supply 48000 bearings per year from a concern. On a steady basis, it is estimated that it costs Rs. 0.20 as inventory holding cost per bearing per month and the set-up cost per run of bearing manufacture is Rs. 384.

You are required to:

(i) compute the optimum run size and number of runs for bearing manufacture.

(ii) compute the interval between two consecutive runs.

(iii) find out the extra costs to be incurred, if company adopts a policy to manufacture 8000 bearings per run as compared to optimum run Size.

(iv) give your opinion regarding run size of bearing manufacture.

Assume 365 days in a year. (PYP Nov'18,10 Marks)

Answer 15

(i) **Optimum batch size or Economic Batch Quantity (EBQ):**

$$EBQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 48,000 \times 384}{2.4}} = 3919.18 \text{ or } 3,920 \text{ units}$$

Number of Optimum runs = 48,000 ÷ 3,920 = 12.245 or 13 run

(ii) Interval between 2 runs (in days) = 365 days ÷ 13 = 28 days Or

365 ÷ 12.24 = 29.82 days

(iii) If 8,000 bearings are manufactures in arun:

Total cost = Set-up cost + Inventory holding cost

= Rs. .384 × (48,000 ÷ 8,000) + (8,000 ÷ 2) × ₹.2.4

= 2304 + 9,600 = 11,904

Extra cost = Rs. (11,904 – 9,406*) = ₹ 2,498/- OR

Extra cost = Rs. (11,904 – 9,696*) = Rs. 2,208/-

* Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum Average Inventory = 3,920 units ÷ 2 = 1,960 units

Carrying Cost per unit per annum = Rs. 0.2 × 12 months = Rs. 2.4 Minimum Inventory Holding Costs = 1,960 units × Rs. 2.4 = Rs. 4,704

Total cost = Set-up cost + Inventory holding cost = (12.245 × 384) + 4704 = Rs. 9,406 (approx.)

OR

Total cost = Set-up cost + Inventory holding cost = (13 × 384) + 4704 = Rs. 9,696 (approx.)

(iv) To save cost the company should run at optimum batch size i.e. 3,920 Units. It saves Rs. 2,498 or 2208. Run size should match with the Economic production run of bearing manufacture. When managers of a manufacturing operation make decisions about the number of units to produce for each production run, they must consider the costs related to setting up the production process and the costs of holding inventory

Alternative presentation to part 3(a) (iii)

Statement showing Total Cost at Production Run size of 3,600 and 8,000 bearings

A.	Annual requirement	48,000	48,000
B.	Run Size	3,920	8,000
C.	No. of runs (A/B)	12.245	6
D.	Set up cost per run	₹ 384	₹ 384
E.	Total set up cost (CxD)	₹ 4,702	₹ 2,304
F.	Average inventory (B/2)	1,960	4,000
G.	Carrying cost per unit p.a.	2.40	2.40
H.	Total Carrying cost (FxG)	4,704	9,600
I.	Total cost (E+H)	9,406	11,904

Extra cost incurred, if run size is of 8,000=Rs. 11,904-9,406=Rs. **2,498**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This numerical question was based on batch costing. The majority of examinees did well.

Question 16

AUX Ltd. has an Annual demand from a single customer for 60,000 Covid-19 vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

(i) Find the most Economical Production Run.

(ii) Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.(PYP 5 Marks July '21)

Answer 16

i. **Calculation of most Economical Production Run**

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

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

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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

It was a practical problem requiring to calculate Economic Production Run and extra cost due to a different production plan. Performance of the examinees was

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Question 17

A Ltd. is a pharmaceutical company which produces vaccines for diseases like Monkey Pox, Covid-19 and Chickenpox. A distributor had given an order for 1,600 Monkey Pox Vaccines. The company can produce 80 vaccines at a time. To process a batch of 80 Monkey Pox vaccines, the following costs would be incurred:

	₹
Direct Materials	**4,250**
Direct wages	**500**
Lab set-up cost	**1,400**

The Production Overheads are absorbed at a rate of 20% of direct wages and 20% of total production cost is charged in each batch for Selling, distribution and administration Overheads. The company is willing to earn profit of 25% on sales value.

You are required to determine:

(i)   Total Sales value for 1,600 Monkey Pox Vaccines

(ii) Selling price per unit of the Vaccine. (PYP 5 Marks Nov 22)

Answer 17

(i) & (ii) Calculation of Sales value and Selling price per unit of Monkey Pox vaccine

Particulars	Amount (₹) per Batch	Amount (₹) for 1600 units or 20 batches	Amount (₹) per unit
Direct materials	4,250	85,000	53.125
Direct wages	500	10,000	6.250
Lab set-up cost	1,400	28,000	17.500
Production overheads (20% of direct wages)	100	2,000	1.250
Production Cost	6,250	1,25,000	78.125
Selling, distribution and administration cost (20% of Production cost)	1,250	25,000	15.625
Total Cost	7,500	1,50,000	93.75
Add: Profit (1/3rd of Total cost or 25% of Sales value)	2,500	50,000	31.25
Sales value	10,000	2,00,000	125.00

Question 18

TSK Limited manufactures a variety of products. The annual demand for one of its products- Product 'X' is estimated as `1,35,000 units. Product 'X' is to be manufactured done in batches. Set up cost of each batch is ` 3,375 and inventory holding cost is ` 5 per unit. It is expected that demand of Product 'X' would be uniform throughout the year.

Required:

(i)   Calculate the Economic Batch (EBQ) for Product 'X'.

(ii) Assuming that the company has a policy of manufacturing 7,500 units of Product 'X' per batch, calculate the additional cost incurred as compared to the cost incurred as per Economic Batch Quantity (EBQ) as computed in (i) above. (PYP 5 Marks, May '23)

Answer 18

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

where,

D   =   Annual demand for the product

S   =   Set-up cost per batch

C   =   Carrying cost per unit per annum.

$$\sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 1,35,000}{5}} = \textbf{13,500 units.}$$

ii) **Total Cost (of maintaining the inventories) when batch size (Q) are 13,500 and 7,500 units respectively**

Total cost = Total set-up cost + Total carrying cost.

	When batch size is 13,500 units	When batch size is 7,500 units
Total set up cost	$= \frac{1,35,000}{13,500} \times$ `3,375 = ` 33,750 Or, No. of setups = 10 = 10 x `3,375 = `33,750	$=\frac{1,35,000}{7,500}$ × `3,375    = ` 60,750
Total Carrying cost	1/2 × 13,500 × 5 = `33,750	1/2 × 7,500 × 5 = `18,750
Total Cost	`67,500	`79,500

12,000 is the excess cost borne by the company due to batch size not being economic batch quantity.

Alternative presentation

	EOQ 13,500	Batch size 7500	Extra cost	Saving
No of setup	10	18	8 x 3375 = 27,000	
Carrying cost	13,500 – 7500 = 6000/ 2 @ 5			15,000

Net extra cost = (27,000- 15,000) = `12,000

Chapter 9
Job Costing and Contract Costing

Question 1

A factory uses job costing. The following data are obtained from its books for the year ended 31st March, 20X8:

	Amount (Rs.)
Direct materials	9,00,000
Direct wages	7,50,000
Selling and distribution overheads	5,25,000
Administration overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

(i) PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.

(ii) In 2018-19, the factory received an order for a job. It is estimated that direct materials required will be Rs.2,40,000 and direct labour will cost Rs.1,50,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory recovers overheads as a percentage of Cost of Production, based on cost rates prevailing in the previous year. (MTP Aug '18,10 Marks) (RTP May '20 & May '18)

Answer 1

(i) **Production Statement**

For the year ended 31st March, 2018

		Amount (₹)
Direct materials		9,00,000
Direct wages		7,50,000
	Prime Cost	16,50,000
Factory overheads		4,50,000
	Cost of Production	21,00,000
Administration overheads		4,20,000
Selling and distribution overheads		5,25,000
	Cost of Sales	30,45,000
Profit		6,09,000
	Sales value	36,54,000

Calculation of Rates:

1. Percentage of factory overheads to direct wages = Rs. 4,50,000 / Rs. 7,50,000x 100 = 60%

2. Percentage of administration overheads to Cost of production = Rs.4,20,000/Rs.21,00,000× 100 = 20%

3. Selling and distribution overheads = ₹ 5,25,000 × 115% = ₹ 6,03,750 Selling and distribution overhead % to Cost of production = $\frac{Rs.6,03,750}{Rs.21,00,000} \times 100$ = 28.75%

4. Percentage of profit to sales = $\frac{Rs.6,09,000}{Rs.36,54,000} \times 100$ = 16.67%

(ii) Calculation of price for the job received in 2018 -19	
	Amount (₹)
Direct materials	2,40,000
Direct wages	1,50,000
Prime Cost	3,90,000
Factory overheads (60% of ₹ 1,50,000)	90,000
Cost of Production	4,80,000

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Chapter 9 Job Costing and Contract Costing

Administration overheads (20% of ₹ 4,80,000)	96,000
Selling and distribution overheads (28.75% of ₹ 4,80,000)	1,38,000
Cost of Sales	7,14,000
Profit (20% of ₹ 7,14,000)	1,42,800
Sales value	8,56,800

Question 2

APFL Ltd. deals in plumbing materials and also provides plumbing services to its customers. On 12th August, 2019, APFL received a job order for a students' hostel to supply and fitting of plumbing materials. The work is to be done on the basis of specification provided by the hostel owner. Hostel will be inaugurated on 5th September, 2019 and the work is to be completed by 3rd September, 2019. Following are the details related with the job work:

Direct Materials

APFL uses a weighted average method for the pricing of materials issues. Opening stock of materials

as on 12th August 2019:

- 15mm GI Pipe, 12 units of 15 feet size @ Rs.600 each
- 20mm GI Pipe, 10 units of 15 feet size @ Rs.660 each
- Other fitting materials, 60 units @ Rs. 26 each
- Stainless Steel Faucet, 6 units @ Rs. 204each
- Valve, 8 units @ Rs. 404 each Purchases:
  On 16th August 2019:
- 20mm GI Pipe, 30 units of 15 feet size @ Rs. 610 each
- 10 units of Valve @ Rs. 402 each On 18th August 2019:
- Other fittingmaterials, 150 units @ Rs. 28 each
- Stainless Steel Faucet, 15 units @ Rs. 209 each On 27th August2019:
- 15mm GI Pipe, 35 units of 15 feet size @ Rs.628 each
- 20mm GI Pipe, 20 units of 15 feet size @ Rs.660 each
- Valve, 14 units @ Rs.424 each Issues for the hostel job:

On 12th August 2019:

- 20mm GI Pipe, 2 units of 15 feetsize
- Other fitting materials, 18 units On 17th August 2019:
- 15mm GI Pipe, 8 units of 15 feetsize
- Other fitting materials, 30 units On 28th August 2019:
- 20mm GI Pipe, 2 units of 15 feetsize
- 15mm GI Pipe, 10 units of 15 feetsize
- Other fitting materials, 34 units
- Valve, 6 units On 30thAugust:
- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ Rs. 50 per hour (includes 12 hours overtime) Helper: 192 hours @ Rs.35 per hour

(includes 24 hours overtime) Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ Rs. 13 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

(a) Calculate the total cost of the job.

(b) Calculate the price to be charged from the customer. (MTP Oct. '19, 10 Marks) (RTP Nov '20)

Answer 2

(a) Calculation of Total Cost for the Hostel Job Particulars	Amount (Rs.)	Amount (Rs.)
Direct Material Cost:		
- 15mm GI Pipe (Working Note-1)	11,051.28	
- 20mm GI Pipe (Working Note-2)	2,588.28	
- Other fitting materials (Working Note- 3)	3,866.07	
- Stainless steel faucet		
$15 \text{ units} \times \left(\frac{6 \times Rs.204 + 15 \times 209}{21 \text{ units}} \right)$		
-Value	3,113.57	
$6 \text{ units} \times \left(\frac{8 \times Rs.404 + 10 \times Rs.402 + 14 \times Rs.424}{32 \text{ units}} \right)$	2,472.75	23,091.95
Direct Labour:		
-Plumber [(180 hours × Rs.50) + (12 hours × Rs.25)]	9,300.00	
-Helper [(192 hours × Rs.35) + (24 hours × Rs.17.5)]	7,140.00	16,440.00
-Overheads [Rs. 13 × (180 + 192) hours]		4,836.00
Total Cost		44,367.95

(b) **Price to be charged for the job work:**

	Amount (Rs.)
Total Cost incurred on the job	44,367.95
	14,789.32
Add: 25% Profit on Job Price $\left(\frac{44,367.95}{75\%} \times 25\% \right)$	59,157.27

Working Note:

1. **Cost of 15mm GI Pipe**

Date		Amount (Rs.)
17-08-2019	8 units × Rs. 600	4,800.00
28-08-2019	$10 \text{ units} \times \left(\frac{4 \times Rs.600 + 35 \times Rs.628}{39 \text{ units}} \right)$	6,251.28
		11,051.28

2. **Cost of 20mm GI Pipe**

Date		Amount (Rs.)
12-08-2019	2 units × Rs. 660	1,320.00
28-08-2019	$2 \text{ units} \times \left(\frac{8 \times Rs.660 + 30 \times Rs.610 + 20 \times Rs.660}{39 \text{ units}} \right)$	1,268.28
		2,588.28

3. **Cost of Other fitting materials**

Date		Amount (Rs.)
12-08-2019	18 units × Rs. 26	468.00
17-08-2019		780.00
28-08-2019	30 units × Rs. 26	946.96
	$34 \text{ units} \times \left(\frac{12 \times Rs.26 + 150 \times Rs.28}{162 \text{ units}} \right)$	
30-08-2019	$60 \text{ units} \times \left(\frac{12 \times Rs.26 + 150 \times Rs.28}{162 \text{ units}} \right)$	1,671.11

		3,866.07

Question 3

A Ltd. is an engineering manufacturing company producing job orders on the basis of specifications provided by the customers. During the last month it has completed three jobs namely A, B and C. The following are the items of expenditures which are incurred in addition to direct materials and direct employee cost:

Office and administration cost - Rs. 6,00,000

Product blueprint cost for job A - Rs. 2,80,000

Hire charges paid for machinery used in job work B - Rs. 80,000

Salary to office attendants - Rs. 1,00,000

One time license fee paid for software used to make computerised graphics for job C - Rs. 1,00,000.

Salary paid to marketing manager - Rs. 2,40,000.

Required:

CALCULATE direct expenses attributable to each job. (MTP 5 Marks Mar 21)

Answer 3

Calculation of Direct expenses

Particulars	Job A (Rs.)	Job B (Rs.)	Job C (Rs.)
Product blueprint cost	2,80,000	--	--
Hire charges paid for machinery	--	80,000	--
License fee paid for software	--	--	1,00,000
Total Direct expenses	**2,80,000**	**80,000**	**1,00,000**

Question 4

MT Ltd. pays the followings to skilled workers engaged in production works. The following are the employee benefits paid to the employees:

(a)	Basic salary per day	₹1,000
(b)	Dearness allowance (DA)	20% of basic salary
(c)	House rent allowance	16% of basic salary
(d)	Transport allowance	₹50 per day of actual work
(e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8th hours.
(f)	Work of holiday and Sunday	Double of per day basic rate provided works at least 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory deductions.
(h)	Earned leave & Casual leave	These are paid leave.
(h)	Employer's contribution to Provident fund	12% of basic and DA
(i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between. During the month of August 2020, Mr. Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked

for 5 and 6 hours respectively without lunch break.

On 5th and 13th August he worked for 10 and 9 hours respectively. During the month Mr. Z worked for 100 hours on Job no.HT200. You are required to CALCULATE:

     (i)   **Earnings per day**

     (ii)   **Effective wages rate per hour of Mr. Z.**

     (iii) **Wages to be charged to Job no.HT200 [MTP 10 Marks April '23]**

Answer 4

Workings:

1. Normal working hours in a month = (Daily working hours – lunch break) × no. of days

= (8 hours – 0.5 hours) × 26 days = 195 hours

2. Hours worked by Mr.Z = No. of normal days worked + Overtime + holiday/ Sunday worked

= (21 days × 7.5 hours) + (9.5 hours + 8.5 hours) + (5 hours + 6 hours)

= 157.5 hours + 18 hours + 11 hours = 186.50 hours.

(i)   **Calculation of earnings per day**

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Dearness allowance (20% of basic salary)	5,200
	31,200
House rent allowance (16% of basic salary)	4,160
Employer's contribution to Provident fund (12% × ₹31,200)	3,744
Employer's contribution to Pension fund (7% × ₹31,200)	2,184
	41,288
No. of working days in a month (days)	26
Rate per day	1,588
Transport allowance per day	50
Earnings per day	**1,638**

(ii)   **Calculation of effective wage rate per hour of Mr. Z:**

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Additional basic salary for Sunday & holiday (₹1,000 × 2 days)	2,000
Dearness allowance (20% of basic salary)	5,600
	33,600
House rent allowance (16% of basic salary)	4,480
Transport allowance (₹50 × 23 days)	1,150
Overtime allowance (₹160 × 2 × 2 hours)*	640
Employer's contribution to Provident fund (12% × ₹33,600)	4,032
Employer's contribution to Pension fund (7% × ₹33,600)	2,352
Total monthly wages	46,254
Hours worked by Mr.Z (hours)	186.5
Effective wage rate per hour	**248**

*(Daily Basic+DA) ÷ 7.5 hours

= (1,000+200) ÷ 7.5 = ₹₹160 per hour

(iii) **Calculation of wages to be charged to Job no. HT200**

= ₹248 × 100 hours = ₹24,800

Question 5

Ispat Engineers Limited (IEL) undertook a plant manufacturing work for a client. It will charge a profit mark up of 20% on the full cost of the jobs. The following are the information related to the job:

Direct materials utilized – ₹ 1,87,00,000

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

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

Budgeted selling and administration overheads are ₹ 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. (RTP Nov'19)

Answer 5

Calculation of job price

Particulars	Amount (₹)
Direct materials	1,87,00,000
Direct wages (₹80 × 2,400 hours)	1,92,000
Production overheads $\left(\dfrac{Rs.\,48,00,000}{24,000hrs} \times 2,400hrs\right)$	4,80,000
Production cost	**1,93,72,000**
Selling and administration overheads $\left(\dfrac{Rs.\,18,00,000}{Rs.\,36,00,00,000} \times Rs.\,1,93,72,000\right)$	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**

Question 6

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. (RTP Nov'18)

Answer 6

Determination of quotation price for the job

Cost	(₹)
Direct Material (10kg × ₹ 10)	100
Direct Labour (20hrs × ₹ 5)	100
Variable production overhead (20hrs × ₹ 2)	40

Fixed Overhead (Rs. 1,00,000 / 10,000 Budgeted Hours200 × 20*Hours*

Other costs   50

Total costs   490

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

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

= ₹ 210 ÷ ₹ 700 = 30%

Question 7

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'21, May '22 & Nov '23)**

Answer 7

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

Factory Overhead Recovery Rate = $\dfrac{Factory\ Overhead\ in\ 2020-21}{Direct\ labour\ Cost\ in\ 2020-21}$ X 100

= $\dfrac{Rs.30,80,000}{Ra.90,50,000}$ X 100 = 34 % of Direct labour

Administrative Overhead Recovery Rate = $\dfrac{Administrative\ Overhead\ in\ 2020-21}{Factory\ Cost\ in\ 2020-21\ (W.N.)}$ X 100

= $\dfrac{Rs.20,50,400}{Rs.2,96,80,000}$ X 100 = 6.91 % 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

Particulars	Amount (₹)
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.

Question 8

Distinguish between Job costing and Process Costing. (Any five points of differences)
(PYP 5 Marks May'22, Old & New SM)(MTP 5 Marks Oct '23)

Answer 8

Job Costing	Process Costing
A Job is carried out or a product is produced by specific orders.	The process of producing the product has a continuous flow and the product produced is homogeneous.
(ii) Costs are determined for each job.	Costs are compiled on time basis i.e., for production of a given accounting period for each process or department.
Each job is separate and independent of other jobs.	Products lose their individual identity as they are manufactured in a continuous flow.
Each job or order has a number and costs are collected against the same job number.	The unit cost of process is an average cost for the period.
Costs are computed when a job is completed. The cost of a job may be determined by adding all costs against the job.	Costs are calculated at the end of the cost period. The unit cost of a process may be computed by dividing the total cost for the period by the output of the process during that period.
As production is not continuous and each job may be different, so more managerial attention is required for effective control.	Process of production is usually standardized and is therefore, quite stable. Hence control here is comparatively easier.

Question 9

B Limited has taken a contract for ₹ 70,00,000 and furnishes the following information:

	1st Year	2nd Year
	(Amount in ₹)	(Amount in ₹)
Material	12,50,000	13,65,000
Wages	12,50,000	11,44,000
Direct Expenses	4,20,000	3,80,000
Indirect Expenses	2,70,000	2,60,000
Work Certified	32,00,000	70,00,000
Work Uncertified	2,19,000	-

Other Information:

- **Plant costing ` 3,40,000 was bought at the commencement of the contract.**

- **Depreciation of ` 85,000 per annum is charged on the plant on Straight Line Method (SLM) basis.**

- **There is a provision for escalation clause in the contract for increase in material rate and wage rate in the second year only.**

- **Standard material for the first and second year was ` 12,000 units each year @ ` 90 per unit whereas the actual consumption was 12,500 @ ` 100 per unit in the first year and 13,000 units @ ` 105 per unit in the 2ndyear. Standard labour hours for first year were 10,000 hours and for the second year it was 9,000 hours. Standard wage rate was ` 120 per hour. The firm has paid for 10,000 hours @ ` 125 per hour in the first year and 8,800 hours @ ` 130 per hour in the second year.**

Required:

(i) Prepare Contract Account for both years without considering escalation clause.

(ii) Compute the total value of contract by considering the escalation clause.

(iii) Compute the total increase / (decrease) in the cost of material and wages for both the years. **(PYP 10 Marks, May '23)**

Answer 9

i) **Contract Account (For 1st Year)**

Particulars	(`)	Particulars	(`)
To Material	12,50,000	By work in Progress	
To Wages	12,50,000	Work certified 32,00,000	
To Direct expense	4,20,000	Work uncertified 2,19,000	34,19,000
To Indirect expense	2,70,000		
To Depreciation (`3,40,000 – `2,55,000)	85,000		
To Costing P&L (Notional Profit b/f)	1,44,000		
	34,19,000		34,19,000

Contract Account (For 2nd Year)

Particulars	(`)	Particulars	(`)
To Opening Work in Progress:		By Contractee A/C	70,00,000
Work certified 32,00,000			
Work uncertified 2,19,000	34,19,000		
To Material	13,65,000		
To Wages	11,44,000		
To Direct expenses	3,80,000		
To Indirect expenses	2,60,000		
To Depreciation (` 2,55,000 – ` 1,70,000)	85,000		
	3,47,000		

To Costing P&L (b/f)	70,00,000		70,00,000

ii) **Computation of total value of contract after escalation clause**

Particulars	(`)
Contract Price	70,00,000
Increase in cost of material 12,000 (105 – 90)	1,80,000
Increase in cost of labour 9,000 (130-120)	90,000
	72,70,000

iii) **Calculation of Increase/Decrease in cost of material and wages**

Year 1	Standard Cost	Actual Cost	Increase/Decrease
Material	10,80,000 (12,000 x 90)	12,50,000 (12,500 x 100)	1,70,000
Labour	12,00,000 (10,000 x 120)	12,50,000 (10,000 x 125)	50,000
			2,20,000
Year 2	**Standard Cost**	**Actual Cost**	**Increase/Decrease**
Material	10,80,000 (12,000 x 90)	13,65,000 (13,000 x 105)	2,85,000
Labour	10,80,000 (9,000 x 120)	11,44,000 (88,000 x 130)	64,000
			3,49,000
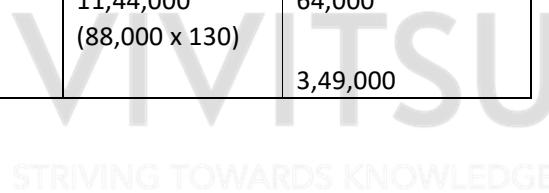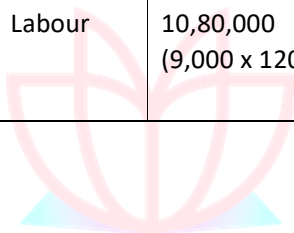
Chapter 10
Process & Operation Costing

Question 1

Following details are related to the work done in Process-I by XYZ Company during the month of March:

(`)

Opening work-in process (2,000 units)	
Materials	80,000
Labour	15,000
Overheads	45,000
Materials introduced in Process-I (38,000 units)	14,80,000
Direct Labour	3,59,000
Overheads	10,77,000
Units scrapped: 3,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%
Closing work-in process: 2,000 units	
Degree of completion:	
Materials	100%
Labour and overheads	80%
Units finished and transferred to Process-II:	35,000 units

Normal Loss:

5% of total input including opening work-in-process. Scrapped units fetch ` 20 per piece. You are required to PREPARE using average method:

(i) Statement of equivalent production
(ii) Statement of cost
(iii) Statement of distribution cost, and
(iv) Process-I Account, Normal Loss Account and Abnormal Loss Account.
(Old & New SM) (Same concept different figures PYP 10 Marks Nov 20)

Answer 1

(i) Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		**Labour & O.H.**	
				%	Units	%	Units
Opening WIP	2,000	Completed and transferred to Process-II	35,000	100	35,000	100	35,000
Units introduced	38,000	Normal Loss (5% of 40,000)	2,000	--	--	--	--
		Abnormal loss (Balancing figure)	1,000	100	1,000	80	800
		Closing WIP	2,000	100	2,000	80	1,600
	40,000		40,000		38,000		37,400

(ii) Statement showing cost for each element

Particulars	Materials (`)	Labour (`)	Overhead (`)	Total (`)
Cost of opening work-in-process	80,000	15,000	45,000	1,40,000
Cost incurred during the month	14,80,000	3,59,000	10,77,000	29,16,000
Less: Realisable Value of normal scrap (` 20 × 2,000 units)	(40,000)	--	--	(40,000)
Total cost: (A)	15,20,000	3,74,000	11,22,000	30,16,000

Equivalent units: (B)	38,000	37,400	37,400	
Cost per equivalent unit: (C) = (A ÷ B)	40.00	10.00	30.00	80.00

(iii)   Statement of Distribution of cost

		Amount (`)	Amount (`)
1.	Value of units completed and transferred (35,000 units × ` 80)		28,00,000
2.	Value of Abnormal Loss:		
	- Materials (1,000 units × ` 40)	40,000	
	- Labour (800 units × ` 10)	8,000	
	- Overheads (800 units × ` 30)	24,000	72,000
3.	Value of Closing W-I-P:		
	- Materials (2,000 units × ` 40)	80,000	
	- Labour (1,600 units × ` 10)	16,000	
	- Overheads (1,600 units × ` 30)	48,000	1,44,000

(iv)   Process-I A/c

Particulars	Units	(`)	Particulars	Units	(`)
To Opening W.I.P:			By Normal Loss (`20 × 2,000 units)	2,000	40,000
- Materials	2,000	80,000	By Abnormal loss	1,000	72,000
- Labour	--	15,000	By Process-I A/c	35,000	28,00,000
- Overheads	--	45,000	By Closing WIP	2,000	1,44,000
To Materials introduced	38,000	14,80,000			
To Direct Labour		3,59,000			
To Overheads		10,77,000			
	40,000	30,56,000		40,000	30,56,000

Normal Loss A/c

Particulars	Units	(`)	Particulars	Units	(`)
To Process-I A/c	2,000	40,000	By Cost Ledger Control A/c	2,000	40,000
	2,000	40,000		2,000	40,000

Abnormal Loss A/c

Particulars	Units	(`)	Particulars	Units	(`)
To Process-I A/c	1,000	72,000	By Cost Ledger Control A/c	1,000	20,000
			By Costing Profit & Loss A/c		52,000
	1,000	72,000		1,000	72,000

Question 2

Aditya Agro Ltd. mixes powdered ingredients in two different processes to produce one product.

The output of Process- I becomes the input of Process -II and the output of Process-II is transferred to the Packing department.

From the information given below, you are required to PREPARE accounts for Process-I, Process-II and Abnormal loss/ gain A/c to record the transactions for the month of February 20X9.

Process-I

Input:	
Material A	6,000 kilograms at Rs. 50 per kilogram
Material B	4,000 kilograms at Rs. 100 per kilogram
Labour	430 hours at Rs. 50 per hour
Normal loss	5% of inputs. Scrap are disposed off at Rs.16 per kilogram

Output	9,200 kilograms.

There is no work- in- process at the beginning or end of the month.

Process-II

Input:	
Material C	6,600 kilograms at Rs. 125 per kilogram
Material D	4,200 kilograms at Rs. 75 per kilogram
Flavouring Essence	Rs. 3,300
Labour	370 hours at Rs.50 per hour
Normal loss	5% of inputs with no disposal value
Output	18,000 kilograms.

There is no work-in-process at the beginning of the month but 1,000 kilograms in process at the end of the month and estimated to be only 50% complete so far as labor and overhead were concerned. Overhead of Rs. 92 ,000 incurred to be absorbed on the basis of labor hours. (MTP 10 Marks March '19 & Sep '23)

Answer 2

Process-I A/c

Particulars	Qty. (kgs)	Amount	Particulars	Qty. (kgs)	Amount (Rs.)
To Material A	6,000	3,00,000	By Normal loss	500	8,000
To Material B	4,000	4,00,000	By Process-II A/c	9,200	7,38,857
To Labour	-	21,500	By Abnormal loss A/c	300	24,093
To Overhead $\dfrac{Rs.\,92,000 \times 430 hrs}{800 hrs}$	--	49,450			
	10,000	7,70,950		10,000	7,70,950

$$*\frac{\{(Rs.3,00,000+Rs.4,00,000+Rs.21,500+Rs.49,450)-Rs.8,000)\}}{(10,000-500)units} = \frac{Rs.7,70,950-Rs.8,000}{9,500 units} = Rs.\ 80.3105$$

Process-II A/c

Particulars	Qty. (kgs)	Amount (Rs.)	Particulars	Qty. (kgs)	Amount (Rs.)
To Process-I A/c	9,200	7,38,857	By Normal loss	1,000	--
To Material C	6,600	8,25,000	By Packing Dept. A/c (See the working notes)	18,000	18,42,496
To Material D	4,200	3,15,000	By WIP A/c (See the working notes)	1,000	1,00,711
To Flavouring essence	--	3,300			
To Labour	--	18,500			
To Overheads $\dfrac{Rs.92,000 \times 370 hrs}{800 hrs}$	--	42,550			
	20,000	19,43,207		20,000	19,43,207

Abnormal loss A/c

Particulars	Qty. (kgs)	Amount (Rs.)	Particulars	Qty. (kgs)	Amount (Rs.)
T o Process-I A/c	300	24,093	By Bank	300	4,800

			By Costing Profit & Loss A/c	--	19,293
	300	**24,093**		**300**	**24,093**

Working Notes:

Calculation of Equivalent Production units

Input	Units	Output	Units	Process-I		Mat-C & D		Labour & OH	
				(%)	Units	(%)	Units	(%)	Units
	9,200	Transferred to Packing.	18,000	100	18,000	100	18,000	100	18,000
Mat-C	6,600	Closing WIP	1,000	100	1,000	100	1,000	50	500
Mat-D	4,200	Normal loss	1,000	--	--	--	--	--	--
	20,000		20,000		19,000		19,000		18,500

Calculation of Unit cost			
Cost component	Amount (Rs.)	Equivalent units	Cost per unit (Rs.)
Transferred-in	7,38,857	19,000	38.8872
Material-C	8,25,000	19,000	43.4211
Material-D	3,15,000	19,000	16.5789
Flavouring essence	3,300	19,000	0.1737
Total Material Cost	18,82,157	19,000	99.0609
Labour	18,500	18,500	1.0000
Overheads	42,550	18,500	2.3000
Total Cost	**19,43,207**		**102.3609**

Value of Materials transferred to Packing Department

= 18,000 unit × Rs.102.3609 = 18,42,496

Value of WIP: For Materials- 1,000 units × Rs.99.0609

Rs.99,061

For Labour & Overheads 500 units × Rs.3.30=   Rs.1,650

Rs.1,00,711

Question 3

The following are the details in respect of Process A and Process B of a processing factory:

	Process A (₹)	Process B (₹)
Materials	40,000	--
Labour	40,000	56,000
Overheads	16,000	40,000

The output of Process A is transferred to Process B at a price calculated to give a profit of 20% on the transfer price and the output of Process B is charged to finished stock at a profit of 25% on the transfer price. The finished stock department realized ₹ 4,00,000 for the finished goods received from Process B. PREPARE process accounts and CALCULATE total profit, assuming that there was no opening or closing work-in-progress. (MTP March '18, 5 Marks)

Answer 3

Process A Account

Dr.   Cr.

	₹		₹
To Materials	40,000	By Process B A/c (Transfer to Process B)	1,20,000
To Labour	40,000		
To Overheads	16,000		
	96,000		
To Profit (20% of transfer price, i.e., 25% of cost)	24,000		
	1,20,000		1,20,000

Process B Account

Dr.   Cr.

	₹		₹
To Process A A/c (Transferred from Process A)	1,20,000	By Finished Stock A/c (Transfer to finished stock)	2,88,000
To Labour	56,000		
To Overhead	40,000		
	2,16,000		
To Profit (25% of transfer price i.e., 33.33% of cost)	72,000		
	2,88,000		2,88,000

Statement of Total Profit

	₹
Profit from Process A	24,000
Profit from Process B	72,000
Profit on Sales (₹ 4,00,000 – ₹ 2,88,000)	1,12,000
Total Profit	2,08,000

Question 4

The M-Tech Manufacturing Company is presently evaluating two possible processes for the manufacture of a toy. The following information is available:

Particulars	Process A (Rs.)	Process B (Rs.)
Variable cost per unit	12	14
Sales price per unit	20	20
Total fixed costs per year	30,00,000	21,00,000
Capacity (in units)	4,30,000	5,00,000
Anticipated sales (Next year, in units)	4,00,000	4,00,000

SUGGEST:

1. Which process should be chosen?
2. Would you change your Answer as given above, if you were informed that the capacities of the two processes are as follows:

A - 6,00,000 units; B - 5,00,000 units? STATE the reason?   (MTP Aug. '18, 5 Marks)

Answer 4

(1) Comparative Profitability Statements		
Particulars	Process- A (Rs.)	Process- B (Rs.)
Selling Price per unit	20.00	20.00
Less: Variable Cost per unit	12.00	14.00
Contribution per unit	8.00	6.00

Total Contribution	32,00,000	24,00,000
	(Rs. 8 × 4,00,000)	(Rs. 6 × 4,00,000)
Less: Total fixed costs	30,00,000	21,00,000
Profit	2,00,000	3,00,000
*Capacity (units)	4,30,000	5,00,000
Total Contribution at full capacity	34,40,000	30,00,000
	(Rs. 8×4,30,000)	(Rs. 6×5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	4,40,000	9,00,000

Process- B should be chosen as it gives more profit as compared to Process-A.

(2)

Particulars	Process- A (Rs.)	Process- B (Rs.)
*Capacity (units)	6,00,000	5,00,000
Total contribution	48,00,000	30,00,000
	(Rs. 8 × 6,00,000)	(Rs. 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	18,00,000	9,00,000

If the capacity of the Process A and B is 6,00,000 units and 5,00,000 units respectively then Process-A is giving double profit than Process C. Thus Process A be chosen.

*Note: It is assumed that capacity produced equals sales.

Question 5

The following information relate to Process A:

(i)	**Opening Work-in-Process**	**8,000 units at Rs.15,00,000**
	Degree of Completion:	
	Material	**100%**
	Labour and Overhead	**60%**
(ii)	**Input 1,82,000 units at**	**Rs.1,47,50,000**
(iii)	**Wages paid**	**Rs.68,12,000**
(iv)	**Overheads paid**	**Rs.34,06,000**
(v)	**Units scrapped**	**14,000**
	Degree of Completion: Material	**100%**
	Wages and Overheads	**80%**
(vi)	**Closing Work - in- Process**	**18,000 units**
	Degree of Completion: Material	**100%**
	Wages and Overheads	**70%**

(vii)   Units completed and transferred to next process 1,58,000 units

(viii)   Normal loss 10% of total input including opening WIP

(ix)   Scrap value is Rs.15 per unit to be adjusted out of direct material cost

You are required to COMPUTE on the basis of FIFO

(i)   Equivalent Production

(ii)   Cost per unit

(iii)   Value of units transferred to next process. (MTP Oct '18, 10 Marks, RTP Nov 19) (Same concepts different figures MTP 10 Marks Apr'21)

Answer 5

(i)   Statement of Equivalent Production (FIFO Method)

Input		Output		Equivalent Production			
Particulars	Units	Particulars	Units	Material		Labour & Overheads	
				(%)	Units	(%)	Units
Opening WIP	8,000	Transfer to next Process:					
Introduced	1,82,000	Opening WIP completed	8,000	--	--	40	3,200
		Introduced & completed	1,50,000	100	1,50,000	100	1,50,000
		Normal loss 10% (8,000 + 182,000)	19,000	--	--	--	--
		Abnormal gain	(5,000)	100	(5,000)	100	(5,000)
		Closing WIP	18,000	100	18,000	70	12,600
	1,90,000		1,90,000		1,63,000		1,60,800

(ii)   Computation of Cost per unit

Particulars	Materials (Rs.)	Labour (Rs.)	Overhead (Rs.)
Input of Materials	1,47,50,000	--	--
Expenses	--	68,12,000	34,06,000
Total	1,47,50,000	68,12,000	34,06,000
Less: Sale of Scrap (19,000 units × Rs.15)	(2,85,000)	--	--
Net cost	1,44,65,000	68,12,000	34,06,000
Equivalent Units	1,63,000	1,60,800	1,60,800
Cost Per Unit	88.7423	42.3632	21.1816

Total cost per unit = ₹ (88.7423 + 42.3632 + 21.1816) = ₹ 152.2871

(iii)   Value of units transferred to next process:

	Amount (Rs.)	Amount (Rs.)
Opening W-I-P	15,00,000.00	
Add: Labour (3,200 units × Rs. 42.3632)	1,35,562.24	
Overhead (3,200 units × Rs. 21.1816)	67,781.12	17,03,343.36
New introduced (1,50,000 units × Rs. 152.2871)		2,28,43,065.00
		2,45,46,408.36

Question 6

G K Ltd. produces a product "XYZ" which passes through two processes, viz. Process-A and Process-B. The details for the year ending 31st March, 2020 are as follows:

	Process A	Process - B
40,000 units introduced at a cost of	Rs. 3,60,000	-
Material consumed	Rs. 2,42,000	2,25,000
Direct wages	Rs. 2,58,000	1,90,000
Manufacturing expenses	Rs. 1,96,000	1,23,720
Output in units	37,000	27,000
Normal wastage of inputs	5%	10%
Scrap value (per unit)	Rs. 15	20
Selling price (per unit)	Rs. 37	61

Additional Information:

(a) **80% of the output of Process-A, was passed on to the next process and the balance was sold. The entire output of Process- B was sold.**

(b) **Indirect expenses for the year was Rs. 4,48,080.**

(c) **It is assumed that Process-A and Process-B are not responsibility centre.**
    Required:

(i) **PREPARE Process-A and Process-B Account.**

(ii) **PREPARE Costing Profit & Loss Account showing the net profit/ net loss for the year. (MTP 10 Marks May '20 & Oct '23)**

Answer 6

(i) Process- A Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Inputs	40,000	3,60,000	By Normal wastage (2,000 units × Rs.15)	2,000	30,000
To Material	---	2,42,000	By Abnormal loss A/c (1,000 units × Rs.27)	1,000	27,000
To Direct wages	---	2,58,000	By Process- B (29,600 units × Rs.27)	29,600	7,99,200
To Manufacturing Exp.	---	1,96,000	By Profit & Loss A/c (7,400 units × Rs.27)	7,400	1,99,800
	40,000	10,56,000		40,000	10,56,000

Cost per unit = Rs. 10,56,000- Rs. 30,000 / 40,000units -2,000 units = Rs. 27 per unit

Normal wastage = 40,000 units × 5% = 2,000 units

Abnormal loss = 40,000 units – (37,000 units + 2,000 units) = 1,000 units Transfer

to Process- B = 37,000 units × 80% = 29,600 units

Sale = 37,000 units × 20% = 7,400 units

Process- B Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	29,600	7,99,200	By Normal wastage (2,960 units × Rs. 20)	2,960	59,200
To Material	---	2,25,000	By Profit & Loss A/c (27,000 units × Rs. 48)	27,000	12,96,000
To Direct Wages	---	1,90,000			
To Manufacturing Exp.	---	1,23,720			
	360	17,280			
To Abnormal Gain A/c (360 units × Rs. 48)	29,960	13,55,200		29,960	13,55,200

Cost per unit = Rs. 13,37,920-Rs.59,200 / 29,600 units – 2,960 units = Rs. 48 per unit

Normal wastage = 29,600 units × 10% = 2,960 units

Abnormal gain = (27,000 units + 2,960 units) – 29,600 units = 360 units

(ii) Costing Profit & Loss Account

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
To Process- A A/c	1,99,800	By Sales:	2,73,800
To Process- B A/c	12,96,000	- Process-A (7,400 units × Rs. 37)	16,47,000

To Abnormal loss A/c	12,000	- Process- B	10,080
		(27,000 units × Rs. 61)	
To Indirect Expenses	4,48,080	By Abnormal gain	25,000
	19,55,880	By Net loss	19,55,880

Working Notes: **Normal wastage (Loss) Account**

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	2,000	30,000	By Abnormal Gain A/c (360 units × Rs. 20)	360	7,200
To Process- B A/c	2,960	59,200	By Bank (Sales)	4,600	82,000
	4,960	89,200		4,960	89,200

Abnormal Loss Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Process- A A/c	1,000	27,000	By Bank A/c	1,000	15,000
			(1,000 units × Rs. 15)		
			By Profit & Loss A/c	---	12,000
	1,000	27,000		1,000	27,000

Abnormal Gain Account

Particulars	Units	Amount (Rs.)	Particulars	Units	Amount (Rs.)
To Normal loss A/c (360 units × Rs. 20)	360	7,200	By Process- B A/c	360	17,280
To Profit & Loss A/c		10,080			
	360	17,280		360	17,280

Question 7

'Healthy Sweets' is engaged in the manufacturing of jiggery. Its process involve sugarcane crushing for juice extraction, then filtration and boiling of juice along with some chemicals and then letting it cool to cut solidified jaggery blocks.

The main process of juice extraction (Process – I) is done in conventional crusher, which is then filtered and boiled (Process – II) in iron pots. The solidified jaggery blocks are then cut, packed and dispatched. For manufacturing 10 kg of jaggery, 100 kg of sugarcane is required, which extracts only 45 litre of juice.

Following information regarding Process – I has been obtained department of *Healthy Sweets* for the month of January, 2020:	from the manufacturing
	(₹)
Opening work-in process (4,500 litre)	
Sugarcane	50,000
Labour	15,000
Overheads	45,000
Sugarcane introduced for juice extraction (1,00,000 kg)	5,00,000
Direct Labour	2,00,000
Overheads	6,00,000
Abnormal Loss: 1,000 kg	
Degree of completion:	
Sugarcane	100%

Labour and overheads	**80%**

Closing work-in process: 9,000 litre Degree of completion:

Sugarcane	**100%**
Labour and overheads	**80%**

Extracted juice transferred for filtering and boiling: 39,500 litre (Consider mass of 1 litre of juice equivalent to 1 kg)

You are required to PREPARE using average method:

    (i) Statement of equivalent production,

    (ii) Statement of cost,

    (iii) Statement of distribution cost, and

    (iv) Process-I Account. [MTP 10 Marks Oct '20, Old & New SM)

Answer 7

    (i) Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Sugarcane		Labour & O.H.	
				%	Units	%	Units
Opening WIP	4,500	Completed and transferred to Process - II	39,500	100	39,500	100	39,500
Units introduced	1,00,000	Normal Loss (55%* of 1,00,000)	55,000	--	--	--	--
		Abnormal loss	1,000	100	1,000	80	800
		Closing WIP	9,000	100	9,000	80	7,200
	1,04,500		1,04,500		49,500		47,500

* 100 kg of sugarcane extracts only 45 litre of juice. Thus, normal loss = 100 – 45 = 55%

    (ii) Statement showing cost for each element

Particulars	Sugarcane (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	50,000	15,000	45,000	1,10,000
Cost incurred during the month	5,00,000	2,00,000	6,00,000	13,00,000
Total cost: (A)	5,50,000	2,15,000	6,45,000	14,10,000
Equivalent units: (B)	49,500	47,500	47,500	
Cost per equivalent unit: (C) = (A ÷ B)	11.111	4.526	13.579	29.216

    (iii) Statement of Distribution of cost

		Amount (₹)	Amount (₹)
1.	Value of units completed and transferred (39,500 units × ₹ 29.216)		11,54,032
2.	Value of Abnormal Loss:		
	- Sugarcane (1,000 units × ₹ 11.111)	11,111	
	- Labour (800 units × ₹ 4.526)	3,621	
	- Overheads (800 units × ₹ 13.579)	10,863	25,595
3.	Value of Closing W-I-P:		
	- Sugarcane (9,000 units × ₹ 11.111)	99,999	

-	Labour (7,200 units × ₹ 4.526)	32,587	
-	Overheads (7,200 units × ₹ 13.579)	97,769	2,30,355

(iv) Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:			By Normal Loss	55,000	--
- Sugarcane	4,500	50,000	By Abnormal loss (₹25,595 + ₹18	1,000	25,613
			(difference due to approximation))		
- Labour	--	15,000	By Process-II A/c	39,500	11,54,032
- Overheads	--	45,000	By Closing WIP	9,000	2,30,355
To Sugarcane introduced	100,000	5,00,000			
To Direct Labour		2,00,000			
To Overheads		6,00,000			
	104,500	14,10,000		104,500	14,10,000

Question 8

MP Ltd. produces a Product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of Rs. 85 per unit, product Z is produced. The information related for the month of September 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Materials added	62,000	1,36,000	84,200
Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is Rs. 2,88,000, which is absorbed as a percentage of direct wages.

The scraps are sold at Rs. 10 per unit

Product-Z can be sold at Rs. 135 per unit with a selling cost of Rs. 15 per unit No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600 There is no stock at the beginning and end of the month.

You are required to PREPARE accounts for:

(i) Process-I, II and III

(ii) By-Product-Z (MTP 10 Marks March '21, RTP Nov'20)

Answer 8

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

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

(i) **Process-I A/c**

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000 units)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of Rs.42,000)	-	84,000			
	7,000	3,42,000		7,000	3,42,000

*Cost per Unit = $\frac{Rs.(3,42,000-3,500)}{(7,000-350)Units}$ = Rs.50.9022

Process-II A/c

Particulars	Units	Amt.(Rs.)	Particulars	Units	Amt.(Rs.)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600 units)	660	6,600
To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of Rs.54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

*Cost per Unit = $\frac{Rs.(6,49,955-6,600)}{(6,600-660)Units}$ = Rs. 108.3089

Process-III A/c

Particulars	Units	Amt. (Rs.)	Particulars	Units	Amt. (Rs.)
To Process-I A/c	5,200	5,63,206	By Normal loss (5% of 5,200 units)	260	2,600
To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z#	600	21,000
To Production OH (200% of Rs.48,000)	-	96,000	(Rs.35 × 600 units)		
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

***Cost per Unit = $\frac{Rs.(8,05,406-2,600-21,000)}{(5,200-260-660)Units}$ = Rs. 180.1396

Realizable 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

Question 9

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 5 Marks, April '21)

Answer 9

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:

=0.5/500 × 990 = 0.99 kg.

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

Question 10

Navyug Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses a FIFO process costing system to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of the paper files containing records of the process operations for the month.

Navyug Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

• **Opening work-in-process at the beginning of the month was 900 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 29,970.**

- **Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.**
- **Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.**
- **Output sent to finished goods warehouse was 4,200 litres.**
- **Losses have a scrap value of ₹ 20 per litre.**
- **All raw materials are added at the commencement of the process.**
- **The cost per equivalent unit (litre) is ₹39 for the month made up as follows:**

	(₹)
Raw Material	23
Labour	7
Overheads	9
	39

REQUIRED:

(i) Calculate the quantity (in litres) of raw material inputs during the month.

(ii) Calculate the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month.

(iii) Calculate the values of raw material, labour and overheads added to the process during the month.

(iv) Prepare the process account for the month. (MTP 10 Marks Oct '21, RTP May'18) (Same concept different figures RTP May'20)

Answer 10

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	900	Transfer to Finished Goods	4,200
Raw material input (balancing figure)	5,260	Process Losses	1,800
		Closing WIP	160
	6,160		6,160

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

Particulars	Litres
Total process losses for month	1,800
Normal Loss (10% input)	526
Abnormal Loss (balancing figure)	1,274

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	₹ 23.00	₹ 7.00	₹ 9.00
Equivalent units (litre) (refer the working note)	4,734	4,892	4,966
Cost of equivalent units	₹ 1,08,882	₹ 34,244	₹ 44,694
Add: Scrap value of normal loss (526 units × ₹ 20)	₹ 10,520	--	--
Total value added	₹ 1,19,402	₹ 34,244	₹ 44,694

Workings: Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Material Units	Material (%)	Labour Units	Labour (%)	Overheads Units	Overheads (%)
Opening WIP	900	Units completed:							

			Output	Materials		Labour		Overheads	
Units introduced	5,260	- Opening WIP	900	--	--	270	30	360	40
		- Fresh inputs	3,300	3,300	100	3,300	100	3,300	100
		Normal loss	526	--	--	--	--	--	--
		Abnormal loss	1,274	1,274	100	1,274	100	1,274	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,734		4,892		4,966	

(iv) Process Account for Month

	Litres	Amount (₹)		Litres	Amount (₹)
To Opening WIP	900	29,970	By Finished goods	4,200	1,63,800
To Raw Materials	5,260	1,19,402	By Normal loss	526	10,520
To Wages	--	34,244	By Abnormal loss	1,274	49,686
To Overheads	--	44,694	By Closing WIP	160	4,304
	6,160	2,28,310		6,160	2,28,310

Question 11

Following information is available regarding process A for the month of October, 2021:

Production Record:

Units in process as on 01.10.2021	8,000
(All materials used, 25% complete for labour and overhead)	
New units introduced	32,000
Units completed	28,000
Units in process as on 31.10.2021	12,000
(All materials used, 33-1/3% complete for labour and overhead)	
Cost Records:	
Work-in-process as on 01.10.2021	(₹)
Materials	12,00,000
Labour	2,00,000
Overhead	2,00,000
	16,00,000
Cost during the month	
Materials	51,20,000
Labour	30,00,000
Overhead	30,00,000
	1,11,20,000

Presuming that average method of inventory is used, PREPARE:

(i) Statement of Equivalent Production.

(ii) Statement showing Cost for each element.

(iii) Statement of Apportionment of cost.

(iv) Process Cost Account for Process A. *(MTP 10 Marks Nov '21, RTP May '19, Old & New SM) (Same concept different figures RTP Nov'21)*

Answer 11

(i) Statement of Equivalent Production (Average cost method)

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%*)	Units**	(%)*	Units**	(%)*	Units**

40,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	WIP	12,000	100	12,000	33-1/3	4,000	33-1/3	4,000
40,000		40,000		40,000		32,000		32,000

*Percentage of completion   ** Equivalent units

(ii)   Statement showing Cost for each element

Particulars	Materials	Labour	Overhead	Total
Cost of opening work-in-progress (₹)	12,00,000	2,00,000	2,00,000	16,00,000
Cost incurred during the month (₹)	51,20,000	30,00,000	30,00,000	1,11,20,000
Total cost (₹) : (a)	63,20,000	32,00,000	32,00,000	1,27,20,000
Equivalent units : (B)	40,000	32,000	32,000	
Cost per equivalent unit (₹) : C= (A ÷ B)	158	100	100	358

(iii)   Statement of Apportionment of cost

	(₹)	(₹)
Value of output transferred: (A) (28,000 units × ₹ 358)		1,00,24,000
Value of closing work-in-progress: (B)		
Material (12,000 units × ₹158)	18,96,000	
Labour (4,000 units × ₹ 100)	4,00,000	
Overhead (4,000 units × ₹ 100)	4,00,000	26,96,000
Total cost : (A + B)		1,27,20,000

(iv)   Process- A Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening WIP	8,000	16,00,000	By Completed units	28,000	1,00,24,000
To Materials	32,000	51,20,000	By Closing WIP	12,000	26,96,000
To Labour		30,00,000			
To Overhead		30,00,000			
	40,000	1,27,20,000		40,000	1,27,20,000

Question 12

Chill Ltd. uses process costing to manufacture water density sensor for hydro sector. The following information pertains to operations for the month of February:

Particulars	Units
Beginning WIP, February 1	22,400
Started in production during February	1,40,000
Completed production during February	1,28,800
Ending work in progress, February 28	33,600

The beginning work in progress was 50% complete for materials and 30% complete for conversion costs. The ending inventory was 80% complete for material and 30% complete for conversion costs.

Costs pertaining to the month of February are as follows:

Beginning inventory costs are material ₹ 1,38,350, direct labour ₹ 1,50,600 and factory overhead ₹ 63,600

Cost incurred during February are material ₹ 23,95,000, direct labour ₹ 9,14,400, factory overheads ₹ 19,55,800.

CALCULATE:

(i)   Using the FIFO method, the equivalent units of production for material.

(ii)   Cost per equivalent unit for conversion cost. (MTP 5 Marks March '22, Old & New SM)

Answer 12

i.   Calculation of equivalent units of production:

Input Details	Units	Output Particulars	Units	Material %	Material Units	Conversion cost %	Conversion cost Units
Beginning WIP	22,400	From beginning WIP	22,400	50	11,200	70	15,680
Unit Introduced	1,40,000	Completed output	1,06,400	100	1,06,400	100	1,06,400
		Closing W-I-P	33,600	80	26,880	30	10,080
Total	1,62,400	Total	1,62,400		1,44,480		1,32,160

ii.   Calculation of cost per equivalent unit for conversion costs

Particulars	
Direct labour	₹ 9,14,400
Factory overheads	₹ 19,55,800
Total	₹ 28,70,200
Equivalent units	1,32,160 units
Cost per equivalent unit	₹ 21.72

Question 13

WHAT is inter-process profit? STATE its advantages and disadvantages. (MTP 4 Marks Mar'22)

Answer 13

Inter-Process Profit: To control cost and to measure performance, different processes within an organization are designated as separate profit centres. In this type of organizational structure, the output of one process is transferred to the next process not at cost but at market value or cost plus a percentage of profit. The difference between cost and the transfer price is known as inter - process profits. The advantages and disadvantages of using inter-process profit, in the case of process type industries are as follows:

Advantages:

1.   Comparison between the cost of output and its market price at the stage of completion is facilitated.

2.   Each process is made to stand by itself as to the profitability.

Disadvantages:

1.   The use of inter-process profits involves complication.

2.   The system shows profits which are not realised because of stock not sold out.

Question 14

A Manufacturing unit manufactures a product which passes through three distinct Processes - A, B and C. The following data is given:

	Process A	Process B	Process C
Material consumed (in ₹)	36,400	31,500	28,000
Direct wages (in ₹)	56,000	49,000	42,000

- **The total Production Overhead of ₹ 2,20,500 was recovered @ 150% of Direct wages.**

- **15,000 units at ₹ 28 each were introduced to Process 'A'.**

- **The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process ' C'.**

- **No stock of materials or work in progress was left at the end. The following additional information is given:**

Process	% of wastage to normal input	Value of Scrap per unit (₹)
A	6%	15.40
B	?	28.00
C	5%	14.00

You are required to:

(i) **FIND OUT the percentage of wastage in process 'B', given that the output of Process 'B' is transferred to Process 'C' at ₹ 56 per unit.**

(ii) **PREPARE Process accounts for all the three processes A, B and C. (10 Marks April '22) (Same concept different figures PYP 10 Marks July 21)**

Answer 14

Dr.   **Process-A Account**   **Cr.**

	Particulars	Units	(₹)		Particulars	Units	(₹)
To	Material introduced	15,000	4,20,000	By	Normal Loss A/c [(6% of 15,000 units) x ₹ 15.40]	900	13,860
"	Additional material	--	36,400	"	Process-B A/c (₹ 41.31* × 14,100 units)	14,100	5,82,540
"	Direct wages	--	56,000				
"	Production OH	--	84,000				
		15,000	5,96,400			15,000	5,96,400

* Cost per unit of completed units

$$= \frac{Total\ Cost - Realisable\ value\ from\ normal\ loss}{Inputs\ units - Normal\ loss\ units} = \frac{Rs.5,96,400 - Rs.13,860}{15,000\ units - 900\ units} = Rs.\ 41.31$$

15,000 units - 900 units

Dr.   **Process-B Account**   **Cr.**

	Particulars	Units	(₹)		Particulars	Units	(₹)
To	Process-A A/c	14,100	5,82,540	By	Normal Loss A/c [(#13.44% of 14,100 units) x ₹ 28]	1,895	53,060
"	Additional material	--	31,500	"	Process-C A/c (₹ 56 × 12,205 units)	12,205	6,83,480
"	Direct wages	--	49,000				
"	Production OH	--	73,500				
		14,100	7,36,540			14,100	7,36,540

#Calculation for % of wastage in process 'B':

Let's consider number of units lost under process 'B' = b

Now, Total Cost - Realisable value from normal loss / Inputs units - Normal loss units = 56

$\frac{Rs.7,36,540 - Rs.28b}{14,100\ units - b}$ = Rs. 56

₹ 7,36,540 - ₹ 28b = ₹ 7,89,600 - ₹ 56b

28b = ₹ 53,060 => b = 1,895 units
% of wastage = 1,895 units /14,100 units = 13.44%

Dr.   **Process-C Account**   **Cr.**

	Particulars	Units	(₹)		Particulars	Units	(₹)
To	Process-B A/c	12,205	6,83,480	By	Normal Loss A/c [(5% of 12,205 units) x ₹ 14]	610	8,540
"	Additional material	--	28,000	"	Finished Stock A/c (₹ 69.68$ × 12,000 units)	12,000	8,36,160
"	Direct wages	--	42,000				
"	Production OH	--	63,000				
"	Abnormal gain (₹ 69.68$ × 405 units)	405	28,220				
		12,610	8,44,700			12,610	8,44,700

Cost per unit of completed units

$= \frac{Total\ Cost - Realisable\ value\ from\ normal\ loss}{Input\ units - Normal\ loss\ units} = \frac{Rs.8,16,480 - Rs.8,540}{12,205\ units - 610\ units}$ = Rs. 69.68

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

It was a practical problem on process costing which required the examinees to prepare process accounts and also find the percentage of wastage in process Y. Very few examinees answered the question in the correct line. Most of the examinees could not calculate the percentage of wastage correctly. Average performance was observed.

Question 15

The following data are available in respect of Process-I for January 20X9:

(1) Opening stock of work in process: 600 units at a total cost of Rs. 4,20,000.

(2) Degree of completion of opening work in process:

Material	100%
Labour	60%
Overheads	60%

(3) Input of materials at a total cost of Rs.55,20,000 for 9,200 units.

(4) Direct wages incurred Rs.18,60,000

(5) Production overhead Rs.8,63,000.

(6) Units scrapped 200 units. The stage of completion of these units was:

Materials	100%

Labour	80%
Overheads	80%

(7) Closing work in process; 700 units. The stage of completion of these units was:

Material	100%
Labour	70%
Overheads	70%

(8) 8,900 units were completed and transferred to the next process.

(9) Normal loss is 4% of the total input (opening stock plus units put in)

(10) Scrap value is Rs.60 per unit. You are required to:
   (i) COMPUTE equivalent production,
   (ii) CALCULATE the cost per equivalent unit for each element.
   (iii) CALCULATE the cost of abnormal loss (or gain), closing work in process and the units transferred to the next process using the FIFO method. (10 Marks April '19) (Same concept different figures MTP 10 Marks Oct'22)

Answer 15

(i)   (FIFO Method)

Input		Output		Equivalent Production					
				Materials		**Labour**		**Production Overhead**	
Details	**Units**	**Details**	**Units**	**%**	**Units**	**%**	**Units**	**%**	**Units**
Opening Stock	600	From opening stock	600	-	-	40	240	40	240
		- From fresh materials	8,300	100	8,300	100	8,300	100	8,300
		Closing W-I-P	700	100	700	70	490	70	490
Fresh inputs	9,200	Normal loss	392	-	-	-	-	-	-
			9,992		9,000		9,030		9,030
		Less: Abnormal Gain	(192)	100	(192)	100	(192)	100	(192)
	9,800		9,800		8,808		8,838		8,838

(ii)   Statement of Cost per equivalent units

Elements	(Rs.)	Cost (Rs.)	Equivalent units (EU)	Cost per EU (Rs.)
Material Cost	55,20,000			
Less: Scrap realisation 392 units @ Rs. 60/- p.u.	(2,3520)	54,96,480	8,808	624.03
Labour cost		18,60,000	8,838	210.45
Production OH Cost		8,63,000	8,838	97.65
Total Cost		82,19,480		932.13

(iii)   Cost of Abnormal Gain – 192 Units

	(Rs.)	(Rs.)
Material cost of 192 units @ Rs. 624.03 p.u.	1,19,813.76	
Labour cost of 192 units @ Rs. 210.45 p.u.	40,406.40	
Production OH cost of 192 units @ Rs. 97.65 p.u.	18,748.80	1,78,968.96

Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ Rs. 624.03 p.u.	4,36,821.00	
Labour cost of 490 equivalent units @ Rs. 210.45 p.u.	1,03,120.50	
Production OH cost of 490 equivalent @ Rs. 97.65 p.u.	47,848.50	5,87,790.00

Cost of 8,900 units transferred to next process

(i) Cost of opening W-I-P Stock b/f –600 units	4,20,000.00
(ii) Cost incurred on opening W-I-P stock	
Material cost	–
Labour cost 240 equivalent units @ Rs. 210.45 p.u.	50,508.00
Production OH cost 240 equivalent units @ Rs 97.65 p.u	. 23,436.00
	4,93,944.00
(iii) Cost of 8,300 completed units	
8,300 units @ Rs. 932.13 p.u.	77,36,679.00
Total cost [(i) + (ii) + (iii))]	86,50,623.00

Question 16

XYZ Ltd. is manufacturer of medicines. It carries on production operation in two processes. The material first passes through Process I, where Medicine ' X' is produced. Following data are given for the month October, 2022:

Opening work-in-progress quantity (Material 100% and conversion 50% complete)	(in Liter)	12,000
Material input quantity	(in Liter)	60,000
Work completed quantity	(in Liter)	40,000
Closing work-in-progress quantity (Material 100% and conversion 80% complete)	(in Liter)	15,000
Opening work-in-progress cost		
Material cost	(in ₹)	1,75,000
Processing cost	(in ₹)	1,40,000
Material input cost	(in ₹)	7,70,000
Processing cost	(in ₹)	8,35,000

Normal process loss is 15% of material input. It has no realizable value.

Any quantity of Medicine 'X' can be sold for ₹ 42.50 per Liter. Alternatively, it can be transferred to Process II for further processing and then sold as Medicine ' XYZ' for ₹ 50 per Liter. Further materials are added in Process II, which yield 1.25 Liter of Medicine ' XYZ' for every Liter of Medicine 'X' of Process I. Out of the 40,000 Liter of work completed in Process I, 10,000 Liter are sold as Medicine 'X' and 30,000 Liter are passed through Process II for sale as Medicine 'XYZ'.

The monthly costs incurred in Process II (other than the cost of Medicine ' X') are:

Input	30,000 Liter of Medicine 'X'
Materials Cost	₹ 2,75,000
Processing Costs	₹ 2,50,000

You are required to:

(i) **PREPARE Statement of Equivalent production and determine the cost per Liter of Medicine 'X' in Process I, using the weighted average cost method.**

(ii) Company is mulling over the option to sell the 30,000 Liter of Medicine ' X' at Process-I without processing it further in Process-II. WILL IT BE beneficial for the company over the current pattern of processing 30,000 Liter in process-II? (MTP 10 Marks Sep'22)

Answer 16

(i) Process I Statement of Equivalent Production (Under Weighted Average Method)

Particulars	Input units (in Liter)	Particulars	Output units (in Liter)	Material		Conversion	
				(%)	Equivalent units (in Liter)	(%)	Equivalent units (in Liter)
Opening WIP	12,000	Units introduced and completed	40,000	100	40,000	100	40,000
New Material Introduced	60,000	Normal Loss (15% of 60,000 liters)	9,000	-	-	-	-
		Closing WIP	15,000	100	15,000	80	12,000
		Abnormal Loss (Bal. fig.)	8,000	100	8,000	100	8,000
	72,000		72,000		63,000		60,000

Statement of Cost for Each Element

Elements of Costs	Material (₹)	Conversion Cost (₹)
Costs of Opening WIP	1,75,000	1,40,000
Cost of the Process (for the period)	7,70,000	8,35,000
Total Cost	9,45,000	9,75,000
Equivalent Units (in liter)	63,000	60,000
Cost Per equivalent Units (in liter)	₹ 15	₹ 16.25

Therefore, Cost of Medicine 'X' is ₹ 31.25 per liter (₹ 15 + ₹ 16.25)

(ii) Statement showing comparative data to decide whether 30,000 Liters of Medicine 'X' should be further processed into 'XYZ'

	Alternative 1	Alternative 2
	Sell medicine 'X' afterProcess I (₹)	Process further into 'XYZ' (₹)
Sales	12,75,000 (30,000 liters x ₹ 42.50)	18,75,000 (37,500 liters x ₹ 50)
Less: Costs:		
Process I - Costs (30,000 liters x ₹ 31.25)	9,37,500	9,37,500
Material in Process II	-	2,75,000
Conversion cost in Process II	-	2,50,000
Total Cost	9,37,500	14,62,500
Profit	3,37,500	4,12,500

Hence, company should process further as it will increase profit further by ₹ 75,000 (₹ 4,12,500 − ₹ 3,37,500)

Question 17

SM Pvt. Ltd. manufactures their products in three consecutive processes. The details are as below:

	Process X	Process Y	Process Z
Transferred to next Process	60%	50%	
Transferred to warehouse for sale	40%	50%	100%

In each process, there is a weight loss of 2% and scrap of 4% of input of each process. The realizable value of scrap of each process is as below:

Process X @ ₹ 3 per ton

Process Y @ ₹ 5 per ton

Process Z @ ₹ 7 per ton.

The following particulars relate to January 2023:

	Process X	Process Y	Process Z
Materials used (in Tons)	1,500	454	189
Rate per ton	₹ 21.5	₹ 14	₹ 12
Direct Wages	₹ 5,000	₹ 3,260	₹ 2,540
Direct Expenses	₹ 3,820	₹ 2,775	₹ 1,900

PREPARE Process Accounts- X, Y and Z & calculate cost per ton at each process. (MTP 10 Marks March '23) (Same concept different figures RTP Nov'22)

Answer 17

Process X Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Materials	1,500	32,250	By Weight Loss	30	---
To Wages		5,000	By Scrap	60	180
To Direct Expenses		3,820	By Process Y	846	24,534
			By Warehouse	564	16,356
Total	1,500	41,070	Total	1,500	41,070

Cost per Ton = (41,070 - 180)/(1,500-30-60) = ₹ 29 per ton

Process Y account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process X	846	24,534	By Weight Loss	26	---
To Materials	454	6,356	By Scrap	52	260
To Wages		3,260	By Process Z	611	18,332.5
To Direct Expenses		2,775	By Warehouse	611	18,332.5
Total	1300	36,925	Total	1300	36,925

Cost per Ton = (36,925-260)/(1,300-26-52)= ₹30 per ton

Process Z Accounts

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process Y	611	18332.5	By Weight Loss	16	---
To Materials	189	2,268	By Scrap	32	224
To Wages		2,540	By Warehouse	752	24,817
To Direct Expenses		1,900			
Total	800	25,041	Total	800	25041

Cost per Ton = (25,041-224)/(800-16-32) = ₹ 33 per ton

Question 18

From the following information for the month of January, 20X9, PREPARE Process-III cost accounts.

Opening WIP in Process-III	1,600 units at ₹ 24,000
Transfer from Process-II	55,400 units at ₹ 6,23,250
Transferred to warehouse	52,200 units
Closing WIP of Process-III	4,200 units
Units Scrapped	600 units
Direct material added in Process-III	₹ 2,12,400
Direct wages	₹ 96,420
Production overheads	₹ 56,400

Degree of completion:

	Opening Stock	Closing Stock	Scrap
Material	80%	70%	100%
Labour	60%	50%	70%
Overheads	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ ₹ 5 per unit. (Students may treat material transferred from Process – II as Material – A and fresh material used in Process – III as Material B) (RTP Nov.'18)

Answer 18

Statement of Equivalent Production Process III

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material -A		Material - B		Labour & Overhead	
				%	Units	%	Units	%	Units
Opening WIP	1,600	Work on Op. WIP	1,600	-	-	20	320	40	640
Process – II Transfer	55,400	Introduced & Completed During the Month	50,600	100	50,600	100	50,600	100	50,600
		Normal Loss (5 % of 52,800 units)	2,640	-	-	-	-	-	-
		Closing WIP	4,200	100	4,200	70	2,940	50	2,100
		Abnormal Gain	(2,040)	100	(2,040)	100				

Working note:

Production units = Opening units + Units transferred from Process-II – Closing Units

= 1,600 units + 55,400 units – 4,200 units = 52,800 units

Statement of Cost

	Cost (₹)	Equivalent units	Cost per equivalent units (₹)

Material A (Transferred from previous process)	6,23,250		
Less: Scrap value of normal loss (2,640 units × ₹5)	(13,200)		
	6,10,050	52,760	11.5627
Material B	2,12,400	51,820	4.0988
Labour	96,420	51,300	1.8795
Overheads	56,400	51,300	1.0994
	9,75,270		18.6404

Statement of apportionment of Process Cost			
		Amount (₹)	Amount (₹)
Opening WIP	Material A		24,000
Completed opening	Material B (320 units × ₹ 4.0988)	1311.62	
WIP units-1600			
	Wages (640 units × ₹ 1.8795)	1202.88	
	Overheads (640 units × ₹ 1.0994)	703.62	3,218.12
Introduced &	50,600 units × ₹ 18.6404		9,43,204.24
Completed-50,600 units			
Total cost of 52,200 finished goods units			9,70,422.36
Closing WIP units- 4,200	Material A (4,200 units × ₹ 11.5627)		48,563.34
	Material B (2,940 units × ₹ 4.0988)		12,050.47
	Wages (2,100 units × ₹ 1.8795)		3,946.95
	Overheads (2,100 units × ₹ 1.0994)		2,308.74
			66,869.50
Abnormal gain units- 2,040	(2,040 units × ₹ 18.6404)		38026.42

Process III A/c

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Balance b/d	1,600	24,000	By Normal loss	2,640	13,200
To Process II A/c	55,400	6,23,250	By Finished goods	52,200	9,70,422.36
To Direct material		2,12,400	By Closing WIP	4,200	66,874.06*
To Direct wages		96,420			
To Production overheads		56,400			
To Abnormal gain	2,040	38,026.42			
	59,040	10,50,496.42		59,040	10,50,496.42

* Difference in figure due to rounding off has been adjusted with closing WIP.

Question 19

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)(Same concept but different figures RTP May'22 & Old & New SM)

Answer 19

Process I
Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Materials (%)	Materials Units	Labour (%)	Labour Units	Overheads (%)	Overheads 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 (%)	Materials Units	Labour (%)	Labour Units	Overheads (%)	Overheads 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

Question 20

EXPLAIN the term Equivalent units used in process industries. (RTP Nov.'19)

Answer 20

Equivalent Units: Equivalent units or equivalent production units, means converting the incomplete production units into their equivalent completed units. Under each process, an estimate is made of the percentage completion of work-in-process with regard to different elements of costs, viz., material, labour and overheads. It is important that the estimate of percentage of completion should be as accurate as possible. The formula for computing equivalent completed units is: For instance, if 25% of work has been done on the average of units still under process, then 200 such units will be equal to 50 completed units and the cost of work-in process will be equal to the cost of 50 finished units.

Question 21

Describe Operation costing with two examples of industries where operation costing is applied. (May'18)

Answer 21

This product costing system is used when an entity produces more than one variant of final product using different materials but with similar conversion activities. Which means conversion activities are similar for all the product variants but materials differ significantly. Operation Costing method is also known as Hybrid product costing system as materials costs are accumulated by job order or batch wise but conversion costs i.e. labour and overheads costs are accumulated by department, and process costing methods are used to assign these costs to products. Moreover, under operation costing, conversion costs are applied to products using a predetermined application rate. This predetermined rate is based on budgeted conversion costs. The two example of industries are Ready made garments and Jewellery making.

Question 22

'**Dairy Wala Private limited' is engaged in the production of flavoured milk. Its process involve filtration and boiling of milk after that some sugar, flavour, colour is added and then letting it cool to fill the product into clean and sterile bottles. For Producing 10 litre of flavour milk, 100 litre of Raw milk is required, which extracts only 45 litres of standardized milk.**

Following information regarding Process – I has been obtained from the manufacturing department of Dairy Wala Private limited for the month of December 2022:

Items	(`)
Opening work-in process (13,500 litre)	
Milk	1,50,000
Labour	45,000
Overheads	1,35,000
Milk introduced for filtration and boiling (3,00,000 litre)	15,00,000

Direct Labour	**6,00,000**
Overheads	**18,00,000**
Abnormal Loss: 3,000 litres	
Degree of completion:	
Milk	**100%**
Labour and overheads	**80%**
Closing work-in process: 27,000 litres	
Degree of completion:	
Milk	**100%**
Labour and overheads	**80%**
Milk transferred for Packing: 1,18,500 litres	
You are required to PREPARE using average method:	
(i) Statement of equivalent production,	
(ii) Statement of cost,	
(iii) Statement of distribution cost, and	
(iv) Process-I Account.	

(RTP May 23)

Answer 22

(i)   Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Milk %	Milk Units	Labour & O.H. %	Labour & O.H. Units
Opening WIP	13,500	Completed and transferred to Process-II	1,18,500	100	1,18,500	100	1,18,500
Units introduced	3,00,000	Normal Loss (55%* of 3,00,000)	1,65,000	--	--	--	--
		Abnormal loss	3,000	100	3,000	80	2400
		Closing WIP	27,000	100	27,000	80	21,600
	3,13,500		3,13,500		1,48,500		1,42,500

* 100 litre of milk extracts only 45 litre of standardized milk. Thus, normal loss = 100 – 45 = 55%

(ii)   Statement showing cost for each element

Particulars	Milk (`)	Labour (`)	Overhead (`)	Total (`)
Cost of opening work-in-process	1,50,000	45,000	1,35,000	3,30,000
Cost incurred during the month	15,00,000	6,00,000	18,00,000	39,00,000
Total cost: (A)	16,50,000	6,45,000	19,35,000	42,30,000
Equivalent units: (B)	1,48,500	1,42,500	1,42,500	
Cost per equivalent unit: (C) = (A ÷ B)	11.111	4.526	13.578	29.216

(iii)   Statement of Distribution of cost

	(`)	(`)

1. Value of units completed and transferred (1,18,500 units × `29.216)		34,62,096
2. Value of Abnormal Loss: -		
Milk (3,000 units × `11.111)	33,333	
Labour (2400 units × `4.526)	10,863	
Overheads (2400 units × `13.579)	32,590	76,786
3. Value of Closing W-I-P:		
Milk (27,000 units × `11.111)	299997	
Labour (21,600 units × `4.526)	97,762	
Overheads (21,600 units × `13.579)	2,93,306	6,91,065

(iv)   Process-I A/c

Particulars	Units	Amount (`)	Particulars	Units	Amount (`)
To Opening W.I.P:			By Normal Loss	1,65,000	--
Milk	13,500	1,50,000	By Abnormal Loss (`.44 difference due to approximation)	3,000	76,839
Labour	--	45,000	By Process-II A/c	1,18,500	34,62,096
Overheads	--	1,35,000	By Closing WIP	27,000	6,91,065
To Milk introduced	3,00,000	15,00,000			
To Direct Labour		6,00,000			
To Overheads		18,00,000			
	3,13,500	42,30,000		3,13,500	42,30,000

Question 23

The following information is furnished by ABC Company for Process - II of its manufacturing activity for the month of April 2023:

(i)   Opening Work-in-Progress – Nil

(ii)   Units transferred from Process I – 55,000 units at `3,27,800

(iii)   Expenditure debited to Process – II:

    Consumables   `1,57,200

    Labour   `1,04,000

    Overhead   `52,000

(iv)   Units transferred to Process III   – 51,000 units

(v)   Closing WIP – 2,000 units (Degree of completion):

    Consumables   80%

    Labour   60%

    Overhead   60%

(vi)   Units scrapped   - 2,000 units, scrapped units were sold at `5 per unit

(vii)   Normal loss – 4% of units introduced

You are required to:

(i)   Prepare a Statement of Equivalent Production.

(ii)   Determine the cost per unit

(iii) Determine the value of Work-in-Process and units transferred to Process – III

(RTP Nov '23)

Answer 23

(i) Statement of Equivalent Production

Input Details	Units	Output Particulars	Units	Material-A*		Consumables		Labour & Overheads	
				%	Units	%	Units	%	Units
Units transferred from Process-I	55,000	Units transferred to Process-III	51,000	100	51,000	100	51,000	100	51,000
		Normal loss (4% of 55,000)	2,200	-	-	-	-	-	-
		Closing W-I-P	2,000	100	2,000	80	1,600	60	1,200
		Abnormal Gain	(200)	100	(200)	100	(200)	100	(200)
	55,000		55,000		52,800		52,400		52,000

*Material A represent transferred-in units from process-I

(ii) Determination of Cost per Unit

Particulars	Amount (`)	Units	Per Unit (`)
(i) Direct Material (Consumables) :			
Value of units transferred from Process-I	3,27,800		
Less: Value of normal loss (2,200 units × ` 5)	(11,000)		
	3,16,800	52,800	6.00
(ii) Consumables added in Process-II	1,57,200	52,400	3.00
(iii) Labour	1,04,000	52,000	2.00
(iii) Overhead	52,000	52,000	1.00
Total Cost per equivalent unit			12.00

(iii) Determination of value of Work-in-Process and units transferred to Process-III

Particulars	Units	Rate (`)	Amount (`)
Value of Closing W-I-P:			
Material from Process-I	2,000	6.00	12,000
Consumables	1,600	3.00	4,800
Labour	1,200	2.00	2,400
Overhead	1,200	1.00	1,200
			20,400
Value of units transferred to Process-III	51,000	12.00	6,12,000

Question 24

A product passes through two distinct processes before completion. Following information are available in this respect:

	Process-1	Process 2
Raw materials used	10000 units	-
Raw material cost (per unit)	₹ 75	-
Transfer to next process/Finished good	9000 units	8200 units

Normal loss (on inputs)	5%	10%
Direct wages	₹ 3,00,000	₹ 5,60,000
Direct expenses	50% of direct wages	65% of direct wages
Manufacturing overheads	25% of direct wages	15% of direct wages
Realizable value of scrap (per unit)	₹ 13.50	₹ 145

8000 units of finished goods were sold at a profit of 15% on cost. There was no opening and closing stock of work-in-progress.

Prepare:

(i) Process-1 and Process-2 Account

(ii) Finished goods Account

(iii) Normal Loss Account

(iv) Abnormal Loss Account

(v) Abnormal Gain Account (PYP Nov'19,10 Marks) (Same concept different figures Old & New SM)

Answer 24

(i)

Dr.	Particulars	Units	Total (₹)		Process-1 Account Particulars	Units	Cr. Total (₹)
To	Raw Material Consumed	10,000	7,50,000	By	Normal Loss A/c @ 13.5	500	6,750
"	Direct Wages	—	3,00,000	"	Process 2 @ 133.5	9,000	12,01,500
"	Direct Expenses	—	1,50,000	"	By Abnormal Loss @ 133.5	500	66,750
"	Manufacturing Overheads		75,000				
		10,000	12,75,000			10,000	12,75,000

Cost per unit of completed units and abnormal loss:

$$\frac{Rs.12,75,00 - Rs.6,750}{10,000 \text{ units} - 50 \text{ units}} = Rs. 133.5$$

(ii)

Dr.   **Process-2 Account**   Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process-I A/c	9,000	12,01500	By	Normal Loss A/c @ 145	900	1,30,500
"	To Direct Wages	--	5,60,000	"	By Finished Stock A/c [bal fig]	8,200	21,04,667
"	Direct Expenses	--	3,64,000				
"	Manufacturing Overheads	--	84,000				
"	To Abnormal gain (₹ 256.67 × 100 units)	100	25,667				
		9,100	22,35,167			9,100	22,35,167

Cost per unit of completed units and abnormal gain:

$$\frac{Rs.22,09,500 - Rs.130500}{8,100 \text{ units}} = Rs. 256.67$$

Dr.   **Finished Goods A/c**   *Cr.*

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process II A/c	8,200	21,04,667	By	By Cost of Sales	8,000	20,53,333
				"	By Balance c/d	200	51,334
		8,200	21,04,667			8,200	21,04,667

(iii) Normal Loss A/c

Dr.   Cr.

	Particular s	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	6,750	By	By abnormal Gain II	100	14,500
	Process II	900	1,30,500		By Cash	500	6,750
					By Cash	800	1,16,000
		1400	1,37,250			1400	1,37,250

(iv) Abnormal Loss A/c

Dr.   Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Process I	500	66,750	By	By Cost Ledger Control A/c	500	6,750
					By Costing P& L A/C (Abnormal Loss)		60,000
			66,750				66,750

(v) Abnormal Gain A/c

Dr.   Cr.

	Particulars	Units	Total (₹)		Particulars	Units	Total (₹)
To	Normal Loss A/c @ 145	100	14,500	By	Process II	100	25,667
To	Costing P & L A/C		11,167				
		100	25,667			100	25,667

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical problem from the topic 'Process Costing'. The question required preparing Process accounts, normal loss, abnormal loss and abnormal gain accounts. Generally, well answered by most of the examinees. Performance of the examinees in this question was good.

Question 25

KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019:

Particulars	Process		Finished stock
	A (₹)	B (₹)	(₹)
Opening Stock	5,000	5,500	10,000
Direct Materials	9,000	9,500	
Direct Wages	5,000	6,000	
Factory Overheads	4,600	2,030	
Closing Stock	2,000	2,490	5,000

Inter-process profit included in opening stock		1,000	4,000

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price.

Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are ₹ 75,000.

Prepare the Process cost accounts and Finished stock account showing the profit element at each stage.

(PYP May '19, 10 Marks) (Same concept different figures Old & New SM)

Answer 25

	Process-A				A/c		
Particulars	Total(₹)	Cost(₹)	Profit(₹)	Particulars	Total(₹)	Cost(₹)	Profit(₹)
Opening stock	5,000	5,000	_	Process BA/c	28,800	21,600	7,200
Direct materials	9,000	9,000	_				
Direct wages	5,000	5,000	_				
	19,000	19,000	_				
Less: Closing stock	(2,000)	(2,000)	_				
Prime Cost	17,000	17,000	_				
Overheads	4,600	4,600	_				
Process Cost	21,600	21,600	_				
Profit (33.33%							
of total cost)	7,200	-	7,200				
	28,800	**21,600**	**7,200**		**28,800**	**21,600**	**7,200**

Process-B A/c

Particulars	Total(₹)	Cost(₹)	Profit(₹)	Particulars	Total(₹)	Cost(₹)	Profit(₹)
Opening stock	5,500	4,500	1,000	Finished stock A/c	61,675	41,550	20,125
Process A A/c	28,800	21,600	7,200				
Direct materials	9,500	9,500	_				
Direct wages	6,000	6,000	_				
	49,800	41,600	8,200				
Less: Closing stock	(2,490)	(2,080)	(410)				
Prime Cost	47,310	39,520	7,790				
Overheads	2,030	2,030	_				
Process Cost	49,340	41,550	7,790				
Profit (25%							
of total cost)	12,335	-	12,335				
	61,675	**41,550**	**20,125**		**61,675**	**41,550**	**20,125**

Finished Stock A/c

Particulars	Total(₹)	Cost(₹)	Profit(₹)	Particulars	Total(₹)	Cost(₹)	Profit(₹)
Opening stock	10,000	6,000	4,000	Costing P & L A/c	75,000	44,181	30,819

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this numerical question of 'Process Costing' examinees were asked to prepare process cost accounts and finished stock account. Examinees made a mistake in the calculation of profit in the closing stock in the Process B Account and Finished Stock Account.

Performance of the examinees was not satisfactory. Overall performance in this question was below average.

Process B A/c	61,675	41,550	20,125			
	71,675	47,550	24,125			
Less: Closing stock	(5,000)	(3,369)	(1,631)			
COGS	66,675	44,181	22,494			
Profit	8,325	-	8,325			
	75,000	**44,181**	**30,819**		**75,000**	**44,181 30,819**

Question 26

Following details have been provided by M/s AR Enterprises:

(i)   Opening works-in-progress - 3000 units (70% complete)

(ii)   Units introduced during the year - 17000 units

(iii) Cost of the process (for the period) - ₹ 33,12,720

(iv) Transferred to next process - 15000 units

(v)   Closing works-in-progress - 2200 units (80% complete)

(vi) Normal loss is estimated at 12% of total input (including units in process in the beginning). Scraps realise ₹ 50 per unit. Scraps are 100% complete.

Using FIFO method, compute:

(i)   Equivalent production

(ii) Cost per equivalent unit (PYP Nov '18, 5 Marks)

Answer 26

Statement of Equivalent Production Units (Under FIFO Method)

Particulars	Input units	Particulars	Output units	Equivalent Production (%)	Equivalent units
Opening W-I-P	3,000	From opening W-I-P	3,000	30	900
Units introduced	17,000	From fresh inputs	12,000	100	12,000
		Units completed			
		(Transferred to next process)	15,000		
		Normal Loss			
		{12% (3,000 + 17,000 units)}	2,400	--	--
		Closing W-I-P	2,200	80	1760
		Abnormal loss (Balancing figure)	400	100	400
	20,000		**11,000**		**15,060**

Computation of cost per equivalent production unit:

Cost of the Process (for the period)	₹ 33,12,720
Less: Scrap value of normal loss (₹ 50 × 2,400 units)	(₹ 1,20,000)
Total process cost	₹ 31,92,720

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> In this numerical problem of process costing for calculation of equivalent production and cost per equivalent unit. Performance of the examinees was average.

Question 27

Alpha Ltd. is engaged in the production of a product A which passes through 3 different process - Process P, Process Q and Process R. The following data relating to cost and output is obtained from the books of accounts for the month of April 2017:

Particular	Process P	Process Q	Process R
Direct Material	38,000	42,500	42,880
Direct Labour	30,000	40,000	50,000

Production overheads of ₹ 90,000 were recovered as percentage of direct labour.

10,000 kg of raw material @ ₹ 5 per kg. was issued to Process P. There was no stock of materials or work in process. The entire output of each process passes directly to the next process and finally to warehouse. There is normal wastage, in processing, of 10 %.

The scrap value of wastage is ₹ 1 per kg. The output of each process transferred to next process and finally to warehouse are as under:

Process P = 9,000 kg Process Q = 8,200 kg Process R = 7,300 kg

The company fixes selling price of the end product in such a way so as to yield a profit of 25% selling price. Prepare Process P, Q and R accounts. Also calculate selling price per unit of end product. (PYP May '18, 10 Marks)

Answer 27

Process- P Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.		Amount (₹)
To Input	10,000	50,000	By Normal wastage	1,000		1,000
			(1,000 kg. × ₹ 1)			
To Direct Material	—	38,000	By Process- Q	9,000		1,39,500
			(9,000 kg. × ₹ 15.50)			
To Direct Labour	—	30,000				
To Production OH (₹ 90,000 × 3/12)	—	22,500				
	10,000	1,40,500		10,000		1,40,500

Cost per unit = $\frac{Rs.1,40,500 - Rs.1,000}{10,000kg. - 1,000kg.}$ = Rs. 15.50

Process- Q Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.		Amount (₹)
To Process-P A/c	9,000	1,39,500	By Normal wastage			
			(900 kg. × ₹ 1)	900		900
To Direct Material	—	42,500	By Process- Q (8,200kg.×₹ 31)	8,200		2,54,200
To Direct Labour	—	40,000				
To Production OH (₹ 90,000 × 4/12)	—	30,000				
To Abnormal Gain (100 kg. × ₹ 31)	100	3,100				
	9,100	2,55,100		9,100		2,55,100

Cost per unit = $\frac{Rs.2,52,000 - Rs.900}{9,000kg - 900kg.}$

Process- R Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-Q A/c	8,200	2,54,200	By Normal wastage	820	820
			(820 kg. × Re.1)		
To Direct Material	—	42,880	By Abnormal loss	80	4,160
			(80 kg. × ₹ 52)		
To Direct Labour	—	50,000	By Finished Goods	7,300	3,79,600
			(7,300 kg. × ₹ 52)		
To Production OH					
(₹ 90,000 × 5/12)	—	37,500			
	8,200	3,84,580		8,200	3,84,580

Cost per unit = $\frac{Rs.3,84,580 - Rs.820}{8,200 kg. - 820\ kg}$ = Rs. 52

Calculation of Selling price per unit of end product:

Cost per unit	₹ 52.00
Add: Profit 25% on selling price i.e. 1/3rd of cost	₹ 17.33 Selling price per unit
	₹ 69.33

Question 28

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   (PYP 5 Marks Jan 21)

Answer 28

(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

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

Working Notes:

1. Computation of Cost per unit

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)
Input costs	2,20,000	26,500	61,500
Less: Realizable value of normal scrap (3,250 units x ₹ 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)	23,233.75
Labour (3,750 units × ₹ 0.5191)	1,946.63
Overheads (3,750 units × ₹ 1.2047)	4,517.62
	29,698

Question 29

A product passes through Process-I and Process-II. Particulars pertaining to the Process-I are:

Materials issued to Process-I amounted to ₹ 80,000, Wages ₹ 60,000 and manufacturing overheads were ₹ 52,500. Normal Loss anticipated was 5% of input, 9,650 units of output were produced and transferred out from Process-I to Process-II. Input raw materials issued to Process-I were 10,000 units.

There were no opening stocks.

Scrap has realizable value of ₹ 5 per unit. You are required to prepare:

    (i)   Process-I Account

    (ii)   Abnormal Gain/Loss Account (PYP 5 Marks Dec '21)

Answer 29

(i) Process - I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	10,000	80,000	By Normal loss (5%of 10,000)	500	2,500
To Wages	-	60,000	By Process-II A/c (₹20*×9,650units)	9,650	1,93,000
To Manufacturing OH		52,500			
To Abnormal Gain A/c (₹20*×150units)	150	3,000			
	10,150	1,95,500		10,150	1,95,500

$$\frac{(80,000 + 60,000 + 52,500) - 2,500}{10,000 - 500} = 20$$

(ii) Abnormal Gain - Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Normal loss A/c	150	750	By Process-I A/c	150	3,000
To Costing P&L A/c	-	2,250			
	150	3,000		150	3,000

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This Numerical question was based on the basic concept of Process Costing. A few examinees made mistake in the calculation of abnormal gain amounts. Overall performance of the examinees was good.

Question 30

STG Limited is a manufacturer of Chemical 'GK', which is required for industrial use. The complete production operation requires two processes. The raw material first passes through Process I, where Chemical 'G' is produced. Following data is furnished for the month April 2022:

Particulars	(in kgs.)
Opening work-in-progress quantity (Material 100% and conversion 50% complete)	9,500
Material input quantity	1,05,000
Work Completed quantity	83,000
Closing work-in-progress quantity (Material 100% and conversion 60% complete)	16,500

You are further provided that:

Particulars	(in ₹)
Opening work-in-progress cost Material cost Processing cost	29,500 14,750
Material input cost	3,34,500
Processing cost	2,53,100

Normal process loss may be estimated to be 10% of material input. It has no realizable value. Any loss over and above normal loss is considered to be 100% complete in material and processing.

The Company transfers 60,000 kgs. of output (Chemical G) from Process I to Process II for producing Chemical 'GK'. Further materials are added in Process II which yield 1.20 kg. of Chemical 'GK' for every kg. of Chemical 'G' introduced. The chemicals transferred to Process II for further processing are then sold as Chemical 'GK' for ₹ 10 per kg. Any quantity of output completed in Process I, are sold as Chemical 'G' @ ₹ 9 per kg.

The monthly costs incurred in Process II (other than the cost of Chemical 'G') are: Input 60,000 kg. of Chemical 'G'

Materials Cost ₹ 85,000

Processing Costs ₹ 50,000 You are required:

(i) **Prepare and determine the cost per kg. of Chemical 'G' in Process I using the weighted average cost method.**

(ii) **Prepare a statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in progress.**

(iii) **STG is considering the option to sell 60,000 kg. of Chemical 'G' of Process I without processing it further in Process-II. Will it be beneficial for the company over the current pattern of processing 60,000 kg in process-II?**

(Note: You are not required to prepare Process Accounts) (PYP 10 Marks May'22)

Answer 30

Statement of Equivalent Production

Particulars	Input quantity	Particulars	Total	Material %	Material Units	Processing Cost %	Processing Cost Units
Opening WIP	9,500	Units completed	83,000	100%	83,000	100%	83,000
Material Input	1,05,000	Normal loss (10% of 1,05,000)	10,500	-	-	-	-
		Abnormal loss (Bal. fig.)	4,500	100%	4,500	100%	4,500
		Closing WIP	16,500	100%	16,500	60%	9,900
	14,500		1,14,500		1,04,000		97,400

Statement of Cost for each element

Particulars	Material (₹)	Processing (₹)	Total cost (₹)
Cost of opening WIP	29,500	14,750	44,250
Cost incurred during the month	3,34,500	2,53,100	5,87,600
Total cost (A)	3,64,000	2,67,850	6,31,850
Equivalent production (B)	1,04,000	97,400	
Cost per kg of Chemical 'G' (A/B)	3.5	2.75	6.25

Alternative Presentation

Statement showing cost per kg of each statement

	(₹)	(₹)
Material	$\dfrac{29,500 + 3,34,000}{1,04,000}$	3.5

Processing cost	$\dfrac{14{,}750 + 2{,}53{,}100}{1{,}04{,}000}$	2.75
Total Cost per kg		6.25

(ii) Statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in- progress

	(₹)
Units transferred (60,000 × 6.25)	3,75,000
Abnormal loss (4,500 × 6.25)	28,125
Closing work in progress:	
Material (16,500 × 3.5)	57,750
Processing cost (9,900 × 2.75)	27,225
	84,975

(iii) Calculation of Incremental Profit / Loss after further processing

Particulars	(₹)	(₹)
Sales if further processed (A) (60,000 x 1.20 x ₹ 10)	7,20,000	
Calculation of cost in Process II		
Chemical transferred from Process I	3,75,000	
Add: Material cost	85,000	
Add: Process cost	50,000	
Total cost of finished stock (B)	5,10,000	
Profit, if further processed (C = A – B)		2,10,000
If sold without further processing then,		
Sales (60,000 x ₹ 9)	5,40,000	
Less: Cost of input without further processing	3,75,000	
Profit without further processing (D)		1,65,000
Incremental Profit after further processing (C – D)		45,000
Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.		

Alternative Presentation

Calculation of Incremental Profit / Loss after further processing

	(₹)
If 60,000 units are sold @ ₹ 9	5,40,000
If 60,000 units are processed in process II (60,000 × 1.2 × ₹ 10)	7,20,000
Incremental Revenue (A)	1,80,000
Incremental Cost: (B)	
Material Cost	85,000
Processing Cost	50,000
	1,35,000
Incremental Profit (A-B)	45,000

Additional net profit on further processing in Process II is 45,000. Therefore, itis advisable to process further chemical 'G'.

Question 31

N Ltd. produces a product which passes through two processes – Process – I and Process-II. The company has provided following information related to the Financial Year 2021-22:

	Process-I	Process -II
Raw Material @₹ 65 per unit	**6,500 units**	-
Direct Wages	**₹ 1,40,000**	**₹ 1,30,000**
Direct Expenses	**30% of Direct Wages**	**35% of Direct Wages**
Manufacturing Overheads	**₹ 21,500**	**₹ 24,500**
Realisable value of scrap per unit	**₹ 4.00**	**₹ 16.00**
Normal Loss	**250 units**	**500 units**
Units transferred to Process-II / finished stock	**6,000 units**	**5,500 units**
Sales	-	**5,000 units**

There was no opening or closing stock of work-in progress. You are required to prepare:

(i)   **Process-I Account**

(ii)   **Process -II Account**

(iii) **Finished Stock Account (PYP 10 Marks Nov 22)**

Answer 31

Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Raw material used (₹ 65 × 6,500 units)	6,500	4,22,500	By Normal loss (250 units × ₹ 4)	250	1,000
To Direct wages	--	1,40,000	By Process- II A/c (₹ 100 × 6,000 units)	6,000	6,00,000
To Direct expenses (30% of ₹ 1,40,000)	--	42,000	By Abnormal loss (₹ 100 × 250 units)	250	25,000
To Manufacturing overhead		21,500			
	6,500	6,26,000		6,500	6,26,000

Cost per unit of completed units and abnormal loss : $\dfrac{Total\ Cost - Realisable\ value\ from\ normal\ loss}{Inputs\ units - Normal\ loss\ units}$

$= \dfrac{Rs.6,26,000 - Rs.1,000}{6,500\ units - 250\ units} = \dfrac{Rs.6,25,000}{6,250\ units}$ = Rs. 100

Process- II A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process - I A/c	6,000	6,00,000	By Normal loss (500 units × ₹16)	500	8,000
To Direct wages	--	1,30,000	By Finished Stock A/c (₹144 × 5,500 units)	5,500	7,92,000
To Direct expenses (35% of ₹ 1,30,000)	--	45,500			
To Manufacturing overhead	--	24,500			
	6,000	8,00,000		6,000	8,00,000

Cost per unit of completed units and abnormal loss:

$$\frac{Total\ Cost - Realisable\ value\ from\ normal\ loss}{Input\ units - Normal\ loss\ units}$$

$= \frac{Rs.8,00,000 - Rs.8.000}{6,000\ units - 500\ units} = \frac{Rs.7,92,000}{5,500\ units}$ = Rs. 144

Finished Goods Stock A/c

	Particulars	Units	(₹)	Particulars	Units	(₹)
To	Process II A/c	5,500	7,92,000	By Cost of Sales (₹144 × 5,000 units)	5,000	7,20,000
				By Balance c/d	500	72,000
		5,500	7,92,000		5,500	7,92,000

Question 32

How will you treat normal loss, abnormal loss and abnormal gain in process costing? Explain (PYP 5 Marks, May '23)

Answer 32

Treatment of normal loss, abnormal loss and abnormal gain in process costing

Treatment of Normal loss in Cost Accounts: The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realised by the sale of normal process loss units should be credited to the process account.

Treatment of Abnormal loss in Cost Accounts: The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

Treatment of Abnormal Gain in Cost Accounts: The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and Loss account. The cost of abnormal gain is computed on the basis of normal production.

Chapter 11
Joint Product and By Product

Question 1

Three products X,Y and Z along with a byproduct B are obtained again in a crude state which require further processing at a cost of Rs. 5 for X; Rs. 4 for Y; and Rs. 2.50 for Z per unit before sale. The byproduct is however saleable as such to a nearby factory. The selling prices for the three main products and byproduct, assuming they should yield a net margin of 25 percent of cost, are fixed at Rs. 13.75 Rs. 8.75 and Rs. 7.50 and Re. 1.00 respectively – all per unit quantity sold.

During a period, the joint input cost including the material cost was Rs. 90,800 and the respective outputs were:

X	8,000 units
Y	6,000 units
Z	4,000 units
B	1,000 units

By product should be credited to the joint cost and only the net joint costs are to be allocated to the main products.

Calculate the joint cost per unit of each product and the margin available as a percentage on cost. (MTP Aug. '18, 10 Marks)

Answer 1

Working Notes:

(i) Computation of Allocation Ratio for Joint Costs

	Products		
	X Rs.	Y Rs.	Z. Rs.
Selling Price	13.75	8.75	7.50
Less: Anticipated margin@ 25% on cost or 20% on sales	2.75	1.75	1.50
Cost of sales	11.00	7.00	6.00
Less: Post split off cost	5.00	4.00	2.50
Joint cost per unit	6.00	3.00	3.50
Output (units)	8,000	6,000	4,000
Total output cost	48,000	18,000	14,000
Allocation ratio for joint costs	24	9	7

(ii) Computation of net allocable joint costs

	Rs.	Rs.
Joint input cost including material cost		90,800
Less: Credit for realization from by-product B: Sales revenue (1,000 × Re. 1)	1,000	
Less: profit @ 25% on cost or 20% on sales	200	800
Net joint costs to be allocated		90,000

Determination of joint cost per unit of each product

Product	Net joint costs allocation Rs.	Output(units) Rs.	Joint cost per unit Rs.
X	54,000 (Note : 1)	8,000	6.75
Y	20,250	6,000	3.38
Z	15,750	4,000	3.94
	90,000		

Profit margin available on each product as a percentage on cost

Product	Joint Cost Rs.	Post spilt off cost Rs.	Total Cost Rs.	Selling Price Rs.	Margin Rs.	Margin % on cost Rs.
X	6.75	5.00	11.75	13.75	2.00	17.02
Y	3.38	4.00	7.38	8.75	1.37	18.56
Z	3.94	2.50	6.44	7.50	1.06	16.46

Note: 1

$X = \frac{24}{40} \times 90,000 = 54000$

$Y = \frac{9}{40} \times 90,000 = 20250$

$Z = \frac{7}{40} \times 90,000 = 15750$

Total   90000

Question 2

In an Oil Mill, four products emerge from a refining process. The total cost of input during the quarter ending March 2019 is Rs.22,20,000. The output, sales and additional processing costs are as under:

Products	Output in Litres	Additional processing cost after split off (Rs.)	Sales value (Rs.)
A	8,000	6,45,000	25,87,500
B	4,000	1,35,000	2,25,000
C	2,000	-	90,000
D	4,000	22,500	6,75,000

In case these products were disposed-off at the split off point that is before further processing, the selling price per litre would have been:

A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
225.00	90.00	45.00	112.50

PREPARE a statement of profitability based on:

(i)   If the products are sold after further processing is carried out in the mill.

(ii)   If they are sold at the split off point.   (MTP Oct. '19, 10 Marks, RTP Nov '18)

Answer 2

Statement of profitability of an Oil Mill (after carrying out further processing) for the quarter ending 31st March 2019.

Products	Sales Value after further processing	Share of Joint cost	Additional processing cost	Total cost after processing	Profit (loss)
A	25,87,500	14,80,000	6,45,000	21,25,000	4,62,500
B	2,25,000	2,96,000	1,35,000	4,31,000	(2,06,000)
C	90,000	74,000	-	74,000	16,000
D	6,75,000	3,70,000	22,500	3,92,500	2,82,500
	35,77,500	22,20,000	8,02,500	30,22,500	5,55,000

Statement of profitability at the split off point

Products	Selling price of split off	Output in units	Sales value at split off point	Share of joint cost	Profit at split off point
A	225.00	8,000	18,00,000	14,80,000	3,20,000
B	90.00	4,000	3,60,000	2,96,000	64,000

C	45.00	2,000	90,000	74,000	16,000
D	112.50	4,000	4,50,000	3,70,000	80,000
	-	-	27,00,000	22,20,000	4,80,000

Note: Share of Joint Cost has been arrived at by considering the sales value at split off point.

Question 3

EXPLAIN the treatment of by-product cost in cost accounting. (MTP 5 Marks May 20, PYP 5 Marks Nov '18, Old & New SM, RTP May 20)

Answer 3

By-product cost can be dealt in cost accounting in the following ways:

(i) When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.

2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

(ii) When the by-products are of considerable total value: Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

(iii) Where they require further processing: In this case, the net realisable value of the by- product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products.

If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (i).

In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (ii).

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a theoretical question on process costing on treatment of by product. Below average performance was observed.

Question 4

'Buttery Butter' is engaged in the production of Buttermilk, Butter and Ghee. It purchases processed cream and let it through the process of churning until it separates into buttermilk and butter. For the month of January, 2020, 'Buttery Butter' purchased 50 Kilolitre processed cream @ ₹ 100 per 1000 ml. Conversion cost of ₹ 1,00,000 were incurred up-to the split off point, where two saleable products were produced i.e. buttermilk and butter. Butter can be further processed intoGhee.

The January, 2020 production and sales information is as follows:

Products	Production (in Kilolitre/tonne)	Sales Quantity (in Kilolitre/tonne)	Selling price per Litre/Kg (₹)
Buttermilk	28	28	30
Butter	20	—	—

Ghee	**16**	**16**	**480**

All 20 tonne of butter were further processed at an incremental cost of ₹ 1,20,000 to yield 16 Kilolitre of Ghee. There was no opening or closing inventories of buttermilk, butter or ghee in January, 2020.

Required:

SHOW how joint cost would be apportioned between Buttermilk and Butter under Estimated Net Realisable Value method.

'Healthy Bones' offers to purchase 20 tonne of butter in February at ₹ 360 per kg. In case 'Buttery Butter' accepts this offer, no Ghee would be produced in February. SUGGEST whether 'Buttery Butter' shall accept the offer affecting its operating income or further process butter to make Ghee itself? (MTP 5 Marks Oct 20, Old & New SM)

Answer 4

(i) **Estimated Net Realizable Value Method:**

	Buttermilk Amount (₹)	Butter Amount (₹)
Sales Value	8,40,000	76,80,000
	(₹ 30 × 28 × 1000)	(₹ 480 × 16 × 1000)
Less: Post split-off cost (Further processing cost)	-	(1,20,000)
Net Realizable Value	8,40,000	75,60,000
Apportionment of Joint Cost of ₹ 51,00,000* in ratio of 1:9	5,10,000	45,90,000

* [(₹ 100 × 50 × 1000) + ₹ 1,00,000] = ₹ 51,00,000

(ii) **Incremental revenue from further processing of Butter into Ghee**

(₹ 480 × 16 × 1000 - ₹ 360 × 20 × 1000)   ₹ 4,80,000

Less: Incremental cost of further processing
of Butter into Ghee   ₹ 1,20,000

Incremental operating income from further processing   ₹ 3,60,000

The operating income of 'Buttery Butter' will be reduced by ₹ 3,60,000 in February if it sells 20 tonne of Butter to 'Healthy Bones', instead of further processing of Butter into Ghee for sale. Thus, 'Buttery Butter' is advised not to accept the offer and further process butter to make Ghee itself.

Question 5

A factory produces two products, 'Ghee' and 'Cream' from a single process. The joint processing costs during a particular month are:

Direct Material	**₹ 60,000**
Direct Labour	**₹ 19,200**
Variable Overheads	**₹ 24,000**
Fixed Overheads	**₹ 64,000**

Sales: Ghee - 200 litre @ ₹ 600 per litre; Cream – 240 litre @ ₹ 200 per litre. REQUIRED:

I.   Apportion joints costs on the basis of:

(i)   Physical Quantity of each product.

(ii) Contribution Margin method, and

II.   Determine Profit or Loss under both the methods. (MTP 5 Marks, Oct.'21, PYP 5 Marks Nov '19)

Answer 5

Total Joint Cost

Particulars	Amount (₹)
Direct Material	60,000
Direct Labour	19,200
Variable Overheads	24,000
Total Variable Cost	1,03,200
Fixed Overheads	64,000
Total joint cost	1,67,200

Apportionment of Joint Costs:

			Product-Ghee	Product-Cream
I.	(i)	Apportionment of Joint	**₹ 76,000**	**₹ 91,200**
		Cost on the basis of 'Physical Quantity'	Rs. 1,67, 200/200+240 litre × 200	Rs. 1,67,200/200+240 litre × 240
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	**₹ 46,909**	**₹ 56,291**
			(Rs. 1,03,200 /200+240 litre × 200)	(Rs. 1,03,200 /200+240 litre × 240)
		Contribution Margin	**73,091**	**- 8,291**
			(₹600×200 – 46,909)	(₹200×240 – 56,291)
		Fixed Costs*	**₹ 64,000**	
		Total apportioned cost	**₹ 1,10,909**	**₹ 56,291**
II.	(iii)	**Profit or Loss:**		
		When Joint cost apportioned on basis of physical units		
	A.	Sales Value	₹ 1,20,000	₹ 48,000
	B.	Apportioned joint cost on basis of 'Physical Quantity':	₹ 76,000	₹ 91,200
A-B		**Profit or (Loss)**	**44,000**	**(43,200)**
		When Joint cost apportioned on basis of 'Contribution Margin Method'		
	C	Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 1,10,909	₹ 56,291
A-C		**Profit or (Loss)**	₹ 9,091	₹ (8,291)

* The fixed cost of ₹ 64,000 is to be apportioned over the joint products- Ghee and Cream in the ratio of their contribution margin but contribution margin of Product- Cream is Negative so fixed cost will be charged to Product- Ghee only.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical problem from the topic 'Joint products and by-products'. The question required apportionment of joint cost on the basis of physical quantity method and contribution margin method. Performance of the examinees was average.

Question 6

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. (MTP 5 Marks Nov '21, RTP May '21)

Answer 6

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.

Question 7

SV chemicals Limited processes 9,00,000 kgs. of raw material in a month purchased at ₹ 95 per kg in department X. The input output ratio of department X is 100 : 90. Processing of the material results in two joint products being produced 'P 1' and 'P2' in the ratio of 60 : 40. Product 'P 1' can be sold at split off stage or can be further processed in department Y and sold as a new product 'YP 1'. The input output ratio of department Y is 100 : 95. Department Y is utilized only for further processing of product 'YP 1' to product P1. Individual departmental expenses are as follows:

	Dept. X (₹ lakhs)	Dept. Y(₹ lakhs)
Direct Materials	95.00	14.00
Direct Wages	80.00	27.00
Variable Overheads	100.00	35.00
Fixed Overheads	75.00	52.00
Total	350.00	128.00

Further, selling expenses to be incurred on three products are:

Particulars	Amount (₹ in lakhs)
Product 'P$_1$'	28.38
Product 'P$_2$'	25.00
Product 'YP$_1$'	19.00

Selling price of the products 'P$_1$' and 'P$_2$' at split off point is ₹ 110 per kg and ₹ 325 per kg respectively. Selling price of new product 'YP$_1$' is ₹ 150 per kg.

You are required to:

(i) Prepare a statement showing apportionment of joint costs, in the ratio of value of sales, net of selling expenses.

(ii) Prepare a Statement showing profitability at split off point.

(iii) Prepare a Statement of profitability of 'YP $_1$'.

(iv) Determine that would you recommend further processing of P 1? (MTP March '18, 10 Marks)

Answer 7

Working Notes:

Input output ratio of material processed in Department X = 100:90

Particulars	Quantity (Kg)
Material input	9,00,000
Less: Loss of material in process @ 10% of 9,00,000 kgs	(90,000)
Output	8,10,000

Output of department X is product 'P1' and 'P2' in the ratio of 60 : 40.	
Output 'P1' = $\dfrac{60 \times 8{,}10{,}000}{100}$	= 4,86,000 kgs.
Output 'P2' = $\dfrac{40 \times 8{,}10{,}000}{100}$	= 3,24,000 kgs.

Statement showing ratio of net sales			
Product	P1	P2	Total
Quantity (kgs)	4,86,000	3,24,000	8,10,000
Selling price per kg (₹)	110.00	325.00	
Sales Value (₹ in lakhs)	534.60	1,053.00	1587.60
Less: Selling Expenses (₹ in lakhs)	(28.38)	(25.00)	(53.38)
Net Sales (₹ in lakhs)	506.22	1,028.00	1,534.22
Ratio	33%	67%	100.00

Computation of Joint Costs	
Particulars	Amount (₹ Lakhs)
Raw Material input 9,00,000 kgs @ ₹ 95 per kg	855.00
Direct Materials	95.00
Direct Wages	80.00
Variable Overheads	100.00
Fixed Overheads	75.00
Total	1,205.00

(i) Statement showing apportionment of joint costs in the ratio of net sales

Particulars	Amount (₹ in lakhs)
Joint cost of P1 – 33% of ₹ 1,205 lakhs	397.65
Joint cost of P2 – 67% of ₹ 1,205 lakhs	807.35
Total	1,205.00

(ii) Statement showing profitability at split off point

Product	P1	P2	Total
Net Sales Value (₹ in lakhs) – [A]	506.22	1,028.00	1,534.22
Less: Joint costs (₹ in lakhs)	(397.65)	(807.35)	(1,205.00)
Profit (₹ in lakhs) [A] – [B]	108.57	220.65	329.22

Alternative Presentation

Product	P1	P2	Total
Sales Value (₹ in lakhs) – [A]	534.60	1,053.00	1,587.60
Less: Joint costs (₹ in lakhs)	397.65	807.35	1,205.00
Selling Expenses	28.38	25.00	53.38
Total Cost [B]	426.03	832.35	1,258.38
Profit (₹ in lakhs) [A] – [B]	108.57	220.65	329.22

(iii) Statement of profitability of product 'YP1'

Particulars		YP1
Sales Value (₹ in lakhs) (Refer working note) [A]		629.55
Less: Cost of P1	397.65	
Cost of Department Y	128.00	
Selling Expenses of Product 'YP1'	19.00	
Total Costs [B]		544.65
Profit (₹ in lakhs) [A] – [B]		84.90

Working Note:

Computation of product 'YP1'

Quantity of product P1 input used = 4,86,000 kgs

Input output ratio of material processed in Department Y = 100 : 95

Particulars	Quantity (Kg)
Material input	4,86,000
Less: Loss of material in process @ 5% of 4,86,000	(24,300)
Output	4,61,700

Sales Value of YP1 = 4,61,700 kgs @ ₹ 150 per kg = ₹ 692.55 lakhs

(iv) Determination of profitability after further processing of product P1 into product YP1:

Particulars	(₹ in lakhs)
Profit of Product 'P1' {refer (ii) above}	108.57
Profit of Product 'YP1'{refer (iii) above}	84.90
Decrease in profit after further processing	23.67

Based on the above profitability statement, further processing of product P1 into YP1 should not be recommended.

Question 8

DESCRIBE net realizable value method of apportioning joint costs to by-products (MTP 5 Marks Aug '18, MTP 5 Marks March '21)

Answer 8

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.

Question 9

Mili Ltd., a manufacturing company, produces two main products and a by-product out of a joint process. The ratio of output quantities to input quantities of direct material used in the joint process remains consistent on yearly basis. Company has employed the physical volume method to allocate joint production costs to the main products. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main products. During a month, company incurred joint production costs of ₹ 15,00,000. The main products are not marketable at the split off point and thus have to be processed further. Details of company's operation are given in the table below.

Particulars	Product-Q	Product-R	By product
Monthly output in kg.	90,000	1,80,000	75,000
Selling price per kg.	₹ 50	₹ 30	₹ 5
Process costs	₹ 3,00,000	₹ 4,50,000	

FIND OUT the amount of joint product cost that Mili Ltd. would allocate to product-R by using the physical volume method to allocate joint production costs? .(MTP 5 Marks March '22, Old & New

SM)

Answer 9

Calculation of Net joint costs to be allocated:

Particulars	Amount (₹)
Joint Costs	15,00,000
Less: Net Realizable value of by-product (75,000 × 5)	3,75,000
Net joint costs to be allocated	11,25,000

Therefore, amount of joint product cost that Mili Ltd. would allocate to the product-R by using the physical volume method to allocate joint production costs:

$$= \frac{Physical\ quantity\ of\ Product-R}{Total\ Quantity}\ X\ \text{Net joint costs to be allocated}$$

$$= \frac{1,80,000\ units}{2,70,000\ units}\ X\ 11,25,000 = \text{Rs. } 7,50,000$$

Question 10

Following information is available for A Ltd.:

Sales- P: 200 kg @ ₹ 120 per kg. Q: 240 kg @ ₹ 60 per kg.

Joint costs- Marginal cost ₹ 17,600 Fixed cost ₹ 15,600

You are required to FIND OUT the cost of joint products P and Q using contribution margin method. **(MTP 5 Marks April '22)**

Answer 10

The marginal cost (variable cost) of ₹ 17,600 is apportioned over the joint products P and Q in the ratio of their physical quantity i.e. 200 : 240
Marginal cost for Product P : ₹ 17,600 × 200/440   =   ₹ 8,000
Marginal cost for Product Q : ₹ 17,600 × 240/440   =   ₹ 9,600

The fixed cost of ₹ 15,600 is apportioned over the joint products P and Q in the ratio of their contribution margin i.e. 160 : 48 (Refer to working note)

Product P : ₹ 15,600 × 160/208 = ₹ 12,000 Product Q : ₹ 15,600 × 48/208   = ₹ 3,600 **Working**

Note:

Computation of contribution margin ratio

Products	Sales revenue	Marginal cost	Contribution
	(₹)	(₹)	(₹)
P	24,000	8,000	16,000
Q	14,400	9,600 (Refer to above)	4,800

Contribution ratio is 160 : 48

Question 11

A **manufacturing process yields the following products out of the raw materials introduced in the process:**
Main Product X   60% of Raw Materials
By-Product Y   15% of Raw Materials
By Product Z   20% of Raw Materials
Wastage   5% of Raw Materials
Other information is as follows:

a. **Total Cost: Raw Materials 1,000 units of ₹ 9,200; Labour ₹ 8,200; Overheads ₹ 12,000**
b. **One unit of product z requires ½ the raw materials required for one unit of product Y, one unit of product X requires1½ times the raw materials required for product Y.**
c. **Product X required double the time needed for production of one unit of Y and one unit of Z.**
d. **Product Z requires ½ the time required for the production of one unit of product Y.**
e. **Overheads are to be apportioned in the ratio of 6:1:1.**

You are required to CALCULATE the total and per unit of cost of each of the products. (MTP 5 Marks Sep'22)

Answer 11

Statement of Distribution of Costs

Cost Elements	Basis	Total Cost	Main Product X (600 Units)		By-Product Y (150 Units)		By-Product Z (200 Units)	
			Total	Per Unit	Total	Per Unit	Total	Per Unit
Raw Materials	18:3:2	9,200	7,200	12	1,200	8	800	4
Labour	36:3:2	8,200	7,200	12	600	4	400	2
Overheads	6:1:1	12,000	9,000	15	1,500	10	1,500	7.50
Total		29,400	23,400	39	3,300	22	2,700	13.50

Working Notes:

1. **Calculation of Units produced:**

Main Product X	60% of Raw Materials	600 Units
By-Product Y	15% of Raw Materials	150 Units
By Product Z	20% of Raw Materials	200 Units
Wastage 5% of Raw Materials		50 Units 1000 Units

2. **Cost Allocation Raw Materials**

Let Product Z requires 1 unit of raw materials then, Product Y will require 2 units of raw materials and Product X will require 3 units of raw materials.

Product	X		Y		Z Individual Unit ratio
(a)	3	:	2	:	1
Units (b)	600	:	150	:	200
Ratio for Cost Allocation (a*b)	1800	:	300	:	200
Ratio	18	:	3	:	2

Labour:

Let Product Z requires 1 hour of Labour then, Product Y will require 2 hours of Labour and Product X will require 6 hours of Labour.

Product	X		Y		Z
Individual hour ratio (a)	6	:	2	:	1
Units (b)	600		150		200
Ratio for Cost Allocation (a*b)	3600	:	300	:	200
Ratio	36	:	3	:	2

Question 12

ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold. There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2022-23, the selling prices of the items and the total amounts sold were:

X –186 tons sold for ₹3,000 per ton Y –527 tons sold for ₹2,250 per ton

Z –736 tons sold for ₹1,500 per ton

The total joint manufacturing costs for the year were ₹12,50,000.

An additional ₹6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2023, using Net realizable value (NRV) method of joint cost allocation. (MTP 10 Marks April '23) (Same concepts different figures MTP 10 Marks Mar'23, RTP Nov'20)

Answer 12

Statement of Joint Cost allocation of inventories of X, Y and Z

(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Final sales value of total production (Working Note 1)	10,98,000 (366 × ₹3,000)	13,20,750 (587 × ₹2,250)	11,41,500 (761 × ₹1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

Cost of goods sold as on March 31, 2023
(By using Net Realisable Value Method)

	Products			Total
	X	Y	Z	
	(₹)	(₹)	(₹)	(₹)
Allocated joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional costs	--	--	6,20,000	6,20,000
Cost of goods available for sale (CGAS)	4,66,797	5,61,496	8,41,707	18,70,000

Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18 %)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of goods sold	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes

1. **Total production of three products for the year 2022-2023**

Products	Quantity sold in tones	Quantity of ending inventory in tons	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. **Joint cost apportioned to each product:**

$\frac{Total\ Joint\ Cost}{Total\ net\ Realisable\ value}$ X Net Realizable Value of each Product

Total Cost of Product X = $\frac{Rs.12,50,000}{Rs.29,40,250}$ X Rs. 10,98,000 = Rs. 4,66,797

Total Cost of Product Y = $\frac{Rs.12,50,000}{Rs.29,40,250}$ X Rs. 13,20,750= Rs. 5,61,496

Total Cost of Product Z = $\frac{Rs.12,50,000}{Rs.29,40,250}$ X Rs. 5,21,500 = Rs. 2,21,707

Question 13

A company processes a raw material in its Department 1 to produce three products, viz. A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹ 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹ 1,80,000 and ₹ 1,50,000 respectively.

X was further processed in Department 3 at a cost of ₹ 1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (Rs.)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.

Required:

(i) Prepare a statement showing the apportionment of joint costs to A, B and X.

(ii) Present a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.

(iii) Prepare a statement showing the product wise and total profit for the period.

(iv) State with supporting calculations as to whether any or all the products should be further processed or not. (RTP May'18, RTP May'19)(MTP 10 Marks Sep '23)

Answer 13

(i) Statement showing the apportionment of joint costs to A, B and X

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (Rs.)	9,00,000 (Rs. 50 x 18,000)	4,00,000 (Rs. 40 x 10,000)	5,40,000 (Rs. 10 x 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (Rs.)	6,30,000 $\left(\dfrac{Rs.\,12,88,000}{Rs.\,18,40,000}\times Rs.\,9,00,000\right)$	2,80,000 $\left(\dfrac{Rs.\,12,88,000}{Rs.\,18,40,000}\times Rs.\,4,00,000\right)$	3,78,000 $\left(\dfrac{Rs.\,12,88,000}{Rs.\,18,40,000}\times Rs.\,5,40,000\right)$	12,88,000

(ii) Statement showing the cost per kg. of each product (indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (Rs.) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000
Joint cost per kg (Rs.): (I ÷ II)	35	28	7
Further processing Cost per kg. (Rs.)	10 $\left(\dfrac{Rs.\,1,80,000}{18,000kg}\right)$	15 $\left(\dfrac{Rs.\,1,50,000}{10,000kg}\right)$	2 $\left(\dfrac{Rs.\,1,08,000}{54,000kg}\right)$
Total cost per kg (Rs.)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (Rs.)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (Rs.) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (Rs.)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost (Rs.)	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (Rs.)	1,80,000	1,50,000	1,08,000	
Total cost (Rs.)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (Rs.)	4,59,000	35,000	3,96,000	8,90,000

Working Notes 1.

Products	A	B	X
Sales value (Rs.)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price Rs./kg	72 $\left(\dfrac{Rs.\,12,24,000}{17,000kg}\right)$	50 $\left(\dfrac{Rs.\,2,50,000}{5,000kg}\right)$	18 $\left(\dfrac{Rs.\,7,92,000}{44,000kg}\right)$

2. Valuation of closing stock:

Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total

Closing stock (kgs.)	1,000	5,000	10,000	
Cost per kg (Rs.)	45	43	9	
Closing stock value (Rs.)	45,000	2,15,000	90,000	3,50,00
	(Rs. 45 x 1,000 kg)	(Rs. 43 x 5,000 kg)	(Rs.9x10,000 kg)	

(iv)   Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (Rs.)	50	40	10
Selling price per kg after further processing (Rs.) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (Rs.)	22	10	8
Less: Further processing cost per kg (Rs.)	(10)	(15)	(2)
Incremental profit (loss) per kg (Rs.)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

Question 14

A company produces two joint products A and B from the same basic materials. The processing is completed in three departments.

Materials are mixed in Department I. At the end of this process, A and B get separated. After separation, A is completed in the Department II and B in Department III. During a period, 4,00,000 kg of raw material was processed in Department I at a total cost of ₹ 17,50,000, and the resultant 50% becomes A and 40% becomes B and 10% normally lost in processing. In Department II, 1/5th of the quantity received from Department I is lost in processing. A is further processed in Department II at a cost of ₹ 2,60,000.

In Department III, further new material is added to the material received from Department   I and weight mixture is doubled, there is no quantity loss in the department III. Further processing cost (with material cost) in Department III is ₹ 3,00,000.

The details of sales during the said period are:

	Product A	Product B
Quantity sold (kg)	1,50,000	3,00,000
Sales price per kg (₹)	10	4

There were no opening stocks. If these products sold at split-off-point, the selling price of A and B would be ₹ 8 and ₹ 4 per kg respectively.

Required:

(i) PREPARE a statement showing the apportionment of joint cost to A and B in proportion of sales value at split off point.

(ii) PREPARE a statement showing the cost per kg of each product indicating joint cost, processing cost and total cost separately.

(iii) PREPARE a statement showing the product wise profit for the year.

(iv) On the basis of profits before and after further processing of product A and B, give your COMMENT that products should be further processed or not. (RTP Nov '21)

Answer 14

(i)   Calculation of quantity produced

	Dept I (kg)	Dept II (kg)	Dept III (kg)

Input	4,00,000	2,00,000	1,60,000
		(50% of 4,00,000 kg.)	(40% of 4,00,000 kg.)
Weight (lost) or added	(40,000)	(40,000)	1,60,000
	(10% of 4,00,000 kg.)	(1/5th of 2,00,000 kg.)	
	3,60,000	1,60,000	3,20,000
Production of A	2,00,000	1,60,000	--
Production of B	1,60,000	--	3,20,000

(ii) Statement of apportionment of joint cost of dept I

	Product A	Product B
Output (kg)	2,00,000	1,60,000
Selling price per kg (₹)	8	4
Sales value (₹)	16,00,000	6,40,000
Share in Joint cost (5:2)	12,50,000	5,00,000
	(₹ 17,50,000 × 5 ÷ 7)	(₹ 17,50,000 × 2 ÷ 7)

(iii) Statement of cost per kg

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Share in joint cost (₹)	12,50,000	5,00,000
Joint Cost per kg (₹) (A)	7.8125	1.5625
Further processing cost (₹)	2,60,000	3,00,000
Further processing cost per kg (₹) (B)	1.625	0.9375
Total cost per kg (₹) {(A)+(B)}	9.4375	2.5000

(iv) Statement of profit

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Sales (kg)	(1,50,000)	(3,00,000)
Closing stock (kg)	10,000	20,000
	(₹)	(₹)
Sales	15,00,000	12,00,000
	(1,50,000 kg × ₹ 10)	(3,00,000 kg × ₹ 4)
Add: closing stock (at full cost)	94,375	50,000
	(10,000 kg × ₹ 9.4375)	(20,000 kg × ₹ 2.5)
Value of production	15,94,375	12,50,000
Less: Share in joint cost	12,50,000	5,00,000
Further processing cost	2,60,000	3,00,000
Profit	84,375	4,50,000

(v) Profitability statement before and after processing

	Product A		Product B	
	Before (₹)	After (₹)	Before (₹)	After (₹)
Sales Value	16,00,000		6,40,000	
Share in joint costs	12,50,000		5,00,000	
Profit	3,50,000	84,375 (as per iii above)	1,40,000	4,50,000 (as per iii above)

Product A should be sold at split off point and product B after processing because of higher profitability.

Question 15

DISCUSS the treatment of by-product cost in Cost Accounting when they are of small total value.

(RTP Nov '21)

Answer 15

When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

(i) The sales value of the by-products may be **credited to the Costing Profit and Loss Account** and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.

(ii) The sale proceeds of the by-product may be **treated as deductions from the total costs**. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

Question 16

JP Ltd. uses joint production process that produces three products at the split -off point. Joint production costs during the month of July, 2022 were ₹ 33,60,000.

Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000
Sales prices:			
At the split-off	₹ 200		
After further processing	₹ 300	₹ 350	₹ 100
Costs to process after split-off	₹ 6,00,000	₹ 6,00,000	₹ 6,00,000

1. **Other information is as follows:**

2. **Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value. (RTP Nov'22)**

Answer 16

Product A

As the Question says that "Products B and C must be processed further before they can be sold", it means Product A can be sold at the split-off point.

Cost to process Product A after the split-off point   = ₹ 6,00,000

Additional revenue to be earned by processing further = ₹ 3,00,000

(₹ 100 increase in selling price per unit x 3,000 units)

Therefore, Product A will not be processed further, and the sales value at split -off for A will be used for allocating the joint costs.

Sales value at the split-off for A = ₹ 6,00,000 (₹ 200 × 3,000 units)

Product B

Since Product B must be processed further, we use its net realizable value for the joint cost allocation.

Net realizable value of Product B = ₹ 15,00,000

[(₹ 350 × 6,000 units) − ₹ 6,00,000 further processing costs]

Product C

Product C, the by-product, must also be processed further to be sold.

Net realizable value of Product C   = ₹ 3,00,000

[(₹ 100 × 9,000 units) − ₹ 6,00,000 in further processing costs]

Joint Cost Allocation

Joint production cost   = ₹ 33,60,000

Since, by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated

= ₹ 30,60,000

(₹ 33,60,000 - ₹ 3,00,000 NRV of Product C)

Allocation of joint costs between Product A and B will be on the basis of ₹ 6,00,000 : ₹ 15,00,000

Joint Cost allocated to Product= ₹ 30,60,000× $\frac{₹\,6,00,000}{₹21,000}$ ₹ 8,74,286

Question 17

A factory producing article A also produces a by-product B which is further processed into finished product. The joint cost of manufacture is given below:

Material	` 5,000
Labour	` 3,000
Overhead	` 2,000
	` 10,000

Subsequent cost in ` are given below:

	A	B
Material	3,000	1,500
Labour	1,400	1,000
Overhead	600	500
	5,000	3,000

Selling prices are A ` 16,000

B ` 8,000

Estimated profit on selling prices is 25% for A and 20% for B.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of A and B.

(RTP Nov '23) (MTP 5 Marks , Oct '23)

Answer 17

Apportionment of Joint Costs

Particulars	A (`)	B (`)
Selling Price	16,000	8,000
Less: Estimated profit	4,000 (25% of `16,000)	1,600 (20% of ` 8,000)
Cost of sales	12,000	6,400
Less: Selling & Distribution exp. (Refer working note)	267 (` 400 × 2/3)	133 (` 400 × 1/3)
Less: Subsequent cost	5,000	3,000
Share of Joint cost	6,733	3,267

So, Joint cost of manufacture is to be distributed to A & B in the ratio of 6733 : 3267

Statement showing Cost of Production of A and B

Elements of cost	Joint Cost		Subsequent Cost		Total Cost	
	A	B	A	B	A	B
Material	3,367	1,633	3,000	1,500	6,367	3,133
Labour	2,020	980	1,400	1,000	3,420	1,980

Overheads	1,346	654	600	500	1,946	1,154
			Cost of production		11,733	6,267

Working Note:

Calculation of Selling and Distribution Expenses

Particulars	(`)
Total Sales Revenue (` 16,000 + ` 8,000)	24,000
Less: Estimated Profit (` 4,000 + ` 1,600)	(5,600)
Cost of Sales	18,400
Less: Cost of production:	
- Joint Costs	(10,000)
- Subsequent costs (` 5,000 + ` 3,000)	(8,000)
Selling and Distribution expenses (Balancing figure)	400

Question 18

A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarised cost data:

	Joint Expense(₹)	Separate Expenses (₹)	
		Bomex	Cromex
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling Price per unit		100	40
Estimated profit per unit on sale of Cromex			5
Number of units produced		2,000 Units	2,000 Units

The factory uses net realisable value method for apportionment of joint cost to by products.

You are required to prepare statements showing :

    (i)   Joint cost allocable to Cromex

    (ii)   Product wise and overall profitability of the factory for April 2019.

(PYP May'19,5 Marks)

Answer 18

(i)   **Statement Showing Joint Cost Allocation to 'Cromex'**

Particulars	Cromex (₹)
Sales (₹ 40 × 2,000 units)	80,000
Less: Post Split Off Costs (4,000 + 18,000 + 6,000)	(28,000)
Less: Estimated Profit (₹ 5 × 2,000 units)	(10,000)
Joint cost allocable	**42,000**

(ii)   **Statement Showing Product Wise and Overall Profitability**

Particulars	Bomex (₹)	Cromex (₹)	Total (₹)
Sales	2,00,000	80,000	2,80,000

Less: Share in Joint Expenses	**(1,38,000)***	(42,000)	(1,80,000)
Less: Post Split Off Costs	(36,000)	(28,000)	(64,000)
Profit	**26,000**	**10,000**	**36,000**
(*) 1,80,000 – 42,000			

Question 19

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'. (PYP 5 Marks Nov 20)

Answer 19

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)	5,40,000		
Processing cost:			
- Labour cost (₹ 2,25,000 × 66%)	1,48,500		
- Other costs (₹ 2,25,000 - 1,48,500)	76,500		
Total joint cost	**7,65,000**		
(i) Apportionment of joint costs between the joint products			
Labour cost in the ratio of 100:80	1,48,500	82,500 $\left(\dfrac{1,48,500 \times 100}{180}\right)$	66,000 $\left(\dfrac{1,48,500 \times 80}{180}\right)$
Other joint costs (including material)	6,16,500	5,36,087	80,413

in the ratio of output (5,400:810)		$\left(\dfrac{6,16,500 \times 5,400}{6,210}\right)$	$\left(\dfrac{6,16,500 \times 810}{6,210}\right)$
(ii) Total product cost	7,65,000	**6,18,587**	**1,46,413**

* No. of units produced of Product M = 6750 units x 80% = 5400 units No. of units produced of Product N = 6750 units x 12% = 810 units

Question 20

Narrate the terms 'Joint Products' and 'By-Products' with an example of each term. (PYP 4 Marks Dec '21)

Answer 20

(i) Joint Products - Joint products represent "two or more products separated in the course of the same processing operation usually requiring further processing, each product being in such proportion that no single product can be designated as a major product".

In other words, two or more products of equal importance, produced, simultaneously from the same process, with each having a significant relative sale value are known as joint products. **For example**, in the oil industry, gasoline, fuel oil, lubricants, paraffin, coal tar, asphalt and kerosene are all produced from crude petroleum. These are known as joint products.

(ii) **By-Products** - These are defined as "products recovered from material discarded in a main process, or from the production of some major products, where the material value is to be considered at the time of severance from the main product." Thus, by-products emerge as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short, a by-product is a secondary or subsidiary product which emanates as a result of manufacture of the main product.

The point at which they are separated from the main product or products is known as split-off point. The expenses of processing are joint till the split –off point.

Examples of by-products are molasses in the manufacture of sugar, tar, ammonia and benzole obtained on carbonisation of coal and glycerine obtained in the manufacture of soap.

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> This theory question tested the basic knowledge of Joint product and By product with example. Most of the examinees answered it partially correct. Performance of the examinees was below average.

Question 21

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-realizable value method of allocating joint costs.

You are required to prepare:

(i) Schedule showing the allocation of joint costs.

(ii) Calculate the Cost of goods sold of each product and the cost of each item in Inventory.

(iii) A comparative statement of Gross profit. **(PYP 10 Marks Jan 21)**

Answer 21

(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 realizable 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 products for the year 2019-2020

Products	Quantity sold in litres	Quantity of closing inventory in litres	Total production	Closing inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)}	(5) = (3)/ (4)
X	10,000	5,000	15,000	100/3
Y	15,000	--	15,000	--

	Z	22,500	7,500	30,000	25

2. Joint cost apportioned to each product:

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

Joint cost of product X $= \frac{\text{Rs.}5,98,000}{\text{Rs.}11,50,000} \times$ Rs. 4,50,000 = Rs. 2,34,000

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

Joint cost of product Y $= \frac{\text{Rs.}5,98,000}{\text{Rs.}11,50,000} \times$ Rs. 4,00,000 = Rs. 2,08,000

Question 22

OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the spilt-off point - S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and N can be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oi l and processing it were ₹ 40,000. Other details are as follows:

Product	Further processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A	-	20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions. (PYP 5 Marks July 21)

Answer 22

Statement of Comparison of Profits before and after further processing

		S (₹)	P (₹)	N (₹)	A (₹)	Total (₹)
A.	Sales at split off point	20,000	12,000	28,000	20,000	80,000
B.	Apportioned Joint Costs (Refer Working Note)	**10,000**	**6,000**	**14,000**	**10,000**	40,000
C.	**Profit at split-off point**	10,000	6,000	14,000	10,000	40,000
D.	Sales after further processing	1,20,000	40,000	48,000	-	2,08,000
E.	Further processing cost	80,000	32,000	36,000	-	1,48,000
F.	Apportioned Joint Costs (Refer Working Note)	10,000	6,000	14,000	-	-
G.	**Profit if further processing (D – E + F)**	**30000**	**2,000**	**(-) 2,000**	-	-
H.	Increase/ decrease in profit after further processing (G- C)	20,000	- 4000	- 16,000	-	-

Suggested Product to be further processed for maximizing profits:

On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e. ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

Working Note:

Apportionment of joint costs on the basis of Sales Value at split -off point

Apportioned joint cost = $\frac{\text{Total joint cost}}{\text{Total Sales value at split−off point}} \times$ Sales value of each product

Where, Total Joint cost = ₹ 40,000

Total sales at split off point (S, P, N and A) = 20,000 + 12,000 + 28,000 + 20,000 = ₹ 80,000

Share of S in joint cost = $\frac{\text{Rs.40,000}}{\text{Rs.80,000}} \times$ Rs. 20,000 = Rs. 10,000

Share of P in joint cost = $\frac{\text{Rs.40,000}}{\text{Rs.80,000}} \times$ Rs. 12,000 = Rs. 6,000

Share of N in joint cost = $\frac{\text{Rs.40,000}}{\text{Rs.80,000}} \times$ Rs. 28,000 = Rs. 14,000

Share of A in joint cost = $\frac{\text{Rs.40,000}}{\text{Rs.80,000}} \times$ Rs. 20,000 = Rs. 10,000

Alternative Solution
Decision for further processing of Product S, P and N

Products	S (₹)	P (₹)	N (₹)
Sales revenue after further processing	1,20,000	40,000	48,000
Less: sales value at split-off point	20,000	12,000	28,000
Incremental Sales Revenue	**1,00,000**	**28,000**	**20,000**
Less: Further Processing cost	80,000	32,000	36,000
Profit/ loss arising due to further processing	**20,000**	**(-)4,000**	**(-)16,000**

Suggested Product to be further processed for maximizing profits:
On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e. ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

It was a practical problem on treatment of joint cost and identification of products which has to be further processed for maximizing profits. Many examinees could not present the answer in a convincing manner in spite of arriving at the correct decision. Performance of the examinees was average.

Question 23

RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for the month of April, 2022.

Cost incurred up to separation point: ₹ 10,000

	Product X	Product Y	Product Z
Output (in Litre)	100	70	80
₹　　　₹　　₹			
Cost incurred after separation point	2,000	1,200	800
Selling Price per Litre:			
After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method of apportionment of pre-separation cost.

Advise the management whether, on purely financial consideration, the three products are to be processed further or not.(PYP 5 Marks May22)

Answer 23

Statement showing profit/loss by each product after further processing products

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)
Sales value after further processing	5,000	5,600	4,800
Less: Further processing cost	2,000	1,200	800
Less: Joint Cost* (as apportioned)	4,000	2,800	3,200
Profit/(loss)	(1,000)	1,600	800

* Statement showing apportionment of joint cost on the basis of physical units

	Product X (in ₹)	Product Y(in ₹)	Product Z (in ₹)	Total (₹)
Output (in litre)	100	70	80	250
Weight	0.4 (100/250)	0.28 (70/250)	0.32 (80/250)	
Joint cost apportioned	4,000	2,800	3,200	

(ii)Decision whether to process further or not

	Product X(in ₹)	Product Y(in ₹)	Product Z(in ₹)
Incremental Revenue	2,500 [(50-25) × 100]	700 [(80-70) × 70]	1,200 [(60-45) × 80]
Less: Further processing cost	2,000	1,200	800
Incremental profit /(loss)	500	(500)	400

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)	Total
Sales	2500	4900	3600	11000
Pre separation costs	4000	2800	3200	10000
Profit/(Loss)	(1500)	2100	400	1000

It is advisable to further process only product X and Z and to sale product Y at the point of separation.

Question 24

ASR Ltd mainly produces Product 'L' and gets a by-Product 'M' out of a joint process. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main product. During the month of October 2022, company incurred joint production costs of ₹ 4,00,000. The main Product 'L' is not marketable at the split off point. Thus, it has to be processed further. Details of company's operation are as under:

Particulars	Product L	By- Product M
Production (units)	10,000	200
Selling price per kg	₹ 45	₹ 5
Further processing cost	₹ 1,01,000	-

You are required to find out:

(i)   Profit earned from Product 'L'.

(ii) Selling price per kg of product 'L', if the company wishes to earn a profit of ₹ 1,00,000 from the above production. (PYP 5 Marks Nov 22)

Answer 24

(i) **Calculation of profit on product 'L'**

Particular	₹
Sales	4,50,000
Less: Further processing cost	(1,01,000)
	3,49,000
Less: Joint Production Cost*	(3,99,000)
loss	(50,000)

*Joint Production Cost = [4,00,000 – (200 × 5)] = 3,99,000

(ii) **Calculation of desired selling price of product 'L'**

$$\text{Desired Selling Price} = \frac{\text{Desired Profit} + \text{Total Cost}}{\text{Units Measured}}$$

$$= \frac{1,00,000 + 1,01,000 + 3,99,000}{10,000} = \text{Rs. 60 per kg.}$$

Question 25

ABC Company produces a Product 'X' that passes through three processes: R, S and T. Three types of raw materials, viz., J, K, and L are used in the ratio of 40:40:20 in process R. The output of each process is transferred to next process. Process loss is 10% of total input in each process. At the stage of output in process T, a by-product 'Z' is emerging and the ratio of the main product 'X' to the by-product 'Z' is 80:20. The selling price of product 'X' is `60 per kg.

The company produced 14,580 kgs of product 'X'

Material price : Material J @ ` 15 per kg; Material K @ ` 9 per kg.

Material L@ ` 7 per kg Process costs are as follows:

Process	Variable cost per kg (`)	Fixed cost of Input (`)
R	5.00	42,000
S	4.50	5,000
T	3.40	4,800

The by-product 'Z' cannot be processed further and can be sold at ` 30 per kg at the splitoff stage. There is no realizable value of process losses at any stage.

Required:

Present a statement showing the apportionment of joint costs on the basis of the sales value of product 'X' and by-product 'Z' at the split- off point and the profitability of product 'X' and by-product 'Z. (PYP 10 Marks, May '23)

Answer 25

Working Notes:

1. **Calculation of Input of Raw Material**

Let assume total raw material in Process R be 100%

∴ Output of Process T will be equal to:

Input R	100%
10% Normal Loss	`10
Input S	90%
10% Normal loss	9
Input T	81%
10% Normal loss	8.1
Output of T	72.9
Actual output of X	14,580 units
Which is 80% of the total output	

∴ Output of Process T

$$= \frac{14,580}{80\,\%} = 18,225$$

∴ Input of Process R = $\frac{18225}{72.9\%}$ = 25,000 kgs

Alternative presentation for Calculation of Input in Process R, S and T

Working notes:

Process T (Kg.)			
To Input (Transfer from process S)	20,250	By Normal loss	2,025
		By Output Product X	14,580
		By output of by-product Z	3,645
	20,250		20,250

Process S (kg.)			
To Input (Transfer from process S)	22,500	By Normal loss (10%)	2,250
		By Transfer to process T	20,250
	22,500		22,500

Process R (kg.)			
To Input	25,000	By Normal loss (10%)	2,500
		By Transfer to process S	22,500
	25,000		25,000

2. **Calculation of Joint Cost**

Process	Inputs	Variable cost per kg	Variable cost	Fixed Cost	Total Cost
		`	`	`	`
R	25,000	5	1,25,000	42,000	1,67,000
S	22,500	4.5	1,01,250	5,000	1,06,250
T	20,250	3.4	68,850	4,800	73,650
					3,46,900

Raw material J	10000 x 15	`	1,50,000
K	10000 x 9	`	90,000
L	5000 x 7	`	35,000
			2,75,000
Add: Processing cost (as above)		`	3,46,900
Total Joint Cost			6,21,900

i) **Statement showing apportionment of Joint Cost**

Particulars	Product X	By-Product Z	Total
Units	14,580	3,645	

Selling price (`)	60	30	
Sales Value (`)	8,74,800	1,09,350	9,84,150
(` 6,21,900 to apportioned in ratio of sales value at split off point)	5,52,800	69,100	6,21,900

ii) **Statement of Profitability**

Particulars	Product X	By-Product Z	Total
Sales Value	8,74,800	1,09,350	9,84,150
Joint Cost (As apportioned above)	(5,52,800)	(69,100)	(6,21,900)
Profit	3,22,000	40,250	3,62,250

Chapter 12
Service Costing

Question 1 (Illustration)

A lodging home is being run in a small hill station with 100 single rooms. The home offers concessional rates during six off- season (Winter)months in a year when numbers of visitor are limited. During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending on 31st March. [Assume a month to be of 30 days].

(i) Occupancy during the season is 80% while in the off- season it is 40% only.

(ii) Total investment in the home is ` 200 lakhs of which 80% relate to buildings and balance for furniture and equipment.

(iii) Expenses:

- Staff salary [Excluding room attendants]: ` 5,50,000
- Repairs to building   : ` 2,61,000
- Laundry charges : ` 80, 000
- Interior   : ` 1,75,000
- Miscellaneous expenses : ` 1,90,800

(iv) Annual depreciation is to be provided for buildings @ 5% and on furniture and equipment @ 15% on straight-line basis.

(v) Room attendants are paid ` 10 per room day on the basis of occupancy of the rooms in a month.

(vi) Monthly lighting charges are ` 120 per room, except in four months in winter when it is ` 30 per room.

You are required to WORK OUT the room rent chargeable per day both during the season and the off-season months on the basis of the foregoing information. (Old & New SM) (Same concept different figures MTP 10 Marks, Oct '21, PYP 10 Marks Nov '19)

Answer 1

Working Notes:

(i) **Total Room days in a year**

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	100 Rooms × 80% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 100% = 14,400
Off-season – 40% Occupancy	100 Rooms × 40% × 6 months × 30 days in a month = 7,200 Room Days	7,200 Room Days × 50% = 3,600
Total Room Days	14,400 + 7,200 = 21,600 Room Days	18,000 Full Room days

(ii) **Lighting Charges:**

It is given in the question that lighting charges for 8 months is `120 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	100 Rooms × 80% × 6 months × `120 per month = ` 57,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	100 Rooms × 40% × 2 months × `120 per month = ` 9,600
Off- season & -winter – 40% Occupancy months)	100 Rooms × 40% × 4 months × ` 30 per month = ` 4,800
Total Lighting charges	` 57,600+ 9,600 + 4,800 = ` 72,000

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Statement of total cost:

	(`)
Staff salary	5,50,000
Repairs to building	2,61,000
Laundry & Linen	80,000
Interior	1,75,000
Sundries Expenses	1,90,800
Depreciation on Building (` 200 Lakhs × 80% × 5%)	8,00,000
Depreciation on Furniture & Equipment (` 200 Lakhs × 20% × 15%)	6,00,000
Room attendant's wages (` 10 per Room Day for 21,600 Room Days)	2,16,000
Lighting charges	72,000
Total cost	29,44,800
Add: Profit Margin (20% on Room rent or 25% on Cost)	7,36,200
Total Rent to be charged	36,81,000

Calculation of Room Rent per day:

Total Cost / Equivalent Full Room days = ` 36,81,000/ 18,000 = `204.50 Room Rent during Season – `204.50

Room Rent during Off season = `204.50 × 50% = ` 102.25

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical question relating to the topic 'Costing of Service Sector'. Examinees were required to calculate hotel room rent chargeable per day. Most of the examinees could not compute the total cost correctly and hence could not work out room rent chargeable per day during season and off-season. Performance of the examinees was below average.

Question 2 (Illustration)

ABC Hospital runs a Critical Care Unit (CCU) in a hired building. CCU consists of 35 beds and 5 more beds can be added, if required.

Rent per month - ` 75,000

Supervisors – 2 persons – `25,000 Per month – each

Nurses – 4 persons – ` 20,000 per month – each

Ward Boys – 4 persons – ` 5,000 per month – each

Doctors paid ` 2,50,000 per month – paid on the basis of number of patients attended and the time spent by them

Other expenses for the year are as follows:

Repairs (Fixed) – ` 81,000

Food to Patients (Variable) – ` 8,80,000

Other services to patients (Variable) – `3,00,000

Laundry charges (Variable) – ` 6,00,000

Medicines (Variable) – ` 7,50,000

Other fixed expenses – ` 10,80,000

Administration expenses allocated – ` 10,00,000

It was estimated that for 150 days in a year 35 beds are occupied and for 80 days only 25 beds are occupied.

The hospital hired 750 beds at a charge of ` 100 per bed per day, to accommodate the flow of patients. However, this does not exceed more than 5 extra beds over and above the normal capacity of 35 beds on any day.

You are required to –

(1) CALCULATE contribution per Patient day, if the hospital recovers on an average ` 2,000 per day from each patient.

(2) FIND OUT Breakeven point for the hospital. (Old & New SM) (MTP 10 Marks Oct '23)

Answer 2

Working Notes:

1) Calculation of number of Patient days

35 Beds × 150 days =	5,250
25 Beds × 80 days =	2,000
Extra beds =	750
Total =	8,000

Statement of Profitability

Particulars	Amount	Amount
Income for the year (` 2,000 per patient per day × 8,000 patient days)		1,60,00,000
Variable Costs:		
Doctor Fees (` 2,50,000 per month × 12)	30,00,000	
Food to Patients (Variable)	8,80,000	
Other services to patients (Variable)	3,00,000	
Laundry charges (Variable) – (`)	6,00,000	
Medicines (Variable) – (`)	7,50,000	
Bed Hire Charges (`100 × 750 Beds)	75,000	
Total Variable costs		56,05,000
Contribution		1,03,95,000
Fixed Costs:		
Rent (` 75,000 per month × 12)	9,00,000	
Supervisor (2 persons × `25,000 ×12)	6,00,000	
Nurses (4 persons × ` 20,000 × 12)	9,60,000	
Ward Boys (4 persons × ` 5,000 × 12)	2,40,000	
Repairs (Fixed)	81,000	
Other fixed expenses – (`)	10,80,000	
Administration expenses allocated – (`)	10,00,000	
Total Fixed Costs		48,61,000
Profit		55,34,000

(1) Calculation of Contribution per Patient day
Total Contribution – ` 1,03,95,000 Total Patient days – 8,000
Contribution per Patient day – ` 1,03,95,000 / 8,000 = ` 1,299.375

(2) Breakeven Point = Fixed Cost / Contribution per Patient day
= ` 48,61,000 / `1,299.375
= 3,741 patient days

Question 3

Calculate a suggested fare per passenger-km from the following information for a Mini Bus:

(i)   Length of route: 30 km

(ii) Purchase price Rs. 4,00,000

(iii) Part of above cost met by loan, annual interest of which is Rs. 10,000 p.a.

(iv) Other annual charges: Insurance Rs. 15,000, Garage rent Rs. 9,000, Road tax Rs. 3,000, Repairs & maintenance Rs. 15,000, Administrative charges Rs. 5,000.

(v)   Running Expenses: Driver & Conductor Rs. 5,000 p.m., Repairs/Replacement of tyre-tube Rs. 3,600 p.a., Diesel and oil cost per km Rs. 5.

(vi) Effective life of vehicle is estimated at 5 years at the end of which it will have a scrap value of Rs. 10,000.

(vii) Mini Bus has 20 seats and is planned to make Six no. two way trips for 25 days/p.m.

(viii) Provide profit @ 20% of total revenue. (MTP Aug.'18 5Marks)

Answer 3

Working Notes:

Depreciation per annum: $= \dfrac{\text{Purchase price} - \text{Scrap value}}{\text{Estimated life}}$

$= \dfrac{\text{Rs.}4,00,000 - \text{Rs.}10,000}{5 \text{years}} = \text{Rs.}78,000$

= Total distance travelled by mini-bus in 25 days:

= Length of the route (two-sides) × No. of trips per day × No. of days

= 60km × 6 trips × 25 days = 9,000 km

1. Total Passenger-Km:

= Total distance travelled by mini-bus in 25 days × No. of seats

= 9,000 km × 20 seats = 1,80,000 passenger-km

Statement suggesting fare per passenger-km

Particulars		Cost per annum	Cost per month
		Rs.	Rs.
Fixed expenses:			
Insurance		15,000	
Garage rent		9,000	
Road tax		3,000	
Administrative charges		5,000	
Depreciation		78,000	
Interest on loan		10,000	
		1,20,000	**10,000**
Running expenses:			
Repair and maintenance		15,000	1,250
Replacement of tyre-tube		3,600	300
Diesel and oil cost (9,000 km × Rs. 5)		-	45,000
Driver and conductor's salary		-	5,000
Total cost (per month)			61,550.00
Add: Profit 20% of total revenue cost or 25% of total cost			15,387.50
Total revenue			76,937.50
Rate per passenger-km Rs. 76,937.50/1,80,000 passenger km = 0.42743 i.e.,	= 0.43	i.e., 43 paise.

Question 4

DKG Airlines owns single passenger aircraft and operates between Melbourne and Delhi only. Flight leaves Melbourne on Monday and Thursday and departs from Delhi on Wednesday and Saturday. DKG Airlines cannot afford any more flight between Melbourne and Delhi. Only economical class seats are available on its flight and all tickets are booked by travel agents. The following information are collected.

Seating capacity per plane	360
Average passengers per flight	250
Flights per week	4
Flights per year	208
Average one-way fare	Rs.50,000
Variable fuel cost	Rs.28,00,000 per flight
Food service to passengers (not charged to Passengers)	Rs.2,600 per passenger

Commission to travel agents	15% of fare
Fixed annual lease cost allocated to each flight	Rs. 15,30,000 per flight
Fixed ground services (maintenance, check in, Baggage handling cost) allocated to each flight	Rs.1,70,000 per flight
Fixed salaries of flight crew allocated to each flight	Rs.6,50,000 per flight

For the sake of simplicity assume that fuel cost is unaffected by the actual number of passengers on a flight.

Required:

(i) Calculate the operating income that DKG Airlines makes on each way flight between Melbourne and Delhi?

(ii) The market research department of DKG Airlines indicates that lowering the average one-way fare to Rs. 48,000 and increase in agents' commission to 17.5% will increase the average number of passenger per flight to 275. DECIDE whether DKG Airlines should lower its fare or not? (MTP Oct'18, 10Marks)

Answer 4

(i) Statement of operating income of DKG Airlines for Melbourne-Delhi flight (one way)

Particulars	Amount(₹)	Amount(₹)
Fare received (per flight): 250 passengers × ₹ 50,000		1,25,00,000
Variable costs (per flight):		
- Fuel cost	28,00,000	
- Food (250 × ₹ 2,600)	6,50,000	
- Commission to Travel Agents (15% of ₹ 1,25,00,000)	18,75,000	(53,25,000)
Contribution per flight		71,75,000
Fixed cost (per flight):		
Annual lease cost	15,30,000	
Fixed ground service costs	1,70,000	
Salaries of flight crew	6,50,000	(23,50,000)
Operating income per flight		48,25,000
(ii) Operating income of DKG Airlines per Melbourne-Delhi flight (one way) after reduction in fare		
Fare received (per flight): 275 passengers × ₹ 48,000 Variable costs (per flight):		1,32,00,000
Fuel cost	28,00,000	
Food (275 × ₹ 2,600)	7,15,000	
Commission to Travel Agents (17.5% of ₹ 1,32,00,000)	23,10,000	(58,25,000)
Contribution per flight		73,75,000

Excess contribution due to lowering of fare (₹ 73,75,000 – ₹ 71,75,000) = ₹ 2,00,000. DKG Airlines should lower its fare as it would increase its contribution by ₹ 2,00,000.

Question 5

KR Resorts (P) Ltd. offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to DETERMINE the tariff to be charged to the customers for different types of rooms on the basis of following information:

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3

times of 'deluxe room'. Annual expenses are as follows:

Particulars	Amount (Rs. lakhs)
Staff salaries	780.00
Lighting, Heating and Power	350.00
Repairs, Maintenance and Renovation	220.00
Linen	60.00
Laundry charges	34.00
Interior decoration	85.00
Sundries	36.28

An attendant for each room was provided when the room was occupied and he was paid Rs. 500 per day towards wages. Further, depreciation is to be provided on building @ 5% on Rs. 900 lakhs, furniture and fixtures @ 10% on Rs. 90 lakhs and air conditioners @ 10% on Rs. 75 lakhs. Profit is to be provided @ 25% on total taking and assume 360 days in a year. (MTP 10 Marks May 20) (Same concepts but different figures MTP March '18, 10 Marks) (RTP Nov '23)

Answer 5

Total cost statement of KR Resort (P) Limited

Particulars	Cost per annum (Rs. in lakhs)
Staff Salaries	780.00
Room Attendant's Wages (Refer working note 3)	286.20
Lighting, Heating & Power	350.00
Repairs, Maintenance & Renovation	220.00
Linen	60.00
Laundry charges	34.00
Interior Decoration	85.00
Sundries	36.28
Depreciation: (Refer working note 4)	
- Building	45.00
- Furniture & Fixture	9.00
- Air Conditioners	7.50
Total cost for the year	1912.98

Computation of profit:

Let Rs. x be the rent for deluxe from.
Equivalent deluxe room days are 90,720 (Refer working note 2)

Total takings = Rs. 90,720x

Profit is 25% of total takings.

Profit = 25% of Rs. 90,720x = Rs. 22,680x Total takings

= Total Cost + Profit

Rs. 90,720x = Rs. 19,12,98,000 + Rs. 22,680x Rs. 90,720x -Rs. 22,680x = Rs.

19,12,98,000 Rs. 68,040x = Rs. 19,12,98,000

$X = \frac{Rs.19,12,98,000}{Rs.68,040} = Rs. 2,811.55$

Rent to be charged for deluxe room	Rs. 2,811.55
Rent to be charged for super deluxe room = Rent of deluxe room x 2 = Rs. 2,811.55 x 2	Rs. 5,623.10
Rent to be charged for luxury suite =	Rs. 8,434.65

Rent of Super Deluxe room x 1.5 = Rs. 5,623.10 x 1.5	

Working Notes:

(1) Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400
Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200
Luxury Suite	40 rooms x 360 days x 60% occupancy	8,640
	Total	57,240

(2) Computation of equivalent deluxe room days

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore, equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
	Total	90,720

(3) Computation of room attendant's wages

Room occupancy days @ Rs. 500 per day = 286.2 lakhs (i.e. 57,240 days ×Rs. 500)

(4) Computation of Depreciation per annum

Particulars	Cost (Rs.)	Rate of Depreciation	Depreciation (Rs.)
Building	9,00,00,000	5%	45,00,000
Furniture & Fixtures	90,00,000	10%	9,00,000
Air Conditioners	75,00,000	10%	7,50,000

Question 6

EXPLAIN standing charges and running charges in the case of transport organizations. LIST three examples of both. (MTP 5 Marks, Oct '20)

Answer 6

Standing Charges: These are the fixed costs that remain constant irrespective of the distance travelled. These costs include the following-

- Insurance
- License fees
- Salary to Driver, Conductor, Cleaners, etc. if paid on monthly basis
- Garage costs, including garage rent
- Depreciation (if related to efflux of time)
- Taxes Administration expenses, etc.

Running Charges: These costs are generally associated with the distance travelled. These costs include the following-

- Petrol and Diesel
- Lubricant oils,
- Wages to Driver, Conductor, Cleaners, etc. if it is related to operations

- Depreciation (if related to activity) Any other variable costs identified

Question 7

GMCS Ltd. collects raw milk from the farmers of Ramgarh, Pratapgarh and Devgarh panchayats and processes this milk to make various dairy products. GMCS Ltd. has its own vehicles (tankers) to collect and bring the milk to the processing plant. Vehicles are parked in the GMCS Ltd.'s garage situated within the plant compound. Following are the information related with the vehicles:

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles assigned	4	3	5
No. of trips a day	3	2	4
One way distance from the processing plant	24 k.m.	34 k.m.	16 k.m.
Fess & taxes per month (Rs.)	5,600	6,400	---

All the 5 vehicles assigned to Devgarh panchayat, were purchased five years back at a cost of Rs. 9,25,000 each. The 4 vehicles assigned to Ramgarh panchayat, were purchased two years back at a cost of Rs. 11,02,000 each and the remaining vehicles assigned to Pratapgarh were purchased last year at a cost of Rs. 13,12,000 each. With the purchase of each vehicle a two years free servicing warranty is provided. A vehicle gives 10 kmpl mileage in the first two year of purchase, 8 kmpl in next two years and 6 kmpl afterwards. The vehicles are subject to depreciation of 10% p.a. on straight line basis irrespective of usage. A vehicle has the capacity to carry 10,000 litres of milk but on an average only 70% of the total capacity is utilized.

The following expenditures are related with the vehicles:

Salary of Driver (a driver for each vehicle)	Rs. 24,000 p.m.
Salary to Cleaner (a cleaner for each vehicle)	Rs. 12,000 p.m.
Allocated garage parking fee	Rs. 4,200 per vehicle per month
Servicing cost	Rs. 15,000 for every complete 5,000 k.m. run.
Price of diesel per litre	Rs. 78.00

From the above information you are required to CALCULATE

(i) Total operating cost per month for each vehicle. (Take 30 days for the month) Vehicle operating cost per litre of milk. (MTP 10 Marks , Mar'21)

Answer 7

(i) Calculation of Operating Cost per month for each vehicle

	Ramgarh (Rs.)	Pratapgarh (Rs.)	Devgarh (Rs.)	Total (Rs.)
A. Running Costs:				
- Cost of diesel (Working Note- 2)	1,68,480	95,472	2,49,600	5,13,552
- Servicing cost (Working Note- 3)	45,000	-	45,000	90,000
	2,13,480	95,472	2,94,600	6,03,552
B. Fixed Costs:				
- Salary to drivers	96,000 (4 drivers × Rs. 24,000)	72,000 (3 drivers × Rs. 24,000)	1,20,000 (5 drivers × Rs. 24,000)	2,88,000
- Salary to cleaners	48,000 (4 cleaners ×	36,000 (3 cleaners ×	60,000 (5 cleaners ×	1,44,000

	Rs. 12,000)	Rs. 12,000)	Rs. 12,000)	
- Allocated garage parking fee	16,800 (4 vehicles × Rs.4,200)	12,600 (3 vehicles × Rs.4,200)	21,000 (5 vehicles × Rs.4,200)	50,400
- Depreciation (Working Note- 4)	36,733	32,800	38,542	1,08,075
- Fess & taxes	5,600	6,400	---	12,000
	2,03,133	1,59,800	2,39,542	6,02,475
Total [A + B]	4,16,613	2,55,272	5,34,142	12,06,027
Operating Cost per vehicle	1,04,153 (Rs.4,16,613 ÷ 4 vehicles)	85,091 (Rs.2,55,272 ÷ 3 vehicles)	1,06,828 (Rs.5,34,142 ÷ 5 vehicles)	1,00,502 (Rs.12,06,027 ÷ 12 vehicles)

(ii) Vehicle operating cost per litre of milk

$$\frac{\text{Total Operating Cost per Month}}{\text{Total Milk Carried a Month}} = \frac{\text{Rs.12,06,027}}{\text{79,80,000 Litres(Working Note}-5)} = \text{Rs. 0.15}$$

Working Notes:

1. Distance covered by the vehicles in a month

Route		Total Distance (in K.M.)
Ramgarh	(4 vehicles × 3 trips × 2 × 24 km. × 30 days)	17,280
Pratapgarh	(3 vehicles × 2 trips × 2 × 34 km. × 30 days)	12,240
Devgarh	(5 vehicles × 4 trips × 2 × 16 km. × 30 days)	19,200

2. Cost of diesel consumption

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Mileage per litre of diesel	8 kmpl	10 kmpl	6 kmpl
Diesel consumption (Litre)	2,160	1,224	3,200
	(17,280 ÷ 8)	(12,240 ÷ 10)	(19,200 ÷ 6)
Cost of diesel consumption @ Rs. 78 per litre (Rs.)	1,68,480	95,472	2,49,600

3. Servicing Cost

	Ramgarh	Pratapgarh	Devgarh
Total distance travelled (K.M.)	17,280	12,240	19,200
Covered under free service warranty	No	Yes	No
No. of services required	3 (17,280 k.m. ÷ 5,000 k.m.)	2 (12,240 k.m. ÷ 5,000 k.m.)	3 (19,200 k.m. ÷ 5,000 k.m.)
Total Service Cost (Rs.)	45,000 (Rs. 15,000 × 3)	---	45,000 (Rs. 15,000 × 3)

4. Calculation of Depreciation

	Ramgarh	Pratapgarh	Devgarh
No. of vehicles	4	3	5
Cost of a vehicle (Rs.)	11,02,000	13,12,000	9,25,000
Total Cost of vehicles (Rs.)	44,08,000	39,36,000	46,25,000

Depreciation per month (Rs.)	36,733 $\left(\dfrac{\text{Rs. }44,08,000 \times 10\%}{12 \text{ months}}\right)$	32,800 $\left(\dfrac{\text{Rs. }39,36,000 \times 10\%}{12 \text{ months}}\right)$	38,542 $\left(\dfrac{\text{Rs. }46,25,000 \times 10\%}{12 \text{ months}}\right)$

5. **Total volume of Milk Carried**

Route		Milk Qty. (Litre)
Ramgarh	(10,000 ltr. × 0.7 × 4 vehicles × 3 trips × 30 days)	25,20,000
Pratapgarh	(10,000 ltr. × 0.7 × 3 vehicles × 2 trips × 30 days)	12,60,000
Devgarh	(10,000 ltr. × 0.7 × 5 vehicles × 4 trips × 30 days)	42,00,000
		79,80,000

Question 8

DIFFERENCIATE between Service costing and Product costing (MTP 5 Marks, March '21)

Answer 8

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.

Question 9

Harry Transport Service is a Delhi based national goods transport service provider, owning five trucks for this purpose. The cost of running and maintaining these trucks are as follows:

Particulars	Amount
Diesel cost	**Rs.15 per km.**
Engine oil	**Rs. 4,200 for every 14,000 km.**
Repair and maintenance	**Rs.12,000 for every 10,000 km.**
Driver's salary	**Rs. 20,000 per truck per month**
Cleaner's salary	**Rs. 7,000 per truck per month**
Supervision and other general expenses	**Rs.15,000 per month**
Cost of loading of goods	**Rs. 200 per Metric Ton (MT)**

Each truck was purchased for Rs. 20 lakhs with an estimated life of 7,20,000 km. During the next month, it is expecting 6 bookings, the details of which are as follows:

Sl. No.	Journey	Distance (in km)	Weight - Up (in MT)	Weight - Down (in MT)
1.	**Delhi to Kochi**	**2,700**	**15**	**7**
2.	**Delhi to Guwahati**	**1,890**	**13**	**0**
3.	**Delhi to Vijayawada**	**1,840**	**16**	**0**
4.	**Delhi to Varanasi**	**815**	**11**	**0**
5.	**Delhi to Asansol**	**1,280**	**13**	**5**

6.	Delhi to Chennai	2,185	11	9
	Total	**10,710**	**79**	**21**

Required:

(i) **CALCULATE the total absolute Ton-km for the next month.**

(ii) **CALCULATE the cost per ton-km. (MTP 10 Marks, April.'21)**

Answer 9

(i) **Calculation of Absolute Ton-km for the next month:**

Journey	Distance (in km)	Weight-Up (in MT)	Ton-km	Weight - Down (in MT)	Ton-km	Total
	(a)	**(b)**	**(c) = (a)×(b)**	**(d)**	**(e) = (a)×(d)**	**(f) = (c)+(e)**
Delhi to Kochi	2,700	15	40,500	7	18,900	59,400
Delhi to Guwahati	1,890	13	24,570	0	0	24,570
Delhi to Vijayawada	1,840	16	29,440	0	0	29,440
Delhi to Varanasi	815	11	8,965	0	0	8,965
Delhi to Asansol	1,280	13	16,640	5	6,400	23,040
Delhi to Chennai	2,185	11	24,035	9	19,665	43,700
Total	10,710	79	1,44,150	21	44,965	1,89,115

Total absolute Ton-Km = 1,89,115 ton-km

(ii) Calculation of cost per ton-km:

Particulars	Amount (Rs.)	Amount (Rs.)
A. Running cost:		
- Diesel Cost {Rs.15 × (10,710 × 2)}	3,21,300	
- Engine oil cost (Rs.4,200 / 14,000 km× 21,420 km)	6,426	
- Cost of loading of goods {Rs.200 × (79 + 21)}	20,000	
- Depreciation (Rs. 20,00,000/7,20,000 km × 21,420km)	59,500	4,07,226
B. Repair & Maintenance Cost ($\frac{Rs.12,000}{10,000km}$ × 21,420km)		25,704
C. Standing Charges		
- Drivers' salary (Rs.20,000 × 5 trucks)	1,00,000	
- Cleaners' salary (Rs.7,000 × 5 trucks)	35,000	
- Supervision and other general expenses	15,000	1,50,000
Total Cost (A + B + C)		5,82,930
Total absolute ton-km		1,89,115
Cost per ton-km		3.08

Question 10

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 vehicle specifications (i.e. weight, size, time saving etc.), the following weights has been assigned to the passing vehicles:

Sl. No.	Type of vehicle	
1.	Two wheelers	5%
2.	Car and SUVs	20%
3.	Bus and LCV	30%
4.	Heavy commercial vehicles	45%

Required:

(i) CACULATE the total project cost per day of concession period.

(ii) COMPUTE toll fee to be charged for per vehicle of each type, if the company wants earn a profit of 15% on total cost. [Note: Concession period is a period for which an infrastructure is allowed to operate and recover its investment] (MTP 10 Marks Nov '21) (Same concept different figures MTP 10 Marks Oct'19, Old & New SM)

Answer 10

(i) Calculation of total project cost per day of concession period:

Activities	Amount (₹ in lakh)
Site clearance	341.00
Land development and filling work	9,160.00
Sub base and base courses	10,520.00
Bituminous work	32,140.00
Bridge, flyovers, underpasses, Pedestrian subway, footbridge, etc	28,110.00
Drainage and protection work	9,080.00
Traffic sign, marking and road appurtenance	8,810.00
Maintenance, repairing and rehabilitation	12,850.00
Environmental management	1,964.00
Total Project cost	**1,12,975.00**
Administration and toll plaza operation cost	1,200.00
Total Cost	1,14,175.00
Concession period in days (21 years × 365 days)	7,665
Cost per day of concession period (₹ in lakh)	**14.90**

(ii) Computation of toll fee:

Cost to be recovered per day = Cost per day of concession period + 15% profit on cost

= ₹ 14,90,000 + ₹ 2,23,500 = ₹ 17,13,500

Cost Per equivalent vehicle = ₹ 17,13,500 / 76,444 units (Refer working note)

= ₹ 22.42 per equivalent vehicle

(iii) Vehicle type-wise toll fee:

Sl. No.	Type of vehicle	Equivalent cost [A]	Weight [B]	Toll fee per vehicle [A×B]
1.	Two wheelers	₹22.42	1	**22.42**
2.	Car and SUVs	₹22.42	4	**89.68**
3.	Bus and LCV	₹22.42	6	**134.52**
4.	Heavy commercial vehicles	₹22.42	9	**201.78**

Working Note:

The cost per day has to be recovered from the daily traffic. The each type of vehicle is to be converted into equivalent unit. Let's convert all vehicle types equivalent to Two-wheelers..

Sl. No.	Type of vehicle	Daily traffic volume [A]	Weight	Ratio [B]	Equivalent Two- wheeler [A×B]
1.	Two wheelers	44,500	0.05	1	44,500
2.	Car and SUVs	3,450	0.20	4	13,800
3.	Bus and LCV	1,800	0.30	6	10,800
4.	Heavy commercial vehicles	816	0.45	9	7,344
	Total				**76,444**

Question 11

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 operational 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 10 Marks March '22)

Answer 11

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 $\left(\dfrac{48,00,000 \times 20\% \times 20\text{buses}}{12\text{ months}}\right)$	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.

Question 12

STATE the unit of cost for the following service industries:

(i) **Electricity Supply service**

(ii) **Hospital**

(iii) **Cinema**

(iv) **Hotels (MTP 4 Marks April '22 & Sep '22)**

Answer 12

S. No.	Service industry	Unit of cost
(i)	Electricity Supply service	Kilowatt- hour (kWh)
(ii)	Hospital	Patient per day, room per day or per bed, per operation etc.
(iii)	Cinema	Per ticket.
(iv)	Hotels	Guest Days or Room Days

Question 13

Answer the following:

A company has the following three alternative proposals for conveyance facilities for its sales personnel who has to do substantial traveling, approximately 20,000 kilometers yearly:

(i) Purchasing and maintaining its own fleet of cars. The average cost of a car is ₹ 7,20,000

(ii) Allow the Executive to use their own car and reimburse the expenses @ ₹ 12 per kilometer and also bear insurance costs.

(iii) Hire cars from an agency at ₹ 2,16,000 per year per car. The company will have to bear costs of petrol, taxes and tyres.

The following further details are available:

Petrol	₹ 7.20 per km.
Tyre	₹ 0.144 per km.
Taxes	₹ 960 per car per annum
Repairs and maintenance	₹ 0.24 per km.
Insurance	₹ 1,440 per car per annum
Life of the car	5 years with annual mileage of 20,000 km.

Resale value ₹ 96,000 at the end of the fifth year. WORK OUT the relative costs of three proposals and rank them. **(MTP 5 Marks Sep'22, Old & New SM)**

Answer 13

Calculation of relative costs of three proposals and their ranking

	I- Use of company's car per km. (₹)	II- Use of own car per km. (₹)	III- Use of hired car per km. (₹)
Reimbursement	--	12.00	--
Hire Charges	--	--	10.80*
Fixed cost:			
Insurance	0.072	0.072	--
Taxes	0.048	--	0.048
Depreciation	6.24#	--	--
Running and Maintenance Cost:			
Petrol	7.20	--	7.20
Repairs and Maintenance	0.24	--	--
Tyre	0.144	--	0.144
Total cost per km.	13.944	12.072	18.192
Cost for 20,000 km.	2,78,880	2,41,440	3,63,840
Ranking of proposals	II	I	III

*(₹ 2,16,000 ÷ 20,000 km.) = ₹ 10.80

#[(₹ 7,20,000 - ₹ 96,000) ÷ 5 years] ÷ 20,000 km. = ₹ 6.24

The Second alternative i.e., use of own car by the executive and reimbursement of expenses by the company is the best alternative from company's point of view.

Question 14

Royal transport company has been given a 50-kilometre-long route to run 6 buses. The cost of each bus is ₹ 75,00,000. The buses will make 3 round trips per day carrying on an average 75 percent passengers of their seating capacity. The seating capacity of each bus is 48 passengers. The buses will run on an average 25 days in a month. The other information for the year 2021-22 is given below:

Garage Rent	₹ 60,000 per month
Annual Repairs & Maintenance	₹ 2,40,000 each bus
Salaries of 6 drivers	₹ 20,000 each per month
Wages of 6 conductors	₹ 16,000 each per month
Wages of 6 cleaners	₹ 10,000 each per month
Manager's salary	₹ 50,000 per month
Road Tax, Permit fee, etc.	₹ 60,000 for a quarter
Office expenses	₹ 25,000 per month
Cost of diesel per litre	₹92
Kilometer run per litre for each bus	6 kilometres
Annual Depreciation	20% of cost
Annual Insurance	4% of cost
Engine oils & lubricants (for 1,000 kilometres)	₹ 20,000

You are required to calculate the bus fare to be charged from each passenger per kilometer (upto four decimal points), if the company wants to earn profit of $33\frac{1}{3}$ percent on taking (total receipts from passengers).   (MTP 10 Marks Oct'22)

Answer 14

Working Notes:

1. **Total Kilometres to be run during the year 2021-22**

    = 50 km.× 2 sides × 3 trips × 25 days × 12 months × 6 buses = 5,40,000 Kilometres

2. **Total passenger Kilometres**

    = 5,40,000 km. × 48 passengers × 75% = 1,94,40,000 Passenger- km.

Operating Cost Sheet for the year 2021- 22

	Particulars	Total Cost (Rs.)
A.	Fixed Charges:	
	Garage rent (Rs. 60,000 × 12 months)	7,20,000
	Salary of drivers (Rs. 20,000 × 6 drivers ×12 months)	14,40,000
	Wages of Conductors (Rs. 16,000 × 6 conductors × 12 months)	11,52,000
	Wages of Cleaners (Rs. 10,000 × 6 cleaners × 12 months)	7,20,000
	Manager's salary (Rs.50,000 × 12 months)	6,00,000
	Road Tax, Permit fee, etc. (Rs. 60,000 × 4 quarters)	2,40,000
	Office expenses (Rs. 25,000 × 12 months)	3,00,000
	Depreciation (Rs. 75,00,000 × 6 buses × 20%)	90,00,000
	Insurance (Rs. 75,00,000 × 6 buses × 4%)	18,00,000
	Total (A)	1,59,72,000
B.	Variable Charges:	
	Repairs and Maintenance (Rs. 2,40,000 × 6 buses)	14,40,000
	Diesel {(5,40,000 km. ÷ 6 km.) × Rs.92}	82,80,000
	Engine oils & lubricants {(Rs. 20,000. ÷ 1000 km.) × 5,40,000 km}	1,08,00,000
	Total (B)	2,05,20,000
	Total Cost (A+B)	3,64,92,000
	Add: 33 1/3 % Profit on takings or 50% on cost	1,82,46,000
C.	Total Takings (Total bus fare collection)	5,47,38,000

D.	Total Passenger-km. (Working Note 2)	1,94,40,000
E.	Bus fare to be charged from each passenger per km. (C ÷ D)	2.82

Question 15

Secure lifeline Ltd. operates in life insurance business. It launched a new insurance policy 'Total secure'. The company has incurred the following expenditures during the last year for the policy:

	₹
Cost of marketing of the policy	**74,58,000**
Sales support expenses	**18,89,250**
Policy issuance cost	**16,59,735**
Claims management cost	**2,07,240**
Policy development cost	**18,56,250**
Postage and logistics	**16,91,250**
Facilities cost	**25,14,600**
Policy servicing cost	**58,09,155**
Employees cost	**9,24,000**
IT cost	**1,22,62,800**
Office administration cost	**26,73,660**

Number of policies sold- 844. Total insured value of policies - ₹ 1,640 crore.

Required:

(i) CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions.

(ii) CALCULATE cost per policy.

(iii) CALCULATE cost per rupee of insured value. (MTP 5 Marks March '23, Old & New SM, RTP Nov '18, PYP 5 Marks July '21)

Answer 15

(i) Calculation of total cost for 'Professionals Protection Plus' policy

	Particulars	Amount (₹)	Amount (₹)
1	**Marketing and Sales support:**		
	- Policy development cost	18,56,250	
	- Cost of marketing	74,58,000	
	- Sales support expenses	18,89,250	1,12,03,500
2	**Operations:**		
	- Policy issuance cost	16,59,735	
	- Policy servicing cost	58,09,155	
	- Claims management cost	2,07,240	76,76,130
3	**IT Cost**		1,22,62,800
4	**Support functions**		
	- Postage and logistics	16,91,250	
	- Facilities cost	25,14,600	
	- Employees cost	9,24,000	
	- Office administration cost	26,73,660	78,03,510
	Total Cost		**3,89,45,940**

(ii) Calculation of Cost per policy $\frac{\text{Total Cost}}{\text{Number of policies}} = \frac{3,89,45,940}{844}$ = Rs. 46,144.48

(iii)   Cost per rupee of insured value $\frac{\text{Total Cost}}{\text{Total insured value}} = \frac{3,89,45,940}{1,640 \text{ crore}}$ = Rs. 0.0024

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This practical problem was based on service costing which required examinees to segregate costs of Insurance policy under four main activities and to calculate cost per policy. Most of the examinees could not segregate the costs correctly. Performance of the examinees was below average.

Question 16

Arnav LMV Pvt. Ltd, operates cab/ car rental service in Delhi/NCR. It provides its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fueled cars but it is also considering to upgrade these into Electric vehicle (EV). The following details related with the owning of CNG & EV propelled cars are as tabulated below:

Particulars	CNG Car	EV Car
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy on purchase of car (₹)	--	1,50,000
Life of the car	15 years	10 years
Residual value (₹)	95,000	1,70,000
Mileage	20 km/kg	240 km per charge
Electricity consumption per full charge	--	30 Kwh
CNG cost per Kg (₹)	90	--
Power cost per Kwh (₹)	--	7.60
Annual Maintenance cost (₹)	8,000	5,200
Annual insurance cost (₹)	7,600	14,600
Tyre replacement cost in every 5 -year (₹)	16,000	16,000
Battery replacement cost in every 8- year (₹)	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m
Garage rent per car (₹)	4,500 p.m
Share of Office & Administration cost per car (₹)	1,500 p.m

Required:

CALCULATE the operating cost of vehicle per month per car for both CNG & EV options. [MTP 10 Marks April '23, RTP May '22)

Answer 16

Working Notes:

1.   Calculation of Depreciation per month:

	Particulars	CNG Car	EV Car
A	Car purchase price (₹)	9,20,000	15,20,000
B	Less: Govt. subsidy (₹)	--	(1,50,000)

C	Less: Residual value (₹)	(95,000)	(1,70,000)
D	Depreciable value of car (₹) [A-B-C]	8,25,000	12,00,000
E	Life of the car	15 years	10 years
F	Annual depreciation (₹) [D÷E]	55,000	1,20,000
G	**Depreciation per month (₹) [F÷12]**	**4,583.33**	**10,000**

2. **Fuel/ Electricity consumption cost per month:**

	Particulars	CNG Car	EV Car
A	Average distance covered in a month (KM)	1,500	1,500
B	Mileage (KM)	20	240
C	Qty. of CNG/ Full charge required [A÷B]	75 kg.	6.25
D	Electricity Consumption [C×30kwh]	-	187.5
E	Cost of CNG per kg (₹)	90	-
F	Power cost per Kwh (₹)	-	7.60
G	**CNG Cost per month (₹) [C×E]**	**6,750**	-
H	**Power cost per month (₹) [D×F]**	-	**1,425**

3. **Amortised cost of Tyre replacement:**

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	5 years	5 years
C	No. of time replacement required	2 times	1 time
D	Cost of tyres for each replacement (₹)	16,000	16,000
E	Total replacement cost (₹) [C×D]	32,000	16,000
F	Amortised cost per year (₹) [E÷A]	2,133.33	1,600
E	**Cost per month (₹) [F÷12]**	**177.78**	**133.33**

4. **Amortised cost of Battery replacement:**

	Particulars	CNG Car	EV Car
A	Life of vehicle	15 years	10 years
B	Replacement interval	8 years	8 years
C	No. of time replacement required	1 time	1 time
D	Cost of battery for each replacement (₹)	12,000	5,40,000
E	Total replacement cost (₹) [C×D]	12,000	5,40,000
F	Amortised cost per year (₹) [E÷A]	800	54,000
E	**Cost per month (₹) [F÷12]**	**66.67**	**4,500**

Calculation of Operating cost per month:

	Particulars	CNG Car (₹)	EV Car (₹)
A	**Running cost:**		
	Fuel cost/ Power consumption cost [Refer WN-2]	6,750	1,425
B	**Maintenance cost:**		
	Annual Maintenance cost [Annual cost ÷12]	666.67	433.33
	Annual Insurance cost [Annual cost ÷12]	633.33	1,216.67

	D	Amortised cost of Tyre replacement [Refer WN-3]	177.78	133.33
		Amortised cost of Battery replacement [Refer WN-4]	66.67	4,500
			1,544.45	6,283.33
C		Fixed cost:		
		Depreciation [Refer WN-1]	4,583.33	10,000
		Driver's salary	20,000	20,000
		Garage rent	4,500	4,500
		Share of Office & Administration cost	1,500	1,500
			30,583.33	36,000
D		Operating cost per month [A+B+C]	38,877.78	43,708.33

Question 17

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes along with primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

	Amount (₹)
Teachers' salary (15 teachers × ₹ 35,000 × 12 months)	**63,00,000**
Principal's salary	**14,40,000**
Lab attendants' salary (2 attendants × ₹ 15,000 × 12 months)	**3,60,000**
Salary to library staff	**1,44,000**
Salary to peons (4 peons × ₹ 10,000 × 12 months)	**4,80,000**
Salary to other staffs	**4,80,000**
Examinations expenditure	**10,80,000**
Office & Administration cost	**15,20,000**
Annual day expenses	**4,50,000**
Sports expenses	**1,20,000**

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	-

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for

commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participate in annual functions and sports activities.
Requirement:

(a) CALCULATE cost per student per annum for all three streams.

(b) If the management decides to take uniform fee of ₹ 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.

(c) If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively. (RTP May' 20, RTP May'18, Old & New SM)

Answer 17

Calculation of Cost per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
R-apportionment of Economics & Mathematics teachers' salary (W.N-2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(i) Calculation of cost per student per annum

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(ii) Calculation of profitability

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)	Total (Rs.)
Total Fees per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(iii) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (Rs.)	Commerce (Rs.)	Science (Rs.)

Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:

(1) Teachers' salary

Particulars	Arts	Commerce	Science
No. of teachers	4	5	6
Salary per annum (Rs.)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (Rs.)	(84,000)	84,000	(61,091)	61,091
		$\left(\dfrac{Rs.\,4,20,000}{1,040}\times 208\right)$		$\left(\dfrac{Rs.\,4,20,000}{1,100}\times 160\right)$

(3) Principal's salary has been apportioned on the basis of time spent by him for administration of classes.

(4) Lab attendants' salary has been apportioned on the basis of lab classes attended by the students.

(5) Salary of library staffs are apportioned on the basis of time spent by the students in library.

(6) Salary of Peons are apportioned on the basis of number of students. The peons' salary allocable to higher secondary classes is calculated as below:

	Amount (Rs.)
Peon dedicated for higher secondary	1,20,000
(1 peon × Rs.10,000 × 12 months)	
Add: 15% of other peons' salary	54,000
{15% of (3 peons × Rs.10,000 × 12 months)}	
	1,74,000

(7) Salary to other staffs, office & administration cost, Annual day expenses and sports expenses are apportioned on the basis of number of students.

(8) Examination Expenses has been apportion taking number of students and number examinations into account.

Question 18

A transport company has a fleet of four trucks of 10 tonne capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No.of trips per day	Load carried per trip / day tonnes
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost ₹
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the year under review:

Diesel	₹ 60 per litre. Each litre gives 4 km per litre of diesel on an average.
Driver's salary	₹ 22,000 per truck per month
Licence and taxes	₹ 15,000 per annum per truck
Insurance	₹ 80,000 per annum for all the four trucks
Purchase Price per truck	₹30,00,000, Life 10 years. Scrap value at the end of life is ₹1,00,000.
Oil and sundries	₹ 525 per 100 km run.
General Overhead	₹ 1,10,840 per annum

The trucks operate 24 days per month on an average.

Required

(i) PREPARE an Annual Cost Statement covering the fleet of four trucks

(ii) CALCULATE the cost per km. run.

(iii) DETERMINE the freight rate per tonne km. to yield a profit of 30% on freight. (RTP Nov'19) (Same concept different figures MTP 10 Marks March '19 & Sep '23)

Answer 18

    (i)   Annual Cost Statement of four vehicles

	(₹)
Diesel {(4,21,632 km. ÷ 4 km) × ₹ 60) (Refer to Working Note 1)	63,24,480
Oil & sundries {(4,21,632 km. ÷ 100 km.) × ₹ 525}	22,13,568
Maintenance {(4,21,632 km. × ₹ 0.75) + ' 18,000}(Refer to Working Note 2)	3,34,224
Drivers' salary {(₹ 22,000 × 12 months) × 4 trucks}	10,56,000
Licence and taxes (₹ 15,000 × 4 trucks)	60,000
Insurance	80,000
Depreciation {(₹ 29,00,000 ÷ 10 years) × 4 trucks}	11,60,000
General overhead	1,10,840
Total annual cost	**1,13,39,112**

(ii) Cost per km. run

Cost per Kilometer run = $\dfrac{\text{Total annual cost of vehicles}}{\text{Total kilometre travelled annually}}$ (Refer to working Note 1)

$$= \frac{\text{Rs.}1,13,39,112}{4,21,632 \text{ Kms}} = \text{Rs. } 26.89$$

(iii) Freight rate per tonne km (to yield a profit of 30% on freight)

Cost per Kilometer run = $\dfrac{\text{Total annual cost of three vehicles}}{\text{Total effective tonnes kms. per annum}}$ (Refer to working Note 1)

$$= \frac{\text{Rs.}1,13,39,112}{16,10,496 \text{kms}} = \text{Rs. } 7.04$$

Freight rate per tonne km. $\left(\dfrac{\text{Rs.7.04}}{0.7}\right) \times 1 = \text{Rs. } 10.06$

Working Notes:

1. Total kilometer travelled and tonnes kilometer (load carried) by four trucks in one year

—

Truck number	One way distance in kms	No. of trips	Total distance covered in km per day	Load carried per trip/day in tonnes	Total effective tonnes km
1	48	4	384	6	1,152
2	120	1	240	9	1,080
3	90	2	360	8	1,440
4	60	4	480	8	1,920
Total			1,464		5,592

Total kilometer travelled by four trucks in one year (1,464 km. × 24 days × 12 months)   =

4,21,632

Total effective tonnes kilometer of load carried by four trucks during one year (5,592 tonnes km. × 24 days × 12 months)   = 16,10,496

2.   **Fixed and variable component of maintenance cost:**

Variable maintenance cost per km = $\dfrac{\text{Difference in maintence cost}}{\text{Difference in distance travelled}}$

$$= \dfrac{Rs.1,38,150 - Rs.1,35,525}{1,60,200\,Kms - 1,56,700\,kms}$$

= Rs. 0.75

Fixed maintenance cost   =   Total maintenance cost – Variable maintenance cost

=   ₹ 1,38,150 – 1,60,200 kms × ₹ 0.75 = ₹ 18,000

Question 19

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹ 10,00,000 per month along with 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Total annual cost of vehicles Total kilometer travelled annually

Following information is given:		
Type of suite	Number	Occupancy percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite.

The other expenses for the year 20X9 are as follows:

	(Rs.)
Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to Calculate the rent to be charged for each type of suite. (RTP May'19, Old & New SM)

Answer 19

(i)   Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms X 360 days X 100%)	36,000 (36,000 X 1)
Double rooms suites	14,400 (50 rooms X 360 days X 80%)	36,000 (14,400 X 2.5)
Triple rooms suites	6,480 (30 rooms X 360 days X 60%)	32,400 (6,480 X 5)
		1,04,400

(ii)   **Statement of total cost:**

	(₹)
Staff salaries	14,25,00,000
Room attendant's wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000
	25,21,00,000
Building rent {(₹10,00,000 ☐ 12 months) + 5% on total taking}	1,20,00,000+ 5% on total takings
Total cost	26,41,00,000 + 5% on total takings

Profit is 20% of total takings

∴ Total takings = ₹ 26,41,00,000 + 25% (5% + 20%) of total takings

Let x be rent for single room suite

Then 1,04,400 x = 26,41,00,000 + 0.25 × 1,04,400 x

Or, 1,04,400 x = 26,41,00,000 + 26,100 x

∴Or, 78,300 x = 26,41,00,000

Or, x = 3,373

(iii)   Rent to be charged for single room suite = ₹ 3,373

Rent for double rooms suites ₹ 3,373 x 2.5 = ₹ 8,432.5

Rent for triple rooms suites ₹ 3,373 x 5 = ₹ 16,865.

Question 20

A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT
2	20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 per cent of vehicles are laid up for repairs every day. The following information is related to the month of August, 2020:

Salary of Transport Manager	₹ 60,000
Salary of 30 drivers	₹ 20,000 each driver
Wages of 25 Helpers	₹ 12,000 each helper
Loading and unloading charges	₹ 850 each trip
Consumable stores (depends on running of vehicles)	₹ 1,35,000
Insurance (Annual)	₹ 8,40,000
Road Licence (Annual)	₹ 6,00,000
Cost of Diesel per litre	₹ 78
Kilometres run per litre each vehicle	5 Km.
Lubricant, Oil etc.	₹ 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	₹ 4,25,000
Garage rent (Annual)	₹ 9,00,000
Routine mechanical services	₹ 3,00,000
Electricity charges (for office, garage and washing station)	₹ 55,000
Depreciation of vehicles (on time basis)	₹ 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 per cent of transport manager's salary is debited to the workshop. The transport department has been apportioned ₹88,000 by the workshop during the month. During the month operation was for 25 days.

You are required:

(i) CALCULATE per ton-km operating cost.

(ii) DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight. (RTP Nov '20)

Answer 20

(i) **Operating Cost Sheet for the month of August, 2020**

	Particulars	Amount (₹)
A.	**Fixed Charges:**	
	Manager's salary (₹60,000 × 60%)	36,000
	Drivers' Salary (₹20,000 × 30 drivers)	6,00,000
	Helpers' wages (₹12,000 × 25 helpers)	3,00,000
	Insurance (₹8,40,000 ÷ 12 months)	70,000
	Road licence (₹6,00,000 ÷ 12 months)	50,000
	Garage rent (₹9,00,000 ÷ 12 months)	75,000
	Routine mechanical services	3,00,000
	Electricity charges (for office, garage and washing station)	55,000
	Depreciation of vehicles	6,00,000
	Apportioned workshop expenses	88,000
	Total (A)	21,74,000
B.	**Variable Charges:**	
	Loading and unloading charges (Working Note 1)	7,65,000
	Consumable Stores	1,35,000
	Cost of diesel (Working Note 2)	14,04,000
	Lubricant, Oil etc.	1,15,000

	Replacement of Tyres, Tubes & other parts	4,25,000
	Total (B)	28,44,000
C.	**Total Cost (A + B)**	**50,18,000**
D.	Total Ton-Kms. (Working Note 3)	9,43,200
E.	**Cost per ton-km. (C ÷ D)**	**5.32**

(ii) Calculation of Chargeable Freight

Cost per ton-km.	₹ 5.32
Add: Profit @ 25% on freight or 33⅓% on cost	₹ 1.77
Chargeable freight per ton-km.	**₹ 7.09**

Working Notes:

1. Wages paid to loading and unloading labours

Numbers of vehicles available per day × No. of days × trips × wages per trip (20 vehicles × 90%) × 25 days × 2 trips × ₹850

18 × 25 × 2 × 850 = ₹7,65,000

2. Cost of Diesel:

Distance covered by each vehicle during August, 2020

= 100 k.m. × 2 × 25 days × 90% = 4,500 km.

Consumption of diesel = $\frac{4,500 \text{ K.M.} \times 20 \text{ Vehicles}}{5 \text{ K.m.}}$ = 18,000 litres

Cost of Diesel = 18,000 litres × Rs.78 = Rs.14,04,000

Calculation of Total ton –km:

Total Ton-Km. = Total Capacity × Distance covered by each vehicle × Average Capacity Utilisation ratio.

= $[(5 \times 9\text{MT}) + (6 \times 12 \text{ MT}) + (7 \times 15 \text{ MT}) + (2 \times 20\text{MT})] \times 4,500 \text{K.m.} \times \frac{(90\% + 70\%)}{2}$

= (45 + 72 + 105 + 40) × 4,500 k.m. × 80%

= 262 × 4,500 × 80%.

= 9,43,200 ton-km.

Question 21

VPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning, the first trip picks up senior students and the second trip plying an hour later picks up junior students. Similarly, in the afternoon, the first trip takes the junior students and an hour later the second trip takes the senior students home.

The distance travelled by each bus, one way is 8 km. The school works 22 days in a month and remains closed for vacation in May and June. The bus fee, however, is payable by the students for all the 12 months in a year.

The details of expenses for a year are as under:

Driver's salary – payable for all the 12 in months	₹ 12,000 per month per driver
Cleaner's salary payable for all the 12 months	₹ 8,000 per month per cleaner License
fees, taxes etc.	₹ 8,400 per bus per annum
Insurance Premium	₹ 15,600 per bus per annum
Repairs and Maintenance	₹ 20,500 per bus per annum
Purchase price of the bus	₹ 20,00,000 each

Life of the bus	16 years
Scrap value	₹ 1,60,000
Diesel Cost	₹ 78.50 per litre

Each bus gives an average of 5 km. per litre of diesel. The seating capacity of each bus is 40 students.

The school follows differential transportation fees based on distance travelled as under:

Students picked up and dropped within the range of distance from the school	Transportation fee	Percentage of students availing this facility
2 km.	25% of Full	15%
4 km.	50% of Full	30%
8 km.	Full	55%

Due to a pandemic, lockdown imposed on schools and the school remained closed from April 2020 to December 2020. Drivers and cleaners were paid 75% of their salary during the lockdown period. Repairing cost reduced to 75% for the year 2020.

Ignore the interest cost.

Required:

(i) PREPARE a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.

(ii) FIND OUT transportation fee per student per month in respect of:

(a) Students coming from a distance of upto 2 km. from the school.

(b) Students coming from a distance of upto 4 km. from the school; and

(c) Students coming from a distance of upto 8 km. from the school.

(iii) CALCULATE the minimum bus fare that has to be recovered from the students for the year 2020. (RTP May '21, Old & New SM)

Answer 21

(i) Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (₹)	Fleet of 25 buses per annum (₹)
Running costs : (A)		
Diesel (Refer to working note 1)	2,21,056	55,26,400
Repairs & maintenance costs: (B)	20,500	5,12,500
Fixed charges:		
Driver's salary (₹ 12,000 × 12 months)	1,44,000	36,00,000
Cleaners salary (₹ 8,000 × 12 months)	96,000	24,00,000
Licence fee, taxes etc.	8,400	2,10,000
Insurance	15,600	3,90,000
Depreciation $\left(\dfrac{\text{Rs.}\,20,00,000 - \text{Rs.}\,1,60,000}{16\ \text{years}}\right)$	1,15,000	28,75,000
Total fixed charges: (C)	3,79,000	94,75,000
Total expenses: (A+B+C)	6,20,556	1,55,13,900

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

(a) 2 km. from the school {₹ 6,20,556 / (236 students × 12 months)} (Refer to Working Note 2)	₹ 219.12
(b) 4 km. from the school (₹ 219.12 × 2)	₹ 438.24
(c) 8 km. from the school (₹ 219.12 × 4)	₹ 876.48

(iii) Calculation of minimum bus fare to be recovered from the students during the year 2020:

Statement showing the expenses of operating a single bus in year 2020

Particulars	Per bus per annum (₹)
Running costs : (A)	
Diesel (Refer to working note 3)	66,316.80
Repairs & maintenance costs: (B) (₹ 20,500 x 0.75)	15,375
Fixed charges:	
Driver's salary {₹ 12,000 × 3 months + (75% of ₹ 12,000 × 9 months)}	1,17,000
Cleaners salary {₹ 8,000 × 3 months + (75% of ₹ 8,000 × 9 months)}	78,000
Licence fee, taxes etc.	8,400
Insurance	15,600
Depreciation $\left(\dfrac{\text{Rs.} 20,00,000 - \text{Rs.} 1,60,000}{16 \text{ years}}\right)$	1,15,000
Total fixed charges: (C)	3,34,000
Total expenses: (A+B+C)	4,15,691.80

Minimum bus fare to be recovered:

(a) 2 km. from the school {₹ 4,15,691.8 / (236 students × 12 months)} (Refer to Working Note 2)	₹ 146.78
(b) 4 km. from the school (₹ 146.78 × 2)	₹ 293.56
(c) 8 km. from the school (₹146.78 × 4)	₹ 587.12

Working Notes:

1. Calculation of diesel cost per bus:

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (8 km. × 2 trips)	16 km.
Distance travelled per day by a bus (16 km. × 4 shifts)	64 km.
Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled per year (1,408 × 10 months)	14,080 km.
No. of litres of diesel required per bus per year (14,080 km. ÷ 5 km.)	2,816 litres
Cost of diesel per bus per year (2,816 litres × ₹ 78.50)	₹ 2,21,056

2. Calculation of equivalent number of students per bus:

Bus capacity of 2 trips (40 students × 2 trips)	80 students
$1/4^{th}$ fare students (15% × 80 students)	12 students

½ fare students (30% × 80 students × 2) (equivalent to $1/4^{th}$ fare students)	48 students
Full fare students (55% × 80 students × 4) (equivalent to $1/4^{th}$ fare students)	176 students
Total students equivalent to $1/4^{th}$ fare students	236 students

3. Calculation of diesel cost per bus in Year 2020:

Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled during the year 2020 (1,408 × 3 months)	4,224 km.
No. of litres of diesel required per bus per year (4,224 km. ÷ 5 km.)	844.8 litres
Cost of diesel per bus per year (844.8 litres × ₹ 78.50)	₹ 66,316.80

Question 22

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.**
	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. (RTP Nov '21)

Answer 22

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 X 2 trips X 9 days)	90	810	160	1,29,600 (810 seats × 160 km.)
Delhi to Aligarh & Back	1,200 (50 seats X 2 trips X 12 days)	95	1,140	160	1,82,400 (1,140 seats × 160 km.)
Delhi to Alwar & Back	600 (50 seats X 2 trips X 6 days)	100	600	170	1,02,000 (600 seats × 170 km.)
Total					4,14,000

Monthly Operating Cost Statement

Particulars	(₹)	(₹)
(i) Running Costs		
Diesel {(8,760 km / 5 km) × ₹ 90}	1,57,680.00	
Lubricant oil {(8,760 km / 100) × ₹ 30}	2,628.00	1,60,308.00
(ii) Maintenance Costs		
Repairs & Maintenance		5,000.00
(iii) Standing charges		
Salary to driver	30,000.00	
Salary to conductor	26,000.00	
Salary of part-time accountant	7,000.00	
Insurance (₹ 6,000 ÷12)	500.00	
Road tax (₹ 21,912 ÷12)	1,826.00	
Permit fee	500.00	
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. = Total takings per month / Total Passenger – Km.per month

= Rs. 5,37,268 / 4,14,000 Passenger –Km. = Rs. 1.30 (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

Question 23

Royal Transport Services runs fleet of buses within the limits of Jaipur city. The following are the details which were incurred by the company during October, 2021:

	(₹)
Cost of each Bus	24,00,000
Garage Rent	1,00,000
Insurance	25,000
Road tax	20,000
Manager's Salary	60,000
Assistant's Salary (Two)	32,000 each
Supervisor's Salary (Three)	24,000 each
Driver's Salary (Twenty-Five)	20,000 each
Cleaner's Salary (Twenty)	5,000 each
Office Staff's Salary	1,00,000
Consumables	1,20,000
Repairs & Maintenance	90,000
Other Fixed Expenses	72,000
Diesel (10 Kms per Litre)	80 per litre
Oils & Lubricants	1,45,000

Tyres and tubes   35,000

Depreciation   10% p.a. on Cost Other details are as below:

Capacity

Buses   60 Passengers

13Buses   50 Passengers

Each bus makes 4 round trips a day covering a distance of 10 Kilometers in each trip (One Way) on an average. During the trips 80% of the seats are occupied. The annual records show that 5 buses are generally required to be kept away from roods each day for repairs.

You are required to CALCULATE cost per passenger-km. Cost sheet to be prepared on the basis of 25 buses. (RTP Nov'22)

Answer 23

Operating Cost Sheet

Particulars	Amount (₹)	Amount (₹)
Standing Charges:		
Depreciation (₹ 24,00,000 X 10% X 1/12 X 25)	5,00,000	
Garage Rent	1,00,000	
Insurance Road Tax	25,000	
Manager's Salary		

Assistant's Salary (₹ 32,000 X 2)	20,000	
Supervisor's Salary (₹ 24,000 X 3)	60,000	
Driver's Salary (₹ 20,000 X 25)	64,000	
Cleaner's Salary (₹ 5,000 X 20)	72,000	
Office Staff's Salary	5,00,000	
Consumables	1,00,000	
Repairs & Maintenance	1,00,000	
Other Fixed Expenses	1,20,000	
	90,000	
	72,000	
		18,23,000
Running Charges	3,96,800	
Diesel (49,600 Kms / 10 Kms X ₹ 80 per unit)	1,45,000	
Oils & Lubricants	35,000	
Tyres and tubes		5,76,800
Total Operating Cost		**23,99,800**

Cost per passenger-km = $\dfrac{\text{Total Operating Cost}}{\text{Passenger –kms}}$

$= \dfrac{23,99,800}{27,18,080} = 0.883$

Working Note:

Calculation of Total Kilometers and Passenger Kilometers

Specification	Total Km.	Passenger–Km.
12 Buses (60 Passengers)	29,760 Kms (10 Kms × 4 X 2 trips × 31 days x 12 Buses)	14,28,480 (29760 Kms x 60 Pass. x 80%)
13 Buses (50 Passengers)	32,240 Kms (10 Kms × 4 X 2 trips × 31 days x 13 Buses)	12,89,600 (32240 Kms x 50 Pass. x 80%)
Total	62,000	27,18,080

Since 5 buses out of 25 buses are kept for repairs every day

Actual total Km.   62,000 × 20/25 =   49,600

Question 24

Health Wealth Hospital is interested in estimating the cost for each patient stay. The hospital offers general health care facility i.e. only basic services.(RTP Nov'22)

You are required to:

(i) **CLASSIFY each of the following costs as either direct or indirect with respect to each patient.**

(ii) **CLASSIFY each of the following costs as either fixed or variable with respect to hospital costs per day.**

	Direct	Indirect	Fixed	Variable
Electronic monitoring				
Meals for patients				
Nurses' salaries	_			
Parking maintenance				
Security				

Answer 24

a)

Item	Direct	Indirect	Fixed	Variable

Electronic monitoring	YES			YES
Meals for patients	YES			YES
Nurses' salaries		YES	YES	
Parking maintenance		YES	YES	
Security		YES	YES	

Question 25

PREPARE cost statement of Panipat Thermal Power Station showing the cost of electricity generated per kwh, from the following data.

Total units generated	16,50,000 kWh
	(`)
Operating labour	21,75,000
Repairs & maintenance	7,25,000
Lubricants, spares and stores	5,80,000
Plant supervision	4,35,000
Administration overheads	29,00,000
Insurance Charges	15,00,000
Fuel Charges	8,00,000

7 kWh. of electricity generated per kg. of coal consumed @ `4.75 per kg. Depreciation charges @ 5% on capital cost of `3,10,00,000. (RTP May 23) (Same concept different figures Old & New SM)

Answer 25

Total units generated 16,50,000 kWh.

Cost Statement of Panipat Thermal Power Station

	Per annum (`)	Per kWh. (`)
Fixed costs:		
Plant supervision	4,35,000	
Administration overheads	29,00,000	
Insurance Charges	15,00,000	
Depreciation (5% of ` 3,10,00,000 p.a.)	15,50,000	
Total fixed cost: (A)	63,85,000	3.87
Variable costs:		
Operating labour	21,75,000	
Fuel Charges	8,00,000	
Lubricants, spares and stores	5,80,000	
Repairs & maintenance	7,25,000	
Coal cost (Refer to working note)	11,19,643	
Total variable cost: (B)	53,99,643	3.27
Total cost [(A) + (B)]	1,17,84,643	7.14

Working Note:

Coal cost (16,50,000 kWh. ÷ 7 kWh) × `4.75 per kg. = `11,19,643

Question 26

Describe Composite Cost unit as used in Service Costing and discuss the ways of computing it. (PYP Nov'19,5 Marks)

Answer 26

Composite Cost Unit: Sometime two measurement units are combined together to know the cost of service or operation. These are called composite cost units. For example, a public transportation undertaking would measure the operating cost per passenger per kilometer.

Examples of Composite units are Ton- km., Quintal- km, Passenger-km., Patient-day etc. **Composite unit may be computed in two ways**:

      (i)   Absolute (Weighted Average) basis.

      (ii)   Commercial (Simple Average) basis.

In both bases of computation of service cost unit, weightage is also given to qualitative factors rather quantitative (which are directly related with variable cost elements) factors alone.

(i)   **Weighted Average or Absolute basis –** It is summation of the products of qualitative and quantitative factors. For example, to calculate absolute Ton-Km for a goods transport is calculated as follows.:

$$\sum (\text{Weight Carried} \times \text{Distance})_1 + (\text{Weight Carried} \times \text{Distance})_2$$
$$+ \ldots . + (\text{Weight Carried} \times \text{Distance})_n$$

Similarly, in case of Cinema theatres, price for various classes of seats are fixed differently. For example–

First class seat may be provided with higher quality service and hence charged at a higher rate, whereas Second Class seat may be priced less. In this case, appropriate weight to be given effect for First Class seat and Second Class seat – to ensure proper cost per composite unit.

(ii)   **Simple Average or Commercial basis –** It is the product of average qualitative and total quantitative factors. For example, in case of goods transport, Commercial Ton-Km is arrived at by multiplying total distance km., by average load quantity.

$$\sum (\text{Distance}_1 + \text{Distance}_2 + \ldots . \& + \text{Distance}_n) \times \left(\frac{W_1 + W_2 + \cdots \ldots W_n}{n}\right)$$

In both the example, variable cost is dependent of distance and is a quantitative factor. Since, the weight carried does not affect the variable cost hence and is a qualitative factor.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a theoretical question based on composite cost unit. Performance of the examinees was below average.

Question 27

X Ltd. distributes' its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey. The following information is available:

Diesel Consumption	**8 km per litre**
Diesel Cost	**` 60 per litre**
Engine Oil	**` 200 per week**
Driver's Wages (fixed)	**` 2,500 per week**
Repairs	**` 600 per week**
Garage Rent	**` 800 per week**
Cost of Lorry (excluding cost of tyres)	**` 9,50,000**
Life of Lorry	**1,60,000 kms**
Insurance	**` 18,200 per annum**
Cost of Tyres	**` 52,500**
Life of Tyres	**25,000 kms**
Estimated sale value of the lorry at end of its life is	**` 1,50,000**
Vehicle License Cost	**` 7,800 per annum**

Other Overhead Cost   ` 41,600 per annum

The lorry operates on a 5 day week.

Required :

(i) A statement to show the total cost of operating the vehicle for the four week period analysed into Running cost and Fixed cost.

(ii) Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year) (PYP May '19, 10 Marks)

Answer 27

Working Notes:

Particulars	For 4 weeks	For 1 week (by dividing by 4)
Total distance travelled (40 k.m × 2 × 2 trips × 5 days × 4 weeks)	3,200 km	800 km
Total tonne km (40 k.m × 10 tonnes × 2 × 5 days × 4 weeks)	16,000 tonne km	4,000 tonne km

(i)   Statement showing Operating Cost

Amount (`)

	Particulars	For 4 weeks	For 1 week (by dividing by 4)
A.	Fixed Charges:		
	Drivers' wages (` 2,500 x 4 weeks)	10,000	2,500
	Garage rent (` 800 × 4 weeks)	3,200	800
	Insurance {(` 18,200 ÷ 52 weeks) × 4 weeks}	1,400	350
	Vehicle license {(` 7,800 ÷ 52 weeks) × 4 weeks}	600	150
	Other overheads cost {(`41,600÷52 weeks)×4 weeks}	3,200	800
	Total (A)	18,400	4,600
B.	Running Cost:		
	Cost of diesel {(3,200 ÷ 8 kms) × ` 60}	24,000	6,000
	Engine Oil (` 200 × 4 weeks)*	800	200
	Repairs (` 600 × 4 weeks)*	2,400	600
	Depreciation on vehicle	16,000	4,000
	$\left(\dfrac{\text{Rs. } 9,50,000 - \text{Rs. } 1,50,000}{1,60,000 \text{ Km}} \times 3,200\text{km}\right)$		
	Depreciation on tyres $\left(\dfrac{\text{Rs.} 52,500}{25,000\text{km}} \times 3,200\text{km}\right)$	6,720	1,680
	Total (B)	49,920	12,480
C.	Total Cost (A + B)	68,320	17,080

*Cost of engine oil & repairs may also be treated as fixed cost, as the question relates these with time i.e. in weeks instead of running of vehicle.

(ii)	**Calculation of vehicle operating cost :**				
Operating cost per k.m.		=	` 68,320 / 3,200 kms	**or**	` 17,080 /=` **21.35** 800 Kms
Operating cost per Tonne-k.m.		=	` 68,320 / 16,000	or	` 17,080 / = ` **4.27** 4,000

Question 28

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 ` 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. (PYP Nov'18, 10 Marks)

Answer 28

(i)	Statement showing the Operating Cost per Passenger-km.		
		Yearly (`)	Monthly (`)
(A)	**Standing Charges:**		
	Insurance Charge ` 20,00,000 × 3%	60,000	5,000
	Road Tax	36,000	3,000
	Depreciation (20,00,000/5)	4,00,000	33,333.33
	Total	4,96,000	41,333.33
(B)	**Maintenance Charges:**		
	Annual Repairs	50,000	4166.67
	Office and administration overheads	3,18,000	26,500
	Total	3,68,000	30666.67
(C)	**Running Cost/Charges:**		
	Driver's Salary	2,40,000	20,000
	Conductor's Salary	1,80,000	15,000
	Diesel & Oil (60,000 × 1,500/100)	9,00,000	75,000
	Total	13,20,000	41,333.33
	Total (A+B+C) Cost before commission and profit	21,84,000	1,82,000
	Commission (33,60,000 × 10%) (working note 2)	3,36,000	28,000
	Profit (33,60,000 × 25%) (working note 2)	8,40,000	70,000
	Takings (working note 1)	33,60,000	2,80,000

(ii)   Fare per passenger – K.m = $\dfrac{\text{Total Collection /Takings}}{\text{Total passenger}-\text{km (working note 3)}}$

$\dfrac{33,60,000}{24,00,000}$ = Rs. 1.40

OR

Fare per Passenger Km.(Monthly)= $\frac{2,80,000}{2,00,000}$ = Rs. 1.40

Working note :

1. Cost before commission (10%) and profit (25%) is 21,84,000 which is 65% of total takings. So total takings is (21,84000÷65) ×100 = ` 33,60,000
2. Commission is 10% of ` 33,60,000 = ` 3,36,000 and Profit is 25% of ` 33,60,000= ` 8,40,000
3. Total Km is (4 Round Trips × Days in a month × Month = (4×2×25 ×25×12) = 60,000 km Passenger km is 60,000 km×40 passenger= 24,00,000.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This practical problem was related to Service Costing. A few number of examinees secured good marks. Some of the examinees failed to calculate passenger kilometres and lost three marks. Overall performance in this question was average.

Question 29

A group of 'Health Care Services' has decided to establish a Critical Care Unit in a metro city with an investment of ` 85 lakhs in hospital equipments. The unit's capacity shall be of 50 beds and 10 more beds, if required, can be added. Other information for a year are as under:

	(`)
Building Rent	2,25,000 per month
Manager Salary (Number of Manager-03)	50,000 per month to each one Nurses
Salary (Number of Nurses-24)	18,000 per month to each
Nurse Ward boy's Salary (Number of ward boys' -24)	9,000 per month per person Doctor's
payment (Paid on the basis of number 5,50,000 per month of patients attended and time spent by them)	
Food and laundry services (variable)	39,53,000
Medicines to patients (variable)	22,75,000 per year
Administrative Overheads	28,00,000 per year
Depreciation on equipments	15% per annum on original cost

It was reported that for 200 days in a year 50 beds were occupied, for 105 days 30 beds were occupied and for 60 days 20 beds were occupied.

The hospital hired 250 beds at a charge of ` 950 per bed to accommodate the flow of patients. However, this never exceeded the normal capacity of 50 beds on any day. Find out: (i) Profit per patient day, if hospital charges on an average ` 2,500 per day from each patient. (ii) Break even point per patient day (Make calculation on annual basis) [PYP May'18, 10 Marks]

Answer 29

Number of Patient Days = (200x50) + (105x30) + (60x20)

=14,350 patient days + 250 = 14,600

Statement Showing Profit

Elements of Cost and Revenue	Total (`)
A. Revenue(14,600x`2,500)	3,65,00,000
Variable Costs	

Food and Laundry Service	39,53,000
Medicines to Patients	22,75,000

Doctor's Payment	66,00,000
Hire Charges of Bed (250 x ` 950)	2,37,500
Total Variable Cost	1,30,65,500
C. Fixed Costs	
Building Rent	27,00,000
Manager's Salary (` 50,000 x 3 x 12)	18,00,000
Nurse's Salary (` 18,000 x 12 x 24)	51,84,000
Ward boy's Salary (` 9,000 x 12 x 24)	25,92,000
Administrative Overheads	28,00,000
Depreciation on Equipment's	12,75,000
	1,63,51,000
D. Total Cost (B+C)	2,94,16,500
E. Profit (A-D)	70,83,500

Profit per patient day = ` 70,83,500/14,600 = ` 485.17

(i)   Contribution (per patient day) = (` 3,65,00,000 − ` 1,30,65,500)/ 14,600 = ` 1,605.10 BEP = 1,63,51,000/1,605.10 = 10,186.90 or say 10,187 patient days

Notes:

1.   Higher Charges for extra beds are a semi variable cost; still, for the sake of convenience it has been considered a variable cost.

2.   Assumed, the hospital hired 250 beds at a charge of ` 950 per bed to accommodate the flow of patients. However, this never exceeded the 10 beds above the normal capacity of 50 beds on any day.

3.   The fees were paid based on the number of patients attended to and the time spent by them, which on an average worked out to ` 5,50,000 p.m.

Question 30

SEZ Ltd. built a 120 km. long highway and now operates a toll road to collect tolls. The company has invested ` 900 crore to build the road and has estimated that a total of 120 crore vehicles will be using the highway during the 10 years toll collection tenure. The other costs for the month of "June 2020" are as follows:

(i)   **Salary:**

- **Collection personnel (3 shifts and 5 persons per shift) - ` 200 per day per person.**
- **Supervisor (3 shifts and 2 persons per shift) - ` 350 per day per person.**
- **Security personnel (2 shifts and 2 persons per shift) - ` 200 per day per person.**
- **Toll Booth Manager (3 shifts and 1 person per shift) - ` 500 per day per person.**

(ii) **Electricity - ` 1,50,000**

(iii) **Telephone - ` 1,00,000**

(iv) **Maintenance cost - ` 50 lakhs**

(v)   **The company needs 30% profit over total cost.**

Required:

(1) **Calculate cost per kilometre.**

(2) **Calculate the toll rate per vehicle. (PYP 10 Marks Nov 20, Old & New SM)**

Answer 30

Statement of Cost

Particulars		(`)
A. Apportionment of capital cost	$\left(\dfrac{Rs.\,900\ crore}{10\ Years} \times \dfrac{1}{12 months}\right)$	7,50,00,000
B. Other Costs		
Salary to Collection Personnel	(3 Shifts × 5 persons per shift × 30 days × ` 200 per day)	90,000
Salary to Supervisor	(3 Shifts × 2 persons per shift × 30 days × ` 350 per day)	63,000
Salary to Security Personnel	(2 Shifts × 2 persons per shift × 30 days × ` 200 per day)	24,000
Salary to Toll Booth Manager	(3 Shifts × 1 person per shift × 30 days × ` 500 per day)	45,000
Electricity		1,50,000
Telephone		1,00,000
		4,72,000
C. Maintenance cost		50,00,000
Total (A + B + C)		8,04,72,000

(1) Calculation of cost per kilometer:

$$= \frac{\text{Total Cost}}{\text{Total Km.}} = \frac{Rs.8,04,72,000}{120km.} = \textbf{Rs. 6,70,600}$$

(2) Calculation of toll rate per vehicle:

$$= \frac{\text{Total Cost}+25\%\,\text{Profit}}{\text{Vehicles per month}} = \frac{Rs.8,04,72,000+Rs.2,41,41,600}{1,00,00,000\ vehicles} = \textbf{Rs. 10.46}$$

Working :

Vehicles per month $= \dfrac{\text{Total estimated vehicles}}{10\ years} \times \dfrac{1\ month}{12\ months}$

$= \dfrac{120\ crore}{10\ years} \times \dfrac{1\ month}{12\ months} =$ 1 Crore vehicles

Question 31

A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ` 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator	208
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20
Normal unavoidable idle time-hours per operator	10
Average rate of wages per day of 8 hours per operator	` 100
Production bonus estimated	10% on wages
Power consumed	` 40,250
Supervision and Indirect Labour	` 16,500
Lighting and Electricity	` 6,000

The following particulars are given for a year:

Insurance	` 3,60,000
Sundry work Expenses	` 50,000

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Management Expenses allocated ` 5,00,000 Depreciation 10% on the original cost

Repairs and Maintenance (including consumables): 5% of the value of all the machines. Prepare a statement showing the comprehensive machine hour rate for the machine shop.(PYP 5 Marks Jan '21)

Answer 31

Workings:

Particulars	Six months 6 operators (Hours)
Normal available hours per month (208 x 6 months x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours (A)	7,380
Less: Leave hours (20 x 6 operators)	(120)
Less: Normal idle time (10 x 6 operators)	(60)
Effective working hours	**7,200**

2021 Computation of Comprehensive Machine Hour Rate

Particulars	Amount for six months (`)
Operators' wages (7,380/8 x100)	92,250
Production bonus (10% on wages)	9,225
Power consumed	40,250
Supervision and indirect labour	16,500
Lighting and Electricity	6,000
Repair and maintenance {(5% × ` 32,00,000)/2}	80,000
Insurance (` 3,60,000/2)	1,80,000
Depreciation {(` 32,00,000 × 10%)/2}	1,60,000
Sundry Work expenses (` 50,000/2)	25,000
Management expenses (` 5,00,000/2)	2,50,000
Total Overheads for 6 months	**8,59,225**
Comprehensive Machine Hour Rate = ` 8,59,225/7,200 hours	**` 119.33**

(Note: Machine hour rate may be calculated alternatively. Further, presentation of figures may also be done on monthly or annual basis.)

Question 32

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.

(PYP 10 Marks Jan 21)

Answer 32

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

Question 33

What do you understand by Build-Operate-Transfer (BOT) approach in Service Costing? How is the Toll rate computed? (PYP 5 Marks July 21)

Answer 33

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 = Total Cost + Profit / 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.

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> It was a service costing question on Build-Operate-Transfer (BOT). Performance of the examinees was below average.

Question 34

M/s Zaina Private Limited has purchased a machine costing ` 29,14,800 and it is expected to have a salvage value of ` 1,50,000 at the end of its effective life of 15 years.

Ordinarily the machine is expected to run for 4,500 hours per annum but it is estimated that 300 hours per annum will be lost for normal repair & maintenance. The other details in respect of the machine are as follows:

(i) Repair & Maintenance during the whole life of the machine are expected to be ` 5,40,000.

(ii) Insurance premium (per annum) 2% of the cost of the machine.

(iii) Oil and Lubricants required for operating the machine (per annum) ` 87,384.

(iv) Power consumptions: 10 units per hour @ ` 7 per unit. No power consumption during repair and maintenance. ·

(v) Salary to operator per month ` 24,000. The operator devotes one third of his time to the machine.

You are required to calculate comprehensive machine hour rate. (PYP May'19,5Marks)

Answer 34

Effective machine hour = 4,500 – 300 = 4,200 hours

Calculation of Comprehensive machine hour rate

Elements of Cost and Revenue	Amount (`) Per Annum
Repair and Maintenance (`5,40,000 ÷15 years)	36,000
Power (4,200 hours × 10 units × `7)	2,94,000
Depreciation $\left(\dfrac{Rs.29,14,800 - Rs.1,50,000}{15\ Years}\right)$	1,84,320
Insurance (`29,14,800 × 2%)	58,296
Oil and Lubricant	87,384
Salary to Operator {(`24,000×12)/3}	96,000
Total Cost	7,56,000
Effective machine hour	4,200
Total Machine Rate Per Hour	**180**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This question was related to 'Overheads' on calculation of comprehensive machine hour rate. Performance of the examinees was good.

Question 35

Paras Travels provides mini buses to an IT company for carrying its employees from home to office and dropping back after office hours. It runs a fleet of 8 mini buses for this purpose. The buses are parked in a garage adjoining the company's premises. Company is operating in two shifts (one shift in the morning and one shift in the afternoon). The distance travelled by each mini bus one way is 30 kms. The company works for 20 days in a month. The seating capacity of each mini bus is 30 persons. The seating capacity is normally 80% occupied during the year. The details of expenses incurred for a year are as under:

Particulars	
Driver's salary	` 20,000 per driver per month
Lady attendant's salary (mandatorily required for each mini bus)	` 10,000 per attendant per month
Cleaner's salary (One cleaner for 2 mini buses)	` 15,000 per cleaner per month
Diesel (Avg. 8 kms per litre)	` 80 per litre
Insurance charges (per annum)	2% of Purchase Price
License fees and taxes	` 5,080 per mini bus per month
Garage rent paid	` 24,000 per month
Repair & maintenance including engine oil and lubricants (for every 5,760 kms)	` 2,856 per mini bus
Purchase Price of mini bus	` 15,00,000 each
Residual life of mini bus	8 Years
Scrap value per mini bus at the end of residual life	` 3,00,000

Paras Travels charges two types of fare from the employees. Employees coming from a distance of beyond 15 kms away from the office are charged double the fare which is charged from employees coming from a distance of up-to 15 kms. away from the office. 50% of employees travelling in each trip are coming from a distance beyond 15 kms. from the office. The charges are to be based on average cost.

You are required to:

(i) Prepare a statement showing expenses of operating a single mini bus for a year,

(ii) Calculate the average cost per employee per month in respect of:

(a) Employees coming from a distance upto 15 kms. from the office.

(b) Employees coming from a distance beyond 15 kms. from the office. (PYP 10 Marks Dec '21)

Answer 35

(a) (i) Statement of Expenses of operating a mini bus in a year

Particulars	Rate (`)	Per Bus per annum (`)
(A) Standing Charges:		
Driver's salary	20,000 p.m	2,40,000
Lady attendant's salary	10,000 p.m	1,20,000
Average Cleaner's salary (50%)	15,000 p.m	90,000
Insurance charge	30,000 p.a.	30,000
License fee, taxes etc.	5,080 p.m.	60,960
Average Garage Rent	24,000 p.m	36,000
Depreciation {(15,00,000 − 3,00,000) ÷ 8}	1,50,000 p.a.	1,50,000
(B) Maintenance Charges:		
Repairs & maintenance including engine oil and lubricants (Working Note 1)	28,560 p.a.	
(C) Operating Charges:		
Diesel (Working Note 2)		5,76,000
Total Cost (A + B + C)		13,31,520
Cost per month		1,10,960

(ii) Average cost per employee per month:

A. Employee coming from distance of upto 15 km

$$= \frac{\text{Total cost per month}}{\text{Total no.of equivalent employee}} = \frac{1,10,960}{72*} = \text{Rs. 1,541.11}$$

B. Employee coming from a distance beyond 15 km

= 1541.11 × 2 = `3,082.22

* Considering half fare employees as a base	
Full fare employees (12 × 2)	24 employees
Add: Half fare employees (Working Note 3)	12 employees
Total Equivalent number of employees per month	36 employees
Total Equivalent number of employees per month (morning + afternoon shift of company)	72 employees

Working Notes:

1. Calculation of Repairs and maintenance cost of a bus:

Distance travelled in a year:

(4 trip × 2 shifts × 30 km. × 20 days × 12 months) Distance travelled p.a.: 57,600 km.

Repairs and maintenance cost per Bus per annum:

$= \frac{57,600 \text{ km.}}{5,760 \text{ km}}$ X Rs. 2,856 per bus

= `28,560 per annum

2. Calculation of diesel cost per bus per annum: Distance travelled in a year = 57,600 km

Diesel cost per Bus per annum:

$= \dfrac{57{,}600 \text{ km.}}{8 \text{ km}}$ X Rs. 80

= 5,76,000

3. **Calculation of equivalent number of employees per bus:**

Seating capacity of a bus	30 employees
Occupancy (80% of capacity)	24 employees
Half fare employees (50% of 24 employees)	12 employees
Full fare employees (50% of 24 employees)	12 employee

[**Note**: Total Equivalent number of employees per month (morning + afternoon shift of company can also be calculated considering full fare employees as a base. In that case the number will be 36. Then fare for employees coming from distance beyond 15km will be 1,10,960/36 =` 3,082.22 and employees coming from distance upto 15 km will be 3,082.22 / 2 = `1,541.11]

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This Numerical Question was based on the concept of Operating Costing. Many examinees faced hardship in the calculation of the cost of diesel, repairs & maintenance and equivalent employee's numbers. Performance of the examinees was below average.

Question 36

Coal is transported from two mines X & Y and unloaded at plots in a railway station. X is at distance of 15 kms and Y is at a distance of 20 kms from the rail head plots. A fleet of lorries having carrying capacity of 4 tonnes is used to transport coal from the mines. Records reveal that average speed of the lorries is 40 kms per hour when running and regularly take 15 minutes to unload at the rail head.

At Mine X average loading time is 30 minutes per load, while at mine Y average loading time is 25 minutes per load.

Additional Information:

Drivers' wages, depreciation, insurance and taxes, etc. ₹ 12 per hour Operated Fuel, oil tyres, repairs and maintenance, etc. ₹ 1.60 per km

You are required to prepare a statement showing the cost per tonne kilometre of carrying coal from each mine 'X' and 'Y'.\ (PYP 5 Marks May'22)

Answer 36

Statement showing the cost per tonne-kilometre of carrying mineral from each mine

	line X (₹)	line Y (₹)
Fixed cost per trip: (Refer to working note 1)		
(Driver's wages, depreciation, insurance and taxes)		
X: 1 hour 30 minutes @ ₹ 12 per hour	8.00	
Y: 1 hour 40 minutes @ ₹ 12 per hour		0.00
Running and maintenance cost:		
(Fuel, oil, tyres, repairs and maintenance)		
X: 30 km. ₹ 1.60 per km.	8.00	
Y: 40 km. ₹ 1.60 per km.		4.00
Total cost per trip (₹)	6.00	4.00
Cost per tonne – km (Refer to working note 2)	1 $\left[\dfrac{₹66}{60 \text{ tonne} - \text{km}}\right]$	.05 $\left[\dfrac{₹84}{80 \text{ tonne} - \text{km}}\right]$

Working notes:

	Mine- X	Mine- Y
(1) Total operated time taken per trip		
Running time to & fro	45 minutes	60 minutes

	$\left[30\text{km} \times \dfrac{60 \text{ minutes}}{40 \text{ km}}\right]$	$\left[40\text{km} \times \dfrac{60 \text{ minutes}}{40 \text{ km}}\right]$
Un-loading time	15 minutes	15 minutes
Loading time	30 minutes	25 minutes
Total operated time	90 minutes or	100 minutes or
	1 hour 30 minutes	1 hour 40 minutes
(2) Effective tones – km.	60(4 tonnes × 15 km.)	80(4 tonnes × 20 km.)

Question 37

ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each.

Branch is having four employees at a monthly salary of ₹ 50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹ 70,000 each, exclusively for processing of Education Loan applications.
In addition to above, following expense are incurred by the Branch:

- Branch Manager who supervises all the activities of branch, is paid at ₹ 90,000 per month.

- Legal charges, Printing & stationery and Advertising Expenses are incurred at
  ₹ 30,000, ₹ 12,000 and ₹ 18,000 respectively for a month.

Other expenses are ₹ 10,000 per month. You are required to:

(i) Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.

(ii) Find out the number of Education Loan Applications processed, if the total processing cost per Education Loan Application is same as in the Vehicle Loan Application as computed in (i) above. (PYP 5 Marks Nov 22)

Answer 37

Particulars	Vehicle loan Applications (₹)	Education loan Application (₹)	Total (₹)
Employee Cost	2,00,000 (₹ 50,000 × 4)	1,40,000 (₹ 70,000 × 2)	3,40,000
Apportionment of Branch manager's salary	27,000	27,000	54,000
Legal charges, Printing & stationery, and Advertising expenses	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	2,48,000	1,88,000	4,36,000

(i) **Computation of cost of processing a vehicle loan application:**
  Total Cost ÷ No. of applications
  ₹ 2,48,000 ÷ 496 = ₹ 500

(ii) **Computation of no. of Education loan Processed**
  Total Cost = No. of applications × Processing cost per application
  ₹ 1,88,000 = No. of applications × ₹ 500
  No. of education loan applications = ₹1,88,000 ÷ ₹500 = 376 applications

Question 38

RST Toll Plaza Limited built an 80-kilometre-long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000

light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, Members of Parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey, the toll fare will be reduced by 25 percent automatically. It is estimated that 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll and maintenance cost for a month is ` 59,09,090, The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

(i) Calculate the toll rate for each type of vehicle if concession facilities are not available on the return journey.

(ii) Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculated in option (i) remains the same. (PYP 5 Marks, May '23)

Answer 38

Working Notes:

(1) Calculation of equivalent numbers of Light weight vehicles (when no concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	45,000	1	90,000
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,50,000

*50,000 light vehicles less 10% exempted vehicles

(2) Calculation of equivalent numbers of Light weight vehicles (when concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	41,625 [45,000- (45,000 × 30% × 25%)]	1	86,625
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,46,625

(i) Calculation of toll rate for each type of vehicle:

Total cost to cover ÷ Equivalent type of vehicles

(` 59,09,090 + 10% of ` 59,09,090) ÷ 2,50,000 equivalent vehicles (Refer working note 1)

= 65,00,000 ÷ 2,50,000 = ` 26

Toll rate for:

Light weight vehicle = ` 26

Medium weight vehicle = ` 26 × 2.5 = ` 65

Heavy weight vehicle = ` 26 × 5 = ` 130

(ii) Calculation of toll rate for each type of vehicle:

Revenue earned from Light weight vehicle in (i) above

= 90,000 vehicles × ` 26 = ` 23,40,000

New toll rate to maintain the same revenue from Light weight vehicle

= ` 23,40,000 ÷ 86,625 (Refer working note-2) = ` 27.01

Light weight vehicle = ` 27.01

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26

Alternative presentation

(iii) Toll rate to be charged from light weight vehicles if concession applicable Revenue share in light vehicles = 90,000 × 26 = ` 23,40,000

Suppose rate is x, then outward journey 45,000 x; return journey (45,000 - 30% of 45,000) + 13,500 (x - 0.25)

45,000x + 31,500x + 13500 (0.75x) = ` 23,40,000

Toll rate to be charged from light weight vehicles: 86,625x = ` 23,40,000 = ` 27.01

Rate to be charged from 76,500 light weight vehicles @ 27.01; revenue will be ` 20,66,494

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26 revenue will be ` 2,73,506
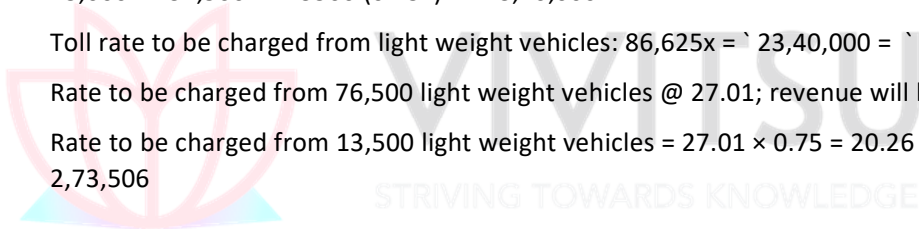
Chapter 13
Standard Costing

Question 1

A manufacturing department of a company has employed 120 workers. The standard output of product ''NPX" is 20 units per hour and the standard wage rate is ₹ 25 per labour hour.

In a 48 hours week, the department produced 1,000 units of 'NPX' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were ₹ 25.70 per hour.

Calculate:

(i) **Labour Cost Variance**

(ii) **Labour Rate Variance**

(iii) **Labour Efficiency Variance**

(iv) **Labour Idle time Variance (PYP 5 Marks May'22)**

Answer 1

Working Notes:

1. **Calculation of standard man hours**

   When 120 worker works for 1 hr., then the std. output is 20 units.

   Std. man hour per unit

   $=\dfrac{120 hurs}{20 units} = 6 hurs$

2. **Calculation of std. man hours for actual output**
   Total std. man hours = 1,000 units × 6 hrs. = 6,000 hrs.

Standard for actual			Actual				
Hours	Rate (₹)	Amount(₹)	Actual hrs.paid	Idle time hrs.	Production hrs.	Rate (₹)	Amount paid (₹)
6,000	25	50,000	5,760 (48 hrs. x 120 workers)	288	5,472	25.70	1,48,032

(i) Labour cost variance

= Std. labour cost – Actual labour cost

= 1,50,000 – 1,48,032   = ₹ 1,968 F

(ii) Labour rate variance

= (SR – AR) × AHPaid

= (25 - 25.70) × 5,760   = ₹ 4,032 A

(iii) Labour efficiency variance

= (SH – AH) × SR

= (6,000 – 5,472) × 25   = ₹ 13,200 F

(iv) Labour Idle time variance

= Idle Hours × SR

= 288 × 25 = ₹ 7,200 A

Note: Variances can also be calculated for one worker instead of 120.

Question 2

Following are the standard cost for a product-X:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹100 per hour	800
Variable Overhead 8 hours @ ₹15 per hour	120
Fixed Overhead	400
	2,220

Budgeted output for the year was 2,000 units. Actual output is 1,800 units. Actual cost for year is as follows:

	(₹)
Direct Materials 17,800 Kg @ ₹ 92 per Kg.	16,37,600
Direct Labour 14,000 hours @ ₹ 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

(i) Material Usage Variance

(ii) Material Price Variance

(iii) Material Cost Variance

(iv) Labour Efficiency Variance

(v) Labour Rate Variance

(vi) Labour Cost Variance

(vii) Variable Overhead Cost Variance

(viii) Fixed Overhead Cost Variance. [10 Marks April '23]

Answer 2

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)

= ₹ 90 (18,000 kg. – 17,800 kg.)

= ₹ 18,000 (Favourable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)

= 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost

= (SQ × SP) – (AQ × AP)

= (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)

= ₹ 16,20,000 – ₹ 16,37,600

= ₹17,600 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)

= ₹ 100 (1,800 units × 8 – 14,000 hrs.)

= ₹ 100 (14,400 hrs. – 14,000 hrs.)

= ₹ 40,000 (Favourable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)

= 14,000 hrs. (₹ 100 – ₹104)

= ₹ 56,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost

$$= (SH \times SR) - (AH \times AR)$$

$$= (14,400 \text{ hrs.} \times ₹ 100) - (14,000 \text{ hrs.} \times ₹ 104)$$

$$= ₹ 14,40,000 - ₹ 14,56,000$$

$$= ₹16,000 \text{ (Adverse)}$$

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost

$$= (14,400 \text{ hrs.} \times ₹ 15) - ₹2,17,500$$

$$= ₹ 1,500 \text{ (Adverse)}$$

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead

$$= (1,800 \text{ units} \times ₹400) - ₹ 7,68,000$$

$$= ₹ 7,20,000 - ₹ 7,68,000 = ₹ 48,000 \text{ (Adverse)}$$

Question 3

The following standards have been set to manufacture a product:

Direct Material:		(`)
2units of A @ `4 per unit	8.00	8.00
3 units of B @ `3 per unit	9.00	9.00
3units of B @ `3 per unit		15.00
15 units of C @ `1 per unit		32.00
Direct Labour: 3 hours @ `8 per hour	24.00	24.00
Total standard prime cost		56.00

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows:

12,500 units of A at `4.40 per unit
18,000 units of B at `2.80 per unit
88,500 units of C at `1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours, the company paid at `12 per hour while for the remaining, the wages were paid at standard rate.

CALCULATE

I. Materials price variance & Usage variance
II. Labour rate & Efficiency variances. (Old & New SM) (Same concepts different figures MTP Mar'19 10 Marks)

Answer 3

For Material Cost Variances

	SQ × SP	AQ × AP	AQ × SP
A	12,000 × 4 = 48,000	12,500 × 4.40 = 55,000	12,500 × 4 = 50,000
B	18,000 × 3 = 54,000	18,000 × 2.80 = 50,400	18,000 × 3 = 54,000
C	90,000 × 1 = 90,000	88,500 × 1.20 = 1,06,200	88,500 × 1 = 88,500
Total	`1,92,000	`2,11,600	`1,92,500

Variances:

Material Price Variance = Actual quantity (Std. price – Actual price) Or, = (AQ × SP) – (AQ × AP)

Or, = `1,92,500 – `2,11,600

= `19,100 (A)

Material Usage Variance = Standard Price (Std. Quantity – Actual Quantity) Or, = (SP × SQ) – (SP × AQ)

Or, = `1,92,000 – `1,92,500 = `500 (A)

For Labour Cost Variance:

	SH × SR	AH × AR	AH × SR
Labour	(6,000 × 3) × `8 = 1,44,000	2,500 × 12 = 30,000 15,000 × 8 = 1,20,000	17,500 × 8 = 1,40,000

| Total | ` 1,44,000 | ` 1,50,000 | ` 1,40,000 |

Variances:

Labour Rate Variance: Actual Hours (Std. Rate – Actual Rate) Or, = (AH × SR) – (AH × AR)

Or, = `1,40,000 – `1,50,000

= `10,000 (A)

Labour Efficiency Variance: Standard Rate (Std. Hours – Actual Hours) Or, = (SR × SH) – (SR × AH)

Or, = `1,44,000 – `1,40,000

= `4,000 (F)

Question 4

The standard labour component and the actual labour component engaged in a week for a job are as follows:

	Skilled Workers	Semi-skilled Workers	Un-Skilled workers
Standard number of workers in the gang	32	12	6
Standard wage rate per hour (₹)	30	20	10
Actual number of workers employed in the gang during the week	28	18	4
Actual wages rate per hour (₹)	34	23	12

During the 40 hours working week the gang produced 1,800 standard labour hours of work.

CALCULATE:

(i) Total labour cost variance;

(ii) Labour yield variance;

(iii) Labour mix variance; and

(iv) Labour wage rate variance.   (MTP March '18, 10 Marks)

Answer 4

Work produced by the gang 1,800 standard labour hours, i.e.,

1, 800 / 32+ 12+6   or 36 gang hours

Standard hours of Skilled Labour	(36 x 32)	1,152	hours
Standard hours of Semi-skilled Labour	(36 x 12)	432	hours
Standard hours of Un-skilled Labour	(36 x 6)	216	hours
Total		1,800	hours
Actual hours of Skilled Labour	(40 x 28)	1,120	hours
Actual hours of Semi-skilled Labour	(40 x 18)	720	hours
Actual hours of Un-skilled Labour	(40 x 4)	160	hours
Total		2,000	hours

Revised Standard hours (actual hours worked expressed in standard ratio)

Skilled Labour $\frac{1,152}{1,800} \times 2,000$ 1,280 hours

Semi-skilled Labour $\frac{432}{1,800} \times 2,000$ 480 hours

Unskilled Labour $\frac{216}{1,800} \times 2,000$ 240 hours

2,000 hours

Standard Cost for Actual Output: ₹

Skilled Labour 1,152 hours @₹ 30 34,560

Semi-skilled Labour	432	hours @ ₹ 20	8,640
Unskilled Labour	216	hours @ ₹ 10	2,160
	1,800	hours	45,360

Actual Cost:

Skilled Labour	1,120	hours @ ₹ 34	38,080
Semi-skilled Labour	720	hours @ ₹ 23	16,560
Unskilled Labour	160	hours @ ₹ 12	1,920
	2,000	hours	56,560

(i) Total Labour Cost Variance

Standard Cost - Actual Cost   ₹

₹ 45,360 - ₹ 56,560   11,200 (A)

(ii) Labour Yield Variance:

(Standard hours for Actual Output - Revised Standard hours) x Standard Rate

Skilled (1,152 - 1,280) x ₹ 30	3,840	(A)
Semi-skilled (432 - 480) x ₹ 20	960	(A)
Un-skilled (216 - 240) x ₹ 10	240	(A)
	5,040	(A) 5,040 (A)

(iii) Labour Mix Variance:

(Revised Standard Hours - Actual Hours) x Standard Rate

Skilled (1,280 - 1,120) x ₹ 30	4,800	(F)
Semi-skilled (480 - 720) x ₹ 20	4,800	(A)
Un-skilled (240 - 160) x ₹ 10	800	(F)
	800	(F) 800 (F)

(iv) Labour Wage Rate Variance:

(Standard Rate - Actual Rate) x Actual Hours

Skilled (₹ 30 - ₹ 34) x 1,120	4,480	(A)
Semi-skilled (₹ 20 - ₹ 23) x 720	2,160	(A)
Un-skilled (₹ 10 - ₹ 12) x 160	320	(A)
	6,960	(A) 6,960 (A)

Check : Total Labour Cost Variance = Yield + Mix + Rate   11,200 (A)

Question 5

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

Fixed	₹ 12,00,000;	Variable	₹ 6,00,000;
Semi-Variable	₹ 1,80,000		

Actual production during the April, 2019 of the year was 8,000 units. Each month has 20 working

days. During the month there was one public holiday. The actual overheads amounted to:

Fixed	₹ 1,10,000;	Variable	₹ 48,000
Semi-variable	₹ 19,200		

Semi-variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

CALCULATE the followings:

(i) Overhead Cost Variance

(ii) Fixed Overhead Cost Variance

(iii) Variable Overhead Cost Variance

(iv) Fixed Overhead Volume Variance

(v) Fixed Overhead Expenditure Variance

(vi) Calendar Variance. (MTP Oct. '19, 10 Marks, PYP 10 Marks Dec '21)

Answer 5

COMPUTATION OF VARIANCES

(i)	**Overhead Cost Variance**	=	Absorbed Overheads − Actual Overheads
		=	(₹87,200 + ₹44,800) − (₹1,21,520 + ₹55,680)
		=	₹ 45,200 (A)
(ii)	**Fixed Overhead Cost**	=	Absorbed Fixed Overheads − Actual Fixed Overheads
	Variance	=	₹87,200 − ₹1,21,520
		=	₹ 34,320 (A)
(iii)	**Variable Overhead Cost**	=	Standard Variable Overheads for Production − Actual **Variance** Variable Overheads
		=	₹44,800 − ₹55,680
		=	₹ 10,880 (A)
(iv)	**Fixed Overhead Volume**	=	Absorbed Fixed Overheads − Budgeted Fixed **Variance** Overheads
		=	₹87,200 − ₹1,09,000
		=	₹ 21,800 (A)
(v)	**Fixed Overhead Expenditure**	=	Budgeted Fixed Overheads − Actual Fixed Overheads Variance
		=	₹10.90 × 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)

WORKING NOTE

Fixed Overheads per Unit = $\frac{Budgeted\ Fixed\ Overheads}{Budgeted\ Output}$ = $\frac{Rs.12,00,000}{1,20,000\ units}$	₹ 10
Fixed Overheads element in *Semi-Variable* Overheads i.e. 60% of ₹1,80,000	₹ 1,08,000
Fixed Overheads per Unit = $\frac{Budgeted\ Fixed\ Overheads}{Budgeted\ Output}$ = $\frac{Rs.1,08,000}{1,20,000units}$	₹ 0.90
Standard Rate of Absorption of Fixed Overheads *per unit* (₹10 + ₹0.90)	₹10.90
Fixed Overheads Absorbed on 8,000 units @ Rs10.90	₹ 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 Over heads ₹6,72,000

Standard Variable Cost per unit = $\frac{Budgeted\ Fixed\ Overheads}{Budgeted\ Output}$ = $\frac{Rs.6,72,000}{1,20,000units}$	= ₹5.60

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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

$$\text{Possible Fixed Overheads} = \frac{Budgeted\ Fixed\ Overheads}{Budgeted\ Output} \times \text{Actual Days}$$ ₹ 1,03,550

$$\left[\frac{Rs.\ 1,09,000}{20\ Days} \times 19\ Days\right]$$

Actual Fixed Overheads (₹1,10,000 + 60% of ₹19,200)   ₹1,21,520

Actual Variable Overheads (₹48,000 + 40% of ₹19,200)   ₹55,680

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This Numerical question tested the basic knowledge of examinees on the topic of Standard Costing. The examinees had to calculate various fixed and variable overhead cost variance. The main theme of question was based on segregating the semi- variable overheads into fixed and variable cot and to calculate standard cost for actual output. Some of the examinees had calculated fixed overhead variances correctly but failed to calculate variable overhead variances and calendar variance. Performance of the examinees was below average.

Question 6

Arnav Ltd. manufactures a product Q, the standard cost of which is as follows:

Standard Cost per unit (₹)

Direct Material	600
Direct labour:	
- Skilled @ ₹80 per hour	120
- Unskilled @ ₹60 per hour	90
Variable overheads	75
Fixed overheads	30
	915

During the month just ended 4,000 units of Q were produced. The actual labour cost was as follows.

	Rate per hour (₹)	Cost (₹)
Skilled	87.50	5,77,500
Unskilled	55.00	2,97,000

10% of the labour time was lost due to idle time. The standard idle time was 7.5% of labour time. Arnav Ltd. has budgeted to produce 4,200 units of Q. Arnav Ltd. absorbs its overheads on direct labour hour (effective hours) basis. Actual fixed and variable overheads incurred were ₹1,55,000 and ₹2,85,000 respectively.

CALCULATE:

   (i)   **Labour rate variance;**

   (ii)   **Labour efficiency variance;**

   (iii) **Labour mix variance;**

   (iv) **Labour yield variance;**

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

   (vi) **Variable overhead expenditure variance and**

   (vii) **Variable overhead efficiency variance. (MTP Oct. '18, 10 Marks)**

Answer 6

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Workings:		
	Skilled	**Unskilled**
Standard Rate per hour	80	60
Standard time for producing one unit	1.5 hours(₹ 120 ÷ ₹ 80)	1.5 hours(₹ 90 ÷ ₹ 60)
Actual hours paid (AHPaid)	6,600 hours	5,400 hours
Standard hours required to produce 4,000 units (SH)	6,000 hours (1.5 hours× 4,000 units)	6,000 hours (1.5 hours× 4,000 units)

	Actual hours worked	6,600/100×97.5	5,400/100× 97.5
	(AH$_{Worked}$)	= 6,435 hours	= 5,265 hours

$$\left(\frac{6,600+5,400}{100} \times 97.5\right) \times 0.5 \qquad \left(\frac{6,600+5,400}{100} \times 97.5\right) \times 0.5$$

	Idle time$_{Abnormal}$	= 5,850 hours	= 5,850 hours
(i)	Labour Rate Variance	6,600-6,435=165 hours	5,400−5,265=135 hours
		= AH$_{Paid}$(Std. Rate − Actual Rate)	
	- Skilled	= 6,600 hours (₹ 80 − ₹ 87.50)	= ₹ 49,500 (A)
	- Unskilled	= 5,400 hours (₹ 60 − ₹ 55)	= ₹ 27,000 (F)
			= ₹ 22,500 (A)
(ii)	Labour Efficiency Variance	= Std. Rate (SH − AH$_{Worked}$)	
	- Skilled	= ₹ 80 (6,000 hours − 6,435 hours)	= ₹ 34,800 (A)
	- Unskilled	= ₹ 60 (6,000 hours − 5,265 hours)	= ₹ 44,100 (F)
			= ₹ 9,300 (F)
(iii)	Labour Mix Variance	= Std. Rate (RSH − AH$_{Worked}$)	
	- Skilled	= ₹ 80 (5,850 hours − 6,435 hours)	= ₹ 46,800 (A)
	- Unskilled	= ₹ 60 (5,850 hours − 5,265 hours)	= ₹ 35,100 (F)
			= ₹ 11,700 (A)
(iv)	Labour Yield Variance	= Std. Rate (SH − RSH)	
	- Skilled	= ₹ 80 (6,000 hours − 5,850 hours)	= ₹ 12,000 (F)
	- Unskilled	= ₹ 60 (6,000 hours − 5,850 hours)	= ₹ 9,000 (F)
			= ₹ 21,000 (F)
(v)	Labour Idle time Variance = Std. Rate × Idle time Abnormal		
	- Skilled	= ₹ 80 × 165 hours	= ₹ 13,200 (A)
	- Unskilled	= ₹ 60 × 135 hours	= ₹ 8,100 (A)
			= ₹ 21,300 (A)
(vi)	Variable Overhead Expenditure Variance		

= AH$_{Worked}$ (SR - AR)

= 11,700 hours = $\left(\frac{Rs.75}{2×1.5\ hours} - \frac{Rs.2,85,000}{11,700 hours}\right)$

= 11,700 hours (₹ 25 − ₹ 24.36) = ₹ 7,488 (F)

(vii)   Variable Overhead Efficiency Variance

= Std. Rate (SH − AH$_{Worked}$)

= ₹ 25 (12,000 − 11,700) = ₹ 7,500 (F)

Question 7

ZX Ltd. has furnished the following information:

	Budgeted	Actual March 2020
Number of working days	25	27

Production (in units)	20,000	22,000
Fixed Overheads	₹ 3,00,000	₹ 3,10,000

Budgeted fixed overhead rate is ₹ 10.00 per hour. In March 2020, the actual hours worked were 31,500. In relation to fixed overheads, CALCULATE:

(i) **Efficiency Variance**

(ii) **Capacity Variance**

(iii) **Calendar Variance**

(iv) **Volume Variance**

(v) **Expenditure Variance (MTP 5 Marks May 20)**

Answer 7

Working:

(1) Budgeted Hours = $\frac{Rs.3,00,000}{Rs.10\ per\ hour}$ 30,000hours

(2) Standard Fixed Overhead rate per hour (Standard Rate);

= $\frac{Budgeted\ fixed\ overheads}{Budgeted\ Hours}$ = $\frac{Rs.3,00,000}{30,000\ hours}$ = ₹ 10.00

(3) Standard hour per unit of output = 30,000 hours / 20,000 units = 1.5 hours

(4) Standard hours for Actual Output = 22,000 units × 1.5 hours = 33,000 Hours

(5) Budgeted Overhead per day for budgeted days= ₹3,00,000 / 25 days = ₹12, 000

(6) Budgeted Overhead for actual days worked = ₹ 12,000 × 27 days = ₹3,24,000

(7) Budgeted Hours for Actual days worked = 30,000hours / 25 days ×27 days = 32,400 hours

Computation of Variances in relation to Fixed Overheads:

(i) **Efficiency Variance**

= Standard Rate × (Standard hours for actual output – Actual hours worked)

= ₹10 (33,000 hours – 31,500 hours) = ₹15,000 (Favourable)

(ii) **Capacity Variance**

= Standard Rate × (Actual Hours – Budgeted Hours for actual days worked)

= ₹10 (31,500 hours – 32,400 hours) = ₹9,000 (Adverse)

(iii) **Calendar Variance**

= Standard/Budgeted Fixed Overhead Rate per day × (Actual Working days – Budgeted working days)

= ₹12,000 (27 days – 25 days) = ₹24,000 (Favourable)

(iv) **Volume Variance**

= Standard Rate × (Standard hours – Budgeted hours)

= ₹10 (33,000 hours – 30,000 hours) = ₹30,000 (Favourable)

(v) **Expenditure Variance**

= Budgeted Overheads – Actual Overheads

= ₹3,00,000 – ₹3,10,000 = ₹10,000 (Adverse)

Note: Overhead Variances may also be calculated based on output.

Question 8

Following data is extracted from the books of XYZ Ltd. for the month of January, 2020:

(i) **Estimation-**

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	800	?	--

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Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-B	600	30.00	18,000
			--

Normal loss was expected to be 10% of total input materials.

(ii) **Actuals- 1480 kg of output produced.**

Particulars	Quantity (kg.)	Price (₹)	Amount (₹)
Material-A	900	?	--
Material-B	?	32.50	--
			59,825

(iii) **Other Information-**

Material Cost Variance = ₹ 3,625 (F) Material

Price Variance = ₹ 175 (F)

You are required to CALCULATE:

(i) **Standard Price of Material-A;**

(ii) **Actual Quantity of Material-B;**

(iii) **Actual Price of Material-A;**

(iv) **Revised standard quantity of Material-A and Material-B; and**

(v) **Material Mix Variance; (MTP 10 Marks, Oct.'20 & March '23, Old & New SM)**

Answer 8

(i) Material Cost Variance (A + B) = {(SQ × SP) − (AQ × AP)}

₹ 3,625 = (SQ × SP) − ₹ 59,825

(SQ × SP) = ₹ 63,450

$(SQ_A × SP_A) + (SQ_B × SP_B)$ = ₹ 63,450 (940 kg × SP_A) + (705 kg × ₹ 30) = ₹ 63,450

(940 kg × SP_A) + ₹ 21,150 = ₹ 63,450

(940 kg × SP_A) = ₹ 42,300

SP_A = ₹ 42,300 / 940kg

Standard Price of Material-A = ₹ 45

Working Note:

SQ i.e. quantity of inputs to be used to produce actual output

$= \frac{1,480\ kg}{90\%}$ = 1,645kg

$SQ_A = \frac{800kg}{(800+600)} × 1,645\ kg.$ = 940kg

$SQ_B = \frac{600kg}{(800+600)} × 1,645\ kg.$ = 705kg

(ii) Material Price Variance (A + B) = {(AQ × SP) − (AQ × AP)}

₹ 175 = (AQ × SP) − ₹ 59,825

(AQ × SP) = ₹ 60,000 (AQ_A

× SP_A) + (AQ_B × SP_B) = ₹ 60,000

(900 kg × ₹ 45 (from (i) above)) + (AQ_B × ₹30) = ₹ 60,000

₹ 40,500 + (AQ_B × ₹ 30) = ₹ 60,000

(AQ_B × ₹ 30) = ₹ 19,500

AQ_B = 19,500 / 30 = 650 kg

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Actual Quantity of Material B   = 650 kg.

(iii) (AQ × AP)   = ₹ 59,825

$(AQ_A × AP_A) + (AQ_B × AP_B)$ = ₹ 59,825

(900 kg × APA) + (650 kg (from (ii) above) × ₹ 32.5) = ₹ 59,825 (900 kg × APA) + ₹ 21,125

= ₹ 59,825

$(900 \text{ kg} × AP_A)$ = ₹ 38,700

AP_A = 38,700 / 900 = 43

Actual Price of Material-A   = ₹ 43

(iv) Total Actual Quantity of Material-A and Material-B

$= AQ_A + AQ_B$

= 900 kg + 650 kg (from (ii) above)

= 1,550 kg

Now,

Revised SQ_A = 800kg /800+600 X 1,550kg. = 886kg.

Revised SQ_B = 600kg/(800+600)X 1,550kg. = 664kg.

(v)   Material Mix Variance (A + B) = {(RSQ × SP) − (AQ × SP)}

= {$(RSQ_A × SP_A) + (RSQ_B × SP_B)$ − 60,000}

= (886 kg (from (iv) above) × ₹ 45 (from (i) above))

+ (664 kg (from (iv) above) × ₹ 30) - ₹60,000

= (39,870 + 19,920) − 60,000 = ₹ 210 (A)

Question 9

AK Ltd. has furnished the following standard cost data per unit of production:

Material 10 kg @ ₹ 100 per kg.

Labour 6 hours @ ₹ 55 per hour

Variable overhead 6 hours @ ₹ 100 per hour.

Fixed overhead ₹45,00,000 per month (Based on a normal volume of 30,000 labour hrs)

The actual cost data for the month of September 2020 are as follows:

Material used 50,000 kg at a cost of ₹ 52,50,000.

Labour paid ₹ 15,50,000 for 31,000 hours

Variable overheads ₹ 29,30,000

Fixed overheads ₹ 47,00,000

Actual production 4,800 units.

CALCULATE:

(i)   Material Cost Variance.

(ii)   Labour Cost Variance.

(iii) Fixed Overhead Cost Variance.

(iv) Variable Overhead Cost Variance (MTP 5 Marks, Mar'21) (Same concept different figures MTP 5 Marks Nov'21)

Answer 9

Budgeted Production 30,000 hours ÷ 6 hours per unit = 5,000 units

Budgeted Fixed Overhead Rate = ₹ 45,00,000 ÷ 5,000 units = ₹ 900 per unit Or

= ₹ 45,00,000 ÷ 30,000 hours = ₹ 150 per hour.

(i) Material Cost Variance = (Std. Qty. × Std. Price) − (Actual Qty. × Actual Price)

= (4,800 units × 10 kg. × ₹100) - ₹ 52,50,000

= ₹ 48,00,000 − ₹ 52,50,000

= ₹ 4,50,000 (A)

(ii) Labour Cost Variance = (Std. Hours × Std. Rate) − (Actual Hours × Actual rate)

= (4,800 units × 6 hours × ₹ 55) − ₹ 15,50,000

= ₹ 15,84,000 − ₹ 15,50,000

= ₹ 34,000 (F)

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

= (₹ 900 × 4,800 units) − ₹47,00,000

= ₹ 3,80,000 (A) OR

= (Budgeted Rate × Std. Hours) − Actual Overhead

= (₹ 150 × 4,800 units × 6 hours) − ₹ 47,00,000

= ₹ 3,80,000 (A)

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

= (4,800 units × 6 hours × ₹ 100) - ₹ 29,30,000

= ₹ 28,80,000 - ₹ 29,30,000

= ₹ 50,000 (A)

Question 10

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 10 Marks, Oct'21)(RTP Nov '23)**

Answer 10

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 $= \frac{27,000 \times 12}{9,000} = ₹ 36$

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

Question 11

Rounak Minerals Ltd. operates in iron ore mining through open cast mining method. Explosives and detonators are used for excavation of iron ores from the mines. The following are the details of standard quantity of explosives materials used for mining:

Particulars	Rate (₹)	Standard Qty. for Iron ore	Standard Qty. for Overburden (OB)
SME	40.00 per kg.	2.4 kg per tonne	1.9 kg per cubic-meter
Detonators	20.00 per piece	2 pcs per tonne	2 pcs per cubic-meter

The standard stripping ratio is 3:1 (means 3 cubic- meter of overburden soil to be removed to get one tonne of iron ore). During the month of December 2021, the company produced 20,000 tonnes of iron ore and removed 58,000 cubic- meter of OB. The quantity of explosive materials used and paid for the month is as below:

Material	Quantity	Amount (₹)
SME	1,67,200 kg.	63,53,600
Detonators	1,18,400 pcs	24,27,200

You are required to COMPUTE:

(i) **Material price variance**

(ii) **Material quantity variance**

(iii) **Material cost variance. (MTP 10 Marks April '22 & Sep '23)**

Answer 11

Workings:

1. **Calculation of Standard Qty. of Explosives and Detonators for actual output:**

Particulars	Iron ore	Overburden (OB)	Total

SME:				
A	Actual Output	20,000 tonne	58,000 M3	
B	Standard Qty per unit	2.4 kg./tonne	1.9 kg./M3	
C	Standard Qty. for actual production [A×B]	48,000 kg.	1,10,200 kg.	1,58,200 kg.
Detonators:				
D	Standard Qty per unit	2 pcs/ tonne	2 pcs/ M3	
E	Standard Qty. for actual production [A×D]	40,000 pcs.	1,16,000 pcs	1,56,000 pcs

2. **Calculation of Actual Price per unit of materials:**

Material	Quantity [A]	Amount (₹) [B]	Rate (₹) [C = B÷A]
SME	1,67,200 kg.	63,53,600	38.00
Detonators	1,18,400 pcs	24,27,200	20.50

(i) Computation of material price variance:

Material Price Variance = Actual Qty. × (Std. Price - Actual Price)

SME = 1,67,200 kg. × (₹40 – ₹38) = ₹ 3,34,400 (F)

Detonators = 1,18,400 pcs × (₹20 – ₹20.5) = ₹ 59,200 (A)

Total = ₹ 2,75,200 (F)

(ii) Computation of material quantity variance:

Material Qty. Variance = Std. Price × (Std. Qty for actual output - Actual Qty.)

SME = ₹40 × (1,58,200 kg. - 1,67,200 kg.) = ₹ 3,60,000 (A)

Detonators = ₹20 × (1,56,000 pcs -1,18,400 pcs) = ₹ 7,52,000 (F)

Total = ₹ 3,92,000 (F)

(iii) Computation of material cost variance:

Material cost variance = Std. cost – Actual Cost

Or, (Std. Price × Std. Qty) – (Actual Price × Actual Qty.)

SME = (₹40 × 1,58,200 kg) – (₹38 × 1,67,200 kg.)

= ₹63,28,000 – ₹63,53,600 = ₹ 25,600 (A)

Detonators = (₹20 × 1,56,000 pcs) – (₹20.50 × 1,18,400 pcs)

= ₹31,20,000 – ₹24,27,200 = ₹ 6,92,800 (F)

Total = **₹ 6,67,200 (F)**

Question 12

DISCUSS the Controllable and un-controllable variances (MTP 5 Marks, March '21)

Answer 12

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 centers 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

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situation. If the uncontrollable variances are of significant nature and are persistent, the standard may need revision.

Question 13

BBC Ltd. manufactures Ordinary Portland Cement (OPC). The standard data for the raw materials that are used to manufacture OPC are as follows:

Material	Composition (%)	Rate per Metric Ton (₹)
Limestone	65	565
Silica	20	4,800
Alumina	5	32,100
Iron ore	5	1,800
Others	5	2,400

During the month of February 20X8, A Ltd. produced 500 MT OPC. Actual data related with the consumption and costs are as follows:

Raw Material	Quantity (MT)	Total Cost (₹)
Limestone	340	1,90,400
Silica	105	5,09,250
Alumina	25	8,12,500
Iron ore	30	53,400
Others	23	51,750

You are required to COMPUTE the following variances related with the production of OPC for the month of February 20X8:

(i) Material Price Variance

(ii) Material Mix Variance

(iii) Material Yield Variance

(iv) Material Cost Variance. **(MTP 10 Marks Apr 19)**

Answer 13

(i) **Material Price Variance = Actual Quantity (Std. Price – Actual Price)**

Limestone	=	$340(₹565 - \frac{Rs.1,90,400}{340})$	
	=	340 (₹ 565 - ₹ 560)	= 1,700 (F)
Silica	=	$105(₹4,800 - \frac{Rs.5,09,250}{105})$	
	=	105 (₹ 4,800 - ₹ 4,850)	= 5,250 (A)
Alumina	=	$25(₹32,100 - \frac{Rs.8,12,500}{25})$	
	=	25 (₹ 32,100 - ₹ 32,500)	= 10,000 (A)
Iron ore	=	$30(₹1,800 - \frac{Rs.53,400}{30})$	
	=	30 (₹ 1,800 - ₹ 1,780)	= 600 (F)
Others	=	$23(₹2,400 - \frac{Rs.51,750}{23})$	
	=	23 (₹ 2,400 - ₹ 2,250)	= 3,450 (F)
			9,500 (A)

(ii) **Material Mix Variance = Std. Price (Revised Std. Quantity – Actual Quantity)**

Limestone	=	₹565 (523 × 65% - 340)	
	=	₹565 (339.95 - 340)	= 28.25 (A)
Silica	=	₹4,800 (523 × 20% - 105)	
	=	₹4,800 (104.6 - 105)	= 1,920 (A)

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Alumina	=	₹32,100 (523 × 5% - 25)	
	=	₹32,100 (26.15 - 25)	= 36,915 (F)
Iron ore	=	₹1,800 (523 × 5% - 30)	
	=	₹1,800 (26.15 - 30)	= 6,930 (A)
Others	=	₹2,400 (523 × 5% - 23)	
	=	₹2,400 (26.15 - 23)	= 7,560 (F)
			35,596.75 (F)

(iii) Material Yield Variance = Std. Price (Standard Quantity – Revised Std. Quantity)

Limestone	=	₹ 565 (500 × 65% - 523 × 65%)	
	=	₹ 565 (325 - 339.95)	= 8,446.75 (A)
Silica	=	₹ 4,800 (500 × 20% - 523 × 20%)	
	=	₹ 4,800 (100 - 104.6)	= 22,080 (A)
Alumina	=	₹ 32,100 (500 × 5% - 523 × 5%)	
	=	₹ 32,100 (25 - 26.15)	= 36,915 (A)
Iron ore	=	₹ 1,800 (500 × 5% - 523 × 5%)	
	=	₹ 1,800 (25 - 26.15)	= 2,070 (A)
Others	=	₹ 2,400 (500 × 5% - 523 × 5%)	
	=	₹ 2,400 (25 - 26.15)	= 2,760 (A)
			72,271.75 (A)

(iv) Material Cost Variance = (Std. Quantity × Std. Price) – (Actual Quantity × Actual Price)

Limestone	=	₹ 565 × (500 × 65%) - ₹ 1,90,400	
	=	₹ 1,83,625 - ₹ 1,90,400	= 6,775 (A)
Silica	=	₹ 4,800 × (500 × 20%) - ₹ 5,09,250	
	=	₹ 4,80,000 – ₹ 5,09,250	= 29,250 (A)
Alumina	=	₹ 32,100 (500 × 5%) – ₹ 8,12,500	
	=	₹ 8,02,500 – ₹ 8,12,500	= 10,000 (A)
Iron ore	=	₹ 1,800 (500 × 5%) – ₹ 53,400	
	=	₹ 45,000 – ₹ 53,400	= 8,400 (A)
Others	=	₹ 2,400 (500 × 5%) – ₹ 51,750	
	=	₹ 60,000 – ₹ 51,750	= 8,250 (F)
			46,175 (A)

Question 14

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

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 10 Marks March '22)**

Answer 14

(i) Fixed Overhead Cost Variance = (Std Fixed Overheads – Actual Fixed Overheads)

= (1,00,000 / 20,000 X 21,000 units – Actual Fixed Overheads) = 15,000A

= (1,05,000 - Actual Fixed Overheads) = 15,000A

=> Actual Fixed Overheads = 1,20,000

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

= (Actual Days -25)X $\frac{1,00,000}{25}$ = 8,000 F

= (Actual Days -25) =2

=> Actual Days   = 27

(iii)   Fixed Overhead Efficiency Variance =(Standard Hours for Actual Production – Actual Hours) x Budgeted rate per hour

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

= (10,500 – 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) = 20,000A

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

= (20,000 – 21,000) X $\frac{1,00,000}{20,000}$ **= 5,000F**

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

x Budgeted Rate per Hour

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

Question 15

The details regarding a product manufactured by the company for the last one week are as follows:

Standard cost (per unit)

Direct materials 10 units @ ₹ 22.50	₹ 225
Direct wages 5 hours @ ₹ 120	₹ 600
Total:	₹ 825
Actual (for whole activity):	
Direct materials	₹ 96,525
Direct wages	₹ 2,44,860
Analysis of variances:	
Direct materials:	
Price	₹ 8,775 (Adverse)
Usage	₹ 5,625 (Favourable)
Direct wages (labour):	
Efficiency	₹ 5,400 (Adverse)

You are required to CALCULATE:

(i)   Material Cost variance

(ii)   Actual output units

(iii) **Actual price of material per unit**

(iv) **Actual Wages rate per labour hour**

(v) **Labour rate variance**

(vi) **Labour Cost variance (MTP 10 Marks Sep'22)**

Answer 15

(i) Material Cost Variance = Material Price Variance+ Material Usage Variance

= ₹ 8,775 A + ₹ 5,625 F= ₹ 3,150 Adverse

(ii) Actual output units

Let x be the actual quantity of output

Then Standard Quantity of input for actual output 'x'

SQ = 10x

Material cost variance	= (SQ x SP) - (AQ x AP)
-3,150	= (10x x 22.50) - ₹ 96,525
-3,150	= 225x - ₹ 96,525
225x	= 96,525 – 3,150
	= ₹ 93,375
X	= 93,375/225 = **415 Units**

(iii) **Actual Price of Material per unit**

Material Usage variance	= (SQ - AQ) x SP 5,625 = (10x - AQ) x ₹ 22.50
5,625	= (10 x 415 units - AQ) x ₹ 22.50
5,625/22.50	= 4,150 - AQ
AQ = 4,150 - 250	= 3,900 units
Now, AQ x AP	= ₹ 96,525 (given) AP = ₹ 96,525/AQ
	= ₹ 96,525/3,900 units = ₹ 24.75

(iv) **Actual wages rate per labour hour**

Labour efficiency variance = 5,400 Adverse (given)

Standard rate per hour (Standard time – Actual time) = -5,400

₹ 120 [(Actual output units x Number of hours per output) – Actual time] = -5,400

₹ 120 [(415 units x 5 hrs) – Actual time] = -5,400 2,075 hrs – Actual time

= -5,400/120

Actual time	= 2,075 + 45
	= 2,120 hrs
Now Direct wages hour	= ₹ 2,44,860 (given) Actual time x Actual rate per
	= ₹ 2,44,860
Actual rate per hour	= ₹ 2,44,860 / 2,120 hrs
	= ₹ 115.50

(v) Labour rate variance

= Actual time (Standard Rate – Actual Rate)

= 2,120 hrs (₹ 120 - ₹ 115.50)

= 2,120 hrs x ₹ 4.50 = 9,540 Favourable

(vi)   Labour Cost variance

= Labour rate variance+ Labour efficiency variance

= 9,540 F + 5,400 A = 4,140 Favourable

Question 16

The following information is available from the cost records of a company for the month of July, 2022:

(1)	Material purchased	22,000 pieces	₹ 9,00,000
(2)	Material consumed	21,000 pieces	
(3)	Actual wages paid for	5,150 hours	₹ 2,57,500
(4)	Fixed Factory overhead incurred		₹ 4,60,000
(5)	Fixed Factory overhead budgeted		₹ 4,20,000
(6)	Units produced	1,900	
(7)	Standard rates and prices are:		
	Direct material	₹ 45 per piece	
	Standard input	10 pieces per unit	
	Direct labour rate	₹ 60 per hour	
	Standard requirement	2.5 hours per unit	
	Overheads	₹ 80 per labour hour	

You are required to CALCULATE the following variances:

(i)   Material price variance

(ii)   Material usage variance

(iii)   Labour rate variance

(iv)   Labour efficiency variance

(v)   Fixed overhead expenditure variance

(vi)   Fixed overhead efficiency variance

Fixed overhead capacity variance   **(MTP 10 Marks Oct'22) (Same concept different figures Old & New SM)**

Answer 16

(i)   **Material price variance (on the basis of Single plan):**

= Actual Quantity $_{Purchased}$ (Std. Price – Actual Price)

=22,000 pcs

$(Rs.\ 45 - \frac{Rs.9,00,000}{Rs.22,000pcs}$ = Rs.90,000* (Favourable)

OR

Material price variance (on the basis of Partial plan):

= Actual Quantity $_{consumed}$ (Std. Price – Actual Price)

= 21,000 pcs (Rs. 45 – Rs.9,00,000 = Rs.85,909* (Favourable)

(*Figure may slightly differ due to rounding off the actual price per unit)

(ii)   **Material usage variance:**

= Std. price per piece (Std. Quantity – Actual Quantity $_{consumed}$

= Rs.45 (1,900 units × 10 – 21,000) = Rs. 90,000 (Adverse)

(iii) Labour rate variance:

= Actual hours paid (Std. rate – Actual rate)

= 5,150 hours (Rs. 60 – $\frac{Rs.2,57,500}{5,150\ hours}$ = Rs. 51,500 (Favourable)

(iv) Labour efficiency variance:

= Std. rate per hour (Std. hours – Actual Quantity $_{worked}$

= Rs.60 (1,900 units × 2.5 hours – 5,150 hours) = Rs. 24,000 (Adverse)

(v) Fixed overhead expenditure variance:

= Budgeted Overhead – Actual Overhead

= Rs. 4,20,000 – Rs. 4,60,000 = Rs. 40,000 (Adverse)

(vi) Fixed overhead efficiency variance:

= Std. rate (Std. hours - Actual hours worked)

= Rs.80 (1,900 units × 2.5 hours - 5,150 hours) = Rs. 32,000 (Adverse)

Or,

Fixed overhead efficiency variance on basis of units

 = Std. rate per unit (Actual output – Standard output for actual hours)

= Rs.200 (1,900 units - 5,150 / 2.5 hours) = Rs. 32,000 (Adverse)

(vii) Fixed overhead capacity variance:

= Std. rate (Actual hours worked – Budgeted hours)

= Rs. 80 (5,150hours – $\frac{Rs..4,20,000}{Rs.80}$ = Rs. 8,000 (Adverse)

Or,

Fixed overhead capacity variances on basis of units

= Std. rate per unit (Standard output for actual hours – Budgeted output)

= Rs.200 (2,060 units - 4,20,000 / 200) = Rs. 8,000 (Adverse)

Question 17

X Associates undertake to prepare income tax returns for individuals for a fee. They use the weighted average method and actual costs for the financial reporting purposes. However, for internal reporting, they use a standard costs system. The standards, based on equivalent performance, have been established as follows:

Labour per return	5 hrs @ `40 per hour
Overhead per return	5 hrs @ `20 per hour

For July 2023 performance, budgeted overhead is `98,000 for standard labour hours allowed. The

following additional information pertains to the month of July 2023:

July 1	Return-in-process (25% complete)	200 No.
	Return started in July	825 Nos
July 31	Return-in-process (80% complete)	125 Nos
Cost Data:		
July 1	Return-in-process labour	`12,000
	- Overheads	`5,000
July 1 to 31	Labour : 4,000 hours	`1,78,000
	Overheads	`90,000

You are required to compute:

(i) **For each element, equivalent units of performance and the actual cost per equivalent unit.**

(ii) **Actual cost of return-in-process on July 31.**

(iii) **The standard cost per return.**

(iv) **The labour rate and labour efficiency variance as well as overhead volume and overhead expenditure variance. (MTP 10 Marks, Oct '23)**

Answer 17

I. Statement Showing Cost Elements Equivalent Units of Performance and the Actual Cost Per Equivalent Unit

Detail of Returns	Detail of Input Units	Details	Equivalent Units				
			Output Units	Labour		Overheads	
				Units	%	Units	%
Returns in Process at Start	200	Returns Completed in July	900	900	100	900	100
Returns Started in July	825	Returns in Process at the end of July	125	100	80	100	80
	1,025		1,025	1,000		1,000	

Costs:	Labour (`)	Overhead (`)
From previous month	12,000	5,000
During the month	1,78,000	90,000
Total Cost	1,90,000	95,000
Cost per Equivalent Unit	190.00	95.00

II. Actual cost of returns in process on July 31:

	Numbers	Stage of Completion	Rate per Return (`)	Total (`)
Labour	125 returns	0.80	190.00	19,000
Overhead	125 returns	0.80	95.00	9,500
				28,500

III. Standard Cost per Return:

Labour   5 Hrs × ` 40 per hour = `200

Overhead   5 Hrs × ` 20 per hour = `100

                                       ` 300

Budgeted volume for July = ` 98,000 / 1000 = 980 Returns

Actual labour rate   = ` 178000 / 4000 = `44.50

IV. Computation of Variances:

Statement Showing Output (July only) Element Wise	Labour	Overhead
Actual performance in July in terms of equivalent units as Calculated above	1,000	1,000
Less: Returns in process at the beginning of July in terms of equivalent units i.e. 25% of returns (200)	50	50
	950	950

Variance Analysis:

Labour Rate Variance

                      =   Actual Time × (Standard Rate – Actual Rate)

$$= \text{Standard Rate} \times \text{Actual Time} - \text{Actual Rate} \times \text{Actual Time}$$

$$= `40 \times 4,000 \text{ hrs.} - `1,78,000 = `18,000(A)$$

Labour Efficiency Variance

$$= \text{Standard Rate} \times (\text{Standard Time} - \text{Actual Time})$$

$$= \text{Standard Rate} \times \text{Standard Time} - \text{Standard Rate} \times \text{Actual Time}$$

$$= `40 \times (950 \text{ units} \times 5 \text{ hrs.}) - `40 \times 4,000 \text{ hrs.}$$

$$= `30,000(F)$$

Overhead Expenditure or Budgeted Variance

$$= \text{Budgeted Overhead} - \text{Actual Overhead}$$

$$= `98,000 - `90,000$$

$$= `8,000(F)$$

Overhead Volume Variance

$$= \text{Recovered/Absorbed Overhead} - \text{Budgeted Overhead}$$

$$= 950 \text{ Units} \times 5 \text{ hrs.} \times `20 - `98,000 = `3,000(A)$$

Question 18

ABC Ltd. had prepared the following estimation for the month of January:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg.	90.00	72,000
Material-B	600 kg.	60.00	36,000
Skilled labour	1,000 hours	75.00	75,000
Unskilled labour	800 hours	44.00	35,200

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	86.00	77,400
Material-B	650 kg.	65.00	42,250
Skilled labour	1,200 hours	71.00	85,200
Unskilled labour	860 hours	46.00	39,560

You are required to CALCULATE:

(a)	Material Cost Variance;	(b)	Material Price Variance;
(c)	Material Mix Variance;	(d)	Material Yield Variance;
(e)	Labour Cost Variance;	(f)	Labour Efficiency Variance and (g)

Labour Yield Variance. (RTP May'19 , May '20 May '18) (Same concept different figures RTP May'18)

Answer 18

Material Variances:

Material	SQ	SP	SQ × SP	RSQ	RSQ × SP	AQ	AQ × SP	AP	AQ × AP
	(WN-1)	(₹)	(₹)	(WN-2)	(₹)		(₹)	(₹)	(₹)
A	940 kg.	90.00	84,600	886 kg.	79,740	900 kg.	81,000	86.00	77,400
B	705 kg.	60.00	42,300	664 kg.	39,840	650 kg.	39,000	65.00	42,250
	1645 kg		1,26,900	1550 kg	1,19,580	1550 kg	1,20,000		1,19,650

WN-1: Standard Quantity (SQ):

Material A- $\left(\frac{800kg.}{0.9\times1,400kg.}\times1,480kg.\right)$ = 939.68 or 940kg.

Material B- $\left(\frac{600kg.}{0.9\times1,400kg.}\times1,480kg.\right)$ = 704.76 or 705 kg.

WN- 2: Revised Standard Quantity (RSQ):

Material A- $\left(\frac{800kg.}{1,400kg.}\times1,550kg.\right)$ = 885.71 or 886kg.

Material B- $\left(\frac{600kg.}{1,400kg.}\times1,550kg.\right)$ = 664.28 or 664 kg.

(a)	Material Cost Variance (A + B)	=	{(SQ × SP) − (AQ × AP)}
		=	{1,26,900−1,19,650}=7,250(F)
(b)	Material Price Variance (A + B)	=	{(AQ × SP) − (AQ × AP)
		=	{1,20,000−1,19,650}=350(F)
(c)	Material Mix Variance (A + B)	=	{(RSQ × SP) − (AQ × SP)}
		=	{1,19,580−1,20,000}=420(A)
(d)	Material Yield Variance (A + B)	=	{(SQ × SP) − (RSQ × SP)}
		=	{1,26,900−1,19,580}=7,320(F)

Labour Variances:

Labour	SH	SR	SH × SR	RSH	RSH × SR	AH	AH × SR	AR	AH × AR
	(WN-3)	(₹)	(₹)	(WN-4)	(₹)		(₹)	(₹)	(₹)
Skilled	1,116 hrs	75.00	83,700	1144	85,800	1,200	90,000	71.00	85,200
Unskilled	893 hrs	44.00	39,292	916	40,304	860	37,840	46.00	39,560
	2,009 hrs		1,22,992	2,060	1,26,104	2,060	1,27,840		1,24,760

WN- 3: Standard Hours (SH):

Skilled Labour - $\left(\frac{0.95\times1,000hr.}{0.90\times1,400kg.}\times1,480kg.\right)$ = 1,115.87 or 1,116 hrs.

Unskilled labour- $\left(\frac{0.95\times800\ hr.}{0.90\times1,400kg.}\times1,480kg.\right)$ = 892.69 or 893 hrs.

WN- 4: Revised Standard Hours (RSH):

Skilled Labour - $\left(\frac{1,000hr.}{1,800hr.}\times2,060hr.\right)$ = 1,115.87 or 1,116 hrs.

Unskilled labour- $\left(\frac{800\ hr.}{1,800hr.}\times2,060hr.\right)$ = 915.56 or 916 hrs.

(e) Labour Cost Variance (Skilled + Unskilled)	=	{(SH × SR) − (AH × AR)}
(f) Labour Efficiency Variance (Skilled + Unskilled)	=	{1,22,992 − 1,24,760} = 1,768 (A)
	=	{(SH × SR) − (AH × SR)}
	=	{1,22,992 − 1,27,840} = 4,848 (A)
(g) Labour Yield Variance (Skilled + Unskilled)	=	{(SH × SR) − (RSH × SR)}
	=	{1,22,992 − 1,26,104} = 3,112 (A)

Question 19

JVG Ltd. produces a product and operates a standard costing system and value material and finished goods inventories at standard cost. The information related with the product is as follows:

Particulars	Cost per unit (₹)
Direct materials (30 kg at ₹350 per kg)	10,500

Direct labour (5 hours at ₹ 80per hour)   **400**

The actual information for the month just ended is as follows:

(a) The budgeted and actual production for the month of September 2019 is 1,000 units.

(b) Direct materials – 5,000 kg at the beginning of the month. The closing balance of direct materials for the month was 10,000 kg. Purchases during the month were made at' 365 per kg. The actual utilization of direct materials was 7,200 kg more than the budgeted quantity.

(c) Direct labour – 5,300 hours were utilized at a cost of ₹ 4,34,600.

Required:

Calculate (i) Direct material price and usage variances (ii) Direct labour rate and efficiency variances. (RTP Nov'19)

Answer 19

Working:

Quantity of material purchased and used.

No. of units produced	1,000 units
Std. input per unit	30kg.
Std. quantity (Kg.)	30,000 kg.
Add: Excess usage	7,200 kg.
Actual Quantity	37,200 kg.
Add: Closing Stock	10,000 kg.
Less: Opening stock	5,000 kg.
Quantity of Material purchased	42,200 kg.

(i) Direct Material Price Variance:

= Actual Quantity purchased (Std. Price – Actual Price)

= 42,200 kg.(₹350 – ₹365) = 6,33,000 (Adverse)

Direct Material Usage Variance:

= Std. Price (Std. Quantity – Actual Quantity)

= ₹ 350 (30,000 kg. – 37,200 kg.) = ₹ 25,20,000 (Adverse)

(ii) Direct Labour Rate Variance:

= Actual hours (Std. Rate – Actual Rate)

= 5,300 hours (₹80 – ₹82) = ₹10,600 (Adverse)

Direct Labour Efficiency Variance:

= Std. Rate (Std. hours – Actual hours)

= ₹ 80 (1,000 units × 5 hours – 5,300 hours) = ₹ 24,000 (Adverse)

Question 20

Aaradhya Ltd. manufactures a commercial product for which the standard cost per unit is as follows:

	(Rs.)
Material : 5 kg @ Rs. 4 per kg	20.00
Labour: 3 hours @ Rs. 10 per kg	30.00
Overhead	
Variable: 3 hours @ ₹1	3.00
Fixed: 3 hours @ ₹0.50	1.50
Total	54.50

During Jan. 20X8, 600 units of the product were manufactured at the cost shown below:

	(Rs.)
Materials purchased: 5,000 kg. @ ₹4.10 per kg.	20,500

Materials used: 3,500 kg.	
Direct Labour : 1,700 hours @ ₹ 9	15,300
Variable overhead	1,900
Fixed overhead	900
Total	38,600

The flexible budget required 1,800 direct labour hours for operation at the monthly activity level used to set the fixed overhead rate.

Compute:

(a) Material price variance, (b) Material Usage variance; (c) Labour rate variance; (d) Labour efficiency variance; (e) Variable overhead expenditure variance; (f) Variable overhead efficiency variance; (g) Fixed overhead expenditure variance; (h) Fixed overhead volume variance; (i) Fixed overhead capacity variance; and (j) Fixed overhead efficiency variance. Also RECONCILE the standard and actual cost of production. (RTP Nov.'18)

Answer 20

(a) Material price variance:

= (Standard price – Actual Price) × Actual quantity

= (₹ 4 – ₹ 4.10) × 5,000 = ₹ 500 Adv.

(b) Material usage variance:

= (Std. quantity for actual output – Actual qtty.) × Std. price

= (600 × 5 – 3,500) × 4 = ₹ 2,000 Adv.

(c) Labour Rate Variance:

= (Standard rate – Actual rate) × Actual hours

= (₹ 10 – ₹ 9) × 1,700 = ₹ 1,700 Fav.

Labour Efficiency Variance:

= (Standard hours for actual output – Actual hours) × Standard rate

= (600 × 3 – 1,700) × ₹ 10

= ₹ 1,000 Fav.

Variable Overhead Expenditure Variance

= (Actual Hours × Standard Rate) – Actual Overhead

= (1,700 × ₹ 1) – ₹ 1,900

= ₹ 200 Adv.

Variable Overhead Efficiency Variance:

= Std. hours for actual output – Actual hours) × Std. rate

= (600 × 3 – 1,700) × ₹ 1 = ₹ 100 Fav.

Fixed Overhead Expenditure Variance:

= (Budgeted overhead – Actual overhead)

= (1,800 × 0.50 – 900) = Nil

Fixed Overhead Volume Variance:

= (Std. hours for actual output – Budgeted hours) × Std. rate

= (600 × 3 – 1,800) × ₹ 0.50 = Nil

Fixed Overhead Capacity Variance:

= (Budgeted hours – Actual Hours) × Standard rate

= (1,800 – 1,700) × ₹ 0.50 = ₹ 50 Adv.

Fixed Overhead Efficiency Variance:

= (Std. hours for actual output – Actual hours) × Standard rate

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= (600 × 3 – 1,700) × ₹ 0.50 = ₹ 50 Fav.

Verification: (₹) (₹)

Overhead recovered: 600 units @ ₹ 4.50   2,700

Actual Overhead:

    Variable   1,900

    Fixed   900   2,800

        100 Adv.

Variable expenditure variance   200 Adv

Variable Efficiency variance   100 Fav.

Fixed expenditure variance   Nil

Fixed overhead volume variance   Nil

        100 Adv.

Reconciliation Statement

Standard Cost: 600 units @ ₹ 54.50   32,700

Actual Cost: 38,600

Less: Material Stock at standard cost: (1,500 × ₹4)   6,000   (32,600)   100 Fav.

Variances: Adv. (₹)   Fav. (₹)

    Material price   500

    Material usage   2,000

    Labour rate   1,700

    Labour efficiency   1,000

    Variable expenditure   200

    Variable efficiency   100

    Total   2,700   2,800   100 Fav.

Question 21

LM Limited produces a product 'SX4' which is sold in a 10 Kg. packet. The standard cost card per packet of 'SX4' is as follows:

	(Rs.)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 80 per hour	640
Variable Overhead 8 hours @ ₹ 20 per hour	160
Fixed Overhead	250
	1,950

Budgeted output for a quarter of a year was 10,000 Kg. Actual output is 9,000 Kg. Actual costs for this quarter are as follows:

	(Rs.)
Direct Materials 8,900 Kg @ ₹ 92 per Kg.	8,18,800
Direct Labour 7,000 hours @ ₹ 84 per hour	5,88,000
Variable Overhead incurred	1,40,000
Fixed Overhead incurred	2,60,000
You are required to CALCULATE:	

(i) Material Usage Variance

(ii) Material Price Variance

(iii) Material Cost Variance

(iv) Labour Efficiency Variance

(v) Labour Rate Variance

(vi) Labour Cost Variance

(vii) Variable Overhead Cost Variance

(viii) Fixed Overhead Cost Variance

(RTP May '21) (Same concept but different figures RTP Nov'20)

Answer 21

(i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)

= ₹ 90 (9,000 kg. – 8,900 kg.)

= ₹ 9,000 (Favorable)

(ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)

= 8,900 kg. (₹ 90 – ₹ 92) = ₹ 17,800 (Adverse)

(iii) Material Cost Variance = Std. Material Cost – Actual Material Cost

= (SQ × SP) – (AQ × AP)

= (9,000 kg. × ₹ 90) – (8,900 kg. × ₹ 92)

= ₹ 8,10,000 – ₹ 8,18,800

= ₹ 8,800 (Adverse)

(iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)

= ₹ 80 $(9,000/10 \, X8 Hours)$ – 7,000 hrs.

= ₹ 80 (7,200 hrs. – 7,000 hrs.)

= ₹ 16,000 (Favorable)

(v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)

= 7,000 hrs. (₹ 80 – ₹ 84)

= ₹ 28,000 (Adverse)

(vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost

= (SH × SR) – (AH × AR)

= (7,200 hrs. × ₹ 80) – (7,000 hrs. × ₹ 84)

= ₹ 5,76,000 – ₹ 5,88,000

= ₹ 12,000 (Adverse)

(vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost

= (7,200 hrs. × ₹ 20) – ₹ 1,40,000

= ₹ 4,000 (Adverse)

(viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead

$$= \frac{Rs. 250}{10 \, kgs} \times 9,000 \text{ kgs.} - Rs. 2,60,000$$

= ₹ 2,25,000 – ₹ 2,60,000 = ₹ 35,000 (Adverse)

Question 21

Baby Moon 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) (Same concept different figures MTP 10 Marks Aug'18, Old & New SM)

Answer 21

(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 = ₹ 22,800 (F)

Material Usage Variance = (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 units × 2 hours × ₹ 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) × 10	= 4,000 (A)
2,00,000 – 10X	= - 4,000
X	= 2,04,000 ÷ 10

Therefore, Actual Hours (X) = 20,400

Variable overhead Expenditure Variance

= Variable Overhead at Actual Hours - Actual Variable Overheads

= 20,400 × ₹ 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 = (SH × SR) – (AH × AR)

= 4,00,000 – 4,48,800 = ₹ 48,800 (A)

Labour Rate Variance = (SR – AR) × AH

= (20 – 22) × 20,400 = ₹ 40,800 (A)

Labour Efficiency Variance = (SH – AH) × SR

= (20,000 – 20,400) × 20 = ₹ 8,000 (A)

Question 22

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.

(RTP May '22, PYP 10 Marks July 21)

Answer 22

Working Notes:

1. **Calculation of Standard Man hours**

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

   Standard man hours per unit = $\frac{100\ hours}{50\ Units}$ = **2 hours per unit**

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

   = 1,920 units x 2 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	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 = 1,440F
1,280F

(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 × (12- 3,840 X 12 / 3,800)

= 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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This practical problem tested the basic knowledge of examinees on the topic of standard costing requiring computation of various labour variances. Most of the examinees had just written the formula of different variances. They did not understand how to calculate standard hours for actual output. Performance of the examinees was poor.

Question 23

Ahaan Limited operates a system of standard costing in respect of one of its products 'AH1' which is manufactured within a single cost centre. Details of standard per unit are as follows:

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- The standard material input is 20 kilograms at a standard price of ₹ 24 per kilogram.

- **The standard wage rate is ₹ 72 per hour and 5 hours are allowed to produce one unit.**
- **Fixed production overhead is absorbed at the rate of 100% of wages cost.**

During the month of April 2022, the following was incurred:

- **Actual price paid for material purchased @ ₹ 22 per kilogram.**
- **Total direct wages cost was ₹ 43,92,000**

Fixed production overhead cost incurred was ₹ 45,00,000 Analysis of variances was as follows:

Variances	Favourable	Adverse
Direct material price	₹ 4,80,000	-
Direct material usage	₹ 48,000	
Direct labour rate	-	₹ 69,120
Direct labour efficiency	₹ 33,120	-
Fixed production overhead expenditure		₹ 1,80,000

You are required to CALCULATE the following for the month of April, 2022

(i) **Material cost variance**

(ii) **Budgeted output (in units)**

(iii) **Quantity of raw materials purchased (in kilograms)**

(iv) **Actual output (in units)**

(v) **Actual hours worked**

(vi) **Actual wage rate per labour hour**

(vii) **Labour cost variance**

(viii) **Production overhead cost variance (RTP Nov'22)**

Answer 23

i. **Direct Material Cost Variance** = Direct Material Price Variance + Direct Material Usage Variance

= ₹ 4,80,000 F + ₹ 48,000 F = ₹ 5,28,000 F

ii. **Budgeted Output (units)**

Fixed Production Overhead Expenditure Variance

= Budgeted Fixed Overhead - Actual Fixed Overheads

= Budgeted Output x Standard Overhead Rate - Actual Fixed Overheads

₹ 1,80,000 A = Budgeted Output x ₹ 360 (5 hrs @₹ 72) - ₹ 45,00,000

Budgeted Output=$\frac{₹45,00,000 - ₹1,80,000}{₹360}$= **12,000 units**

iii. **Quantity of Materials purchased (in kilograms)**

Material Price Variance = Actual Usage (Standard Price per kg - Actual price per kg)

₹ 4,80,000 F = Actual Usage (₹ 24 -₹ 22)

Actual usage in kgs =$\frac{₹4,80,000 - ₹1,80,000}{2}$ = 2,40,000 kgs

Actual Output (units)

Actual Direct Wages	₹ 43,92,000
Direct labour rate variance	₹ 69,120 A
Direct labour efficiency variance	₹ 33,120 F
Standard labour cost for actual output	₹ 43,56,000

Actual Output=$\frac{\text{Standard labour cost for actual output}}{\text{Standard wage rate per unit}}$

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$$=\frac{₹4,3,56,000 - ₹1,80,000}{₹360\ (72\times5)}= 12,100\ units$$

Alternatively, let X be the actual quantity of output

Then, Standard Quantity of input for actual output 'X'

20X = SQ

Material cost variance = (SQ x SP) - (AQ x AP)

₹ 5,28,000 = (20 X x ₹ 24) - (2,40,000 kgs x ₹ 22)

480X = ₹ 52,80,000 + ₹ 5,28,000

480X = ₹ 58,08,000

$$X=\frac{₹58,08,000}{480}= \textbf{12,100 units}$$

iv. Actual hours worked

Labour Efficiency Variance = Standard Labour Rate (Standard time for actual output - Actual time)

₹ 33,120 F = ₹ 72 (5 hours x 12100 units - Actual time)

460 hours = 60,500 hours - Actual time

Actual time = 60,500 - 460 = 60,040 hours

v. Actual wage rate per hour

Actual Wages paid = ₹ 43,92,000

Actual hours worked = 60,040 hours

Actual Wage rate per hour $=\frac{₹43,92,000}{60,04\ hours}= ₹ 73.15$ per hour

vi. Production Overhead Cost Variance

= Actual Output x Standard overhead rate - Actual Overheads Incurred

= 12,100 units x₹ 360 - ₹ 45,00,000

= ₹ 43,56,000 - ₹ 45,00,000

= ₹ 1,44,000 A

Question 24

The standard cost of a chemical mixture is as follows : 60% of Material A @ ₹ 50 per kg 40% Material B @ ₹ 60 per kg .

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.

540 kg of Material A @ ₹ 60 per kg 260 kg of Material

B @ ₹ 50 per kg

The quantity processed was 680 kilograms of good product. From the above given information Calculate:

(i) Material Cost Variance   (ii) Material Price Variance

(iii) Material Usage Variance   (iv) Material Mix Variance

(v) Material Yield Variance

(PYP Nov'19,10Marks) (Same concept different figures Old & New SM)

Answer 24

Basic Calculation

Material	Standard for 640 kg. output	Actual for 680 kg. output

	Qty.	Rate	Amount	Qty	Rate	Amount
	Kg.	(₹)	(₹)	Kg.	(₹)	(₹)
A	480	50	24,000	540	60	32,400
B	320	60	19,200	260	50	13,000
Total	800		43,200	800		45,400
Less: Loss	160	-	-	120	-	-
	640		43,200	680		45,400

Std. cost of actual output = ₹43,200 × 680/640 = ₹45,900 Calculation of Variances

(i) **Material Cost Variance** = (Std. cost of actual output − Actual cost)

= (45,900− 45,400)

= **₹ 500 (F)**

(ii) **Material Price Variance** = (SP−AP)×AQ

Material A = (50−60)×540 = ₹ 5400 (A)

Material B = (60−50))×260 =

₹ 2600 (F) MPV =

₹ 2800 (A)

(iii) **Material Usage Variance (MUV)** = (Std. Quantity for actual output − Actual Quantity) × Std. Price

Material A = $\left(\frac{480\times680}{640} - 540\right) \times 50$ = Rs.1,500(A)

Material B = $\left(\frac{320\times680}{640} - 540\right) \times 60$ = Rs.4,800(F)

MUV = **₹ 3,300 (F)**

(iv) **Material Mix Variance** = SP×(RAQ−AQ)

A = ₹50×(480Kg−540Kg) = ₹ 3,000 (A)

B = ₹60×(320Kg.−260Kg.) = ₹3,600(F)

Total = ₹3,000(A)+₹3,600(F) = **₹ 600 (F)**

(v) **Material Yield Variance** = SP×(SQ−RAQ)

A = ₹50×(510Kg.−480Kg) = ₹ 1,500 (F)

B = ₹60×(340Kg.−320Kg.) = ₹1,200(F)

Total = ₹1,500(F)+₹1,200(F) = **₹2,700(F)**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical question relating to the topic 'Standard Costing'. The question required calculation of material variances. Performance of the examinees was average.

Question 25

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled ₹ 70

Semi-skilled ₹ 65

Unskilled ₹ 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled

workers. The actual wages paid were at the rate of ₹ 75, ₹ 60 and ₹ 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.

Calculate the following variances showing clearly adverse (A) or favourable (F)

      (i) Labour Cost Variance   (ii) Labour Rate Variance

      (iii) Labour Efficiency Variance (iv) Labour Mix Variance

      (v) Labour Idle Time Variance (PYP May '19, 10 Marks)

Answer 25

(i) **Labour Cost Variance** = Standard Cost – Actual Cost

= ₹ 1,14,400 – ₹ 1,54,400 = **40,000 (A)**

(1,600*75 + 400*60 + 200 *52 = ₹ 1,54,400)

<center>Or</center>

Types of workers	Standard Cost – Actual Cost	Amount (₹)
Skilled Workers	(30x40x70/2,000x1,600)-(40x40x75)67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600)-(10x40x60)31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600)-(5x40x52)16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	**40,000 (A)**

(ii) **Labour Rate Variance**

Types of workers	Actual Hours × (Standard Rate - Actual Rate)	Amount (₹)
Skilled Workers	1,600 hours × (₹70.00 – ₹75.00)	8,000 (A)
Semi- Skilled	400 hours × (₹ 65.00 – ₹ 60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (₹ 50.00 – ₹ 52.00)	400 (A)
Total	₹ 8,000 (A) + ₹ 2,000 (F) + ₹ 400 (A)	**6,400 (A)**

(iii) **Labour Efficiency Variance**

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	₹ 70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	₹ 65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	₹ 50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	**18,800 (A)**

Alternatively, labour efficiency can be calculated on basis of labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)
Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	**33,600 (A)**

(iv) **Labour Mix Variance**

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

    @on the basis of hours worked

$$= 1,980 \text{ hours} \times \left(\frac{Rs. 1,14,400}{1,760\ hrs.} - \frac{1,440\ hrs. \times Rs.70 + 360\ hrs. \times Rs.65 + 180\ hrs. \times Rs.50}{1,980\ hrs.} \right)$$

<center>**Or**</center>

<center>**Labour Mix Variance**</center>

Types of workers	Std. Rate ₹ (Revised Actual Hours Worked – Actual Hours Worked)	Amount (₹)
Skilled Workers	₹ 70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	₹ 65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un Skilled Workers	₹ 50 × (360 hrs. – 180 hrs.)	9,000 (F)
Total	₹ 25,200 (A) + ₹ 11,700 (F) + ₹ 9,000 (F)	4,500 (A)

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	Amount (₹)
Skilled Workers	₹70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	₹65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	₹50.00 × (200 hours – 180 hours)	1,000 (A)
Total 11,200 (A) + 2,600 (A) + 1,000 (A)		**14,800 (A)**

Verification:

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance + Labour Idle Time Variance

= 6,400 (A) + 18,800 (A) + 14,800 (A) = ₹ 40,000 (A)

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance

= 6400(A) + 33600(A) = ₹ 40000(A)

In this case, labour idle time variance is a part of labour efficiency variance.

Working Notes:

Category	Standard Cost			Actual (1600 units)			Revised Actual Hours
	Hrs.	Rate	Amt. (₹)	Hrs.	Rate	Amt. (₹)	
Skilled	960	70.00	67,200	1,440		1,08,000	1,080
(30 W x 40 x 1,600/2,000)							
				(40Wx36)	75.00		(1,980x6/11)
Semiskilled	480	65.00	31,200	360		21,600	540
(15Wx40 x 1,600/2,000)				(10Wx36)	60.00		(1,980x3/11)
Unskilled	320(10Wx40 x1,600/2,000)	50.00	16,000	180 (5Wx36)	52.00	9,360	360 (1,980x2/11)
Total	1,760	65	1,14,400	1,980		1,38,960	1,980

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this practical question related to 'Standard Costing' examinees were required to calculate Labour Variances. Most of the examinees made a mistake in the calculation of Standard hours

Question 26

ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020:

(i)	Fixed Overhead Cost Variance	₹ 2,800 (Adverse)
(ii)	Fixed Overhead Volume Variance	₹ 2,000 (Adverse)
(iii)	Budgeted Hours for June, 2020	2,400 hours
(iv)	Budgeted Overheads for June,2020	₹ 12,000

(v)	Actual rate of recovery of overheads	₹ 8 Per Hour

From the above given information Calculate:

(1) **Fixed Overhead Expenditure Variance**

(2) **Actual Overheads Incurred**

(3) **Actual Hours for Actual Production**

(4) **Fixed Overhead Capacity Variance**

(5) **Standard hours for Actual Production**

(6) **Fixed Overhead Efficiency Variance (PYP 10 Marks Nov 20)**

Answer 26

(1) **Fixed Overhead Expenditure Variance**

= Budgeted Fixed Overheads – Actual Fixed Overheads

= ₹ 12,000 – ₹ 12,800 (as calculated below) **= ₹ 800(A)**

(2) Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads

2,800 (A) = ₹ 10,000 – Actual Overheads Actual

Overheads **= ₹ 12,800**

(3) Actual Hours for Actual Production = ₹ 12,800/ ₹8 **= 1,600 hrs**.

(4) **Fixed Overhead capacity Variance**

= Budgeted Fixed Overheads for Actual Hours– Budgeted Fixed Overheads

= ₹ 5 x 1600 hrs. – ₹ 12,000 **= ₹ 4,000 (A)**

(5) **Standard Hours for Actual Production**

= Absorbed Overheads/ Std. Rate

= ₹ 10,000/ ₹ 5 **= 2,000 hrs.**

(6) **Fixed Overhead Efficiency Variance**

= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours

= ₹ 10,000 – ₹ 5 x 1,600 hrs. **= ₹ 2,000 (F)**

Working Note:

(i) Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

2,000 (A) = Absorbed Fixed Overheads – ₹12,000

Absorbed Fixed Overheads = ₹ 10,000

(ii) Standard Rate/ Hour = ₹ 5 (₹ 12,000/2,400 hrs.)

Question 27

Premier Industries has a small factory where 52 workers are employed on an average for 25 days a month and they work 8 hours per day. The normal down time is 15%. The firm has introduced standard costing for cost control. Its monthly budget for November, 2020 shows that the budgeted variable and fixed overhead are ₹ 1,06,080 and ₹ 2,21,000 respectively.

The firm reports the following details of actual performance for November, 2020, after the end of the month:

Actual hours worked	8,100 hrs.
Actual production expressed in standard hours	8,800 hrs.
Actual Variable Overheads	₹ 1,02,000
Actual Fixed Overheads	₹ 2,00,000

You are required to calculate:

(i) **Variable Overhead Variances:**

    (a) **Variable overhead expenditure variance.**

    (b) **Variable overhead efficiency variance.**

(ii) **Fixed Overhead Variances:**

    (a) **Fixed overhead budget variance.**

    (b) **Fixed overhead capacity variance.**

    (c) **Fixed overhead efficiency variance.**

(iii) **Control Ratios:**

    (a) **Capacity ratio.**

    (b) **Efficiency ratio.**

    (c) **Activity ratio. (PYP 10 Marks Jan '21)**

Answer 27

Workings:

Calculation of budgeted hours

Budgeted hours = (52 x 25 x 8) x 85% = 8,840 hours

(i) **Variable overheads variance**

    (a) Variable overhead expenditure variance

       = Std. overhead for Actual hours – Actual variable Overhead

$$= \left(\frac{Rs.1,06,080}{8,840} \times 8,100\right) - Rs.\ 1,02,000$$

       = **4800 A**

    (b) Variable overhead efficiency variance

       Std. rate per hour × (Std. hours for actual production – Actual hours)

$$= \frac{Rs.1,06,080}{8,840}(8,800 \text{ hours} - 8,100 \text{ hours}) = 8400F$$

(ii) **Fixed overhead variances**

    (a) Fixed overhead budget variance

       = Budgeted overhead – Actual overhead

       = ₹ 2,21,000 – ₹ 2,00,000

       = **21,000 F**

    (b) Fixed overhead capacity variance

       = Std rate × (Actual hours – budgeted hours)

$$= \frac{Rs.2,21,000}{8,840} \times (8,100 - 8,840) = \textbf{18,500 A}$$

    (c) Fixed overhead efficiency variance

= Std rate x (Std hours for actual production – Actual hours)

$$= \frac{Rs.2,21,000}{8,840} \times (8,800 - 8,100)$$

= **17,500 F**

(iii) Control Ratios

(a) Capacity Ratio

$$= \frac{Actual\ hours}{Budgeted\ hours} \times 100$$

$$= \frac{8,100}{8,840} \times 100 = 91.63\%$$

(b) Efficiency Ratio

$$= \frac{Standard\ hours}{Actual\ hours} \times 100$$

$$= \frac{8,800}{8,100} \times 100 = 108.64\%$$

(c) Activity Ratio

$$= \frac{Standard\ hours}{Budgeted\ hours} \times 100$$

$$= \frac{8,800}{8,840} \times 100 = 99.55\%$$

Question 28

Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely Material P and Material Q. The Standard Cost of Mixture is as under:

Material P 150 ltrs. @ ₹ 40 per ltr.

Material Q 100 ltrs. @ ₹ 60 per ltr.

Standard loss @ 20 of total input is expected during production. The cost records for the period exhibit following consumption: Material P 140 ltrs. @ ₹ 42 per ltr, Material Q 110 ltrs. @ ₹ 56 per ltr, Quantity produced was 195 ltrs.

Calculate:

(i)   Material Cost Variance

(ii) Material Usage Variance.

(iii) Material Price Variance (PYP 5 Marks May '18)

Answer 28

Workings:

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. of output is $\frac{195}{80} \times 100$ = 243.75 ltr.

Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity [SQ] (Kg.)	Rate [SP] (₹)	Amount [SQ × SP] (₹)	Quantity [AQ] (Kg.)	Rate [AP] (₹)	Amount [AQ × AP] (₹)
A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of. 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note:

SQ	= Standard Quantity = Expected Consumption for Actual Output
AQ	= Actual Quantity of Material Consumed
SP	= Standard Price Per Unit
AP	= Actual Price Per Unit

Computation of Variances:

(i) Material Cost Variance = SQ × SP − AQ × AP

A   = ₹ 146.25 ltr. × ₹ 40− 140 ltr. × ₹ 42 = ₹ 30.00 (A) B=

₹ 97.50 ltr. × ₹ 60 − 110 ltr. × ₹ 56 = ₹ 310.00 (A)

Total   = ₹ 30.00 (A) + ₹ 310.00 (A)

= ₹ 340.00 (A)

(ii) Material Usage Variance   = SP × (SQ − AQ)

A   = ₹ 40 × (146.25 ltr. −140 ltr.) = ₹ 250.00 (F) B

= ₹ 60 × (97.50 ltr. − 110 ltr.) = ₹ 750.00 (A)

Total   = ₹ 250.00 (F) + ₹ 750.00 (A)

= ₹ 500.00 (A)

(iii) Material Price Variance = AQ × (SP − AP)

A   = 140 Kg. × (₹ 40 − ₹ 42) = ₹ 280 (A) B

= 110 Kg. × (₹ 60 − 56) = ₹ 440 (F)

Total   = ₹ 280 (A) + ₹ 440 (F)

= ₹ 160 (F)

Question 29

A manufacturing concern has provided following information related to fixed overheads:

	Standard	Actual
Output in a month	5000 units	4800 units
Working days in a month	25 days	23 days
Fixed overheads	₹ 5,00,000	₹ 4,90,000

Compute:

i.   **Fixed overhead variance**

ii. **Fixed overhead expenditure variance**

iii. **Fixed overhead volume variance**

iv. **Fixed overhead efficiency variance (PYP Nov '18, 5 Marks)**

Answer 29

Calculation of Variances:

(i)   Fixed Overhead Variance: Standard fixed overhead − Actual fixed overhead
= ₹ [(5,00,000÷5000) ×4800] − ₹ 4,90,000 = ₹ 10,000 (A)

(ii) Fixed Overhead Expenditure Variances:
Budgeted fixed overhead − Actual fixed overhead
= ₹ 5,00, 000 − ₹ 4,90, 000 = ₹ 10,000 (F)

(iii) Fixed Overhead Volume Variance: Standard fixed overhead − Budgeted fixed overhead
= ₹ 4,80, 000 − ₹ 5,00, 000 = ₹ 20,000 (A)

(iv) Fixed Overhead efficiency Variance: Standard fixed overhead – Budgeted fixed overhead for Actual days

= ₹ 4,80, 000 – [(₹ 5,00, 000÷25) ×23] = ₹ 20,000 (F)

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

In this numerical problem of standard costing to calculate Fixed Overhead variances, average performance was observed. Some examinees failed to understand the concept of Standard Cost for actual output.

Question 30

Discuss briefly some of the criticism which may be levelled against the Standard Costing System (PYP 5 Marks May'22)

Answer 30

Criticism of Standard Costing

(i) Variation in price: One of the chief problem faced in the operation of the standard costing system is the precise estimation of likely prices or rate to be paid. The variability of prices is so great that even actual prices are not necessarily adequately representative of cost. But the use of sophisticated forecasting techniques should be able to cover the price fluctuation to some extent. Besides this, the system provides for isolating uncontrollable variances arising from variations to be dealt with separately.

(ii) Varying levels of output: If the standard level of output set for pre-determination of standard costs is not achieved, the standard costs are said to be not realised. However, the statement that the capacity utilisation cannot be precisely estimated for absorption of overheads may be true only in some industries of jobbing type. In vast majority of industries, use of forecasting techniques, market research, etc., help to estimate the output with reasonable accuracy and thus the variation is unlikely to be very large. Prime cost will not be affected by such variation and, moreover, variance analysis helps to measure the effects of idle time.

(iii) Changing standard of technology: In case of industries that have frequent technological changes affecting the conditions of production, standard costing may not be suitable. This criticism does not affect the system of standard costing. Cost reduction and cost control is a cardinal feature of standard costing because standards once set do not always remain stable. They have to be revised.

(iv) Attitude of technical people: Technical people are accustomed to think of standards as physical standards and, therefore, they will be misled by standard costs. Since technical people can be educated to adopt themselves to the system through orientation courses, it is not an insurmountable difficulty.

(v) Mix of products: Standard costing presupposes a pre-determined combination of products both in variety and quantity. The mixture of materials used to manufacture the products may vary in the long run but since standard costs are set normally for a short period, such changes can be taken care of by revision of standards.

(vi) Level of Performance: Standards may be either too strict or too liberal because they may be based on (a) theoretical maximum efficiency, (b) attainable good performance or (c) average past performance. To overcome this difficulty, the management should give thought to the selection of a suitable type of standard. The type of standard most effective in the control of costs is one which represents an attainable level of good performance.

(vii) Standard costs cannot possibly reflect the true value in exchange: If previous historical costs are amended roughly to arrive at estimates for ad hoc purposes, they are not standard costs in the strict sense of the term and hence they cannot also reflect true value in exchange. In arriving at standard costs, however, the economic and technical factors, internal and external, are brought together and analysed to arrive at quantities and prices which reflect optimum operations. The resulting costs, therefore, become realistic measures of the sacrifices involved.

(viii) Fixation of standards may be costly: It may require high order of skill and competency. Small concerns,

therefore, feel difficulty in the operation of such system.

Question 31

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

Note: Indicate the nature of variance i.e. Favourable or Adverse. (PYP 10 Marks Nov 22)

Answer 31

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)

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(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) x 55   = 12,500(A)

$$38,181.6(A)$$

*Revised Standard Quantity (RSQ)

A = $\frac{10,000}{22,000}$ X 23,000 = 10,454.54

B = $\frac{7,000}{22,000}$ X 23,000 = 7,318.18

C = $\frac{5,000}{22,000}$ X 23,000 = 5,227.17

Material Yield Variance can also be Calculated as below

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

Standard Cost per unit = $\frac{Rs.8,40,000}{20,000}$ = Rs. 42

New Standard Yield = $\frac{20,000}{22,000}$ X 23,000 = 20,909

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

$$= ₹ 38,178\ (A)$$

Question 32

NC Limited uses a standard costing system for the manufacturing of its product 'X'. The following information is available for the last week of the month:

• 25,000 kg of raw material were actually purchased for ` 3,12,500. The expected output is 8 units of product 'X' from each one kg of raw material. There is no opening and closing inventories. The material price variance and material cost variance, as per cost records, are ` 12,500 (F) and ` 1800 (A), respectively.

• The standard time to produce a batch of 10 units of product 'X' is 15 minutes. The standard wage rate per labour hour is 50. The company employs 125 workers in two categories, skilled and semi-skilled, in a ratio of 60:40. The hourly wages actually paid were ` 50 per hour for skilled workers and ` 40 per hour for semiskilled workers. The weekly working hours are 40 hours per worker. Standard wage rate is the same for skilled and semi- skilled workers.

• The monthly fixed overheads are budgeted at ` 76,480 Overheads are evenly distributed throughout the month and assume 4 weeks in a month. In the last week of the month, the actual fixed overhead expenses were ` 19,500.

Required:

(i)   Calculate the standard price per kg and the standard quantity of raw material.

(ii)   Calculate the material usage variance, labour cost variance, and labour efficiency variance.

(iii) Calculate the fixed overhead cost variance, the fixed overhead expenditure variance and the fixed overhead volume variance.

Note: Indicate the nature of variance i.e Favourable or Adverse. (PYP 10 Marks, May '23)

Answer 32

i)   Calculation of Standard price per kg and the standard quantity of raw material:

Standard Price

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost

12,500 (F)	= (SP × AQ) – ` 3,12,500
12,500 (F)	= (SP × 25,000) – ` 3,12,500
SP	**= ` 13**

Standard Quantity

Material Cost Variance = Standard Cost – Actual Cost

1,800 (A)	= SQ × ` 13 – ` 3,12,500
SQ	**= 23,900 kg.**

ii)   Calculation of Material Usage Variance, Labour Cost Variance and Labour Efficiency Variance

(a) Material Usage Variance =   Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

=   SQ × SP – AQ × SP

Or

=   SP × (SQ – AQ)

=   ` 13 × (23,900 kg. – 25,000 kg.)

=   **` 14,300 (A)**

(b) Labour Cost Variance =   Standard Cost – Actual Cost

=   (SH × SR) – (AH × AR)

=   ` 2,39,000 – ` 2,30,000

=   **` 9,000 (F)**

(c) Labour Efficiency Variance=   Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

=   (SH × SR) – (AH × SR)

Or

=   (SH – AH) × SR

=   ` 50 × [4,780 hrs. – 5,000 hrs.]

=   **` 11,000 (A)**

iii) Calculation of Fixed Overhead Cost Variance, Fixed Overhead Expenditure Variance and Fixed Overhead Volume Variance:

(a) Fixed overhead cost variance   =   Standard Fixed Overheads – Actual Fixed Overheads

=   18,279 – 19,500
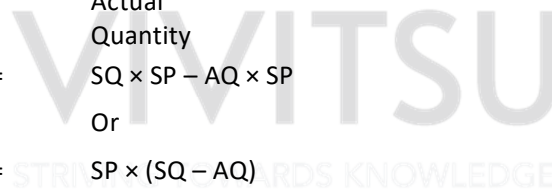
= `**1,221(A)**

(b) Fixed Overhead Expenditure = Budgeted Fixed Overheads – Actual Fixed Overheads

Variance = ` 19,120 – ` 19,500

= `**380 (A)**

(c) Fixed overhead volume variance = (Budgeted output – Actual Output) X Budgeted rate per unit

= (2,00,000 – 1,91,200) 0.0956

= ` 8,800 x 0.0956

= `**841 (A)**

Alternative presentation to part (iii) (a) and (b)

i) Fixed Overhead Cost Variance:

= Overhead absorbed for actual production – Actual overhead incurred

= $\frac{19,120}{2,00,000}$ x 1,91,200 – 19,500 = `**1,221(A)**

(ii) Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted overhead

= $\frac{19,120}{2,00,000}$ x 1,91,200 – 19,120 = `**841(A)**

Working Notes:

1. Standard time to produce 10 units of product X is 15 minutes. Therefore, we can manufacture 40 units in an hour.

   Hours available in a week

   125 Workers x 40 Hours = 5,000 hours

   Therefore, budgeted output = 5,000 x 40 units per hour = 2,00,000 units

Alternatively

Budgeted time per unit = $\frac{15\ units}{10\ units}$ = 1.5 minutes

So, Budgeted output = $\frac{5,000\ Hours \times 60\ Minutes}{1.5\ Minutes}$ = 2,00,00 units

Actual output = 23,900 x 8 units = 1,91,200 units

Standard hour for actual output = 1,91,200 $\times \frac{0.25\ Hrs}{10\ units}$ = 4,780 Hrs

2.

Labour									
Budget			Revised standard				Actual		
Hours	Rate	`	Hours	Rate	`		Hours	Rate	`
5,000	50	2,50,000	4,780	50	2,39,000	Skilled	3000	50	1,50,000
						Semi-Skilled	2000	40	80,000
							5000		2,30,000

3.

	Budget	Actual
Units	2,00,000	1,91,200
Fixed Overheads	19,120	19,500

4. **Standard Fixed overheads:**

$\frac{19,120}{2,00,000}$ ×1,91,200 = `18,279

Budgeted rate per unit:

$\frac{19,120}{2,00,000}$ = 0.0956`

Chapter 14
Marginal Costing

Question 1

NG Ltd. has an annual fixed cost of ₹ 98,50,000. In the year 2022-23, sales amounted to ₹7,80,60,000 as compared to ₹5,93,10,000 in the preceding year 2021-22. Profit in the year 2022-23 is ₹37,50,000 more than that in 2021-22.

Required:

(i) CALCULATE Break-even sales of the company.

(ii) DETERMINE profit/ loss on a forecasted sales volume of ₹8,20,00,000.

(iii) If there is a reduction in selling price by 10% in the financial year 2022-23 and company desires to earn the same amount of profit as in 2021-22, COMPUTE the required sales amount? (MTP 5 Marks April '23, March '19 & Sep '23)

Answer 1

(i) Break-even Sales = $\frac{Fixed\ Cost}{\frac{P}{V}\ Ratio}$

P/v Ratio = $\frac{Change\ in\ Profit}{Change\ in\ Sales}$ X 100 or, $\frac{Rs.37,50,000}{Rs.7,80,60,000 - Rs.5,93,10,000}$ X 100

Or, $\frac{Rs.37,50,000}{Rs.1,87,50,000}$ X 100 or,20%

Break-even Sales = $\frac{Rs.98,50,000}{20\%}$ = Rs. 4,92,50,000

(ii) Profit/ loss = Contribution – Fixed Cost

= ₹8,20,00,000 × 20% - ₹98,50,000

= ₹1,64,00,000 – ₹98,50,000 = ₹65,50,000

(iii) To earn same amount of profit in 2022-23 as it was in 2021-22, the company has to earn the same amount of contribution as it had earned in 2021-22.

Sales – Variable cost = Contribution equal to 2021-22 contribution

Contribution in 2021-22 = Sales in 2021-22 × P/V Ratio in 2021-22

= ₹5,93,10,000 × 20% = ₹1,18,62,000

Let the number of units to be sold in 2022-23 = X

Sales in 2022-23 – Variable cost in 2022-23 = Desired

Contribution 90 X – 80 X = ₹1,18,62,000

Or, 10 X = 1,18,62,000

Or, X = 11,86,200 units

Therefore, Sales amount required to earn a profit equal to 2021-22 profit

= ₹ 90 × 11,86,200 units = ₹ 10,67,58,000

Question 2

Yamuna Ltd. manufactures a product, currently utilizing 80% capacity, with a turnover of Rs.8,00,000 at Rs.25 per unit. The cost data are as under:

Material cost Rs.7.50 per unit, Labour cost Rs.6.25 per unit

Semi-variable cost (Including variable cost of Rs.3.75) per unit Rs.1,80,000.

Fixed cost Rs. 90,000 upto 80% level of output, beyond this an additional Rs. 20,000 will be incurred.

Calculate :

(i) **Activity level at Break-Even-Point**

(ii) **Number of units to be sold to earn a net income of 8% of sales**

(iii) **Activity level needed to earn a profit of Rs. 95,000. (MTP April'19,5 Marks)**

Answer 2

Working notes:

1. (i) Number of units sold at 80% capacity

   (ii) Number of units sold at 100% capacity $\frac{Rs.32,000\,units}{80} \times 100 = 40,000$ units

2. Component of fixed cost included in semi -variable cost of 32,000 units.

   Fixed cost = {Total semi-variable cost – Total variable cost }

   = Rs.1,80,000 – 32,000 units × Rs.3.75

   = Rs.1,80,000 – Rs.1,20,000

   = Rs.60,000

3. (i) Total fixed cost at 80% capacity

   = Fixed cost + Component of fixed cost included in semi—variable

   cost (Refer to working note 2)

   = Rs.90,000 + Rs.60,000 = Rs.1,50,000

   (ii) Total fixed cost beyond 80% capacity

   = Total fixed cost at 80% capacity + Additional fixed cost to be incurred

   = Rs.1,50,000 + Rs.20,000 = Rs.1,70,000

4. **Variable cost and contribution per unit**

   Variable cost per unit = Material cost + Labour cost + Variable cost component

   in semi variable cost = Rs.7.50 + Rs.6.25 + Rs.3.75 = Rs.17.50

   Contribution per unit = Selling price per unit – Variable cost per unit

   = Rs.25 – Rs.17.50 = Rs.7.50

5. **Profit at 80% capacity level**

   = Sales revenue – Variable cost – Fixed cost

   = Rs.8,00,000 – Rs.5,60,000 (32,000 units × Rs.17.50) – Rs.1,50,000

   = Rs.90,000

(i) **Activity level at Break–Even Point**

Break-even point (units) = $\frac{Fixed\ cost}{Contribution\ per\ unit}$ = $\frac{Rs.1,50,000}{Rs.7.50}$ = 20,000 units

(Refer to working notes 3 & 4)

Activity level at BEP = $\frac{Break-Even\ point\ (units)}{No.of\ units\ at\ 100\%\ capacity\ level}$ ×100 (Refer to

working note 1(ii))

= 20,000 units / 40,000 units × 100 = 50%

(ii) **Number of units to be sold to earn a net income of 8% of sales**

Let S be the number of units sold to earn a net income of 8% of sales.

Mathematically it means that : (Sales revenue of S units)

= Variable cost of S units + Fixed cost + Net income

Or, Rs.25S = Rs.17.5S + Rs.1,50,000 + 8/100 × (Rs.25S)

Or, Rs.25S = Rs.17.5S + Rs.1,50,000 + Rs.2S Or, S = (Rs.1,50,000/Rs.5.5) units

Or, S = 27,273 units.

(iii) Activity level needed to earn a profit of Rs. 95,000

The profit at 80% capacity level, is Rs. 90,000 which is less than the desired profit of Rs. 95,000,

therefore the needed activity level would be more than 80%. Thus the fixed cost to be taken to determine the activity level needed should be Rs.1,70,000 (Refer to Working Note 3 (ii))

Units to be sold to earn a profit of Rs.95,000

= Fixed cost + Desired profit / Contribution per unit

= Rs. 1,70,000 + Rs. 95,000 / Rs. 7.5 = 35,333.33 units

Activity level needed to earn a profit of Rs.95,000

= 35,333.33 units / 40,000 units × 100 = 88.33%

Question 3

SK Ltd. engaged in the manufacture of tyres. Analysis of income statement indicated a profit of ₹150 lakhs on a sales volume of 50,000 units. The fixed cost is ₹850 lakhs which appears to be high. Existing selling price is ₹ 3,400 per unit. The company is considering to revise the profit target to ₹ 350 lakhs. You are required to COMPUTE -

(i) Break-even point at existing levels in units and in rupees.

(ii) The number of units required to be sold to earn the target profit.

(iii) Profit with 15% increase in selling price and drop in sales volume by 10%.

(iv) Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 8% in the variable costs and ₹ 85 lakhs in the fixed cost is envisaged. (MTP March '18, 10 Marks) (Same concept different figures RTP Nov'20)

Answer 3

Sales Volume 50,000 Units Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ in lakhs)
Sales	3,400	1,700
Fixed Cost	1,700	850
Profit	300	150
Contribution	2,000	1,000
Variable Cost	1,400	700

(i) Break even sales in units = $\dfrac{Fixed\ cost}{Contribution\ per\ unit}$ = $\dfrac{Rs.8,50,00,000}{.2,000}$ = 42,500 units

Break even sales in rupees = 42,500 units x ₹ 3,400 = ₹ 1,445 lakhs

OR

P/V Ratio = $\dfrac{2,000}{3,400}$ × 100 = 58.82%

B.E.P (in rupees) = $\dfrac{Fixed\ Cost}{\frac{P}{V}Ratio}$ = $\dfrac{8,50,00,000}{58.82\%}$ = Rs. 1,445 lakhs (approx.)

(ii) Number of units sold to achieve a target profit of ₹ 350 lakhs:

Desired Contribution = Fixed Cost + Target Profit

= 850 lakhs + 350 lakhs

= 1,200 lakhs

Number of units to be sold = $\dfrac{Desired\ Contribution}{Contribution\ per\ unit}$ = $\dfrac{12,00,00,000}{2,000}$ = 60,000 units

(iii) Profit if selling price is increased by 15% and sales volume drops by 10%

Existing Selling Price per unit = ₹ 3,400

Revised selling price per unit = ₹ 3,400 × 115% = ₹ 3,910

Existing Sales Volume = 50,000 units

Revised sales volume = 50,000 units – 10% of 50,000 = 45,000 units.

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Statement of profit at sales volume of 45,000 units @ ₹ 3,910 per unit

Particulars	Per unit (₹)	Total (₹ in lakhs)
Sales	3,910.00	1,759.50
Less: Variable Costs	(1,400.00)	(630.00)
Contribution	2,510.00	1,129.50
Less: Fixed Cost		(850.00)
Profit		279.50

(iv) Volume to be achieved to earn target profit of ₹ 350 lakhs with revised selling price and reduction of 8% in variable costs and ₹ 85 lakhs in fixed cost.

Revised selling price per unit	= ₹ 3,910
Variable costs per unit existing	= ₹ 1,400 Revised Variable Costs
Reduction of 8% in variable costs	= ₹ 1,400 − 8% of 1,400
= ₹ 1,400 − ₹ 112	= ₹ 1,288
Total Fixed Cost (existing)	= ₹ 850 lakhs
Reduction in fixed cost	= ₹ 85 lakhs
Revised fixed cost	= ₹ 850 lakhs − ₹ 85 lakhs = ₹ 765 lakhs
Revised Contribution (unit)	= Revised selling price per unit − Revised Variable Costs per units
Revised Contribution per unit	= ₹ 3,910 − ₹ 1,288 = ₹ 2,622
Desired Contribution	= Revised Fixed Cost + Target Profit
	= ₹ 765 lakhs + ₹ 350 lakhs = ₹ 1,115 lakhs

No. of units to be sold = Desired Contribution = Rs. 1,115 lakh /Rs. 2,622 = 42,525 units

Question 4

Fixed Cost	**Rs. 1,20,000**
Variable costs	**Rs. 3 per unit**
Selling price	**Rs. 7 per unit**
Output	**Rs. 50,000 unit42,525 units**

CALCULATE the profit for each of the following situation with the above data:

(i)	**with the data above**	
(ii)	**with a 10% increase in output & sales.**	
(iii)	**with a 10% increase in fixed costs.**	
(iv)	**with a 10% increase in variable costs.**	
(v)	**with a 10% increase in selling price.**	
(vi)	**taking all the above situations.**	**(MTP Aug. '18, 10 Marks)**

Answer 4

(i)	Rs.
Sales 50,000 units at Rs. 7	3,50,000
Variable cost 50,000 × 3	1,50,000
Contribution 50,000 × 4	2,00,000
Fixed costs	1,20,000
Profit	80,000

$$P/V \text{ ratio} = \frac{S-V}{S} \times 100 = \frac{7-3}{7} \times 100 = \frac{4}{7} \times 100 = 57.14\%$$

$$BEP \text{ (units)} = \frac{F}{Contribution \, per \, unit} = \frac{1,20,000}{4} = 30,000 \text{ Units}$$

BEP (Value) = 30,000 Units × 7 = Rs. 2,10,000

Profit Rs. 80,000 (as calculated above)	
(ii) with a 10% increase in output & sales	
i.e., 50,000+ 5,000 = 55,000 units	
Contribution 55,000 × Rs. 4 per unit	Rs. 2,20,000
Fixed costs	Rs. 1,20,000
Profit	Rs. 1,00,000
(iii) with a 10% increase in Fixed Cost	
Contribution (50,000 ×Rs. 4 per unit)	Rs. 2,00,000
Fixed cost (1,20,000+ 12,000)	Rs. 1,32,000
Profit	Rs. 68,000
(iv) with a 10% increase in variable costs	
Selling price per unit	7.00
Less: variable cost (3+0.30)	3.30
Contribution per unit	3.70
Total contribution 50,000 × 3.70	1,85,000
Fixed costs	1,20,000
Profit	65,000
(v) with a 10% increase in selling price	
Selling price per unit (7.00+0.70)	7.70
Variable cost per unit	3.00
Contribution per unit	4.70
Total contribution 50,000 × Rs. 4.70	2,35,000
Fixed costs	1,20,000
Profit	1,15,000
(vi) Effect of all the four above:-	
Sales 55,000 × Rs. 7.70 per unit	Rs. 4,23,500
Variable cost 55,000 × 3.30	Rs. 1,81,500
Contribution 55,000 × 4.40	Rs. 2,42,000
Fixed cost 1,20,000+ 12,000	Rs. 1,32,000
Profit	Rs. 1,10,000

Note: It is assumed that the increase d output of 55,000 units has been sold.

Question 5

C.T. Ltd. manufactures and sells a single product X whose selling price is Rs. 100 per unit and the variable cost is Rs. 60 per unit.

(i) If the Fixed Costs for this year are Rs. 24,00,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%.

(ii) For the next year, it is proposed to add another product line Y whose selling price would be Rs. 150 per unit and the variable cost Rs. 100 per unit. The total fixed costs are estimated at Rs. 28,00,000. The sales mix of X : Y would be 5 : 3. COMPUTE the break- even sales in units for both the products. (MTP Oct.'19,5Marks) (Same concept different figures Old & New SM)

Answer 5

(i) Contribution per unit	=	Selling price – Variable cost
	=	Rs.100 – Rs.60
	=	Rs.40

Break-even Point	=	$\frac{Rs.24,00,000}{Rs.40}$ 60,000 units

Percentage Margin of Safety $= \frac{Actual\ Sales - Break-Even\ Sales}{Actual\ Sales}$

Or, 60% $= \frac{Actual\ Sales - 60,000\ units}{Actual\ Sales}$

∴ Actual Sales = 1,50,000 units

	(Rs.)
Sales Value (1,50,000 units × Rs.100)	1,50,00,000
Less: Variable Cost (1,50,000 units × Rs.60)	90,00,000
Contribution	60,00,000
Less: Fixed Cost	24,00,000
Profit	36,00,000
Less: Income Tax @ 40%	14,40,000
Net Return	21,60,000

Rate of Net Return on Sales = 14.40% $\left(\frac{Rs.21,60,000}{Rs.1,50,00,000} \times 100 \right)$

(ii) Products	X (Rs.)	Y (Rs.)
Selling Price per unit	100	150
Variable Cost per unit	60	100
Contribution per unit	40	50

Composite contribution will be as follows:
Contribution per unit
=(40/8 × 5) + (50/8 × 3)
=25+18.75=Rs.43.75

Break-even Sale = 64,000 units $\left(\frac{Rs.28,00,000}{Rs.43.75} \right)$

Break-even Sales Mix:
X (64,000 units × 5/8) = 40,000 units
Y (64,000 units × 3/8)= 24,000 units

Question 6

Arnav Ltd. is producing a single product, has the profit-volume ratio of 40%. The company wishes to increase the selling price by 10% which will increase the variable cost by 5%. The fixed overheads will increase from its present level of Rs.20,00,000 to Rs.30,00,000.

Required:

(i) Compute the company's original break-even point sales and the break-even point sales after the increase.

(ii) Estimate the sales value for the firm to make a profit of Rs. 4,50,000 after the increase. (MTP Oct.'18,5 Marks)

Answer 6

Workings:

Let us assume that the selling price before increment is ₹ 100, the other relevant details are as follows:

Particulars	Before increase	After increase
Selling Price	100	110
Variable Cost	60	63
Contribution	40	47
P/V Ratio	40%	42.73%

(i) Computation of Break-even point sales:

Break-even point sales =   Fixed Overheads / P/V ratio

- Before increase   = Rs. 20,00,000 / 40% = Rs. 50,00,000

- After increase   = Rs. 30,00,000 / 42.73% =Rs. 70,20,828(approx.)

(ii)   Sales value to make a profit of Rs. 4,50,000:

$$\frac{Fixed\ Overheads + Desired\ Profit}{\frac{P}{V} ratio} = \frac{Rs.30,00,000 + Rs.4,50,000}{42.73\%} = Rs.80,73,953$$

Question 7

A company gives the following information:

Margin of Safety	Rs.7,50,000
Total Cost	Rs.7,75,000
Margin of Safety (Qty.)	15,000 units
Break Even Sales in Units	5,000 units

You are required to CALCULATE:
   (i)   Selling price per unit

   (ii)   Profit

   (iii) Profit/ Volume Ratio

   (iv)   Break Even Sales (in Rupees)

   (v)   Fixed Cost (MTP 5 Marks May 20)

Answer 7

(i)   Selling Price per unit $= \frac{Margin\ of\ Safety\ in\ Rupee\ Value}{Margin\ of\ Safety\ in\ Quantity}$

$= \frac{Rs.7,50,000}{15,000 units}$ = Rs. 50

(ii)   Profit   = Sales Value – Total Cost

= Selling price per unit × (BEP units + MoS units) – Total Cost

= Rs.50 × (5,000 + 15,000) units – Rs.7,75,000

= Rs.10,00,000 – Rs.7,75,000 = Rs.2,25,000

(iii)   Profit/ Volume (P/V) Ratio = $\frac{profit}{MArgin\ of\ Safety\ in\ Rupee\ value} \times 100$

$= \frac{Rs.2,25,000}{Rs.7,50,000} \times 100$ = 30%

(iv)   Break Even Sales (in Rupees) = BEP units × Selling Price per unit

= 5,000 units × Rs.50 = Rs.2,50,000

(v)   Fixed Cost = Contribution – Profit

= Sales Value × P/V Ratio – Profit

= (Rs.10,00,000 × 30%) – Rs.2,25,000

= Rs.3,00,000 – Rs.2,25,000 = Rs. 75,000

Question 8

A company can make any one of the 3 products X, Y or Z in a year. It can exercise its option only at the beginning of each year. Relevant information about the products for the next year is given below.

	X	Y	Z
Selling Price (Rs. / unit)	100	120	120

Variable Costs (Rs. / unit)	60	90	70
Market Demand (unit)	3,000	2,000	1,000
Production Capacity (unit)	2,000	3,000	900
Fixed Costs (Rs.)	3,00,000		

Required

COMPUTE the opportunity costs for each of the products. (MTP 5 Marks May 20, Old & New SM)

Answer 8

		X	Y	Z
I.	Contribution *per unit* (Rs.)	40	30	50
II.	Units (Lower of Production / Market Demand)	2,000	2,000	900
III.	Possible Contribution (Rs.) [I × II]	80,000	60,000	45,000
IV.	Opportunity Cost* (Rs.)	60,000	80,000	80,000

(*****) Opportunity cost is the maximum possible contribution forgone by not producing alternative product i.e. if Product X is produced then opportunity cost will be maximum of (Rs. 60,000 from Y, Rs. 45,000 from Z).

Question 9

CanCola, a zero sugar cold drink manufacturing Indian company, is planning to establish a subsidiary company in Nepal to produce coconut flavoured juice. Based on the estimated annual sales of 60,000 bottles of the juice, cost studies produced the following estimates for the Nepalese subsidiary:

	Total Annual Costs (₹)	Percent of Total Annual Cost which is variable
Material	2,70,000	100%
Labour	1,97,000	80%
Factory Overheads	1,20,000	60%
Administration Expenses	52,000	35%

The Nepalese production will be sold by manufacturer's representatives who will receive a commission of 9% of the sale price. No portion of the Indian office expenses is to be allocated to the Nepalese subsidiary. You are required to-

(i) COMPUTE the sale price per bottle to enable the management to realize an estimated 20% profit on sale proceeds in Nepal.

(ii) CALCULATE the break-even point in rupees value sales and also in number of bottles for the Nepalese subsidiary on the assumption that the sale price is ₹ 14 per bottle. (MTP 10 Marks, Oct. 20, Old & New SM)

Answer 9

(i) **Computation of Sale Price Per Bottle**

Output: 60,000 Bottles

	(₹)
Variable Cost:	
Material	2,70,000
Labour (₹ 1,97,000 × 80%)	1,57,600
Factory Overheads (₹1,20,000 × 60%)	72,000
Administrative Overheads (₹ 52,000 × 35%)	18,200
Commission (9% on ₹9,00,000 (Working Note -1)	81,000
Fixed Cost:	
Labour (₹ 1,97,000 × 20%)	39,400

Factory Overheads (₹ 1,20,000 × 40%)	48,000
Administrative Overheads (₹ 52,000 × 65%)	33,800
Total Cost	7,20,000
Profit (20% of ₹ 9,00,000)	1,80,000
Sales Proceeds	9,00,000
Sales Price per bottle Rs. 9,00,000/60,000	15

(ii) Calculation of Break-even Point

Sales Price per Bottle   =   ₹ 14

Variable Cost per Bottle   = Rs.5,93,400(Working note -2)/ 60,000bottels = Rs. 9.89

Contribution per Bottle   =   ₹ 14 – ₹ 9.89   = ₹ 4.11

Break -even Point (in number of Bottles)= Fixed cost / Contribution per bottle

        = Rs. 1,21,000 / Rs. 4.11 = 29,489

Break- even Point (in Sales Value)   =   29,489 Bottles × ₹14

        =   ₹ 4,12,846

Working Note

(1) Let the Sales Price be 'X'

  Commission = 9X/100

Profit = 20X/ 100

X = ₹ 2,70,000 + ₹1,57,600 + ₹ 72,000 + ₹ 18,200 + ₹ 39,400 + ₹ 48,000 + Rs. 33,800+ 9X/100 +20X/100

X   =   ₹ 6,39,000 + 9X/100 +20X/100

    100X – 9X – 20X   =   6,39,00,000

    71X   =   6,39,00,000

  X = 6,39,00,000/71 = Rs. 9,00,000

(2)

Total Variable Cost	(₹)
Material	2,70,000
Labour	1,57,600
Factory Overheads	72,000
Administrative Overheads	18,200
Commission [(60,000 Bottles × ₹ 14) × 9%]	75,600
	5,93,400

Question 10

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%.**
The selling price to be fixed to bring down its Break-even Point to 10,000 units under present conditions. (MTP 10 Marks March '21)

Answer 10

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 = Contribution per unit/Selling Price per Unit × 100

= Rs. 15 /Rs.50 × 100 = 30%

Calculations:

(i) The number of units to be sold for neither loss nor gain i.e. Break-even units:

$$= \frac{Fixed\ Overheads}{Contribution\ per\ unit} = \frac{Rs.7,20,000}{Rs.15} = 48,000 \text{ Units}$$

(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 = Rs. 35 x + Rs. 7,20,000 + Rs. 10x

Rs. 50x – Rs. 45x = Rs. 7,20,000

Or, X = $\frac{Rs.7,20,000}{Rs.5}$ = 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%	**25%**
		(Rs.)	**(Rs.)**
	Selling price per unit	40.00	37.50
		(Rs. 50 × 80%)	(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		
		2,40,000 units	4,80,000 units

	$\left[\dfrac{Desired\ Contribution}{Contribution\ per\ unit}\right]$	Rs. 12,00,000/Rs. 5	Rs. 12,00,000/Rs. 2.5
(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:

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

Or, Contribution per unit $\quad$ = Rs. 7,20,000/10,000 units = Rs. 72

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

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

Question 11

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 10 Marks, April'21)

Answer 11

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.

$\qquad$ **(i)** Reducing Selling Price by 5%

$\qquad$ New Selling Price (Rs. 80 – 5% of Rs. 80) $\qquad$ = $\qquad$ Rs. 76 New

$\qquad$ Dealer's Margin (10% of Rs. 76) $\qquad\qquad$ = $\qquad$ Rs. 7.60 New

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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 = $\frac{Total\ Contribution\ Required}{New\ Contribution\ per\ unit}$

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

$$= 1,16,129\ units$$

(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 = $\frac{Total\ Contribution\ Required}{New\ Contribution\ per\ unit}$

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

$$= 1,00,000\ units$$

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.

Question 12

DISCUSS basic assumptions of Cost Volume Profit analysis. (MTP 5 Marks, April '21, Old & New SM)

Answer 12

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.

Question 13

Amy Ltd. manufacture and sales its product RM. The following figures have been collected from cost records of last year for the product RM:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 3,45,000
Administration Overhead	2% of Cost of Goods Sold	₹ 1,06,500
Selling & Distribution Overhead	4% of Cost of Sales	₹ 1,02,000

Last Year, 7,500 units were sold at ₹185 per unit. From the given information, DETERMINE the followings:

(i) Break-even Sales (in rupees)

(ii) Profit earned during last year

(iii) Margin of safety (in %)

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

(Assume that Administration Overhead is related with production activity) (MTP 10 Marks, Oct '21, RTP May '20)

Answer 13

1. **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	=	Rs. 4,51,500 / 0.43 = ₹ 10,50,000

   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	=₹ 11,52,000 / 0.96= ₹ 12,00,000

   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

   (2) **Calculation of total Fixed Costs:**

Factory Overhead	₹ 3,45,000
Administration OH	₹ 1,06,500
Selling & Distribution OH	₹ 1,02,000

₹ 5,53,500

Calculation of P/V Ratio:

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

$$= \frac{(Rs.185 \times 7,500\ units) - Rs.6,46,500}{Rs.185 \times 7,500\ units} \times 100$$

$$= \frac{Rs.13,87,500 - Rs.6,46,500}{Rs.13,87,500} \times 100 = 53.41\%$$

(i) Break- Even Sales $= \frac{Fixed\ Costs}{\frac{P}{V}Ratio} = \frac{Rs.5,53,000}{53.41\%}$ = Rs. 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 (%) $= \frac{Sales - Breakeven\ Sales}{Sales} \times 100 = 25.31\%$

(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

Question 14

A factory can produce 1,80,000 units per annum at its 60% capacity. The estimated costs of production are as under:

Direct material	₹ 50 per unit
Direct employee cost	₹ 16 per unit
Indirect expenses:	
- Fixed	₹ 32,50,000 per annum
- Variable	₹ 10 per unit
- Semi-variable	₹ 40,000 per month up to 50% capacity and ₹ 15,000 for every 20% increase in the capacity or part thereof.

If production program of the factory is as indicated below and the management desires to ensure a profit of ₹10,00,000 for the year, DETERMINE the average selling price at which each unit should be quoted:

First three months of the year- 50% of capacity;

Remaining nine months of the year- 75% of capacity. (MTP 5 Marks Nov '21)

Answer 14

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 three months @ ₹ 40,000 p.m.	1,20,000			1,20,000
- For remaining nine months @ ₹ 70,000* p.m.		6,30,000		6,30,000
Total cost	37,82,500	1,58,92,500		1,96,75,000
Desired profit	-	-		10,00,000
Sales value	-	-		2,06,75,000
Average selling price per unit				100.24

* ₹ 40,000 for 50% capacity + ₹ 15,000 for 20% increase in capacity + ₹ 15,000 for 5% increase in capacity (because cost is increased for every 20% increase in capacity or part thereof)

Question 15

A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products		
	S	**T**	**U**
Sales Mix	25%	35%	40%
Selling Price	₹ 600	₹ 800	₹ 400
Variable Cost	₹ 300	₹ 400	₹ 240
Total Fixed Costs			₹ 36,00,000
Total Sales			₹ 1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products		
	S	**T**	**M**
Sales Mix	40%	35%	25%
Selling Price	₹ 600	₹800	₹600
Variable Cost	₹ 300	₹400	₹300
Total Fixed Costs			₹ 36,00,000
Total Sales			₹1,28,00,000

Required

(i) Compute the PV ratio, total contribution, profit and Break-even sales for the existing product mix.

(ii) Compute the PV ratio, total contribution, profit and Break-even sales for the proposed product mix. (MTP 10 Marks Nov '21, RTP May '21 & May '22) (Same concept different figures Old & New SM)

Answer 15

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

	Products			Total
	S	**T**	**U**	
Selling Price (₹)	600	800	400	
Less: Variable Cost (₹)	300	400	240	
Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	

	25%	35%	40%	
Sales Mix	25%	35%	40%	
Contribution per rupee of sales (P/V Ratio × Sales Mix)	12.5%	17.5%	16%	46%
Present Total Contribution (₹ 1,20,00,000 × 46%)				₹55,20,000
Less: Fixed Costs				₹36,00,000
Present Profit				₹19,20,000
Present Break Even Sales (₹ 36,00,000/0.46)				₹ 78,26,087

ii. **Computation of PV ratio, contribution and break-even sale for proposed product mix**

	Products			
	S	**T**	**M**	**Total**
Selling Price (₹)	600	800	600	
Less: Variable Cost (₹)	300	400	300	
Contribution per unit (₹)	300	400	300	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	40%	35%	25%	
Contribution per rupee of sales (P/V Ratio x Sales Mix)	20%	17.5%	12.5%	50%
Proposed Total Contribution (₹1,28,00,000 x 50%)				₹64,00,000
Less: Fixed Costs				₹36,00,000
Proposed Profit				₹28,00,000
Proposed Break Even Sales (₹36,00,000/0.50)				₹72,00,000

Question 16

Maximum Production capacity of KM (P) Ltd. is 28,000 units per month. Output at different levels along with cost data is furnished below:

Particulars of Costs	Activity Level		
	16,000 units	**18,000 units**	**20,000 units**
Direct Material	₹ 12,80,000	₹ 14,40,000	₹ 16,00,000
Direct labour	₹ 17,60,000	₹ 19,80,000	₹ 22,00,000
Total factory overheads	₹ 22,00,000	₹ 23,70,000	₹ 25,40,000

You are required to Calculate the selling price per unit at an activity level of 24,000 units by considering profit at the rate of 25% on sales. (MTP March'18,5Marks)

Answer 16

Computation of Overheads

Variable Overhead per unit = $\dfrac{Change\ in\ Factory\ Overheads}{Change\ in\ activity\ level}$

= $\dfrac{23,70,000-22,00,000}{18,000-16,000}$ or $\dfrac{25,40,000-23,70,000}{20,000-18,000}$

= $\dfrac{1,70,000}{2000}$ Rs. 85 per unit

Fixed Overhead

Activity level = 16,000 units

Particulars	Amount (₹)
Total factory overheads	22,00,000
Less: Variable overheads 16,000 units @ ₹ 85 per unit	(13,60,000)
Fixed Overhead	8,40,000

Computation of Costs at Activity Level 24,000 units

	Per Unit (₹)	Amount (₹)
Direct Material (12,80,000/16,000)	80.00	19,20,000
Direct Labour (17,60,000/16,000)	110.00	26,40,000

Variable Overhead (As calculated above)	85.00	20,40,000
Fixed Overhead		8,40,000
Total Cost		74,40,000

Computation of Selling Price at activity level 24,000 units

Profit required is 25% on selling price, hence cost will be 75%.

Therefore desired profit = $\frac{25 \times 74,40,000}{75}$ = Rs. 24,80,000

Cost of 24,000 units	74,40,000
Desired Profit	24,80,000
Total Sales	99,20,000

Alternatively

Total Sales = $\frac{Total\ Cost}{75} \times 100$ = $\frac{74,40,000}{75} \times 100$ = Rs. 99,20,000

Selling Price per unit = $\frac{Total\ Sales}{No\ of\ unts}$ = $\frac{99,20,000}{24,000}$ = Rs. 413.33

Question 17

At budget activity of 80% of total capacity, a company earns a P/V ratio of 30% and a profit of 15% of total sales. Due to covid pandemic resulting in poor demand, the company has to reduce its selling price by 10%. The company was able to achieve a production and sales volume for the year equivalent to 50% of total capacity. The sales value at this level was ₹ 27,00,000 at a reduced price of ₹ 18 per unit. Due to reduction in production, the actual variable cost went up by 5% of the budget.

You are required to:

(i) PREPARE statement of profitability at budget and actual activity.

(ii) FIND P/V ratio and BES (in ₹ and unit of the actual sales activity). (MTP 10 Marks March '22)

Answer 17

Actual Sales	₹ 27,00,000
Actual Selling Price per unit	18
Actual units (50%) $(\frac{27,00,000}{18})$	1,50,000
Therefore, budgeted units (80%) $(1,50,000 \times \frac{80}{50})$	2,40,000
Budgeted Selling Price (18 / 90%)	20

Budgeted Variable Cost per unit = $\frac{(2,40,000 X 20)(1-.30)}{2,40,000\ units}$ = $\frac{33,60,000}{2,40,000\ units}$ = Rs. 14

(i) **Statement of profitability at budget and actual activity**

Particulars		Budget (80%)	Actual (50%)
Units		2,40,000	1,50,000
Sales (₹)	(a)	48,00,000	27,00,000
Variable cost (₹)	(b)	33,60,000	22,05,000
Contribution (₹) (c = a - b)		14,40,000	4,95,000
Fixed cost (₹)	(d)	7,20,000	7,20,000
Profit (₹)	(e = c − d)	7,20,000	(2,25,000)

(ii) **Calculation of P/V ratio and BES**

P/V ratio $= \dfrac{Contribution}{Sales} X 100$

$= \dfrac{4,95,000}{27,00,000} X\ 100\ = 18.33\%$

Break Even Sales (in Rs.) $= \dfrac{Fixed\ Cost}{\frac{P}{V}Ratio}\ =\ \dfrac{7,20,000}{18.33\%}$ = Rs. 39,27,987

Break Even Sales (In Units) $= \dfrac{Fixed\ Cost}{Contribution\ per\ unit}\ =\ \dfrac{7,20,000}{3.3*}$ = 2,18,182 Units

$* Contribution$ Per unit $=\ =\dfrac{4,95,000}{1,50,,000\ units}$ = 3.3 per unit

Question 18

Company manufacture and sell 3 types of mobile handset. It also manufactures wireless charger for mobile. The company has worked out following estimates for next year.

	Annual Demand (in units)	Selling Price (₹ per unit)	Material cost (₹ per unit)	Labour cost (₹ per unit)
X5	5,000	8,000	2,000	1,000
X6	4,000	9,000	2,500	1,500
X7	3,000	12,000	3,000	2,000
Wireless Charger	15,000	1,500	300	200

To encourage the sale of wireless charger a discount of 10% in its price is being offered if it were to be purchased along with mobile. It is expected that customer buying mobile will also buy the wireless charger. The company factory has an effective capacity of 35,000 labour hours. The labour is paid @ ₹ 500 per hour. Overtime of labour has to be paid at double the normal rate. Other variable cost work out to be 50% of direct labour cost and fixed cost is ₹ 1,00,00,000. There will be no inventory at the end of the year. PREPARE statement of profitability. **(MTP 10 Marks April '22)**

Answer 18

Calculation of Labour overtime hours	
Total hours required for production	
X5 (5,000 x 2 hrs)	10,000
X6 (4,000 x 3 hrs)	12,000
X7 (3,000 x 4 hrs)	12,000
Wireless Charger (15,000 x 0.40 hrs)	6,000
	40,000
Hours available	(35,000)
Overtime	5,000

Statement of Profitability

Particulars	Amount (₹)	Amount (₹)
Sales		
X5 (5,000 x 8,000)	4,00,00,000	
X6 (4,000 x 9,000)	3,60,00,000	
X7 (3,000 x 12,000)	3,60,00,000	
Wireless Charger [(12,000 x 1,350) + (3,000 x 1,500)	2,07,00,000	13,27,00,000
Less: Variable cost		

Material:		
X5 (5,000 x 2,000)		
X6 (4,000 x 2,500)		
X7 (3,000 x 3,000)		
Wireless Charger (15,000 x 300)	3,35,00,000	
Labour:		
X5 (5,000 x 1,000)		
X6 (4,000 x 1,500)		
X7 (3,000 x 2,000)		
Wireless Charger (15,000 x 200)		
Overtime (5,000 x 1,000)	2,50,00,000	
Other variable overheads	1,25,00,000	7,10,00,000
Contribution		6,17,00,000
Less: Fixed Cost		1,00,00,000
Profit		5,17,00,000

Question 19

PS Limited is a manufacturing company and is operating at 75% capacity utilization. The PV ratio at this level of activity is 40%.

The flexible budget drafted by the company for two levels of activity is given below:

	Capacity utilization (75 %)	Capacity utilization (100 %)
	Amount in ₹ (Lakhs)	Amount in ₹ (Lakhs)
Direct materials	180	240
Direct wages	120	160
Power and fuel	12	16
Repairs and maintenance	18	21
Consumables	21	28
Supervision	20	20
Indirect labour	36	42
Administrative expenses	21	21
Selling expenses	18	18
Depreciation	54	54

You are required to:

i. CALCULATE the profit earned by PS Limited at 75% level of activity.

ii. CALCULATE the break-even level of activity. (MTP 10 Marks Sep'22)

Answer 19

Calculation of Semi Variable component

	Repairs and Maintenance (₹)	Indirect labour (₹)
At 75% capacity	18,00,000	36,00,000
At 100% capacity	21,00,000	42,00,000
Variable component for 25%	3,00,000	6,00,000
Hence variable cost at 75%	3,00,000 x 75/25=9,00,000	6,00,000 x 75/25 = 18,00,000
Fixed cost at 75% capacity	18,00,000 – 9,00,000 = 9,00,000	36,00,000 – 18,00,000=18,00,000

Segregation of Fixed and Variable cost

	75%	100%	VC at 75%	FC at 75%
Direct Material	180	240	180	
Direct Labour	120	160	120	
Power and fuel	12	16	12	
Repairs and maintenance	18	21	9	9
Consumables	21	28	21	
Supervision	20	20		20
Indirect labour	36	42	18	18
Administrative expenses	21	21		21
Selling expenses	18	18		18
Depreciation	54	54		54
Total	500	620	360	140

(i) Calculation of profit earned at 75% capacity

Given PV ratio = 40%, Hence variable cost would be 60%

If variable cost is ₹ 360 lakhs then sales would be 360/ 0.60 = ₹ 600 lakhs

Less: Variable cost = ₹ 360 lakhs

Less: Fixed cost = ₹ 140 lakhs

Profit = ₹ 100 lakhs

(ii) Break-even level of activity

BEP Sales = FC/ P/V ratio = 140 /0.40 = ₹ 350 lakhs

Question 20

Answer the following:

A company makes 1,500 units of a product for which the profitability statement is given below:

	(₹)
Sales	1,20,000
Direct Materials	30,000
Direct Labour	35,000
Variable Overheads	15,000
Fixed Cost	16,800
Profit	22,200

After the first 500 units of production, the company has to pay a premium of ₹ 5 per unit towards overtime labour. The premium so paid has been included in the direct labour cost of ₹ 35,000 given above.

You are required to COMPUTE the Break-even point. (MTP 5 Marks Oct'22)

Answer 20

Data / Unit	1 – 500 (Rs.)	501 – 1,500 (Rs.)
Sales (Rs.1,20,000 / 1,500 units)	80	80
Direct Material (Rs.30,000 / 1,500 units)	20	20
Direct Labour*	20	25
Variable Overheads (Rs.15,000 / 1,500 units)	10	10
Contribution	30	25

Contribution at 500 units   =   Rs. 15,000

Fixed Cost	=	Rs. 16,800
Shortfall	=	Rs. 1,800
No. of units to recover shortfall	=	72 units (Rs. 1,800 / Rs.25)
Break Even Point	=	572 units (500 units + 72 units)

(*)

Let X be the Direct Labour per unit up to 500 units. Total Direct Labour-

500X + 1,000 × (X + 5)	=	35,000
1,500X + 5,000	=	35,000
X	=	20

Therefore, up to 500 units the Direct Labour is Rs. 20. After 500 units it is Rs. 25.

Question 21

LNP Ltd. and MNT Ltd. are engaged in manufacturing of identical products. Existing revenue and cost data is as follows:

	LNP Ltd. (₹)	MNT Ltd. (₹)
Sales	13,60,000	17,00,000
Variable Cost	10,88,000	10,20,000
Fixed Cost	1,72,000	5,80,000

You are required to calculate:

(i) Break-even point (in Value) for each company

(ii) Sales at which each company will earn a profit of ₹ 5,00,000

(iii) Sales at which both companies will have same profits. (MTP 10 Marks March '23)

Answer 21

Income Statement

	LNP Ltd. (₹)	MNT Ltd. (₹)
Sales (Rs.)	13,60,000	17,00,000
Less: Variable Cost	10,88,000	10,20,000
Contribution	2,72,000	6,80,000
P.V. Ratio ($\frac{Contribution}{Sales} X 100$)	20%	40%
Fixed Cost (₹)	1,72,000	5,80,000
Profit (₹)	1,00,000	1,00,000

(i) Break even point = $\frac{Fixed\ Cost}{P.V.Ratio}$

LNP Ltd. = $\frac{Rs.1.72.000}{20\%}$ = Rs. 8,60,000

MNT Ltd. = $\frac{Rs.5,80,000}{40\%}$ = Rs. 14,50,000

(ii) Sales value to earn a profit of ₹ 5,00,000

Sales = $\frac{Fixed\ Cost+Desired\ Profit}{P.V.Ratio}$

LNP Ltd. = $\frac{1.72.000+5,00,000}{40\%}$ = Rs. 33,60,000

MNT Ltd. = $\frac{5,80,000+5,00,000}{40\%}$ = Rs. 27,00,000

(iii) Sales value at which both companies will earn same profit

Let S = Sales value and P = Profit

Sales – Variable cost = Fixed cost + Profit

or, Contribution = Fixed cost + Profit

LNP Ltd.:

20% S = ₹1,72,000 + P

or, 0.20S = ₹1,72,000 + P ....(i)

MNT Ltd.

40% S = ₹5,80,000 + P

or, 0.40S = ₹5,80,000 + P ....(ii)

By solving these equations, we will get the value of 'S' and 'P'

0.20S = 1,72,000 + P

0.40S = 5,80,000 + P

-            -   -

- 0.20S = -4,08,000

or, S = ₹ 20,40,000

Putting the value of 'S' in equation no. (i) we will get the value of 'P'

0.20 × 20,40,000 = 1,72,000 + P

or, P = ₹2,36,000

Therefore, at Sale value of ₹20,40,000 both the companies will earn same profit of ₹ 2,36,000

Question 22

The following figures are related to KG Limited for the year ending 31st March, 2023:

Sales - 48,000 units @ ₹ 400 per unit; P/V Ratio 25% and Break-even Point 50% of sales.

You are required to CALCULATE:
  (i)   Profit earned for the year
  (ii) Units to be sold to earn a target net profit of ₹ 22,00,000 for a year.
  (iii) Number of units to be sold to earn a net income of 25% on cost.[MTP 5 Marks April '23]

Answer 22

Break- even point (in units) is 50% of sales i.e. 24,000 units.

Hence, Break- even point (in sales value) is 24,000 units × ₹ 400 = ₹ 96,00,000

(i)   Break even Sales $= \dfrac{Fixed\ Cost}{\frac{p}{V}\ ratio}$

Or, Rs. 96,00,000 $= \dfrac{Fixed\ Cost}{25\%}$

Or, Fixed Cost   = ₹ 96,00,000 × 25%

                              = ₹ 24,00,000

So Fixed Cost for the year is ₹ 24,00,000

(ii)   Contribution for the year   = (48,000 units × ₹ 400) × 25%

                              = ₹ 48,00,000

Profit for the year = Contribution – Fixed Cost

= ₹48,00,000 - ₹ 24,00,000

= ₹ 24,00,000

(iii)   Target net profit is ₹22,00,000

Hence, Target contribution   = Target Profit + Fixed Cost

= ₹ 22,00,000 + ₹ 24,00,000

= ₹ 46,00,000

Contribution per unit = 25% of ₹ 400 = ₹ 100 per unit

No. of units = $\frac{Rs.46,00,000}{Rs.100\ per\ unit}$ = 46,000 units

So, 46,000 units to be sold to earn a target net profit of ₹ 22,00,000 for a year.

(iv)   Let desired total Sales (Number of units × Selling price) be x then desired profit is 25% on Cost or 20% on Sales i.e. 0.2 x

Desired Sales = $\frac{Fixed\ Cost+Desired\ Profit}{\frac{p}{v}Ratio}$

= $\frac{Rs.24,00,000+0.2x}{25\%}$

or, 0.25 x = ₹ 24,00,000 + 0.2 x

or, 0.05 x = ₹ 24,00,000

or, x = ₹ 4,80,00,000

No. of units to be sold = $\frac{₹\,4,80,00,000}{Rs.400}$ = 1,20,000 units

Question 23

T Ltd., produces and sells 95,000 units of 'X' in a year at its 80% production capacity. The selling price of product is ₹ 8 per unit. The variable cost is 75% of sales price per unit. The fixed cost is ₹ 3,50,000. The company is continuously incurring losses and management plans to shut -down the plant. The fixed cost is expected to be reduced to ₹ 1,30,000. Additional costs of plant shut- down are expected at ₹ 15,000.

Should the plant be shut-down? Find the shut-down point in units and also in percentage of capacity level of production. (MTP 5 Marks ,Oct '23)

Answer 23

Statement Showing "Operating Loss"

	If Plant is Continued	If Plant is Shutdown
Sales	7,60,000	---
Less: Variable Cost	5,70,000	---
Contribution	1,90,000	---
Less: Fixed Cost	3,50,000	1,30,000
Less: Additional Cost	---	15,000
Operating Loss	1,60,000	1,45,000

Decision on Shut Down

A comparison of loss figures (indicated as above) points out that loss is reduced by ₹15,000 (₹ 1,60,000 - ₹ 1,45,000) if plant is shut down.

→ Accordingly, plant should be Shut Down.

Shut Down Point   =$\frac{Rs.3,50,000-Rs.1,45,000}{Rs.8-Rs.6}$ = 1,02,500 units

Capacity Level at Shut Down Point (%)

At 100% Level – Production Capacity

= 1,18,750 $\left(\frac{95,000\ Units}{0.80}\right)$

Capacity Level at Shut Down Point

= 86.32% $\left(\frac{1,02,500\ Units}{1,18,750\ Units}\right)$

Question 24

A company manufactures four products. The annual demand for products, selling prices and variable production costs are as follows:

Product	P	Q	R	S
Demand (Units)	1,20,000	1,86,000	1,71,000	99,000
	₹	₹	₹	₹
Selling price/unit	23.88	28.68	55.08	47.88
Direct Material/Unit	10.08	13.20	30.48	24.96
Direct Labour/unit	4.08	4.08	6.72	6.36
Variable overheads/unit	1.44	1.44	2.40	2.16

Other data:

(i) The variable overheads are absorbed on a machine hour basis at a rate of ₹ 1.20 per machine hour.

(ii) Fixed overheads total ₹ 46,84,000 per annum.

(iii) Production capacity available 8,15,000 machine hours per annum.

(iv) Products P, Q and R can be bought-in at ₹ 21.36 per unit, ₹ 24 per unit and ₹ 48 per unit respectively.

You are required to calculate Best product mix and Profitability statement for the year. (MTP 10 Marks, Oct '23)

Answer 24

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

	P (₹)	Q (₹)	R (₹)	S (₹)
Selling Price ...(A)	23.88	28.68	55.08	47.88
Variable Cost				
Direct Material	10.08	13.20	30.48	24.96
Direct Labour	4.08	4.08	6.72	6.36
Variable Overheads	1.44	1.44	2.40	2.16
Total Variable Cost ...(B)	15.60	18.72	39.60	33.48
Contribution per unit ...(A) - (B)	8.28	9.96	15.48	14.40

(ii) **Calculation of Machine Hours/ unit**

Machine Hours per unit	1.20	1.20	2.00	1.80

(iii) **Machine Hours Required**

Machine Hours per unit	1,44,000*	2,23,200%	3,42,000@	1,78,200#
			Total	8,87,400

* - (1,20,000 × 1.2); % - (1,86,000 × 1.2); @ - (1,71,000 × 2); # - (99,000 × 1.8)

(iv) Total Machine Hours Available 8,15,000. Hence, it is a key factor. Product 'S' is to be manufactured, since it is not available with sub-contractor/ market.

(v) **Statement Showing "Make or Buy for Products P, Q, R"**

	P (₹)	Q (₹)	R (₹)
Sub-Contractor/ Buy Price	21.36	24.00	48.00
Less: Variable Manufacturing Cost	15.60	18.72	39.60
Saving in Cost	5.76	5.28	8.40
Saving in Cost per machine hour	4.8	4.4	4.20
Ranking	I	II	III

(vi) **Statement Showing "Best Product Mix"**

Product	Units	Machine Hour/ Unit	Total Machine Hours
S	99,000	1.8	1,78,200
P	1,20,000	1.2	1,44,000
Q	1,86,000	1.2	2,23,200
R (Balance)	1,34,800	2.0	2,69,600
		Total	8,15,000

Balance quantity of R to be purchased 36,200 units (1,71,000 – 1,34,800).

(vii) **Profitability Statement**

Product	No of Units	Contribution/unit (₹)	Total Cont. (₹)
P (Mfg)	1,20,000	8.28	9,93,600
Q (Mfg)	1,86,000	9.96	18,52,560
R (Mfg)	1,34,800	15.48	20,86,704
R (Buy)	36,200	7.08 (₹55.08 - ₹48.00)	2,56,296
S (Mfg)	99,000	14.40	14,25,600
Total Contribution			66,14,760
Less: Fixed Overheads			46,84,000
Net Profit			19,30,760

Question 25

PVC Ltd sold 55,000 units of its product at ₹ 375 per unit. Variable costs are ₹ 175 per unit (manufacturing costs of ₹ 140 and selling cost ₹ 35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹ 65,00,000 (including depreciation of ₹ 15,00,000). There is no beginning or ending inventories.

Required:

(i) Compute breakeven sales level quantity and cash breakeven sales level quantity.

(ii) Compute the P/V ratio.

(iii) Compute the number of units that must be sold to earn an income (EBIT) of ₹5,00,000.

(iv) Compute the sales level achieve an after-tax income (PAT) of ₹5,00,000, assume 40% corporate tax rate.

(RTP Nov'19)(Same concept different figures RTP May'19, Old & New SM)

Answer 25

(i) Contribution = ₹ 375 - ₹ 175 = ₹ 200 per unit.

Break Even Sales Quantity = $\dfrac{Fixed\ Cost}{Contribution\ Margin\ per\ unit}$ = $\dfrac{Rs.65,00,000}{Rs.200}$ = 32,500 units

Cash Break even Sales Qty = $\dfrac{Cash\ Fixed\ Cost}{Contribution\ Margin\ per\ unit}$ = $\dfrac{Rs.50,00,000}{Rs.200}$ = 25,000 units

(ii) P/V Ratio = $\dfrac{Contribution/unit}{Sales\ price/unit} \times 100$ = $\dfrac{Rs.200}{Rs.375} \times 100$ = **53.33%**

(iii)No. of units that must be sold to earn an Income (EBIT) of '5,00,000

$\dfrac{Fixed\ Cost + Desired\ EBIT\ level}{Contribution\ margin\ per\ unit}$ = $\dfrac{65,00,000 + 5,00,000}{200}$ = 35,000 units

(iv)After Tax Income(PAT)=₹5,00,000 Tax rate = 40%

Desired level of Profit before tax = $\dfrac{Rs.5,00,000}{60} \times 100$ =

Rs. 8,33,333   Estimate Sales Level = $= \dfrac{Fixed\ Costs}{p/V Ratio}$

Or, $(Fixed\ Cost + Desired\ Profit\ /Contribution\ per\ unit\ \times Selling\ price\ per\ unit)$

= Rs. 65,00,000+Rs. 8,33,333 / 53.33% = Rs. 1,37,50,859

Question 26

A company sells its product at ₹ 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000 units, it earns a profit of ₹ 4 per unit. Calculate break-even point both in terms of rupees as well as in units. (RTP Nov.'18, Old & New SM)

Answer 26

We know that S − V = F + P (S - Sales, V - Variable cost, F - Fixed cost and P - Profit/loss)

Suppose variable cost = x per unit Fixed

Cost = y

When sales is 8,000 units, then

15x8,000-8,000x=y-40,000.................... (1)

When sales volume raised to 20,000 units, then

15x20,000-20,000x=y+80,000.............. (2)

Or,1,20,000−8,000x=y−40,000.............. (3)

And 3,00,000−20,000x=y+80,000.............. (4)

From (3) & (4) we get x = ₹ 5. Variable cost per unit = ₹ 5

Putting this value in 3rd equation: 1,20,000−(8,000x5)=y 40,000 or y = ₹ 1,20,000

Fixed Cost = ₹ 1,20,000

P/V ratio = $\dfrac{S-V}{S}$ = $\dfrac{15-5}{15} \times 100$ = $\dfrac{200}{3}$ = $66\dfrac{2}{3}\%$

Suppose break-even sales = x

15x−5x=1,20,000(at BEP, contribution will be equal to fixed cost) x = 12,000 units.

Or Break-even sales in units = 12,000

Break-even sales in rupees = 12,000 x ₹ 15 = ₹ 1,80,000

Question 27

A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of ₹ 15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

	A	B
Profit (₹)	1,50,000	30,000

| Selling Price / unit (₹) | 200 | 120 |
| P/V Ratio (%) | 40 | 50 |

Required:

Compute the best option among the following, if the company expects that the number of units to be sold would be equal.

(i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by 7½ %.

(ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.

(iii) Simultaneous introduction of both the option, viz, (i) and (ii) above. (RTP May'18]

Answer 27

Option (i)

Increase in profit when due to change in a manufacturing process there is reduction in joint fixed cost and increase in variable costs.

	(Rs.)
Revised Contribution from 12,000 units of A due to 7.5% increase in Variable Cost {12,000 units × (₹ 200 – ₹ 129)}	8,52,000
Revised Contribution from 12,000 units of B due to 7.5% increase in Variable Cost {12,000 units × (₹ 120 – ₹ 64.50)}	6,66,000
Total Revised Contribution	15,18,000
Less: Fixed Cost (₹ 15,00,000 – 15% × ₹ 15,00,000)	12,75,000
Revised Profit	2,43,000
Less: Existing Profit	1,80,000
Increase in Profit	63,000

Option (ii)

Increase in profit when the price of product A increased by 20% and the price elasticity of its demand would be unity over the range of price.

Budgeted Revenue from Product A (12,000 units × ₹ 200)	24,00,000
Revised Demand (in units) (₹ 24,00,000 / ₹ 240)	10,000
Revised Contribution (in ₹) [10,000 units × (₹ 240 – ₹ 120)]	12,00,000
Less: Existing Contribution (12,000 units × ₹ 80)	9,60,000
Increase in Profit (Contribution)	2,40,000

*Note: Since Price Elasticity of Demand is 1, therefore the Revenue in respect of Products will remain same.

Option (iii)

Increase in profit on the simultaneous introduction of above two options.

		(Rs.)
Revised Contribution from Product A [10,000 units	× (₹ 240 – ₹ 129)]	11,10,000
Revised Contribution from Product B [12,000 units	× (₹ 120 – ₹ 64.50)]	6,66,000
Total Revised Contribution		17,76,000
Less: Revised Fixed Cost		12,75,000
Revised Profit		5,01,000
Less: Existing Profit		1,80,000
Increase in Profit		3,21,000

A comparison of increase in profit figures under above three options clearly indicates that the option (iii)

is the best as it increases the profit of the concern by ₹ 3,21,000.

Note: The budgeted profit / (loss) for 201 8 in respect of products A and B should be ₹ 2,10,000 and (₹ 30,000) respectively instead of ₹ 1,50,000 and ₹ 30,000.

Workings

1. **Contribution per unit of each product:**

	Product	
	A (₹)	B (₹)
Contribution per unit	80	60
(Sales ×P/V Ratio)	(₹200×40%)	(₹120×50%)

2. **Number of units to be sold:**

Total Contribution – Fixed Cost = Profit

Let x be the number of units of each product sold, therefore:

(80x+60x)−₹15,00,000 = ₹1,50,000+₹30,000

Or x = 12,000 units

Question 28

A company has three factories situated in North, East and South with its Head Office in Mumbai. The Management has received the following summary report on the operations of each factory for a period:

				(₹ in '000)
Factory	Sales		Profit	
	Actual	Over / (Under) Budget	Actual	Over / (Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE the following for each factory and for the company as a whole for the period:

(i) Fixed Cost

(ii) Break-even Sales(RTP Nov '21, Old & New SM)

Answer 28

Computation of Profit Volume Ratio

							(₹ in '000)
Factory	Sales			Profit			P/V Ratio
	Actual	Over / (Under) Budget	Budgeted Sales	Actual	Over / (Under) Budget	Budget Profit	(Change in profit / Change in Sales)
North	1,100	(400)	1,500	135	(180)	315	45%
East	1,450	150	1,300	210	90	120	60%
South	1,200	(200)	1,400	330	(110)	440	55%

(i) **Computation of Fixed Costs** (₹ in '000)

Factory	Actual Sales	P/V Ratio	Contribution	Actual Profit	Fixed Cost
	(1)	(2)	(3) = (1) × (2)	(4)	(5) = (3) - (4)
North	1,100	45%	495	135	**360**

East	1,450	60%	870	210	**660**
South	1,200	55%	660	330	**330**
Total	3,750		2,025	675	**1,350**

(ii) Computation of Break-Even Sales

Factory	Fixed Cost (a)	P/V Ratio (b)	Break-even Sales (a) / (b)
North	360	45%	800
East	660	60%	1,100
South	330	55%	600
			2,500

Break –even Sales (Company as whole) = Fixed Cost/ Composite P/V Ratio*

= Rs. 13,50,000/54%

= Rs. 25,00,000

*Composite P/V Ratio = Total Contribution/ Total Actual Sales = 2,025 / 3,750 = 54%

Question 29

a) RPP Manufacturers is approached by an international customer for one-time special order similar to one offered to its domestic customers. Per unit data for sales to regular customers is provided below:

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604
Markup (50%)	₹ 1302
Targeted selling price	₹ 3906

It is provided that RPP Manufacturers has excess capacity. Required:

(i) WHAT is the full cost of the product per unit?

(ii) WHAT is the contribution margin per unit?

(iii) WHICH costs are relevant for making the decision regarding this one-time special order? WHY?

(iv) For RPP Manufacturers, WHAT is the minimum acceptable price of this one- time-special order only

(v) For this one-time-only special order, SHOULD RPP Manufacturers consider a price of ₹ 2100 per unit? WHY or why not?

(vi) The lab corner of New life Hospital Trust operates two types of specialist MRI scanning machine- MR10 and MR59. Following details are estimated for the next period:

Machine	MR10	MR59
Running hours	1,100	2,000
	(₹)	(₹)
Variable running costs excluding special technology	68,750	1,60,000
Fixed Costs	50,000	2,43,750

b) A brain scan is normally carried out on machine type MR10. This task uses special technology costing ₹ 100 each and takes four hours of machine time. Because of the nature of the process, around 10% of the scans produce blurred and therefore useless results.

Required:

• CALCULATE the total cost of a satisfactory brain scan on machine type MR10.

- **Brain scans can also be done on machine type MR59 and would take only 1.8 hours per scan with a reduced reject rate of 6%. However, the cost of the special technology would be ₹ 137.50 per scan. ADVISE which type should be used, assuming sufficient capacity is available on both types of machines. Consider fixed costs will remain unchanged.** (RTP Nov'22)

Answer 29

a) **(i)** **Full cost of the product per unit**

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604

(ii) **Contribution margin per unit**

Selling price	₹ 3906
Less: Variable costs	
Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Contribution margin per unit	₹ 2394

(iii) **Costs for decision making are those costs that differ between alternatives, which in this situation are the incremental costs.**

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Total incremental costs	₹ 1512

(iv) **Minimum acceptable price would be the incremental costs in the short term i.e. ₹ 1512**

(v) Yes, RPP Manufacturers may consider a price of ₹ 2100 per unit because this price is greater than the minimum acceptable price.

b) (i)

Particulars	(₹)
Variable cost per running hour of Machine MR10 (₹ 68,750/1100 hours)	62.50
Fixed cost (₹ 50,000/1100 hours)	45.46
Cost of brain scan on Machine MR10:	(₹)
Variable machine cost (4 hours × ₹ 62.50)	250.00
Special technology	100.00
Total variable cost	350.00
Fixed machine cost (4 hours × ₹ 45.46)	181.84
Total cost of a scan	531.84
Total cost of a satisfactory scan (₹ 531.84/0.9)	590.93

(ii) It is given that fixed cost will remain unchanged and thus they are not relevant for the decision. The relevant costs would be the incremental costs of an additional scan:

Machine MR10:	(₹)
Variable cost per scan	350.00
Variable cost per satisfactory scan (₹ 350/0.9)	388.89

Machine MR59:	(₹)
Variable machine cost per scan (₹ 1,60,000 / 2000 hours × 1.8 hours)	144.00
Special technology	137.50
Variable cost per scan	281.50
Variable cost per satisfactory scan (₹ 281.50/0.94)	299.47

(vii) The relevant costs per satisfactory scan are cheaper on Machine MR59 and therefore brain scans should be undertaken on said machine.

Question 30

The following data are available from the budget records of Finesign Women's Handbag Company for the forthcoming budget period.

	₹
Selling Price per unit	**1000**
Variable cost per unit:	
Cost of Material used	**750.00**
Sales commission	**50.00**
Total Variable Cost	**800.00**
Annual fixed expenses:	
Rent	**7,00,000**
Salaries	**11,00,000**
Other fixed expenses	**5,00,000**
Total Fixed Cost	**23,00,000**

Although the firm manufactures Bags with different styles, they have identical purchase costs and selling price.

Requirement:

(a) What is the annual break-even point both in terms of units and value?

(b) If the store manager is paid 1 per cent commission on sales, what would be the annual break-even point both in terms of units and value?

(c) If the firm decides to pay a fixed salary of ₹ 9,00,000 in lieu of sales commission, what would be the annual break-even point in terms of units and value.

Considering break-even point in requirement (a), If the stores manager is paid 2 per cent commission on each bag sold in excess of the break-even point, what would be the profit if 20000 bags were sold. (RTP May 23)

Answer 30

(a) P/V ratio : $\frac{Sales\ per\ unit - Variable\ Cost\ per\ unit}{Selling\ Price\ per\ unit}$ X 100

$= \frac{1000-800}{1000}$ X100

$= \frac{1000-800}{1000}$ X 100

$= \frac{200}{1000}$ X 100 = 20%

Annual BEP in Units: $\frac{Annual\ fixed\ Cost}{Contribution\ per\ unit}$

$= \frac{Rs.23,00,000}{Rs.200}$ = 11,500 units

Annual BEP in Value : $\frac{Annual\ fixed\ Cost}{\frac{P}{V}\ ratio}$

$\frac{Rs.23,00,000}{Rs.20\%}$ = 11,500 units

(b) **Revised P/V ratio and BEP:**

commission on sales per unit= 1% of 1,000= ₹10

So, P/V ratio : $\frac{1000-(750+50+10)}{1000}$

= $\frac{190}{1000}$ X 100 = 19%

BEP in terms of units = $\frac{Annual\ fixed\ Cost}{Contribution\ per\ unit}$

= $\frac{Rs.23,00,000}{190}$ = 12,106 units

BEP in terms of value : $\frac{Annual\ fixed\ Cost}{P/V}$

= $\frac{Rs.23,00,000}{19\%}$ = Rs. 1,21,05,263

(c) **Break-even point under fixed salary plan:**

P/V ratio : $\frac{Contribution\ per\ unit}{Selling\ price\ per\ unit}$ = $\frac{1000-750}{1000}$ X 100 = $\frac{250}{1000}X$ 100 =25%

Revised fixed cost:

Original fixed cost	₹ 23,00,000
Proposed fixed salary	₹ 9,00,000
Total	₹ 32,00,000

BEP in terms of units = $\frac{Annual\ fixed\ Cost}{Contribution\ per\ unit}$

= $\frac{32,00,000}{250}$ = 12,800 units

BEP in terms of value : $\frac{Annual\ fixed\ Cost}{\frac{P}{V}ratio}$

= $\frac{Rs.32,00,000}{25\%}$ = 1,28,00,000

(d) Annual break-even point under requirement (a) is 11,500 units.

Margin of safety at sales volume of 20,000 unit of bags (20,000 – 11,500) = 8500 units

Contribution on sales beyond break-even sales: Revised contribution per unit: 200 – (2% of 1000) = 180 Profit = Margin of safety (in units) × Contribution per unit = 8500 × 180 = ₹ 15,30,000

Question 31

(a) A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

(i) On 1st April, 2023, the company has an opening stock of 20,000 packets whose variable cost is ₹ 180 per packet.

(ii) In 2022-23, production was 1,20,000 packets and the expected production in 2023-24 is 1,50,000 packets. Expected sales for 2023-24 is 1,60,000 packets.

(iii) In 2022-23, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2023-24. The variable cost is expected to increase by 25%. Selling price for 2023-24 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 2023-24.

(b) The M-Tech Manufacturing Company is presently evaluating two possible processes for the manufacture of a toy. The following information is available:

Particulars	Process A (₹)	Process B (₹)
Variable cost per unit	12	14
Sales price per unit	20	20
Total fixed costs per year	30,00,000	21,00,000
Capacity (in units)	4,30,000	5,00,000
Anticipated sales (Next year, in units)	4,00,000	4,00,000

Suggest:

1. **Identify the process which gives more profit.**

2. **Would you change your answer as given above, if you were informed that the capacities of the two processes are as follows:**

A - 6,00,000 units; B - 5,00,000 units? (RTP Nov '23)

Answer 31

Working Notes:

(a)

Particulars	2022-23 (₹)	2023-24 (₹)
Fixed Cost	72,00,000 (₹ 60 × 1,20,000 units)	79,20,000 (110% of ₹ 72,00,000)
Variable Cost	180	225 (125% of ₹ 180)

Calculation of Break-even Point (in units):

Since, shelf life of the product is one year only, hence, opening stock is to be sold first.

	(₹)
Total Contribution required to recover total fixed cost in 2023-24 and to reach break-even volume.	79,20,000
Less: Contribution from opening stock {20,000 units × (₹ 300 – ₹ 180)}	24,00,000
Balance Contribution to be recovered	55,20,000

Units to be produced to get balance contribution

$= \frac{Rs.55,20,000}{Rs.300 - Rs.225}$ = 73,600 packets.

Break-even volume in units for 2023-24

	Packets
From 2023-24 production	73,600
Add: Opening stock from 2022-23	20,000
	93,600

(b) **Comparative Profitability Statements**

Particulars	Process- A (₹)	Process- B (₹)
Selling Price per unit	20.00	20.00
Less: Variable Cost per unit	12.00	14.00
Contribution per unit	8.00	6.00
Total Contribution	32,00,000 (₹ 8 × 4,00,000)	24,00,000 (₹ 6 × 4,00,000)
Less: Total fixed costs	30,00,000	21,00,000
Profit	2,00,000	3,00,000

Capacity (units)	4,30,000	5,00,000
Total Contribution at full capacity	34,40,000 (₹ 8 × 4,30,000)	30,00,000 (₹ 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	4,40,000	9,00,000

Process - B gives more profit.

(2)

Particulars	Process- A (₹)	Process- B (₹)
*Capacity (units)	6,00,000	5,00,000
Total contribution	48,00,000 (₹ 8 × 6,00,000)	30,00,000 (₹ 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	18,00,000	9,00,000

Process-A be chosen.

*Note: It is assumed that capacity produced equals sales.

Question 32

When volume is 4000 units, average cost is ?

3.75 per unit. When volume is 5000 units, average cost is ₹ 3.50 per unit. The Break-Even point is 6000 units. Calculate: - (i) Variable Cost per unit (ii) Fixed Cost and (iii) Profit Volume Ratio. (PYP Nov'19,5 Marks)

Answer 32

(i) Variable cost per unit $= \dfrac{Change\ in\ Total\ Cost}{Change\ in\ units}$

$= \dfrac{(Rs.3.50\ 5,000\ units)(Rs.3.75\ 4,000\ units)}{5,000-4,000}$

$= \dfrac{Rs.17,500-Rs.15,000}{1,000}$ = Rs. 2,500/1000 = Rs. 2.5

(ii) **Fixed cost** = Total Cost – Variable cost (at 5,000 units level)

= ₹ 17,500 – ₹ 2.5 × 5,000 = ₹ 5,000

(iii) **Contribution**

Per unit $= \dfrac{Fixed\ Cost}{BEP\ (in\ units)} = \dfrac{Rs.5,000}{6,000\ units}$ = 0.833

P/V Ratio $= \dfrac{Contribution per\ unit}{Sales\ price\ per\ unit} = \dfrac{0.833}{2.5+0.833}$ = 25%

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical question relating to the topic 'Marginal costing' to ascertain information based on change in volume, average cost per unit and breakeven point. Most of the examinees were unable to calculate the fixed cost; hence they could not calculate the P/V ratio. Performance of the examinees was average.

Question 33

PJ Ltd manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹ 125 on each stick. The Company is producing 5000 sticks annually by using 50% of its machinery capacity.

The cost of each stick is as under:

Direct Material   ₹ 150

Direct Wages	₹ 50
Works Overhead	₹ 125 (50% fixed)
Selling Expenses	₹ 150 (25% variable)

The anticipation for the next year is that cost will go up as under:

Fixed Charges :	10%
Direct Wages	20%
Direct Material	5%

There will not be any change in selling price.

There is an additional order for 2000 sticks in the next year.

Calculate the lowest price that can be quoted so that the Company can earn the same profit as it earned in the current year ? (PYP Nov'19,10 Marks)

Answer 33

Selling Price = ₹ 500

Profit   = ₹ 125

No of Sticks = 5,000

Particular	Current Year (₹)	Next Year (₹)
Direct Material	150	**157.50** (150 + 5%)
Direct Wages	50	**60** (50+20%)
Works Overheads	62.50 (125 × 50%)	**62.5**
Selling Expenses	12.50 (50 × 25%)	**12.5**
Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	**5,00,000**	**5,50,000**

Let: Lowest Price Quoted = K

Now, Sales = Target Profit (5,000 units × ₹ 125) + Variable Cost + Fixed Cost Or,   = (5,000 × 500) + (2,000 × K) = **6,25,000** + 20,47,500 + 5,50,000 Or, K = ₹ **361.25**

So, Lowest Price that can be quoted to earn the profit of ₹ 6,25,000 (same as current year) is ₹ 361.25

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical problem from the topic 'Marginal Costing'. Question required calculation of lowest price to be quoted for additional order in order to earn the same profit as last year. Performance of majority of the examinees was above average.

Question 34

M/s Gaurav Private Limited is manufacturing and selling two products :'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively. The following sales strategy has been outlined for the financial year 2019-20:

(i)   Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.

(ii)   The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.

(iii) Break-even is planned at 70% of the total sales of each product.

(iv) **Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'**

You are required to calculate:

(i) **Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.**

(ii) **Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above. (PYP May '19, 5 Marks)**

Answer 34

(i)	Statement showing Break Even Sales Particulars	Black	White
	Sales Planned	81,00,000	54,00,000
	Selling Price (₹)	18	24
	Number of Units to be sold	4,50,000	2,25,000
	Break Even sales (in Units), 70% of total sales	**3,15,000**	**1,57,500**
	Or		
	Break Even sales (in ₹), 70% of total sales	**56,70,000**	**37,80,000**
(ii)	**Statement Showing Fixed Cost Reduction**		
	Profit to be maintained (₹)	8,26,200	7,45,200
	Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
	PVR (Profit/ Margin of Safety) x 100	34%	46%
	Contribution (Sales x 34% or 46%) (₹)	27,54,000	24,84,000
	Less: Profit (₹)	8,26,200	7,45,200
	Revised Fixed Cost (₹)	**19,27,800**	**17,38,800**
	Present Fixed Cost (₹)	22,00,000	20,00,000
	Reduction in Fixed Cost	**2,72,200**	**2,61,200**

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a numerical question on 'Marginal Costing'. Examinees easily calculated the BEP, but failed to calculate the reduction in fixed cost, due to lack of conceptual clarity on this topic. The performance in this sub part the question was below Average.

Question 35

What are the limitations of marginal costing? (PYP **May '19, 5 Marks**)

Answer 35

Limitations of Marginal Costing

(i) **Difficulty in classifying fixed and variable elements:** It is difficult to classify exactly the expenses into fixed and variable category. Most of the expenses are neither totally variable nor wholly fixed. For example, various amenities provided to workers may have no relation either to volume of production or time factor.

(ii) **Dependence on key factors:** Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.

(iii) **Scope for Low Profitability:** Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost.

(iv) **Faulty valuation:** Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in-progress. In order to show the correct position fixed overheads have to be included in work-in-progress.

(v) **Unpredictable nature of Cost:** Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption that fixed cost will remain static

throughout is not correct. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. The variable costs do not remain constant per unit of output. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.

(vi) **Marginal costing ignores time factor and investment:** The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

(vii) **Understating of W-I-P:** Under marginal costing stocks and work in progress are understated.

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> In this theoretical question on limitations of 'Marginal Costing'. Most of the examinees failed to mention the limitations correctly. Poor performance of the candidate was observed. Overall performance in this question was below average.

Question 36

A manufacturing company is producing a product 'A' which is sold in the market at ₹ 45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

	₹
Materials	12
Wages	9
Overheads	6
Margin of safety is ₹ 4,12,500.	
You are required to:	

(i) calculate fixed cost and break-even point.

(ii) calculate the volume of sales to earn profit of 20% on sales.

(iii) if management is willing to invest ₹ 10,00,000 with an expected return of 20%, calculate units to be sold to earn this profit.

(iv) Management expects additional sales if the selling price is reduced to ₹ 44. Calculate units to be sold to achieve the same profit as desired in above (iii). (PYP Nov '18, 10 Marks)

Answer 36

$$\text{Margin of Safety} = \frac{Profit}{P/V \ ratio} = \text{Rs. } 4,12,500$$

$$\frac{\text{Profit}}{\frac{45-(2+9+6)}{45}} = \text{Rs. } 4,12,500$$

$$\frac{Profit}{\frac{18}{45}} = 4,12,500$$

Profit = 1,65,000 OR P/V = (18/45) x 100 = 40%

(i) **Fixed Cost**

Profit = (Sales × P/V Ratio) − Fixed Cost

$$1,65,000 = \left((30,000 \times 45) \times \frac{18}{45}\right) − \text{Fixed cost}$$

Or Fixed Cost = 5,40,000 − 1,65,000

= ₹ 3,75,000

OR

Profit = Contribution − Fixed Cost = ₹ 5,40,000 - ₹ 3,75,000 = ₹ 1,65,000

P/VRatio= 18/45 = 40%

Break-even Point = Total Sales – Margin of Safety

= ₹ (30,000 × 45) − 4,12,500

= 13,50,000 − 4,12,500 = ₹ 9,37,500

Or

BEP = $\frac{Fixed\ Cost}{\frac{P}{V}Ratio}$ $\frac{3,75,000}{\frac{18}{45}}$= $\frac{3,75,000}{40\%}$= ₹ 9,37,500 **OR 20833.33 Units**

(ii) **Let's assume, Sales Volume = S unit so total sales value is 45 S and**

Contribution is 45 S - 27 S = 18 S

Now, Contribution = Fixed Cost + Desired Profit 18 S =

3,75,000 + 9 S (20% of 45 S)

Or, 9S = 3,75,0000

So, S = $\frac{3,75,000}{9}$ Units

Volume of sales = $\frac{3,75,000−45}{9}$ = ₹18,75,000 **OR 41666.67 Units**

So, ₹ 18,75,000 sales are required to earn profit on 20% of sales

(iii) Contribution = Fixed Cost + Desired Profit

18S = 3,75,000 + Return on Investment

18S = 3,75,000+2,00,000

S = $\frac{5,75,000}{18}$ Units = 31,945 Units(approx.)

So, 31,945 Units to be sold to earn a return of ₹ 2,00,000.

(iv) Revised Contribution = Fixed Cost +

Desired Profit 17S = 3,75.000+

2,00,000

S = $\frac{5,75,000}{17}$Units

S = 33,824 units (approx.)

Additional Sales to be sold to achieve the same profit is 33,824 Units.

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This question was related to Marginal costing, Most of the examinees performed well and obtained 6-8 marks out of 10 marks.

Overall performance in this question was very good.

Question 37

Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000(Profit)

You are required to calculate:

(i) Profit Volume Ratio

(ii) Fixed Costs

(iii) Break Even Point

(iv) **Sales required to earn a profit of ₹ 45,000.**

(v) **Margin of Safety in Financial Year 2017-18. (PYP May '18, 5 Marks)**

Answer 37

	Sales (₹)	Profit (₹)
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

(i)   P/V Ratio = $\frac{Difference\ in\ profit}{Difference\ in\ Sales} \times 100 = \frac{30,000}{1,00,000} \times 100 = 30\%$

(₹)

(ii)   Contribution in 2016 (4,00,000 x 30%) 1,20,000

Add: Loss   15,000

Fixed Cost*   1,35,000

*Contribution   = Fixed cost + Profit

∴ Fixed cost   = Contribution − Profit

(iii)   Break-even point $=\frac{Fixed\ Cost}{\frac{P}{V}Ratio} = \frac{1,35,000}{30\%} = Rs.\ 4,50,000$

(iv)   Sales to earn a profit of ₹ 45,000

$\frac{Fixed\ Cost + Desired\ profit}{\frac{P}{V}ratio}$ $\frac{1,35,000 + 45,000}{30\%}$ = ₹6,00,000

(v)   Margin of safety in 2017 −18

Margin of safety = Actual sales − Break-even sales

= 5,00,000 − 4,50,000 = ₹ 50,000.

Question 38

PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management:

Particulars	Amount (₹)	Amount (₹)
Sales 1,500 pieces @ ₹ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

i.   **If selling price is increased by ₹ 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?**

ii.   **The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is ₹ 18. Calculate the sales to earn a profit of 20% on sales. (PYP May '18, 10 Marks)**

Answer 38

(i) Evaluation of Option (i)

Selling Price = ₹ 1800 + ₹ 200 = ₹ 2,000 Sales = 2000 x 60% = 1200 Pieces

	(₹)
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material (Rs. 5,94,200 / 1,500 units × 1,200)	4,75,360
Direct Labour (Rs. 4,42,600/1,500 units × 1,200)	3,54,080
Variable Overhead (Rs. 11,97,000 × 60% /1,500 *units* × 1,200	5,74,560

		(₹)
	Contribution	9,96,000
	Less: Fixed cost (Rs. 11,97,000x40%)	4,78,800
Profit		5,17,200

If price has been increased by 11.11% (increases by 200 on 1,800) sales goes down by 20% (decreased by 300 on 1,500). Change in demand is greater than change in price. Since the variable costs are still same profit has been arose to ₹ 5,17,200 in-spite of high elasticity of demand. PH gems would not be able to sustain this policy on account of change if any in variable costs.

(ii) Evaluation of Option (ii)

	(Rs.)
Sales	1,800.00
Less: Direct Material (Rs. 5,94,200 / 1,500)	396.13
Cost of Tie PIN	18.00
Direct Labour (Rs. 4,42,600 / 1,500)	295.07
Variable Overheads ($\frac{Rs.11,97,000 \times 60\%}{1,500}$	478.80

Contribution   612.00

P/V Ratio (₹ 612/1800x100)   34.0%

Sales to required earn a profit of 20%

Sales = ₹ 4,78,800 + 0.20 of Sales

$\quad\quad\quad$ 34.00%

Sales = ₹ 34,20,000 or 1,900 units (₹ 34,20,000/1800)

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e. 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

Question 39

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. (PYP 5 Marks Nov 20, Old & New SM)

Answer 39

(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

Question 40

Differentiate between "Marginal and Absorption Costing".   (PYP 5 Marks Nov 20)

Answer 40

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.

Question 41

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. (PYP 5 Marks Jan '21)

Answer 41

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 =Rs. 6,30,000 / 70% = Rs. 9,00,000

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety) = 60%

(i) **Revised fixed cost** = revised breakeven sales x revised contribution to sales ratio

= ₹ 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

Question 42

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

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

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. (PYP 10 Marks Jan 21)

Answer 42

Workings:

1. **Statement showing computation of Breakeven of merged plant and other required information**

S. No.	Particulars	Plan A		Plant B		Merged Plant (100%) (₹)
		Before (90%) (₹)	After (100%) (₹)	Before (60%) (₹)	After (100%) (₹)	
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

2. PV ratio of merged plant =

$$\frac{Contribution}{Sales} \times 100 = \frac{Rs.68,50,000}{1,50,00,000} \times 100 = 45.67\%$$

(i) **Break even Sales of merged plant** $= \dfrac{Fixed\ Cost}{\frac{P}{V}Ratio}$

$$= \dfrac{Rs.28,00,000}{45.67\%} = \text{Rs. 61,30,939.34(approx..)}$$

Capacity utilization $= \dfrac{Rs.61,30,939.34}{1,50,00,000} \times 10C = 40.88\%$

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

= (₹ 1,50,00,000 x 80%) x P/v ratio – fixed cost

= ₹ 1,20,00,000 x 45.67% – ₹ 28,00,000

= ₹ 26,80,400

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

Desired sales $= \dfrac{Fixed\ Cost + Desired\ profit}{\frac{P}{V}ratio}$

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

= ₹ 1,92,68,666 (approx.)

(ii) **Increase in fixed cost**

= ₹ 28,00,000 x 5% = ₹ 1,40,000

Therefore, percentage increase in sales price

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

Question 43

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:
(1) Determine the average selling price at which each of the toy should be sold to earn the desired profit.
(2) Given the above scenario, advise whether company should accept an offer to sell each Toy at:

    (a) ₹ 130 per Toy

    (b) ₹ 129 per Toy (PYP10 Marks Jan 21)

Answer 43

(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.

Question 44

LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:

(1) Cost Indifference Point in units. Interpret your results.

(2) The Break-even Point of each method in terms of units. (PYP 5 Marks July '21)

Answer 44

(i) Cost Indifference Point

	Method-1 and Method-2 (₹)
Differential Fixed Cost (I)	₹ 2,00,000 (₹ 3,00,000 – ₹ 1,00,000)
Differential Variable Costs (II)	₹ 5 (₹ 15 – ₹ 10)
Cost Indifference Point (I/II) (Differential Fixed Cost / Differential Variable Costs per unit)	**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, Semi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

(ii) Break Even point (in units)

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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This practical problem was based on Marginal Costing which required calculation of cost indifference point between two methods and interpretation of the result. Question also required calculation of BEP under both methods. Most of the examinees failed to interpret the cost indifference point. Performance of the examinees was average.

Question 45

What is Margin of Safety? What does a large Margin of Safety indicates? How can you calculate Margin of Safety? (PYP 5 Marks July 21)

Answer 45

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 = $\frac{Profit}{\frac{P}{V}Ratio}$

Question 46

A Z company has prepared its budget for the production of 2,00,000 units. The variable cost per unit is ₹ 16 and fixed cost is ₹ 4 per unit. The company fixes its selling price to fetch a profit of 20% on total cost.

You are required to calculate:

(i) Present break-even sales (in ₹ and in quantity).

(ii) Present profit-volume ratio.

(iii) Revised break-even sales in ₹ and the revised profit-volume ratio, if it reduces its selling price by 10%.

(iv) What would be revised sales- in quantity and the amount, if a company desires a profit increase of 20% more than the budgeted profit and selling price is reduced by 10% as above in point (iii). (PYP 10 Marks Dec '21)

Answer 46

Variable Cost per Unit=₹16

Fixed Cost per Unit =₹ 4, Total Fixed Cost= 2,00,000 units x ₹ 4 = ₹8,00,000

Total Cost per Unit =₹20

Selling Price per unit = Total Cost + Profit = Rs. 20+Rs. 4 = Rs. 24

Contribution per unit = Rs. 24- Rs. 16 = Rs. 8

(i)   Present Break- even Sales (Quantity) = $\frac{Fixed\ Cost}{Contribution\ margin\ per\ unit} = \frac{Rs.8,00,000}{Rs.8}$

Present Break –even Sales(Rs.) = 1,00,000 units X Rs. 24 = Rs. 24,00,000

(ii)   Present P/V Ratio = 8/24 X 100 = 33.33%

(iii) Revised Selling Price per unit = Rs. 24 – 10% of Rs. 24 = Rs. 21.60

Revised Contribution per unit = Rs. 21.60 – Rs. 16 = Rs. 5.60

Revised Break-even point (Rs.) = $\frac{Fixed\ Cost}{\frac{P}{V}Ratio} = \frac{8,00,000}{25.926\%}$ = Rs. 30,85,705

Or

Revised Break-even point (units) = $\frac{Fixed\ Cost}{Contribution\ margin\ per\ unit} = \frac{Rs.8,00,000}{5.60}$

= 1,42,857

Revised Break-even point (₹) = 1,42,857 units x ₹ 21.60 = ₹ 30,85,711

(iv)   Present profit =₹ 8,00,000

Desired Profit = 120% of ₹ 8,00,000 =₹ 9,60,000 Sales to

earn a profit of ₹ 9,60,000

Total contribution required = 8.00.000 + 9,60,000 = ₹ 17,60,000

$$\frac{Fixed\ Cost + Desired\ Profit}{Contribution\ per\ unit} = \frac{8,00,000+9,60,000}{5.60} = 3,14,286 \text{ units}$$

$Revised$ Sales (in Rs.) = 3,14,286 units X Rs. 21.60 = Rs. 67,88,578

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This Numerical problem based on the concept of Marginal costing. First three parts of the question were answered in the correct line. In the fourth part, many examinees failed to calculate amount of desired contribution. Performance of the examinees was good.

Question 47

Top-tech a manufacturing company is presently evaluating two possible machines for the manufacture of superior Pen-drives. The following information is available:

Particulars	Machine A	Machine B
Selling price per unit	₹ 400.00	₹ 400.00
Variable cost per unit	₹ 240.00	₹ 260.00
Total fixed costs per year	₹ 350 lakhs	₹ 200 lakhs
Capacity (in units)	8,00,000	10,00,000

Required:

(i) Recommend which machine should be chosen?

(ii) Would you change your Answer, if you were informed that in near future demand will be unlimited and the capacities of the two machines are as follows?

Machine A - 12,00,000 units Machine B - 12,00,000 units Why?(PYP 5 Marks May'22)

Answer 47

		Machine-A	Machine-B	Total
A	Selling price per unit (₹)	400	400	
B	Variable cost per cost (₹)	240	260	
C	Contribution per unit (₹) [A-B]	160	140	
D	Units	8,00,000	10,00,000	
E	Total contribution (₹ [C×D]	12,80,00,000	14,00,00,000	26,80,00,000
F	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
G	Profit [E-F] (₹)	9,30,00,000	12,00,00,000	21,30,00,000
H	Profit per unit [G÷D] (₹)	116.25	120.00	

(i) Machine B has the higher profit of ₹2,70,00,000 than the Machine-A. Further, Machine-B's fixed cost is less than the fixed cost of Machine-A and higher capacity. Hence, Machine B be recommended.

Note: This Question can also be solved as below:

Indifferent point = Difference in fixed cost / difference in variable cost per unit

= 1,50,00,000 / 20 = 7,50,000 units

At the level of demand 7,50,000 units both machine options equally profitable. If demand below 7,50,000 units, select machine B (with lower FC).

If demand above 7,50,000 units, select machine A (with lower VC).

(ii) When the capacities of both the machines are same and demand for the product is unlimited, calculation of profit will be as follows:

	Machine-A	Machine-B	Total
Contribution per unit (₹)	160	140	
Units	12,00,000	12,00,000	
Total contribution (₹) [A×B]	19,20,00,000	16,80,00,000	36,00,00,000

Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
Profit [C-E] (₹)	15,70,00,000	14,80,00,000	30,50,00,000
Profit per unit [E÷B] (₹)	130.83	123.33	

Yes, the preference for the machine would change because now, Machine A is having higher contribution and higher profit, hence recommended.

Question 48

UV Limited started a manufacturing unit from 1st October 2021. It produces designer lamps and sells its lamps at ₹ 450 per unit. During the quarter ending on 31st December, 2021, it produced and sold 12,000 units and suffered a loss of ₹ 35 per unit. During the quarter ending on 31st March, 2022, it produced and sold 30,000 units and earned a profit of ₹ 40 per unit.

You are required to calculate:

(i) Total fixed cost incurred by UV ltd. per quarter.

(ii) Break Even sales value (in rupees)

Calculate Profit, if the sale volume reaches 50,000 units in the next quarter (i.e., quarter ending on 30th June, 2022). (PYP 5 Marks May'22)

Answer 48

	Quarter ending 31st December, 2021 (₹)	Quarter ending 31st March, 2022(₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]

P/V Ratio=$\frac{Change\ in\ profit}{Change\ in\ sales} \times 100$

∴ $\frac{16,20,000}{81,00,000} \times 100$=20%

(i) Fixed Cost = Sales × P/V ratio – profit

= ₹ 1,35,00,000 × 20% – 12,00,000

= ₹ 15,00,000

Alternative Presentation for the calculation of Fixed cost

	Quarter ending 31stDecember, 2021(₹)	Quarter ending 31st March, 2022(₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]
Total cost	58,20,000	1,23,00,000

VC per unit = (1,23,00,000 – 58,20,000) / (30,000 – 12,000)

= 64,80,000 / 18,000 =₹ 360 per unit

Fixed cost = TC – VC ,   58,20,000 (360 x12,000 units) ₹15,00,000

$$\frac{Fixed\ cost}{P/V\ ratio} \times 100$$

$$\frac{15,00,000}{20\%} = ₹75,00,000$$

(i) Profit, if sales reach 50,000 units for the quarter ending 30th June, 2022

	(₹)
Sales (50,000 × ₹ 450)	2,25,00,000
Less: Variable cost	1,80,00,000
Contribution	45,00,000
Less: Fixed cost	15,00,000
Profit	30,00,000

Question 49

ABC Ltd sells its Product 'Y' at a price of ₹ 300 per unit and its variable cost is ₹ 180 per unit. The fixed costs are ₹ 16,80,000 per year uniformly incurred throughout the year. The Profit for the year is ₹ 7,20,000.

You are required to calculate:

(i) BEP in value (₹) and units.

(ii) Margin of Safety

(iii) Profits made when sales are 24,000 units.

(iv) Sales in value (₹) to be made to earn a net profit of ₹ 10,00,000 for the year. (PYP 5 Marks Nov 22)

Answer 49

(i) Calculation of BEP in value

$$\text{P/V ratio} = \frac{Sales\ Price - Variable\ Cost}{Sales} = \frac{300 - 180}{300} = 40\%$$

$$\text{Break Even Point in Value (₹)} = \frac{Fixed\ cost}{\frac{P}{v}ratio} = \frac{16,80,000}{40\%} = Rs.\ 42,00,000$$

$$\text{Break Even Point in Units} = \frac{Fixed\ cost}{Contribution} = \frac{16,80,000}{120\%} = 14,000\ Units$$

$$(\text{Alternatively}, \frac{Rs.42,00,000}{300} = 14000\ Units)$$

(ii) Margin of Safety (in Amount) $= \frac{Profit}{\frac{P}{V}ratio} = \frac{7,20,000}{40\%} = Rs.\ 18,00,000$

Margin of safety may also be calculated by deducting BEP sales from present sale. Present sale is ₹ 60,00,000 i.e. (16,80,000 + 7,20,000)/40%.

Margin of Safety (in Units) $= \frac{Profit}{Contribution\ per\ unit} = \frac{7,20,000}{120} = $ **6,000 units**

(iii) Profit when sales are 24,000 units

Particular	(₹)
Contribution (24,000 X 120)	28,80,000
Less: Fixed cost	16,80,000
Profit	12,00,000

(iv) Sales in value to earn a net profit of ₹10,00,000

$$\frac{Fixed\ cost + Desired\ profit}{\frac{P}{v}ratio} = \frac{16,80,000 + 10,00,000}{40\%} = Rs.\ 67,00,000$$

Question 50

Prakshal Shah | 8779794646

An agriculture based company having 210 hectares of land is engaged in growing three different cereals namely, wheat, rice and maize annually. The yield of the different crops and their selling prices are given below:

	Wheat	Rice	Maize
Yield (in kgs per hectare)	2,000	500	100
Selling Price (₹ per kg)	20	40	250

The variable cost data of different crops are given below:

(All figures in ₹ per kg)

Crop	Labour charges	Packing Materials	Other variable expenses
Wheat	8	2	4
Rice	10	2	1
Maize	120	10	20

The company has a policy to produce and sell all the three kinds of crops. The maximum and minimum area to be cultivated for each crop is as follows:

Crop	Maximum Area (in hectares)	Minimum Area (in hectares)
Wheat	160	100
Rice	50	40
Maize	60	10

You are required to:

(i)   Rank the crops on the basis of contribution per hectare.

(ii)   Determine the optimum product mix considering that all the three cereals are to be produced.

(iii)   Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000. (PYP 10 Marks Nov 22)

(Assume that there are no other constraints applicable to this company)

Answer 50

Statement showing Ranking of crops on the basis of Contribution per hectare

Sl. No	Particulars	Wheat	Rice	Maize
(I)	Sales price per kg (₹)	20	40	250
(II)	Variable cost* per kg (₹)	14	13	150
(III)	Contribution per kg (₹)	6	27	100
(IV)	Yield (in kgs per hectare)	2,000	500	100
(V)	Contribution per hectare (₹)	12,000	13,500	10,000
(VI)	Ranking	II	I	III

*Variable cost = Labour Charges +Packing Material+ Other Variable Expenses

Therefore, to maximize profits, the order of priority of production would be Rice, Wheat and Maize.

(ii) & (iii) **Statement showing optimum product mix considering that all the three cereals are to be produced and maximum profit thereof**

Sl. No.	Particulars	Wheat	Rice	Maize	Total
(i)	Minimum Area (in hectare)	100	40	10	150
(ii)	Remaining area (in hectare)				60

(iii)	Distribution of remaining area based on ranking considering Maximum area	50	10	-	60
(iv)	Optimum mix (in hectare)	150	50	10	210
(v)	Contribution per hectare (₹)	12,000	13,500	10,000	
(vi)	Total contribution (₹)	18,00,000	6,75,000	1,00,000	25,75,000
(vii)	Fixed cost (₹)				21,45,000
(viii)	Maximum Profit (₹)				4,30,000

Optimum Product Mix and calculation of maximum profit earned by company can also be presented as below

(ii) Optimum Product Mix:

Particular	Area (in hectares)	Yield (kg per hectare)	Total Production (in kgs)
(a) Maximum of Rice	50	500	25000
(b) Minimum of Maize	10	100	1000
(c) Balance of Wheat	150	2000	300000
	210		326000

(iii) Calculation of maximum profit earned by the company:

	Production (in kgs)	Contribution (₹ per kg)	Total contribution (₹)
(a) Rice	25,000	24	6,75,000
(b) Maize	1,000	100	1,00,000
(c) Wheat	3,00,000	6	18,00,000
Total contribution			25,75,000
Less: Total Fixed Cost per annum			(21,45,000)
Maximum profits earned by the company			4,30,000

Question 51

MNP Company Limited produces two products 'A' and 'B'. The relevant cost and sales data per unit of output is as follows.

Particulars	Product A	Product B
	(₹)	(₹)
Direct material	55	60
Direct labour	35	45
Variable factory overheads	40	20
Selling Price	180	175

The availability of machine hours is limited to 55,000 hours for the month. The monthly demand for product 'A' and product 'B' is 5,000 units and 6,000 units, respectively. The fixed expenses of the company are ₹1,40,000 per month. Variable factory overheads are ₹ 4 per machine hour. The company can produce both products according to the market demand.

Required:

Calculate the product mix that generates maximum profit for the company in the situation and also calculate profit of the company. (PYP 5 Marks, May '23)

Answer 51

Particulars	Product A	Product B
	₹	₹
Selling Price	180	175
Variable cost:		
Direct Material	55	60
Direct labour	35	45
Variable factory overheads	40	20
	130	125
Contribution	50	50
Machine hour (p.u.)	10	5
Contribution per hour	5	10
Rank	II	I

Calculation of Product Mix

Hours available	55,000
Product B (6000 x 5)	30,000
Balance Hours	25,000
Product A (2500 x 10)	25,000
Balance Hours	0

Calculation of Profit

	₹
Contribution	
A 2500 units x 50	
B 6000 units x 50	4,25,000
Less: Fixed cost	(1,40,000)
Profit	2,85,000

Chapter 15
Budget & Budgetary Control

Question 1

CALCULATE (i) Efficiency ratio (ii) Activity Ratio (iii) Capacity Ratio. The relevant data is as below: Budgeted Production 1,44,000 units Standard Hours per unit 12 Actual Production 1,20,000 units Actual Working Hours 12,00,000 (MTP 5 Marks March '23 ,Aug '18)(Same concept different figures MTP Oct '19 5 Marks)

Answer 1

(i) Efficiency Ratio = $\frac{Standard\ hour\ (for\ actual\ Production)}{Actual\ hour\ works}$ X 100

$= \frac{1,20,000\ units\ X\ 12\ hrs.}{12,00,000\ hrs,}$ X 100 = 120%

(ii) Activity Ratio = $\frac{Standard\ hour\ (for\ actual\ Production)}{Budgeted\ Hours}$ X 100

$= \frac{14,40,0000}{1,44,000\ Units\ X\ 12\ hours}$ X 100 = 83.34%

(iii) Capacity Ratio = $\frac{Actual\ Hours\ (worked)}{Budgeted\ Hours}$ X 100

$= \frac{12,00,0000}{1,44,000\ Units\ X\ 12\ hours}$ X 100 = 69.45%

Question 2

Following data is available for ABC Ltd.:

Standard working hours	8 hours per day of 5 days per week
Maximum Capacity	60 employees
Actual working	50 employees
Actual hours expected to be worked per four week	8,000 hours
Standard hours expected to be earned per four week	9,600·hours
Actual hours worked in the four week period	7,500 hours
Standard hours earned in the four week period	8,800 hours

The related period is of four weeks. Calculate the following Ratios:

(i) Efficiency Ratio

(ii) Activity Ratio

(iii) Standard Capacity Usage Ratio

(iv) Actual Capacity Usage Ratio

(v) Actual Usage of Budgeted Capacity Ratio (PYP 5 Marks May '19)

Answer 2

(i) Efficiency Ratio:

$= \frac{Standard\ Hrs}{Actual\ Hrs} \times 100$ $= \frac{8,800\ hours}{7,500\ hours} \times 100$ = **117.33%**

(ii) Activity Ratio:

$= \frac{Standard\ Hrs}{Budgeted\ Hrs} \times 100$ $= \frac{8,800\ hours}{8,000\ hours} \times 100$ = **110%**

(iii) Standard Capacity Usage Ratio:

$= \frac{Budgeted\ Hours}{Max.Possible\ hours\ in\ the\ budgeted\ period} \times 100$ $= \frac{8,800\ hours}{9,600\ hours} \times 100$ = **83.33%**

(iv) Actual Capacity Usage Ratio:

$$= \frac{\text{Actual Hours worked}}{\text{Max.Possible Workings hours in the period}} \times 100 \quad = \frac{7{,}500 \text{ hours}}{9{,}600 \text{ hours}} \times 100 \quad = 78.125\%$$

(v) Actual Usage of Budgeted Capacity Ratio:

$$= \frac{\text{Actual working Hours}}{\text{Budgeted Hrs}} \times 100 \quad = \frac{7{,}500 \text{ hours}}{8{,}000 \text{ hours}} \times 100 \quad = 93.75\%$$

Working Notes:

1. Maximum Capacity in a budget period

   = 60 Employees × 8 Hrs. × 5 Days × 4 Weeks = 9,600 Hrs.

2. Budgeted Hours (Hrs)

   = 50 Employees × 8 Hrs. × 5 Days × 4 Weeks = 8,000 Hrs.

3. Actual Hrs. = 7,500 Hrs. (given)

4. Standard Hrs. for Actual Output = 8,800 Hrs.

Question 3

SP Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (₹)	Product B (₹)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

(i) Before marketing efforts

(ii) After marketing efforts (MTP 5 Marks April '23 & March '19, RTP May '19)

Answer 3

(i) Flexible Budget before marketing efforts:

	Product A (₹)		Product B (₹)	
	6,000 units		9,000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	60,000	8.00	72,000

(ii) Flexible Budget after marketing efforts:

	Product A (₹)		Product B (₹)	
	7,500 units		9,500 units	
	Per unit	Total	Per unit	Total

Sales	120.00	9,00,000	78.00	7,41,000
Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Question 4

Soya B Limited is presently operating at 50% capacity and producing 50,000 units. The entire output is sold at a price of Rs. 180 per unit. The cost structure at the 50% level of activity is as under:

	(₹)
Direct Material	**60 per unit**
Direct Wages	**20 per unit**
Variable Overheads	**20 per unit**
Direct Expenses	**12 per unit**
Factory Expenses (30% fixed)	**16 per unit**
Selling and Distribution Exp. (85% variable)	**10 per unit**
Office and Administrative Exp. (100% fixed)	**6 per unit**

The company anticipates that the variable costs will go up by 20% and fixed costs will go up by 10%.

You are required to prepare an Expense budget, based on marginal cost for the company at 50%,75% and 100% level of activity and find out the profits at respective levels. (MTP 10 Marks March '23, March '18) (Same concepts different figures MTP 10 Marks May'20, Old & New SM)

Answer 4

Expense Budget of Soya B Ltd. for the period

	Per unit (₹)	50,000 units Amount (₹)	75,000 units Amount (₹)	1,00,000 units Amount (₹)
Sales **(A)**	180	90,00,000	1,35,00,000	1,80,00,000
Less: Variable Costs:				
- Direct Material	72	36,00,000	54,00,000	72,00,000
- Direct Wages	24	12,00,000	18,00,000	24,00,000
- Variable Overheads	24	12,00,000	18,00,000	24,00,000
- Direct Expenses	14.4	7,20,000	10,80,000	14,40,000
- Variable factory expenses (70% of Rs 16 p.u.)x 120%	13.44	6,72,000	10,08,000	13,44,000
- Variable Selling & Dist. exp. (85% of Rs 10 p.u.)x120%	10.2	5,10,000	7,65,000	10,20,000
Total Variable Cost (**B**)	158.04	79,02,000	1,18,53,000	1,58,04,000
Contribution (**C**) = (**A – B**)	21.96	10,98,000	16,47,000	21,96,000
Less: Fixed Costs:				
- Office and Admin. exp. (100%)	--	3,30,000	3,30,000	3,30,000
- Fixed factory exp. (30%)	--	2,64,000	2,64,000	2,64,000
- Fixed Selling & Dist. exp. (15%)	--	82,500	82,500	82,500

Total Fixed Costs **(D)**	--	6,76,500	6,76,500	6,76,500
Profit **(C – D)**	--	4,21,500	9,70,500	15,19,500

Question 5

Explain the difference between fixed budget and flexible budget. (MTP Aug. '18, 5 Marks, MTP 5 Marks Apr'22, Old & New SM)

Answer 5

Difference between Fixed and Flexible Budgets:

S. No.	Fixed Budget	Flexible Budget
1.	It does not change with actual volume of activity achieved. Thus it is known as rigid or inflexible budget.	It can be re-casted on the basis of activity level to be achieved. Thus it is not rigid.
2.	It operates on one level of activity and under one set of conditions. It assumes that there will be no change in the prevailing conditions, which is unrealistic.	It consists of various budgets for different levels of activity.
3.	Here as all costs like - fixed, variable and semi-variable are related to only one level of activity so variance analysis does not give useful information.	Here analysis of variance provides useful information as each cost is analysed according to its behaviour.
4.	If the budgeted and actual activity levels differ significantly, then the aspects like cost ascertainment and price fixation do not give a correct picture.	Flexible budgeting at different levels of activity facilitates the ascertainment of cost, fixation of selling price and tendering of quotations.
5.	Comparison of actual performance with budgeted targets will be meaningless specially when there is a difference between the two activity levels.	It provides a meaningful basis of comparison of the actual performance with the budgeted targets.

Question 6

V Ltd. produces and markets a very popular product called 'X'. The company is interested in presenting its budget for the second quarter of 2019.

The following information are made available for this purpose:

(i) It expects to sell 50,000 bags of 'X' during the second quarter of 2019 at the selling price of Rs. 900 per bag.

(ii) Each bag of 'X' requires 2.5 kgs. of a raw–material called 'Y' and 7.5 kgs. of raw–material called 'Z'.

(iii) Stock levels are planned as follows:

Particulars	Beginning of Quarter	End of Quarter
Finished Bags of 'X' (Nos.)	15,000	11,000
Raw – Material 'Y' (Kgs.)	32,000	26,000
Raw – Material 'Z' (Kgs.)	57,000	47,000
Empty Bag (Nos.)	37,000	28,000

(iv) 'Y' cost Rs. 120 per Kg., 'Z' costs Rs. 20 per Kg. and 'Empty Bag' costs Rs. 80 each.

(v) It requires 9 minutes of direct labour to produce and fill one bag of 'X'. Labour cost is Rs. 50 per hour.

(vi) Variable manufacturing costs are Rs. 45 per bag. Fixed manufacturing costs Rs. 30,00,000 per quarter.

(vii) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are Rs. 20,50,000 per quarter.

Required

(i) PREPARE a production budget for the said quarter.

(ii) PREPARE a raw–material purchase budget for 'Y', 'Z' and 'Empty Bags' for the said quarter in quantity

as well as in rupees.

(iii) COMPUTE the budgeted variable cost to produce one bag of 'X'.

(iv) PREPARE a statement of budgeted net income for the said quarter and show both per unit and total cost data. (MTP Oct. '19 & April '23 10 Marks) (Same concept different figures Old & New SM)

Answer 6

(i) Production Budget of 'X' for the Second Quarter

Particulars	Bags (Nos.)
Budgeted Sales	50,000
Add: Desired Closing stock	11,000
Total Requirements	61,000
Less: Opening stock	15,000
Required Production	46,000

(ii) Raw–Materials Purchase Budget in Quantity as well as in Rs. for 46,000 Bags of 'X'

Particulars	'Y' Kgs.	'Z' Kgs.	Empty Bags Nos.
Production Requirements Per bag of 'X'	2.5	7.5	1.0
Requirement for Production (46,000 × 2.5)	1,15,000 (46,000 ×7.5)	3,45,000 (46,000 ×1)	46,000
Add: Desired Closing Stock	26,000	47,000	28,000
Total Requirements	1,41,000	3,92,000	74,000
Less: Opening Stock	32,000	57,000	37,000
Quantity to be purchased	1,09,000	3,35,000	37,000
Cost per Kg./Bag	Rs.120	Rs.20	Rs.80
Cost of Purchase (Rs.)	1,30,80,000	67,00,000	29,60,000

(iii) Computation of Budgeted Variable Cost of Production of 1 Bag of 'X'

Particulars	(Rs.)
Raw – Material	
Y 2.5Kg @120	300.00
Z 7.5Kg. @20	150.00
Empty Bag	80.00
Direct Labour (Rs.50× 9 minutes / 60 minutes)	7.50
Variable Manufacturing Overheads	45.00
Variable Cost of Production *per bag*	582.50

(iv) Budgeted Net Income for the Second Quarter

Particulars	Per Bag (Rs.)	Total (Rs.)
Sales Value (50,000 Bags)	900.00	4,50,00,000
Less: Variable Cost:		
Production Cost	582.50	2,91,25,000
Admn. & Selling Expenses (5% of Sales Price)	45.00	22,50,000
Budgeted Contribution	272.50	1,36,25,000
Less: Fixed Expenses:		
Manufacturing		30,00,000
Admn. & Selling		20,50,000
Budgeted Net Income		85,75,000

Question 7

    EXPLAIN the stages in Zero-based budgeting   (MTP 5 Marks, May 2020)

Answer 7

    Zero-based budgeting (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

(v)   Identification and description of Decision packages: Decision packages are the programmes or activities for which decision is required to be taken. The programmes or activities are described for technical specifications, financial impact in the form of cost benefit analysis and other issues like environmental, regulatory, social etc.

(vi)   **Evaluation of Decision packages**: Once Decision packages are identified and described, it is evaluated against factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

(vii)   **Ranking (Prioritisation) of the Decision packages:** After evaluation of the decision packages, it is ranked on the basis priority of the activities. Because of this prioritization feature ZBB is also known as Priority-based Budgeting.

(viii)   **Allocation of resources**: After ranking of the decision packages, resources are allocated for decision packages. Budgets are prepared like it is done first time without taking reference to previous budgets

Question 8

    DESCRIBE objectives of Budgetary Control System. (MTP 5 Marks Oct '20)

Answer 8

    Objectives of Budgetary Control System

1.   **Portraying with precision the overall aims of the business** and determining targets of performance for each section or department of the business.

2.   **Laying down the responsibilities** of each of the executives and other personnel so that everyone knows what is expected of him and how he will be judged. Budgetary control is one of the few ways in which an objective assessment of executives or department is possible.

3.   **Providing a basis for the comparison** of actual performance with the predetermined targets and investigation of deviation, if any, of actual performance and expenses from the budgeted figures. This naturally helps in adopting corrective measures.

4.   **Ensuring the best use of all available resources** to maximise profit or production, subject to the limiting factors. Since budgets cannot be properly drawn up without considering all aspects usually there is good co-ordination when a system of budgetary control operates.

5.   **Co-ordinating the various activities** of the business, and centralising control and yet enabling management to decentralise responsibility and delegate authority in the overall interest of the business.

6.   **Engendering a spirit of careful forethought**, assessment of what is possible and an attempt at it. It leads to dynamism without recklessness. Of course, much depends on the objectives of the firm and the vigour of its management.

7.   **Providing a basis for revision** of current and future policies.

8.   **Drawing up long range plans** with a fair measure of accuracy.

9.   **Providing a yardstick** against which actual results can be compared.

Question 9 (Includes concepts of Cost Sheet)

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 PREPARE a budget for the FY 2021-22. (MTP 10 Marks March '21) (RTP Nov '20)

Answer 9

(i) Product-wise Profitability Statement for the FY 2020-21:

Particulars		Product-X (Rs.)	Product-Y (Rs.)	Total (Rs.)
Output (units)		8,000	4,000	
Selling price per unit		600	550	
Sales value		48,00,000	22,00,000	70,00,000
Direct material		11,20,000	6,30,000	17,50,000
		(Rs.140 × 8,000 units)	(Rs.157.50 × 4,000 units)	
Direct wages		7,20,000	5,30,000	12,50,000
		(Rs.90 × 8,000 units)	(Rs.132.5 × 4,000 units)	
Variable	factory	5,47,200	4,02,800	9,50,000
overheads*		(76% of Rs. 7,20,000)	(76% of Rs. 5,30,000)	
Other variable costs		3,20,000	2,80,000	6,00,000
		(Rs.40 × 8,000 units)	(Rs.70 × 4,000 units)	
Contribution		20,92,800	3,57,200	24,50,000

Fixed factory overheads		-	-	12,00,000
Other fixed costs		-	-	4,00,000
Profit				**8,50,000**

* Percentage absorption of variable factory overhead on the basis of direct wages

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

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)

Question 10 (Includes concepts of Standard Costing)

Tricon Co. furnishes the following information for the month of September, 2020.

Particulars	Budget Details	Static Budget	Actual
Units produced & Sold		**4,000**	**3,200**
		(Rs.)	(Rs.)
Direct Material	3 kg p.u. @ Rs. 30 per kg.	3,60,000	3,10,000
Direct Labour	1 hr. p.u. @ Rs. 72 per hr.	2,88,000	2,25,600
Variable Overhead	1 hr. p.u. @ Rs. 44 per hr.	1,76,000	1,47,200
Fixed Overhead		1,80,000	1,68,000
Total Cost		10,04,000	8,50,800
Sales		12,00,000	8,96,000
Profit		1,96,000	45,200

During the month 10,000 kg. of materials and 3,100 direct labour hours were utilized.

Required:

(i) PREPARE a flexible budget for the month.

(ii) **DETERMINE the material usage variance and the direct labour rate variance for the actual vs the flexible budget. (MTP 10 Marks, April '21)**

Answer 10

(i) **Statement Showing "Flexible Budget for 3,200 units Activity Level"**

Particulars	Amount (Rs.)	Amount (Rs.)
Sales ($\frac{Rs.\ 12,00,000}{4,000\ units}$ x 3,200 units)		9,60,000
Less: Variable Cost		
Direct Material (3,200 units × 3 kg. p.u. × Rs. 30 per kg.)	2,88,000	
Direct Labour (3,200 units × 1 hr. p.u. × Rs. 72 per hr.)	2,30,400	
Variable Overhead (3,200 units × 1 hr. p.u. × Rs. 44 per hr.)	1,40,800	(6,59,200)
Contribution		3,00,800
Less: Fixed Overhead		1,80,000
Profit		1,20,800

(ii) **Computation of Variances**

Material Usage Variance = Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity

$$= (SQ \times SP) - (AQ \times SP)$$

Or

$$= (SQ - AQ) \times SP$$
$$= [(3,200\ units \times 3\ kg.) - 10,000\ kg.] \times Rs.\ 30.00$$
$$= Rs.\ 12,000\ (A)$$

Labour Rate Variance = Standard Cost of Actual Time – Actual Cost

$$= (SR \times AH) - (AR \times AH)$$

Or

$$= (SR - AR) \times AH$$
$$= [(Rs.\ 72 - Rs.\ 2,25,600/3,100\ hrs.) \times 3,100\ hrs.]$$
$$= Rs.\ 2,400\ (A)$$

Question 11

DESCRIBE the steps necessary for establishing a good budgetary control system. (MTP 5 Marks, April '21, Old & New SM)

Answer 11

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.

Question 12

DEFINE Zero Based Budgeting and mention its various stages. (MTP 5 Marks, Oct '21, PYP Nov'19 5 Marks)

Answer 12

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 synchronization with organizational 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 organizations, where these entities need to justify the benefits of expenditures on social programmers 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

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a theoretical question based on stages of ZBB. Poor performance was observed. Most of the examinees failed to mention the stages of ZBB.

Question 13

T Ltd manufactures and sells a single product and has estimated sales revenue of ₹1,51,20,000 during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material A and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour. Variable selling & distribution overheads are ₹30 per unit sold and fixed selling & distribution overheads are estimated to be ₹34,56,000.

The other relevant details are as under:

Purchase Price:	Material A	₹80 per kg	
	Materials B	₹50 per kg	
Labour Rate:	Machine Shop	₹70 per hour	
	Assembly Shop	₹35 per hour	
	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required

    (i)   CALCULATE number of units of product proposed to be sold and selling price per unit,

    (ii)   PREPARE Production Budget in units and

    (iii) PREPARE Material Purchase Budget in units. (MTP 10 Marks Nov '21) (RTP May '21)

Answer 13

    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:	
	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	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

Question 14

Nakata Ltd a Vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of Rs.5,71,400 is incurred and sold through dealers at a uniform selling price of Rs.8,57,100 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle. Apart from other materials four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October.

There are 9,500 nos. of completed vehicles are in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.
You are required to

(i) PREPARE Production budget (in nos.) for the month of October, November, December and January.

(ii) PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.

(iii) CALCULATE the budgeted gross profit for the quarter October to December. (MTP 10 Marks April '19, MTP 10 Marks Oct'22 & Oct '23, RTP May '20)

Answer 14

(i) **Preparation of Production Budget (in units)**

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000
Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

(ii) **Preparation of Purchase budget for Part-X**

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)
	52,300	56,200	72,400
No. of units required for production	2,09,200 (52300 × 4 units)	2,24,800 (56200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14800 × 4 units)	(76,800) (19200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(ii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000
Net Selling Price per unit*	7,28,535	7,28,535	7,28,535	
Sales Revenue (Rs. in lakh)	2,91,414	2,54,987.25	3,27,840.75	8,74,242
Less: Cost of Sales (Rs. in lakh)	2,28,560	1,99,990.00	2,57,130.00	6,85,680

(Sales unit × Cost per unit)				
Gross Profit (Rs. in lakh)	62,854	54,997.25	70,710.75	1,88,562

* Net Selling price unit = Rs. 8,57,100 – 15% commission on Rs. 8,57,100

= Rs.7,28,535.

Question 15

A firm has a total capacity of producing 1,00,000 units of an item. The budgeted expenses at this level of activity are as under:

	Per unit (₹)
Direct Materials	**650**
Direct Wages	**325**
Direct Expenses	**125**
Variable overheads	**50**
Fixed Production Overheads	**25**
Selling and Distribution Overheads (20% fixed)	**25**
Administrative Expenses (100% fixed)	**60**
Total	**1,260**

The selling price is ₹ 1,750 per unit and is anticipated to remain constant.

You are required to PREPARE a flexible budget, on the basis of marginal costing, for 60,000 and 75,000 units of output level showing the profit and P/V Ratio. **(MTP 10 Marks Sep'22)**

Answer 15

Workings -

1. **Fixed Production overheads (given) = ₹ 25 per unit**

   So, at 1,00,000 units capacity, it will be ₹ 25,00,000 (1,00,000 units x ₹ 25)

2. **Selling and distribution overheads:**

Given (1,00,000 units x ₹ 25)	= ₹ 25,00,000
So, Fixed component	= ₹ 25,00,000 x 20% = ₹ 5,00,000
Hence, variable component	= ₹ 25,00,000 - ₹ 5,00,000 = ₹ 20,00,000
Variable per unit	= ₹ 20,00,000/1,00,000 units
	= ₹ 20 per unit

Flexible Budget

Particulars	Per unit (₹)	Output Level	
		60,000 units (₹)	75,000 units (₹)
Sales (A)	1,750	10,50,00,000	13,12,50,000
Variable costs:			
Direct Material	650	3,90,00,000	4,87,50,000
Direct Wages	325	1,95,00,000	2,43,75,000
Direct expenses	125	75,00,000	93,75,000
Variable overheads	50	30,00,000	37,50,000
Selling and distribution overheads	20	12,00,000	15,00,000
Total Variable cost (B)	1,170	7,02,00,000	8,77,50,000
Contribution (C = A - B)		3,48,00,000	4,35,00,000
Fixed costs:			
Production overheads		25,00,000	25,00,000
Administrative overheads		60,00,000	60,00,000

Selling and distribution overheads		5,00,000	5,00,000
Total Fixed cost (D)		90,00,000	90,00,000
Profit (C-D)		2,58,00,000	3,45,00,000

P/V Ratio = (₹ 3,48,00,000/₹ 10,50,00,000) x 100 = 33.143%

OR

P/V Ratio = (₹ 4,35,00,000/₹ 13,12,50,000) x 100 = 33.143%

Question 16

STATE the advantages of Zero-based budgeting. (MTP 5 Marks March '23) (RTP Nov '20 & May '18)

Answer 16

The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the evaluation of different activities and ranks them in order of preference for the allocation of scarce resources.

- It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.

- It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.

- The areas of wasteful expenditure can be easily identified and eliminated.

- Departmental budgets are closely linked with corporation objectives.

- The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Question 17

KLM Limited has prepared its expense budget for 50,000 units in its factory for the year 2019-20 as detailed below:

	(₹ per unit)
Direct Materials	125
Direct Labour	50
Variable Overhead	40
Direct Expenses	15
Selling Expenses (20% fixed)	25
Factory Expenses (100% fixed)	15
Administration expenses (100% fixed)	8
Distribution expenses (85% variable)	20
Total	298

PREPARE an expense budget for the production of 35,000 units and 70,000 units. (RTP Nov'19)

Answer 17

Expense Budget of KLM Ltd.

Particulars	50,000 Units(₹)	35,000 Units(₹)	70,000 Units (₹)
Direct Material	62,50,000	43,75,000	87,50,000
	(50,000 x 125)	(35,000 x 125)	(70,000 x 125)
Direct Labour	25,00,000	17,50,000	35,00,000
	(50,000x50)	(35,000x50)	(70,000x50)
Variable Overhead	20,00,000 (50,000x40)	14,00,000 (35,000x40)	28,00,000 (70,000x 40)

Direct Expenses	7,50,000 (50,000x15)	5,25,000 (35,000x15)	10,50,000 (70,000x15)
Selling Expenses (Variable)*	10,00,000 (50,000 x20)	7,00,000 (35,000x20)	14,00,000 (70,000x20)
Selling Expenses (Fixed)*(5 x 50,000)	2,50,000	2,50,000	2,50,000
Factory Expenses (Fixed)(15 x 50,000)	7,50,000	7,50,000	7,50,000
Administration Expenses (Fixed)(8 x 50,000)	4,00,000	4,00,000	4,00,000
Distribution Expenses (Variable)**	8,50,000 (17x50,000)	5,95,000 (17x35,000)	11,90,000 (17x70,000)
Distribution Expenses (Fixed)**(3x 50,000)	1,50,000	1,50,000	1,50,000
	1,49,00,000	1,08,95,000	2,02,40,000

*Selling Expenses: Fixed cost per unit = ₹ 25 x 20% = ₹ 5

Fixed Cost = ₹ 5 x 50,000 units = ₹ 2,50,000

Variable Cost Per unit = ₹ 25 – ₹ 5 = ₹ 20

**Distribution Expenses: Fixed cost per unit = ₹ 20 x 15% = ₹ 3

Fixed Cost = ₹3 x 50,000 units = ₹1,50,000

Variable cost per unit = ₹ 20 – ₹ 3 = ₹ 17

Question 18

Gaurav Ltd. is drawing a production plan for its two products Minimax (MM) and Heavy high (HH) for the year 20X8-X9. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	Heavy high (HH)
Budgeted Production units	1,80,000	1,20,000
	(₹)	(₹)
Direct material cost per unit	220	280
Direct labour cost per unit	130	120
Manufacturing overhead	4,00,000	5,00,000

The estimated units to be sol	d in the first four month		of the year 20X8-X9 are as under	
			June	July
	April	**May**		
Minimax	8,000	10,000	12,000	16,000
Heavy high	6,000	8,000	9,000	14,000

PREPARE production budget for the first quarter in month wise. (RTP Nov.'18, Old & New SM)

Answer 18

Production budget of Product Minimax and Heavy high (in units)

	April		May		June		Total	
	MM	**HH**	**MM**	**HH**	**MM**	**HH**	**MM**	**HH**
Sales	8,000	6,000	10,000	8,000	12,000	9,000	30,000	23,000
Add: Closing Stock								
(25% of next month's sale	2,500	2,000	3,000	2,250	4,000	3,500	9,500	7,750
Less: Opening Stock	2,000*	1,500*	2,500	2,000	3,000	2,250	7,500	5,750
Production units	8,500	6,500	10,500	8,250	13,000	10,250	32,000	25,000

*Opening stock of April is the closing stock of March, which is as per company's policy 25% of next month's sale.

Production Cost Budget

Element of cost	Rate (₹)		Amount (₹)	
	MM	HH	MM	HH
	(32,000 units)	(25,000 units)		
Direct Material	220	280	70,40,000	70,00,000
Direct Labour	130	120	41,60,000	30,00,000
Manufacturing Overhead				
(4,00,000/ 1,80,000 × 32,000)			71,111	
(5,00,000/ 1,20,000 × 25,000)				1,04,167
			1,12,71,111	**1,01,04,167**

Question 19

G Ltd. manufactures two products called 'M' and 'N'. Both products use a common raw material Z. The raw material Z is purchased @ ₹ 36 per kg from the market. The company has decided to review inventory management policies for the forthcoming year.

The following information has been extracted from departmental estimates for the year ended 31st March 2018 (the budget period):

	Product M	Product N
Sales (units)	28,000	13,000
Finished goods stock increase by year-end	320	160
Post-production rejection rate (%)	4	6
Material Z usage (per completed unit, net of wastage)	5 kg	6 kg
Material Z wastage (%)	10	5

Additional information:

- Usage of raw material Z is expected to be at a constant rate over the period.
- Annual cost of holding one unit of raw material in stock is 11% of the material cost.
- The cost of placing an orders is ₹ 320 per order.
- The management of G Ltd. has decided that there should not be more than 40 orders in a year for the raw material Z.

Required:

(i) PREPARE functional budgets for the year ended 31st March 2018 under the following headings:

(a) Production budget for Products M and N (in units).

(b) Purchases budget for Material Z (in kgs and value).

(ii) CALCULATE the Economic Order Quantity for Material Z (in kgs).

(iii) If there is a sole supplier for the raw material Z in the market and the supplier do not sale more than 4,000 kg. of material Z at a time. Keeping the management purchase policy and production quantity mix into consideration, CALCULATE the maximum number of units of Product M and N that could be produced. (RTP May'18) (MTP 10 Marks Sep '23)

Answer 19

(i) (a) Production Budget (in units) for the year ended 31st March 2016

	Product M	Product N
Budgeted sales (units)	28,000	13,000
Add: Increase in closing stock	320	160
No. good units to be produced	28,320	13,160
Post production rejection rate	4%	6%
No. of units to be produced	29,500	14,000
	28,320/0.96	13,160/0.94

(a) Purchase budget (in kgs and value) for Material Z

	Product M	Product N
No. of units to be produced	29,500	14,000

Usage of Material Z per unit of production	5 kg.	6 kg.
Material needed for production	1,47,500 kg.	84,000 kg
Materials to be purchased	1,63,889 kg.	88,421 kg
$\left(\frac{1,47,500}{0.90}\right)$ $\left(\frac{84,000}{0.95}\right)$		
Total quantity to be purchased	2,52,310 kg.	
Rate per kg. of Material Z	₹36	
Total purchase price	₹90,83,160	

(ii) Calculation of Economic Order Quantity for Material Z

$$EOQ = \sqrt{\frac{2 \times 2,52,310\,kg. \times Rs.320}{Rs.36 \times 11\%}} = \sqrt{\frac{16,74,78,000}{Rs.3.96}} = 6,385.72\ kg.$$

(iii) Since, the maximum number of order per year cannot be more than 40 orders and the maximum quantity per order that can be purchased is 4,000 kg. Hence, the total quantity of Material Z that can be available for production:

= 4,000 kg. × 40 orders = 1,60,000 kg.

	Product M	Product N
Material needed for production to maintain the same production mix	1,03,929 kg. (1,60,000 × 1,63,889 /2,52,310)	56,071 kg. (1,60,000 × 88,421/ 2,52,310)
Less: Process wastage	10,393 kg.	2,804 kg.
Net Material available for production	93,536 kg.	53,267 kg.
Units to be produced	18,707 units (93,536 kg. / 5 kg.)	8,878 units (53,267 kg. / 6 kg.)

Question 20

The accountant of manufacturing company provides you the following details for year 2019- 20:

Particulars	(₹)
Direct materials	28,00,000
Direct Wages	16,00,000
Fixed factory overheads	16,00,000
Variable factory overheads	16,00,000
Other variable costs	12,80,000
Other fixed costs	12,80,000
Profit	18,40,000
Sales	1,20,00,000

During the year, the company manufactured two products A and B and the output and costs were:

Particulars	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹ 32.00	₹ 56.00
Direct materials per unit	₹ 8.00	₹ 12.00
Direct wages per unit	₹ 4.00	₹ 8.00

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹ 4.00 per unit; and B ₹ 4.80 per unit.

During 2020-21, it is expected that the demand for product A will fall by 25% and for B by 50%. It is decided to manufacture a new product C, the cost for which is estimated as follows:

Particulars	Product C
Output (units)	2,00,000
Selling price per unit	₹ 28.00
Direct materials per unit	₹ 6.40
Direct wages per unit	₹ 4.00

It is anticipated that the other variable costs per unit of Product C will be same as for product A. PREPARE a budget to present to the management, showing the current position and the position for 2020-21. COMMENT on the comparative results. (RTP Nov '21, Old & New SM)

Answer 20

Budget Showing Current Position and Position for 2020-21

	Position for 2019-20			Position for 2020-21			
	A	B	Total (A+B)	A	B	C	Total (A+B+C)
Sales (units)	2,00,000	1,00,000	–	1,50,000	50,000	2,00,000	–
	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)	(₹)
(A) Sales	**64,00,000**	**56,00,000**	**1,20,00,000**	**48,00,000**	**28,00,000**	**56,00,000**	**1,32,00,000**
Direct Material	16,00,000	12,00,000	28,00,000	12,00,000	6,00,000	12,80,000	30,80,000
Direct wages	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Factory overhead (variable)	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
Other variable costs	800,000	4,80,000	12,80,000	6,00,000	240,000	8,00,000	16,40,000
(B) Marginal Cost	40,00,000	32,80,000	72,80,000	30,00,000	16,40,000	36,80,000	83,20,000
(C) Contribution (A- B)	**24,00,000**	**23,20,000**	**47,20,000**	**18,00,000**	**11,60,000**	**19,20,000**	**48,80,000**
Fixed costs – Factory			16,00,000				16,00,000
– Others			12,80,000				12,80,000
(D) Total fixed cost			28,80,000				28,80,000
Profit (C – D)			**18,40,000**				**20,00,000**

Comments: Introduction of Product C is likely to increase profit by ₹ 1,60,000 (i.e. from ₹ 18,40,000 to ₹ 20,00,000) in 2020-21 as compared to 2019-20 even if the demand for Product A & B falls. Therefore, introduction of product C is recommended.

Question 21

Maharatna Ltd., a public sector undertaking (PSU), produces product A. The company is in process of preparing its revenue budget for the year 2022. The company has the following information which can be useful in preparing the budget:

(i) It has anticipated 12% growth in sales volume from the year 2021 of 4,20,000 tonnes.

(ii) The sales price of ₹23,000 per tonne will be increased by 10% provided Wholesale Price Index (WPI) increases by 5%.

(iii) To produce one tonne of product A, 2.3 tonnes of raw material are required. The raw material cost is ₹4,500 per tonne. The price of raw material will also increase by 10% if WPI increase by 5%.

(iv) The projected increase in WPI for 2022 is 4%

(v) A total of 6,000 employees works for the company. The company works 26 days in a month.

(vi) 85% of employees of the company are permanent and getting salary as per 5- year wage agreement. The earnings per manshift (means an employee cost for a shift of 8 hours) is ₹ 3,000 (excluding terminal benefits). The new wage agreement will be implemented from 1st July 2022 and it is expected that a 15% increase in pay will be given.

(vii) The casual employees are getting a daily wage of ₹ 850. The wages in linked to Consumer Price Index (CPI). The present CPI is 165.17 points and it is expected to be 173.59 points in year 2022.

(viii) Power cost for the year 2021 is ₹ 42,00,000 for 7,00,000 units (1 unit = 1 Kwh). 60% of power is used for production purpose (directly related to production volume) and remaining are for employee quarters and administrative offices.

(ix) During the year 2021, the company has paid ₹ 60,00,000 for safety and maintenance works. The amount will increase in proportion to the volume of production.

(x) During the year 2021, the company has paid ₹ 1,20,000 for the purchase of diesel to be used in car hired for administrative purposes. The cost of diesel will increase by 15% in year 2022.

(xi) During the year 2021, the company has paid ₹ 6,00,000 for car hire charges (excluding fuel cost). In year 2022, the company has decided to reimburse the diesel cost to the car rental company. Doing this will attract 5% GST on Reverse Charge Mechanism (RCM) basis on which the company will not get GST input credit.

(xii) Depreciation on fixed assets for the year 2021 is ₹ 80,40,00,000 and it will be 15% lower in 2022.

Required: From the above information PREPARE Revenue (Flexible) budget for the year 2022 and also show the budgeted profit/ loss for the year. (RTP May '22)

Answer 21

Revenue Budget (Flexible Budget) of Maharatna Ltd. for the Year 2022

	Particulars	PY 2021	CY 2022
A	Sales Volume (Tonnes)	4,20,000	4,70,400 [112%×4,20,000]
B	Selling Price per tonne (₹)	23,000	23,000
		(₹ in lakh)	(₹ in lakh)
C	Sales value [A×B]	96,600	1,08,192
D	**Raw material Cost:**		
(i)	Qty. of Material [2.3 tonnes × A] (tonnes)	9,66,000	10,81,920
(ii)	Price per tonne (₹)	4,500	4,500
(iii)	**Total raw material cost (₹ in lakh) [(i)×(ii)]**	**43,470**	**48,686.40**
E	**Wages & Salary Cost:**		
(i)	Wages to casual employees (15% × 6,000 = 900 employees)	2,386.80 [900 × 26 × 12 × ₹ 850]	2,508.47 [900 × 26 × 12 × ₹ 893.33]
(ii)	Salary to permanent employees (85% × 6,000 = 5,100 employees)	47,736 [5100 × 26 × 12 × ₹ 3,000]	51,316.20 [(5100 × 26 × 6 × ₹ 3,000) + (5100 × 26 × 6 × ₹ 3,450)]
(iii)	**Total wages & salary [(i)+(ii)]**	**50,122.80**	**53,824.67**
F	**Power cost:**		
(i)	For production (units)	4,20,000 [60% × 7,00,000]	4,70,400 [112% × 4,20,000]
(ii)	For employees & offices (units) [40% × 7,00.000]	2,80,000	2,80,000
(iii)	Total Power consumption (units) [(i)+(ii)]	7,00,000	7,50,400
(iv)	Power rate per unit (₹) [₹42,00,000 ÷ 7,00,000]	6.00	6.00
(v)	Total power cost [(iii)×(iv)]	**42**	**45.024**

G	Safety and maintenance Cost	60	67.20 [112% × 60,00,000]
H	Diesel cost	1.2	-
I	Car Hire charge:		
(i)	Car hire charge	6	6
(ii)	Fuel reimbursement cost	-	1.38 [115% × 1.2]
(iii)	GST@5% on RCM basis [5%×(i+ii)]	-	0.369
(iv)	Total Car hire charge cost [(i)+(ii)+(iii)]	6	7.749
J	Depreciation	8,040	6,834 [85% × 8040]
K	Total Cost [Sum of D to J]	1,01,742	1,09,465.043
L	Profit/ (Loss) [C-L]	(5,142)	(1273.043)

Question 22

Following information is available for DK and Co.:

Standard working hours 9 hours per day of 5 days per week

Maximum capacity	50 employees
Actual working	40 employees

Actual hours expected to be worked per four week 7,200 hours

Std. hours expected to be earned per four weeks 9,000 hours

Actual hours worked in the four- week period 6,750 hours

Standard hours earned in the four- week period 7,875 hours.

The related period is of 4 weeks. In this period there was a one special day holiday due to national event.

You are required to CALCULATE the following ratios:
  (i) Efficiency Ratio
  (ii) Activity Ratio
  (iii) Calendar Ratio
  (iv) Standard Capacity Usage Ratio
  (v) Actual Capacity Usage Ratio
  (vi) Actual Usage of Budgeted Capacity Ratio (RTP Nov'22, Old & New SM)

Answer 22

Maximum Capacity in a budget period

= 50 Employees × 9 Hrs. × 5 Days × 4 Weeks = 9,000 Hrs.

Budgeted Hours

= 40 Employees × 9 Hrs. × 5 Days × 4 Weeks = 7,200 Hrs.

Actual Hrs.

= 6,750 Hrs

Standard Hrs. for Actual Output

= 7,875 Hrs.

Budget No. of Days

= 20 Days (4 Weeks x 5 Days) Actual No. of Days

= 20 − 1 = 19 Days

i. Efficiency Ratio = $\frac{\text{Standard Hrs}}{\text{Standard Hrs}} \times 100 = \frac{7,875 \text{ hours}}{6,750 \text{ hours}} \times 100$ = 116.67%

ii. Activity Ratio = $\frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 = \frac{7,875 \text{ hours}}{7,200 \text{ hours}} \times 100$ = 109.375%

iii. Calendar Ratio = $\frac{\text{Available working days}}{\text{Budgeted working days}} \times 100 = \frac{19 \text{ days}}{20 \text{ days}} \times 100$ = 95%

iv. Standard Capacity Usage Ratio

$$= \frac{\text{Budgeted Hours}}{\text{Max.possible hours in the budgeted period}} \times 100 = \frac{7,200 \text{ hours}}{9,000 \text{ hours}} 100 = 75\%$$

v. Actual Capacity Usage Ratio $= \frac{\text{Actual Hours worked}}{\text{Budgeted hours}} \times 100 = \frac{6,750 \text{ hours}}{7,200 \text{ hours}} 100 = 93\%$

Question 23

EDF Ltd. produces two products using Skilled labour and two types of materials. Shown below the information for the next month's budget:

	Product- A	Product-B
Budgeted sales (in units)	4,080	6,120
Budgeted material consumption per unit (in kg): Material-X	8.5	5.1
Material-Y	6.8	10.2
Standard labour hours allowed per unit of product	5.1	8.5

Material-X and Material-Y cost `8 and `10 per kg and labours are paid `30 per hour. Overtime premium is 75% and is payable, if a worker works for more than 45 hours a week. There are 400 direct workers.

The target efficiency ratio for the productive hours worked by the direct workers in actually manufacturing the products is 85%. In addition the non-productive down-time is budgeted at 15% of the productive hours worked.

There are four 6-days weeks in the budgeted period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be:

Product-A	550 units
Product-B	350 units
Material-X	1,200 kgs.
Material-Y	600 kgs.

The anticipated closing stocks for budget period are as below:

Product-A	5 days sales
Product-B	5 days sales
Material-X	10 days consumption
Material-Y	3 days consumption

Required:

CALCULATE the Material Purchase Budget and the Wages Budget for the direct workers, showing the quantities and values, for the next month. (RTP May 23, Old & New SM) (Same concepts different figures MTP 10 Marks Oct'18)

Answer 23

Number of days in budget period = 4 weeks × 6 days = 24 days Number of units to be produced

	Product-A (units)	Product-B (units)
Budgeted Sales	4,080	6,120
Add: Closing stock	850	1275
	$\left(\frac{4,080 \text{ units}}{24 \text{ days}} X \text{ 5 } Days\right)$	$\left(\frac{6,120 \text{ units}}{24 \text{ days}} X \text{ 5 } Days\right)$
Less.: Opening Stock	550	350

	4,380	7,045
(i) Material Purchase Budget		
	Material-X (Kg.)	Material-Y (Kg.)
Material required:		
Product-A	37,230 (4,380 units × 8.5 kg.)	29,784 (4,380 units × 6.8 kg.)
Product-B	35,930 (7,045 units × 5.1 kg.)	71,859 (7,045 units × 10.2 kg.)
	73,160	1,01,643
Add: Closing stock	30,483	21,176
	$\left(\dfrac{73,160\ kgs.}{24\ days} X\ 10\ days\right)$	$\left(\dfrac{1,01,643\ kgs.}{24\ days} X\ 5\ Days\right)$
Less: Opening stock	1,200	600
Quantity to be purchased	1,02,443	1,22,219
Rate per kg. of Material	8	10
Total Cost	8,19,541	12,22,186
(ii) Wages Budget		
	Product-A (Hours)	Product-B (Hours)
Units to be produced	4,380	7,045
Standard hours allowed per unit	5.1	8.5
Total Standard Hours allowed	22,338	59,883
Productive hours required for production	$\dfrac{22,338\ hours}{85\%}$ X 26,280	$\dfrac{59,883\ hours}{85\%}$ X 70,450
Add: Non-Productive down time hours	3942 (15% of 26,280 hours)	10568 (15% of 70,450 hours)
Hours to be paid	30,222	81,018
Total Hours to be paid =	1,11,240	
Hours to be paid at normal rate (4 weeks × 45 hours × 400 workers) =	72000	
Hours to be paid at premium rate	39,240	
Total wages to be paid = (72,000 hours × `30 + 39,240 hours × `52.5)	= ` 21,60,000 + ` 20,60,100 = ` 42,20,100	

Question 24

XY Co. Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2022-23:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	400 units at `9	600 units at `9	500 units at `9	700 units at `9

| Y | 300 units at `21 | 500 units at `21 | 200 units at `21 | 400 units at `21 |

Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ` 1, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ` 1 it will have more demand in the market. The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers:

Percentage increase in sales over budgeted sales

Product	East Division	West Division
X	+ 10%	+ 5%
Y	+ 20%	+ 10%

With the help of intensive advertisement campaign, following additional sales (over and above the above-mentioned estimated sales by Divisional Mangers) are possible:

Product	East Division	West Division
X	60 units	70 units
Y	40 units	50 units

You are required to prepare Sales Budget for 2023-24 after incorporating above estimates and also show the Budgeted Sales and Actual Sales of 2022-23. (RTP Nov '23)

Answer 24

Statement Showing Sales Budget for 2023-24

Division	Product X			Product Y			Total
	Qty.	Rate (`)	Amt. (`)	Qty.	Rate (`)	Amt. (`)	Amt. (`)
East	500[1]	10	5,000	400[3]	20	8,000	13,000
West	700[2]	10	7,000	600[4]	20	12,000	19,000
Total	1,200		12,000	1,000		20,000	32,000

Workings

1. 400 × 110% + 60 = 500 units

2. 600 × 105% + 70 = 700 units

3. 300 × 120% + 40 = 400 units

4. 500 × 110% + 50 = 600 units

Statement Showing Sales Budget for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (`)	Amt. (`)	Qty.	Rate (`)	Amt. (`)	Amt. (`)
East	400	9	3,600	300	21	6,300	9,900
West	600	9	5,400	500	21	10,500	15,900
Total	1,000		9,000	800		16,800	25,800

Statement Showing Actual Sales for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (`)	Amt. (`)	Qty.	Rate (`)	Amt. (`)	Amt. (`)
East	500	9	4,500	200	21	4,200	8,700
West	700	9	6,300	400	21	8,400	14,700
Total	1,200		10,800	600		12,600	23,400

Question 25

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. (PYP 5 Marks Nov '20)

Answer 25

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
Variable Cost (@ ₹ 35 (₹ 30 + ₹ 5) per unit)	2,10,000	2,80,000	3,50,000
Contribution (A)	3,90,000	5,20,000	6,50,000
Fixed Cost (part of semi-variable cost)	60,000	60,000	60,000
Other Fixed Cost	1,00,000	1,25,000	1,25,000
Total Fixed Cost (B)	1,60,000	1,85,000	1,85,000
Operating Profit (A – B)	2,30,000	3,35,000	4,65,000

Question 26

What are the important points an organization should consider if it wants to adopt Performance Budgeting?". (PYP 5 Marks Nov 20)

Answer 26

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

Question 27

State the limitations of Budgetary Control System. (PYP 5 Marks Jan '21)

Answer 27

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.

Question 28

PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished Goods (in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional Information:

- **Closing stock of finished goods at the end of March, 2021 is 10,000 units.**
- **Each unit of finished output requires 2 kg of Raw Material 'A' and 3 kg of Raw Material 'B'.**

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

(i) Sales Budget (in ₹)

(ii) Production budget (in units) and

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

Answer 28

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 × b)	**51,000**	**82,000**	**74,000**	**46,000**	**88,000**	3,41,000

For Raw material 'B'

Particulars	Nov, 20	Dec, 20	Jan, 21	Feb, 21	Mar, 21	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	3	3	3	3	3	-
Total raw material consumption (Kg.): (a × b)	**76,500**	**1,23,000**	**1,11,000**	**69,000**	**1,32,000**	5,11,500

Question 29

What are the cases when a flexible budget is found suitable? (PYP 5 Marks May '19)

Answer 29

Flexible budgeting may be resorted to under following situations:

(i) In the case of new business venture due to its typical nature it may be difficult to forecast the demand of a product accurately.

(ii) Where the business is dependent upon the mercy of nature e.g., a person dealing in wool trade may have enough market if temperature goes below the freezing point.

(iii) In the case of labour-intensive industry where the production of the concern is dependent upon the availability of labour.

Suitability for flexible budget:

1. Seasonal fluctuations in sales and/or production, for example in soft drinks industry;

2. a company which keeps on introducing new products or makes changes in the design of its products frequently;

3. industries engaged in make-to-order business like ship building;

4. an industry which is influenced by changes in fashion; and

5. General changes in sales.

> **EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:**
>
> In this theoretical question on suitability of 'Flexible Budget', most of the examinees didn't understand area and conditions where the flexible budget is applicable. Poor performance of the examinees was observed.

Question 30

Why is 'Zero Base Budgeting' (ZBB) considered superior to 'Traditional Budgeting'? Explain. (PYP 5 Marks May '18)

Answer 30

Zero based budgeting is superior to traditional budgeting: Zero based budgeting is superior to traditional budgeting in the following manner:

*   It provides a systematic approach for evaluation of different activities.
*   It ensures that the function undertaken are critical for the achievement of the objectives.
*   It provides an opportunity for management to allocate resources to various activities after a thorough – cost benefit analysis.
*   It helps in the identification of wasteful expenditure and then their elimination. If facilitates the close linkage of departmental budgets with corporate objectives.
*   It helps in the introduction of a system of Management by Objectives

Question 31

An electronic gadget manufacturer has prepared sales budget for the next few months. In this respect, following figures are available:

Months	Electronic gadgets' sales
January	5000 units
February	6000 units
March	7000 units
April	7500 units
May	8000 units

To manufacture an electronic gadget, a standard cost of ₹ 1,500 is incurred and it is sold through dealers at an uniform price of ₹ 2,000 per gadget to customers. Dealers are given a discount of 15% on selling price.

Apart from other materials, two units of batteries are required to manufacture a gadget. The company wants to hold stock of batteries at the end of each month to cover 30% of next month's production and to hold stock of manufactured gadgets to cover 25% of the next month's sale.

3250 units of batteries and 1200 units of manufactured gadgets were in   stock on 1st January.

Required:

(i)   **Prepare production budget (in units) for the month of January, February, March and April.**

(ii) **Prepare purchase budget for batteries (in units) for the month of January, February and March and calculate profit for the quarter ending on March. (PYP 10 Marks Nov '18)**

Answer 31

(i) **Preparation of Production Budget (in Units)**

	January	February	March	April	May
Sales	5,000	6,000	7,000	7,500	8,000
Add: Closing stock (25% of next month's sales)	1,500	1,750	1,875	2,000	
Less: Opening Stock	(1200)	(1500)	(1750)	(1875)	
Production of electronic Gadgets	5,300	6,250	7,125	7,625	

(ii) Preparation of Purchase budget

	January	February	March	April
Consumption/production of Batteries (@ 2 per Gadget)	10,600	12,500	14,250	15,250
Add: Closing Stock (30% of next month's production)	3750	4275	4575	
Less: Opening Stock	3,250	3,750	4275	
Purchase of Batteries	**11,100**	**13,025**	**14,550**	

Statement Showing Profit

	Jan.	Feb.	March	Total
Sales (A)	5,000	6,000	7,000	18,000
Selling Price per unit*	₹. 2,000	₹. 2,000	₹. 2,000	₹. 2,000
Less: Discount @15% of selling price	300	300	300	300
Less: Standard cost of Manufacturing per gadget Cost	1500	1500	1500	1500
Profit (B) (selling Price- discount- cost)	200	200	200	200
Total Profit (A × B)	₹.10,00,000	₹.12,00,000	₹.14,00,000	₹.36,00,000

EXAMINERS' COMMENTS ON THE PERFORMANCE OF EXAMINEES:

This was a simple numerical problem on preparation of production budget, purchase budget and for calculation of profit for the quarter ending on 31 st March. Majority of examinees have calculated production units correctly but failed to calculate purchase units and profit for the quarter ending. Performance in the sub part was below average.

Question 32

The Accountant of KPMR Ltd. has prepared the following budget for the coming year 2022 for its two products 'AYE' and 'ZYE':

Particulars	Product 'AYE'	Product 'ZYE'
Production and Sales (in Units)	**4,000**	**3,000**
	Amount (in ₹)	**Amount (in ₹)**
Selling Price per unit	**200**	**180**
Direct Material per unit	**80**	**70**
Direct Labour per unit	**40**	**35**
Variable Overhead per unit	**20**	**25**
Fixed Overhead per unit	**10**	**10**

After reviewing the above budget, the management has called the marketing team for suggesting some measures for increasing the sales. The marketing team has suggested that by promoting the products on social media, the sales quantity of both the products can be increased by 5%. Also, the selling price per unit will go up by 10%. But this will result in increase in expenditure on variable

overhead and fixed overhead by 20% and 5% respectively for both the products.

You are required to prepare flexible budget for both the products:

(i)   Before promotion on social media,

(ii)   After promotion on social media. (PYP 5 Marks Dec '21)

Answer 32

(i)   Flexible Budget (before promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,000	3,000	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	8,00,000	5,40,000	13,40,000
		(₹ 200×4,000)	(₹ 180×3,000)	
B.	Direct Materials	3,20,000	2,10,000	5,30,000
		(₹ 80 × 4,000)	(₹70 × 3,000)	
C.	Direct labour	1,60,000	1,05,000	2,65,000
		(₹ 40 × 4,000)	(₹ 35 × 3,000)	
D.	Variable Overheads	80,000	75,000	1,55,000
		(₹ 20 × 4,000)	(₹ 25 × 3,000)	
E.	Total Variable Cost (B+C+D)	5,60,000	3,90,000	9,50,000
F.	Contribution (A-E)	2,40,000	1,50,000	3,90,000
G.	Fixed Overhead	40,000	30,000	70,000
		(₹10 × 4,000)	(₹10 × 3,000)	
H.	Profit (F-G)	2,00,000	1,20,000	3,20,000
	Profit per unit	50	40	

(ii) Flexible Budget (after promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,200	3,150	
		(4,000×105%)	(3,000×105%)	
		Amount (₹)	Amount (₹)	Amount (₹)
A.	Sales Value	9,24,000	6,23,700	15,47,700
		(₹ 220 × 4,200)	(₹ 198 × 3,150)	
B.	Direct Materials	3,36,000	2,20,500	5,56,500
		(₹ 80 × 4,200)	(₹ 70 × 3,150)	
C.	Direct labour	1,68,000	1,10,250	2,78,250
		(₹ 40 × 4,200)	(₹ 35 × 3,150)	
D.	Variable Overheads	1,00,800	94,500	1,95,300
		(₹ 24 × 4,200)	(₹ 30 × 3,150)	
E.	Total Variable Cost (B+C+D)	6,04,800	4,25,250	10,30,050
F.	Contribution (A-E)	3,19,200	1,98,450	5,17,650
G.	Fixed Overhead	42,000	31,500	73,500
		(₹ 40,000 × 105%)	(₹ 30,000 × 105%)	
H.	Profit (F-G)	2,77,200	1,66,950	4,44,150
	Profit per unit	66	53	

Question 33

What is 'Budgetary Control System' and discuss the components of the same. (PYP 5 Marks Dec '21, Old & New SM)

Answer 33

Budgetary Control System: It is the system of management control and accounting in which all the operations are forecasted and planned in advance to the extent possible and the actual results compared with the forecasted and planned results.

Components of Budgetary Control System: The policy of a business for a defined period is represented by the master budget, the detailed components of which are given in a number of individual budgets called functional budgets. These functional budgets are broadly grouped under the following heads:

1. **Physical budgets:** Those budgets which contain information in quantitative terms such as the physical units of sales, production etc. This may include quantity of sales, quantity of production, inventories, and manpower budgets are physical budgets.

2. **Cost budgets:** Budgets which provides cost information in respect of manufacturing, administration, selling and distribution, etc. for example, manufacturing costs, selling costs, administration cost, and research and development cost budgets are cost budgets.

3. **Profit budgets:** A budget which enables the ascertainment of profit. For example, sales budget, profit and loss budget, etc.

4. **Financial budgets:** A budget which facilitates in ascertaining the financial position of a concern, for example, cash budgets, capital expenditure budget, budgeted balance sheet etc.

Question 34

SR Ltd. is a manufacturer of Garments. For the first three months of financial year 2022-23 commencing on 1st April 2022, production will be constrained by direct labour. It is estimated that only 12,000 hours of direct labour hours will be available in each month.

For market reasons, production of either of the two garments must be at least 25% of the production of the other. Estimated cost and revenue per garment are as follows:

	Shirt (₹)	Short (₹)
Sales price	60	44
Raw Materials		
Fabric @12 per metre	24	12
Dyes and cotton	6	4
Direct labour @ 8 per hour	8	4
Fixed Overhead @ 4 per hour	4	2
Profit	18	22

From the month of July 2022 direct labour will no longer be a constraint. The company expects to be able to sell 15,000 shirts and 20,000 shorts in July, 2022. There will be no opening stock at the beginning of July 2022. Sales volumes are expected to grow at 10% per month cumulatively thereafter throughout the year. Following additional information is available:

● **The company intends to carry stock of finished garments sufficient to meet 40% of the next**

month's sale from July 2022 onwards.

- **The estimated selling price will be same as above.**
  Required:

I. **Calculate the number of shirts and shorts to be produced per month in the first quarter of financial year 2022-2023 to maximize company's profit.**

II. **Prepare the following budgets on a monthly basis for July, August and September 2022:**

    (i) **Sales budget showing sales units and sales revenue for each product.**

    (ii) **Production budget (in units) for each product.**   **(PYP 10 Marks May'22)**

Answer 34

Calculation of number of shirts & shorts to be produced per month:
Contribution per labour hour:

		Shirts (₹)	Shorts (₹)
A	Sales Price per unit	60	44
B	Variable Cost:		
	- Raw materials	30	16
	- Direct labour	8	4
		38	20
C	Contribution per unit [A-B]	22	24
	Labour hour per unit	1 hour	0.5 hour
	Contribution per labour hour [C÷D]	22	48

Production plan for the first three months:

Since, Shorts has the higher Contribution per labour hour, it will be made first. Shirts will be 25% of Shorts. The quantity will be determined as below:

Let the Quantity of Shorts be X and Shirts will be 0.25 X, then

(Qty. of Shorts × labour hour per unit) + (Qty. of Shirts × labour hour per unit) = Total labour hours available

Or, (X × 0.5 hour) + (0.25X × 1 hour) = 12,000 hours

Or, 0.5X + 0.25X = 12,000 Or, 0.75X = 12,000

Or, X $\qquad$ = 12,000÷0.75

= 16,000 units of Shorts

Therefore, for Shirts = 25% of 16,000 units

= 4,000 units

Production per month for the first quarter will be:

Shorts- 16,000 units & Shirts- 4,000 units

II.   (i)   **Sales Budget for the month of July, August & September 2022:**

		July 2022		August 2022		September 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200
B	Selling price per unit (₹)	60	44	60	44	60	44
C	Sales Revenue (₹)	9,00,000	8,80,000	9,90,000	9,68,000	10,89,000	10,64,800

(ii) **Production budget for the month of July, August & September 2022:**

	July 2022		August 2022		September 2022		October 2022	
	Shirts	Shorts	Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
Opening stock	0	0	6,600	8,800	7,260	9,680		
Sales demand	15,000	20,000	16,500	22,000	18,150	24,200	19,965	26,620
Closing stock	6,600	8,800	7,260	9,680	7,986	10,648		
Production	21,600	28,800	17,160	22,880	18,876	25,168		

Chapter 15 Budget & Budgetary Control

	[B+C-A]									

Question 35

Define Budget Manual. What are the salient features of Budget Manual? (PYP 5 Marks Nov 22) (RTP May '21 & Nov '19, MTP 5 Marks Nov'21, Old & New SM)

Answer 35

Budget Manual: The budget manual is a booklet specifying the objectives of an organisation in relation to its strategy. The budget is made to decide how much an organisation would earn and spend and in what manner. In the budget, the organisation sets its priorities too.

Effective budgetary planning relies on the provision of adequate information to the individuals involved in the planning process. Many of these information needs are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process .

CIMA London defines budget manual as, 'A document which sets out the responsibilities of the persons engaged in, the routines of, and the forms and records required for, budgetary control'.

Contents of a budget manual: Typical budget manual may include the following:

(i)   A statement regarding the objectives of the organisation and how they can be achieved through budgetary control;

(ii)   A statement about the functions and responsibilities of each executive, both regarding preparation and execution of budgets;

(iii) Procedures to be followed for obtaining the necessary approval of budgets. The authority of granting approval should be stated in explicit terms. Whether, one two or more signatures are required on each document should be clearly stated;

(iv)   A form of organisation chart to show who are responsible for the preparation of each functional budget and the way in which the budgets are interrelated.

(v)   A timetable for the preparation of each budget.

(vi)   The manner of scrutiny and the personnel to carry it out;

(vii) Reports, statements, forms and other record to be maintained.

(viii) The accounts classification to be employed. It is necessary that the framework within which the costs, revenue and other financial accounts are classified must be identical both in the accounts and budget department.

(ix)   The reporting of the remedial action.

(x)   The manner in which budgets, after acceptance and issuance, are to be revised or amended, these are included in budgets and on which action can be taken only with the approval of top management

(xi)   This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.

(xii) Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.

(xiii) A list of the organization's account codes, with full explanations of how to use them.

(xiv) Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

(Any four points)

Question 36

PQR Limited manufactures three products - Product X, Product Y and Product Z. The output for the current year is 2,50,000 units of Product X, 2,80,000 units of Product Y and 3,20,000 units of Product Z respectively.

Selling price of Product X is 1.25 times of Product Z whereas Product Y can be sold at double the price at which product Z can be sold. Product Z can be sold at a profit of 20% on its marginal cost.

Other information are as follows:

	Product X	Product Y	Product Z
Direct Material Cost (Per unit)	`20	`20	`20
Direct Wages Cost (per unit)	`16	`24	`16

Raw material used for manufacturing all the three products is the same. Direct Wages are paid @ `4 per labour hour,

Total overhead cost of the company is `52,80,000 for the year, out of which `1 per labour hour is variable and the rest is fixed.

In the next year it is expected that sales of product X and product Z will increase by 12% and 15% respectively and sale of product Y will decline by 5%. The total overhead cost of the company for the next year is estimated at `55,08,000. The variable cost of `1 per labour hour remains unchanged.

It is anticipated that all other costs will remain same for the next year and there is opening and closing stock. Selling Price per unit of each product will remain unchanged in the next year.

Required:

Prepare a budget showing the current position and the position for the next year clearly indicating the total product-wise contribution and profit for the company as a whole. (PYP 10 Marks, May '23)

Answer 36

i) Budget showing current position of total product wise contribution and profitability

	Particulars	Product X (`)	Product Y (`)	Product Z (`)	Total (`)
A	Direct material cost (per unit)	20	20	20	
B	Direct wages cost (per unit)	16	24	16	
C	Variable overhead per unit (Refer WN-1)	4	6	4	
D	Total variable cost/ Marginal cost per unit [A+B+C]	40	50	40	
E	Add: Profit [20% of D]	-	-	8	
F	Selling price unit [D+E]	-	-	48	
G	Price weight	1.25	2	1	
H	Selling price per unit [Selling price of Product Z × G]	60	96	48	
I	Contribution per unit [H-D]	20	46	8	
J	Quantity to be sold	2,50,000	2,80,000	3,20,000	
K	Total Contribution [J×I]	50,00,000	1,28,80,000	25,60,000	2,04,40,000

L	Fixed Overheads [Refer WN-1]				13,20,000
M	Profit				1,91,20,000

Working Notes:

1. **Segregation of Overheads into variable and fixed in current year**

	Particulars	Product X (`)	Product Y (`)	Product Z (`)	Total (`)
A	Total overhead cost	-	-	-	52,80,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,50,000	2,80,000	3,20,000	
D	Total variable overhead cost [B×C]	10,00,000	16,80,000	12,80,000	39,60,000
E	Fixed overhead cost [A-D]				13,20,000

ii) Budget showing next year's position of total product wise contribution and profitability

	Particulars	Product X (`)	Product Y (`)	Product Z (`)	Total (`)
A	Selling price per unit	60	96	48	
B	Contribution per unit	20	46	8	
C	Quantity to be sold	2,80,000 [112% of 2,50,000]	2,66,000 [95% of 2,80,000]	3,68,000 [115% of 3,20,000]	
D	Total Contribution [B×C]	56,00,000	1,22,36,000	29,44,000	2,07,80,000
	Fixed Overheads [Refer WN-2]				13,20,000
	Profit				1,94,60,000

Working Notes:

2. **Segregation of Overheads into variable and fixed in next year**

	Particulars	Product X (`)	Product Y (`)	Product Z (`)	Total (`)
A	Total overhead cost	-	-	-	55,08,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,80,000	2,66,000	3,68,000	
D	Total variable overhead cost [B×C]	11,20,000	15,96,000	14,72,000	41,88,000
E	Fixed overhead cost [A-D]				13,20,000