



Time Allowed: 3 Hours

Full Marks: 100

The figures in the margin on the right side indicate full marks.

Where considered necessary, suitable assumptions may be made and clearly indicated in the answer.

Answer Question No. 1 and any five from Question No. 2, 3, 4, 5, 6, 7 and 8.

SECTION - A

(Compulsory)

1. (a)

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)	(xii)
a	d	b	c	c	b	b	c	d	d	a	d

(b)

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
False	True	False	False	True	True	True

(c)

(i)	(ii)	(iii)	(iv)	(v)	(vi)
Return on Equity	Master Budget	Flexible Budget	Critical success factor(CSFs)	Probabilities	Marginal costing

SECTION - B

(answer any five questions)

2. (a) Management accounting is an offshoot of financial accounting and has specific linkages with cost accounting. Financial literature suggests that the beginning of management accounting is linked with the requirement for accounting information to optimize economic resources during the Industrial Revolution. The International Accounting Federation (IFAC, 1998) has described the evolution of managerial accounting through four phases.

- First stage (prior to 1950s).
- Second stage (1950s – 1965)
- Third stage (1965 – 1985).
- Fourth stage (1985 – till date)



Explanation of four stages and faces are given below:

(1) The first stage (prior to 1950) Cost determination and financial control, which is also referred as the ‘classical era’ is the period where the focus was on cost determination and financial control. At this stage, the development of managerial accounting was oriented to determining costs and financial control of business processes. IFAC describes this period of Management accounting as ‘the technical activity needed to achieve organizational objectives’. Managerial accounting before the 1950s was mainly focused on determining the cost of the product.

The second stage (1950-1965) is referred as the age of information for management planning and control.

During this period the main focus of managerial accounting was to provide information on planning and control issues. This phase is characterized by the use of traditional accounting management techniques that support decision making and responsibility accounting. Management accounting techniques such as: Standard Costs and Profitability Analysis were introduced during this period. The second phase is described as ‘management activity, but in the role of staff’. During this period, the management was focused on the company’s production process and internal analysis and paid less attention to external business environment.

The third stage (1965 - 1985) is referred as reduction of waste of resource in business operation.

Management accounting focussed on reduction of waste of resources in production processes by eliminating ‘no-value activities’. During this period, Japan’s economic progress and rapid technological developments contributed to the growth of global competition. The priority for the companies was to adapt to the new business environment. Companies began to seek both cost reduction and quality improvement at the same time. The use of robotics and computer-controlled processes enabled companies to improve their quality and in many cases impact on cost reduction.

The Fourth Stage (1985-2000) is referred as Creation of value through effective resource:

During this period, technological innovations were at the forefront, competition was intensified, companies, as they were faced with major business uncertainties, and thus made them focus on value creation through effective use of resources, which could be achieved ‘with the use of technology that drives companies to create customer value, shareholder value, and organizational innovations’. The managerial accounting techniques that dominated this period are: Activity-based Cost (ABC); Production just in time (JIT); Target cost; balanced scorecard; Value chain analysis and strategic management accounting.



The various tools and techniques that developed during each particular phase /stage are given below:

Focus	Cost determination and financial control	Information for planning and control	Reduction of waste of resource in Business operation	Creation of Value through effective resource use
Stages →	1760 -1950	1950 -1965	1965 -1985	1985 - till date
Methods ↓				
Cost determination and accounting	Cost determination	Standard cost accounting - developments		
	Standard costing	Marginal costing		
	Direct Costing	Target costing		
	Records of cost accounting		Activity based costing	
	allocation of indirectcost		Activity based management	
	Uniform costing			
	Absorption costing			
Planning	Budgeting	Application of discounted cash flow		
		Transfer costing		
Controlling	Return on investments (ROI)	Responsibility accounting	Application of Kaizen	
	ton -mile ratio	Gentani system	Just in time system	
		Kaizen costing		
Strategic analysis			Life Cycle costing	Value chain analysis
				Five Forces Model
				PEST, SWOT analysis
				Customer profitability analysis
				Competitor analysis
				Balanced scorecard



- (b) i. 1. Activity rate = $[(3 \times ₹ 30,000) + ₹ 9,000] \div 15,000$
= ₹ 6.60 per invoice
2. Fixed activity rate = $₹ 90,000 \div 15,000$
= ₹ 6.00 per invoice
3. Variable activity rate = $₹ 9,000 \div 15,000$
= ₹ 0.60 per invoice

Activity availability = Activity usage + Unused activity

15,000 invoices = 12,500 invoices + 2,500 invoices

- Cost of resources supplied = Cost of activity used + Cost of unused activity
= ₹90,000 + (₹0.60 x 12,500)
= (₹6.60 x 12,500) + (₹6.00 x 2,500)
= ₹82,500 + ₹15,000
= ₹97,500

ii.

- Activity-based costing (ABC) is a costing method that identifies activities in an organization and assigns the cost of each activity to all products and services according to the actual consumption by each. Therefore, this model assigns more indirect costs (overhead) into direct costs compared to conventional costing.
 - a. ABC system is a very valuable tool of control. It offers a number of advantages to the management and the following are the main advantages:
 - (i) It brings accuracy and reliability of the costing data in determination of the cost of the products.
 - (ii) It facilitates cause and effect relationship to exercise effective cost control.
 - (iii) It provides necessary cost information to the management to take decisions on any matter, relating to the business.
 - (iv) It is much helpful in fixing the cost and selling price of a product.
 - (v) It facilitates overhead costs allocate directly to the specific product.
 - (vi) It enables to manage the activities rather than costs.
 - (vii) It helps to remove all types of wastages and inefficiencies.
 - (viii) It provides valuable information to evaluate on the relative efficiencies of various plants and machinery.
 - (ix) Cost Driver Rates will help in significant impact on the development of new products or modification of existing products.



- This will arise when the products manufactured by the manufacturing companies are not standardized and labour hours are predominating. Further a clear distinction between value added and non-value added activities are difficult to make

3. (a) Let contribution to sales ratio of product Cee is C

$$(i) \quad \therefore \text{Contribution/sales (\%)} = (0.33 \times 40\%) + (0.33 \times 50\%) + (0.33 \times C) = 48\%$$

$$0.33C = 0.48 - 0.132 - 0.65$$

$$C = \frac{0.183}{0.33} = 54\%$$

Cee = 54% (Balancing figure)

The total contribution/sales ratio for the revised sales mix is:

$$= (0.40 \times 40\%) + (0.25 \times 50\%) + (0.35 \times 54\%)$$

$$= 47.4\%$$

$$(ii) \quad \text{Weighted average contribution to Sales ratio} = \frac{(30\% \times 2) + (20\% \times 5) + (25\% \times 3)}{10} = 23.5\%$$

$$\text{Break even sales} = \frac{\text{Fixed costs (\₹ 1,00,000)}}{\text{Contribution to sales ratio (23.5\%)}} = \text{₹ 4,25,532}$$

(b) Units sold = Sales ÷ Selling Price per unit = ₹ 12,00,000 ÷ ₹ 40 = 30,000 units

Sales	40	12,00,000
Less: Variable Cost	30	9,00,000
Contribution	10	3,00,000
Less: Profit		1,00,000
Fixed Cost		2,00,000

Hence, total fixed cost in the new case = ₹ 200,000 + ₹ 300,000 = ₹ 500,000

Contribution in the New Case = New Fixed Cost + Profits = 5,00,000 + 1,00,000 = ₹ 6,00,000

Since as per agreement the sale value is restricted to the old value that is ₹ 12,00,000.

Hence P/V Ratio will be:

$$\text{₹ 6,00,000} \div \text{₹ 12,00,000} \times 100 = 50\%$$

The variable cost in the new case = ₹ 30 - ₹ 5 = ₹ 25

$$\text{Variable Cost Ratio} = 100 - \text{P/V Ratio} = (100 - 50)\% = 50\%$$

Computation of New Selling Price:

If VC is 50, then SP = ₹ 100

If VC is 1, then SP = ₹ 100 ÷ 50%

If VC is 25, then SP = 100 ÷ 50% × ₹ 25 = ₹ 50 per unit



4. (a) Statement showing contribution per unit and per labour hour

Particulars	P	Q	R	S
Selling Price per unit (₹)	350	345	280	230
Variable Cost per unit (₹)	330	310	180	185
Contribution per unit (₹)	20	35	100	45
Labour Hours per unit	3	4	2	3
Contribution per labour hour (₹)	6.67	8.75	50	15
Ranking	IV	III	I	II

(i) Statement Showing Production Plan

Total Hours	Products	Hours/unit	Allocation of Hours
24,000	P	3	-
	Q	4	13,000*
	R	2	5,600*
	S	3	5,400*
			24,000

* R = (2800x2) = 5600, S = (1800x3) = 5400,

Therefore, [24000 hours – (5600+5400)] = 13000 hours is allocated to product Q.

As maximum allocation is (3500 units x 4) = 14000 hours.

Statement showing Transfer Price per unit of Product S

Total Labour Hours require for S (2,000 units x 3 hours per unit)	6,000
Hours derived from Product Q (1,500 units x 4 hours per unit)	6,000
Variable manufacturing cost for Product 'S' (2,000x₹185) =	₹3,70,000
Contribution foregone/Opportunity Cost of Product Q (1,500 x ₹35)	₹52,500
	₹4,22,500

Hence Transfer Price per unit (₹4,22,500 ÷ 2,000 units) = ₹211.25

(ii) Statement Showing Production Plan

Total Hours	Products	Hours/unit	Allocation of Hours
32,000	P	3	7,000
	Q	4	14,000
	R	2	5,600
	S	3	5,400
			32,000

**Statement showing Transfer Price per unit of Product S**

Total Labour Hours require for S (2,000 units x 3 hours per unit)	6,000
Hours derived from Product P (2,000 units x 3 hours per unit)	6,000
Variable manufacturing cost for Product 'S' (2,000x₹185) =	₹3,70,000
Contribution foregone/Opportunity Cost of Product PQ (2,000 x ₹20)	₹40,000
	₹4,10,000

Hence Transfer Price per unit (₹ 4,10,000 ÷ 2,000 units) = ₹ 205.00

(b) Contribution required at Budgeted Residual Income

Fixed cost ₹80,00,000

Profit on ₹7,50,00,000x 12% = ₹ 90,00,000

Residual Income = ₹ 1,00,00,000

Total Contribution required = ₹ (80,00,000+90,00,000+1,00,00,000)

= ₹ 2,70,00,000

Contribution derived from existing units = 12,00,000 x ₹20=₹2,40,00,000

Contribution required on 3,00,000 units = ₹2,70,00,000 - ₹ 2,40,00,000 = ₹ 30,00,000

Contribution per unit = ₹30,00,000 / 3,00,000 units = ₹ 10

Increase in Variable Cost = ₹5

Transfer price = Variable Cost + Desired Residual Income + Increase in Variable Cost

= ₹160+₹10+₹5

=₹175

5. (a) (i) Taxable Income = ₹15 lac ÷ (1- 0.30)

= ₹ 21,42,857 or ₹ 21.43 lacs

• Operating Income = Taxable Income + Interest

= ₹21,42,857 +₹10,00,000

= ₹31,42,857 or ₹ 31.43 lacs

• EVA = EBIT (1-Tax Rate) – WACC × Invested Capital

= ₹ 31,42,857 (1 – 0.30) – 13% × ₹ 95,00,000

= ₹ 22,00,000 – ₹12,35,000

= ₹ 9,65,000

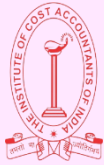
• EVA Dividend = ₹95,00,000 ÷ 6,00,000 = ₹ 1.6083

(ii)

• By definition (DuPont), $ROI = \frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating Assets}} = \text{Margin} \times$

Asset Turnover

⇒ 25% = 10% × Asset Turnover



Therefore, the turnover must be 2.5 times.

$$\text{Since, the Asset turnover} = \frac{\text{sales}}{\text{operating assets}}$$

$$2.5 \text{ times} = \frac{\text{₹ 1200000}}{\text{operating assets}}$$

Therefore, *Operating assets* = ₹ 4,80,000

- Residual Income (RI) = Operating income - Minimum required operating income

Given, *Margin* = 10%

$$\begin{aligned} \text{We know Margin (10\%)} &= \frac{\text{Operating Income}}{\text{Sales}} \\ &= \frac{\text{Operating income}}{\text{₹ 12,00,000}} \end{aligned}$$

$$= \text{₹ 12,00,000} \times 10\%$$

Therefore, the *operating income* = ₹ 1,20,000

$$\text{Residual Income (RI)} = \text{₹ 120,000} - (18\% \times \text{₹ 480,000})$$

$$= \text{₹ 120,000} - \text{₹ 86,400}$$

$$= \text{₹ 33,600}$$

- (b) MAGNA CARTA LTD received an order for 16 units of a new fountain pen called the DENIMA. The first unit required 40 direct labour hours. The production schedule is subject to 80% learning effect which implies that for every doubling of production the cumulative average labour hour would be 80% of the previous and the total would be the multiplied effect of the number of units produced and the cumulative average labour hour. The table shown below shows the effect of 80% learning effect.

Production (units)	Cumulative Average labour hour	Total labour hour
1	40	40
2	32 (0.80×40)	64
4	25.6 (0.80×32)	102.40
8	20.48 (0.80×25.6)	163.843
16	16.384 (0.80×20.48)	262.144

Computation of total cost for the initial order of 16 units:

	₹
Material (30 × 16)	480.00
Direct labour (262.144 [as calculated in above table] × 6)	1572.86
Variable overheads (0.5 × 262.144)	131.07
Fixed overhead apportioned (5 × 262.144)	1310.72
Total cost	3494.65



6. (a) Cash Budget for the 3 Months Ending 30th June 2023 (Amount in ₹)

Particulars	April	May	June
Opening Balance (A)	6,000	3,950	3,000
Add: Receipts : (B)			
Cash Sales	1,600	1,700	1,800
Collection from debtors [see note(i)]	13,050	13,950	14,850
Advance for sale of vehicles	-	-	9,000
Dividends from Investments	-	-	1,000
Total (A+B)	20,650	19,600	29,650
Less: Payments :			
Materials	9,600	9,000	9,200
Wages [see note (ii)]	3,150	3,500	3,900
Overheads	1,950	2,100	2,250
Instalment of Plant & Machinery	2,000	2,000	2,000
Preference dividend	-	-	10,000
Total (C)	16,700	16,600	27,350
Closing Balance (A+B-C)	3,950	3,000	2,300

Working Notes:

(i) Computation of Collection from Debtors (Amount in ₹)

Month	Total Sales	Credit Sales	Feb	Mar	Apr	May	June
Feb	14,000	12,600	---	6,300	6,300	---	---
Mar	15,000	13,500	---	---	6,750	6,750	---
Apr	16,000	14,400	---	---	---	7,200	7,200
May	17,000	15,300	---	---	---	---	7,650
					13,050	13,950	14,850

(ii) Wages payment in each month is to be taken as three-fourths of the current month plus one-fourth of the pre-vious month.

- (b) (i) Budgetary Control is defined as “the establishment of budgets, relating the responsibilities of executives to the requirement of a policy, and the continuous comparison of actual with budgeted results either to secure by individual action the objective of that policy or to provide a base for its revision.” Budgetary control is intimately connected with budgets. The Chartered Institute of Management



Accountants, London defines 'Budgetary control; as "the establishment of budgets, relating the responsibilities of executive to the requirements of a policy and the continuous comparison of actual with budgeted results either to secure by individual action the objectives of that policy or to provide a firm basis for its revision". The process of budgetary control is set up with the objective to closely monitor whether or not the actual sales and expenses are in line with the financial plan.

Objectives of Budgetary Control:

Budgeting is a forward planning. It serves basically as a tool for management control; it is rather a pivot of any effective scheme of control. The objectives of budgeting may be summarized as follows:

- **Planning:** Planning has been defined as the design of a desired future position for an entity and it rests on the belief that the future position can be attained by uninterrupted management action.
- **Co-ordination:** Budgeting plays a significant role in establishing and maintaining coordination
- **Measurement of Success:** Budgets present a useful means of informing manager how well they are performing in meeting targets they have previously helped to set.
- **Motivation:** Budget is always considered a useful tool for encouraging manager to complete things in line with the business objectives.
- **Communication:** A budget serves as a means of communicating information within a firm.
- **Control:** Control is essential to make sure that plans and objectives laid down in the budget are being achieved.

(ii) 1. Revenue Centre

A revenue center is strictly defined as an organizational unit that is responsible for the generation of revenues and has no control over setting selling prices or budgeting costs. In a revenue center, performance evaluations are limited because the manager has control over only one item: revenues.

The importance of revenue centre is to analyse the comparison between actual performance (as well as in any other area that has revenue control) with budgeted performance to determine variances from expectations. Budgeted and actual revenues may differ because of either volume of units sold or price of units sold. To compare budgeted and actual revenues, the price and volume components of revenue must be distinguished from one another.

**2. Investment Center**

An investment center is an organizational unit whose manager is responsible for managing revenues and current expenses.

The investment center is particularly appropriate for those cases where investment decisions must be made very rapidly in order to take advantage of changes in local business conditions. This is a particularly important issue for those companies in rapidly expanding markets, or where consumer needs change rapidly, where waiting for investment approval from a central authority may result in lost sales.

In addition, the center's manager has the authority to acquire, use, and dispose of plant assets to earn the highest feasible rate of return on the center's asset base. Many investment centers are independent, free standing divisions or corporate subsidiaries.

7. (a) (i) Sales Value Variance = Actual Value of Sales – Standard Value of Sales
Total Actual Value of Sales = ₹ 3,200 + ₹ 1,800
= ₹ 5,000
Total Standard Value of Sales = ₹ 1,800 + ₹ 3,200 = ₹ 5,000
Sales Value Variance = (₹ 5,000 – ₹ 5,000) = Nil
- (ii) Sales Price Variance = Actual Quantity Sold × (Actual Price – Standard Price)
Product A → 800 × (₹ 4 – ₹ 3) = ₹ 800 Favourable
Product B → 600 × (₹ 3 – ₹ 4) = ₹ 600 Unfavourable
Total Sales Price Variance = ₹ (800 – 600) = ₹ 200 Favourable
- (iii) Sales Volume Variance = Standard Price × (Actual Units – Standard Units)
Product A → ₹ 3 × (800 – 600) = ₹ 600 Favourable
Product B → ₹ 4 × (600 – 800) = ₹ 800 Unfavourable
Total Sales Volume Variance = ₹ (600 – 800) = ₹ 200 Unfavourable.
- (b) It is important to note that in addition to the usual procedures used to solve standard cost problems, equivalent production (FIFO) must be calculated. The equivalent production determined by the FIFO method will be used to calculate the standard materials and standard labour allowed. Two variances (price and quantity) must be determined for materials, and two variances (rate and efficiency) must be determined for labour.

With the results of equivalent production as calculated above the variances are to be calculated as follows;

**Calculation of Equivalent Production for Materials and Labour by the FIFO****Method:**

Materials:

Work in process, May 1: 200 units (all materials added last period)	0
Units started and finished during May (6,400 – 200)	6,200
Work in process, May 31: 600 units (all materials added)	600
Total equivalent production—materials	6,800

Labour:

Work in process, May 1: 200 units (80% of labour required)	160
Units started and finished during May	6,200
Work in process, May 31: 600 units (80% labour added)	480
Total equivalent production—labour	6,840

Determining the Materials and Labour Variances:

Materials Variances

$$\begin{aligned}\text{Materials price variance} &= (\text{Actual Price} - \text{Standard Price}) \times \text{Actual quantity} \\ &= (\text{₹ } 5.90 - \text{₹ } 6.00) \\ &= (\text{₹ } 5.90 - \text{₹ } 6.00) \times 20,900 \\ &= \text{₹ } 2,090 \text{ (F)}\end{aligned}$$

$$\begin{aligned}\text{Materials Quantity variance} &= (\text{Actual Quantity} - \text{Standard Quantity}) \times \text{Standard Price} \\ &= [20,900 - (6,800 \times 3)] \times \text{₹ } 6.00 \\ &= [20,900 - 20,400] \times \text{₹ } 6.00 \\ &= \text{₹ } 3,000 \text{ (A)}\end{aligned}$$

Note: ₹ 1,23,310 ÷ 20,900 = ₹ 5.90 per kg.

Labour Variances

$$\begin{aligned}\text{Labour Rate Variance} &= (\text{Actual Rate} - \text{Standard Rate}) \times \text{Actual hours} \\ &= (\text{₹ } 7.70 - \text{₹ } 7.50) \times 27,100 \\ &= \text{₹ } 5,420 \text{ (A)}\end{aligned}$$

$$\begin{aligned}\text{Labour Efficiency Variance} &= (\text{Actual Hours} - \text{Standard Hours}) \times \text{Standard Rate} \\ &= [27,100 - (6,840 \times 4)] \times \text{₹ } 7.50 \\ &= \text{₹ } 1,950 \text{ (F)}\end{aligned}$$

Note: ₹ 2,08,670 ÷ ₹ 7.70 = 27,100 hours

The Manager (Cost) should write a 'Report' to the MD showing the above variance calculations.

**8. (a) (i) The Minimax Criterion**

	S ₁	S ₂	S ₃	S ₄	Row Max	
a ₁	5	10	18	25	25	
a ₂	8	7	12	23	23	
a ₃	21	18	12	21	21	← Minimax
a ₄	30	22	19	15	30	

(ii) The Laplace Criterion

Assume equal probabilities (1/4) as there are four states of nature.

	S ₁	S ₂	S ₃	S ₄	EV = $\sum P(X_i) \times X_i$	Figures in ₹ thousand
a ₁	5	10	18	25	$\frac{1}{4} (5 + 10 + 18 + 25) = 14.5$	₹ 14,500
a ₂	8	7	12	23	$\frac{1}{4} (8 + 7 + 12 + 23) = 12.5$	₹ 12,500
a ₃	21	18	12	21	$\frac{1}{4} (21 + 18 + 12 + 21) = 18.0$	₹ 18,000
a ₄	30	22	19	15	$\frac{1}{4} (30 + 22 + 19 + 15) = 21.5$	₹ 21,500

Since it is a cost minimisation problem, decision a₂ would be selected which implicates the lowest cost of ₹ 12500.

(iii) The Savage Criterion

This criterion posits the formulation of a regret matrix. The regret matrix is determined by subtracting 5, 7, 12, and 15 from columns 1 to 4, respectively. And so the following regret matrix is got.

	S ₁	S ₂	S ₃	S ₄	Row Max	
a ₁	0	3	6	10	10	
a ₂	3	0	0	8	8	← Minimax
a ₃	16	11	0	6	16	
a ₄	25	15	7	0	25	

**(iv) The Hurwicz Criterion**

The following table summarizes the computation

Alternative	Row Min	Row Max	α (Row Min) + (1- α) (Row Max)
a ₁	5	25	25 - 20 α ¹
a ₂	7	23	23 - 16 α
a ₃	12	21	21 - 9 α
a ₄	15	30	30 - 15 α

The decision maker will have to decide upon the appropriate α . And thus he can decide upon the optimum alternative.

- (b) i. Expected Value of Perfect Information (EVPI) is the maximum amount that is worth paying for additional information in an uncertain situation, calculated by comparing the expected value of a decision if the information is acquired against the expected value in the absence of the information. It is calculated by comparing the expected value of a decision if the information is acquired against the expected value in the absence of the information.

- ii. Expected value in the absence of the information = ₹ 1,500

$$EV \text{ of Project 1} = (0.2 \times ₹ 80,000) + (0.4 \times ₹ 50,000) - (0.4 \times ₹ 5,000) \\ = ₹ 34,000$$

$$EV \text{ of Project 2} = (0.2 \times ₹ 60,000) + (0.4 \times ₹ 25,000) + (0.4 \times ₹ 10,000) = \\ ₹ 26,000$$

Project 1 would be chosen on the basis if EV without perfect information. With perfect information, this decision would be changed to Project 2 if market research indicates weak demand.

$$EV \text{ with perfect information: } (0.2 \times ₹ 80,000) + (0.4 \times ₹ 50,000) \\ + (0.4 \times ₹ 10,000) \\ = ₹ 40,000$$

$$\text{Value of perfect information} = ₹(40,000 - 34,000) - ₹4,500 \text{ cost} = \\ ₹ 1,500$$

¹ $\alpha(5) + (1-\alpha)(25) = \alpha 5 + 25 - 25\alpha = 25 - 20\alpha$. And so forth (for the remaining values in the column).