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)
c	c	b	d	d	d	c	c	a	c	a	d

(b)

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

(c)

(i)	(ii)	(iii)	(iv)	(v)	(vi)
Cost centres	Excess capacity, variable cost	just-in-time (JIT) production systems, advanced manufacturing technologies (AMTs).	strategic analysis	probabilities	Variable cost

SECTION - B
(answer any five questions)

2. (a) There has been a paradigm shift in the role of the management accountant in the era of globalisation. The focus shifted to strategic analysis. This ushered in the fourth stage of the evolution of management accounting. Authors have opined that most of the management accounting practices used, were actually developed by 1925, and for the next 60 years there was a slowdown, or even a halt, in management accounting innovation.

Globalisation brought about significant changes in the business environment. Along with the changes the roles of the management accountant had to be redefined. In the following lines some of the impacts of the new business environment on management accounting is discussed.

- **Global competition** - Prior to the era of globalisation, many organizations operated in a protected competitive environment. Globalisation ushered in changes where there have been reductions in tariffs and duties on imports and exports as well as dramatic improvements in transportation and communication systems. By this firms operate globally and results in stiff competition from the very best organisations with changed business operation worldwide. The new competitive environment has increased the demand relating to quality and customer satisfaction. Customer profitability analysis and value analysis are important issues in the arena of management accounting.
- **Changing product life cycles** – Changing profile of the customer along with behavioural issues have contributed to drastically reduce the product life cycle, the management accountant plays a crucial role as in order to compete successfully. Companies must be able to manage their costs effectively at the design stage, have the capability to adapt to new environment, different and changing customer requirements and reduce the time to market of new and modified products.
- **Advances in manufacturing technology** - In order to compete effectively, companies must be able to manufacture high quality innovative products at a low cost, and also provide a first-class customer service. Flexibility to cope with short product life cycles, demands for greater variety of product, more discriminating customers and increasing international competition has created enormous pressure on the operational activities of the business.
- **The impact of information technology** - The use of information technology (IT) to support business activities has increased dramatically. Along with electronic business communication technologies known as e-business, e-commerce or internet commerce have also developed significantly. Consumers have become more discerning in their purchases as in online transactions it is relatively easy to compare the merits of different products and services. This have a significant impact on the work of management accountants. The role of the management accountant as a gatherer and processor of information is lost as the managers can directly access the management accounting system on their personal computers to derive the information they require for decision making.
- **Environmental and sustainability issues** – In recent times, ESG4 has become the focal point in the operations of the company. Along with this, ethical issues have also come to the forefront as the business has to deal with customers who are more aware of this issues then they were a decade back.

- **Deregulation and privatization** – Prior to the era of globalization, companies in many industrial sectors were government – owned monopolies and operated in a highly regulated, protected and non-competitive environment. Thus the organizations, especially those incurring losses, were not under any pressure to improve the quality and efficiency of their operations and to improve profitability by adding or dropping particular products or services from their array of product or service. Globalization ushered in the privatization and deregulation which resulted in the elimination of pricing and competitive restrictions and made Companies to realize their cost base and determine the source of profitability for their products, customers and markets.
- **Focus on value creation –** The scope of management accounting is enormous. Managers who are in charge of the operations of the organisations depends on the management accountants in realisation of the strategic goal of the organisations. With the advent of time, the role of the management accountant has changed from merely interpreting, managing and recording costs to creating value. Though cost reduction still remains as the basic function of the management accountant as it has specific impact on selling price fixation which impacts customer value. The new business environment resulted in management accounting distinguishing between value-added and non-value-added activities.

(b) (i) Total overheads ₹1,90,000

Total labour hours:

A = (20,000 × 2) = 40,000
B = (25,000 × 1) = 25,000
C = (2,000 × 1) = 2,000
67,000

Overhead Absorption Rate = ₹1,90,000 ÷67,000 hours = ₹2.836 per hour = ₹2.84 per hour

(ii) **Statement of Cost and Profit** **(Amount in ₹)**

Particulars		A	B	C
Materials		5	10	10
Labour		10	5	5
Overheads (at ₹2.84 per hr)		5.68	2.84	2.84
		20.68	17.84	17.84

Selling price		20	20	20
Profit / Loss		(0.68)	2.16	2.16
(b)	Total	A	B	C
Set-up costs	₹90,000	36,000	46,800	7,200
(Cost per set up= ₹90,000÷25)				
Receiving	₹30,000	13,636	13,636	2,728
(Cost per delivery = ₹30,000÷22)				
Dispatch				
(Cost per order = ₹ 15,000÷60)	₹15,000	5,000	5,000	5,000
Machining	₹55,000	₹23,404	₹29,256	₹2,340
(Cost per machine hour =₹55,000 ÷94,000)				
Total	₹1,90,000	78,040	94,692	17,268
Number of units		20,000	25,000	2,000
Overheads p.u.		₹3.90	₹3.79	₹8.63

Statement of Cost and Profit **(Amount in ₹)**

Particulars		A	B	C
Materials		5	10	10
Labour		10	5	5
Overheads		3.90	3.79	8.63
		18.90	18.79	23.63
Selling price		20.00	20.00	20.00
Profit /(Loss)		**₹1.10**	**₹1.21**	**(₹3.63)**

3. (a) I. Sales = ₹ 2,00,000

Variable Cost = 60% = ₹ 1,20,000

(1) P/V Ratio = 40%

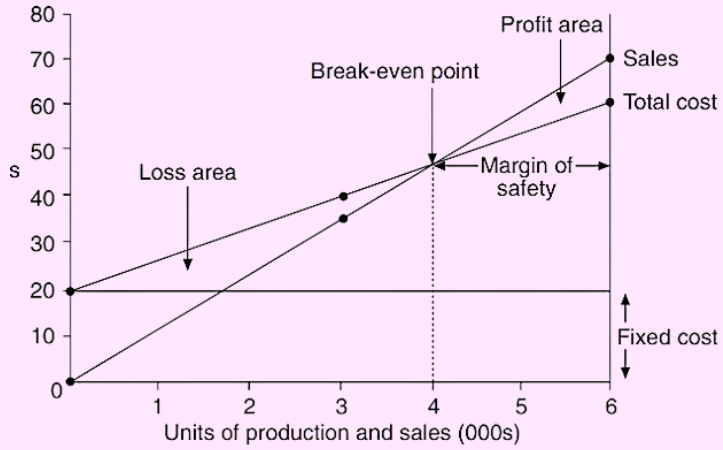
(2) Contribution = ₹ 80,000

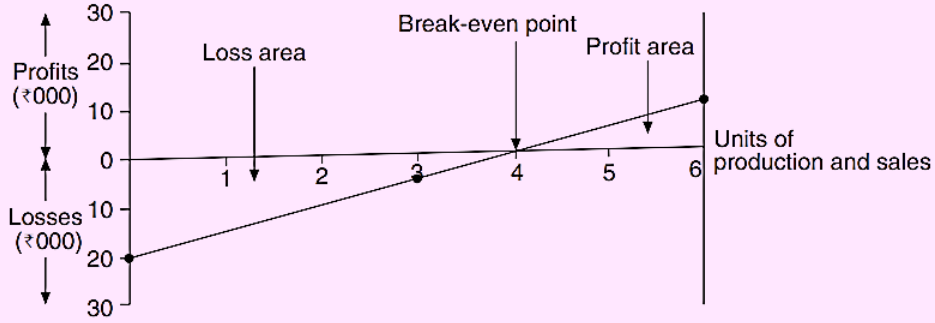
Contribution = Fixed Cost + Profit

Or, fixed Cost = ₹ 62,000

(3) Sales volume to earn a profit of ₹ 50,000 = Fixed Cost + Desired Profit ÷ P/V Ratio = ₹ 2,75,000

II.





(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: Profits		1,00,000
Fixed cost		2,00,000

Hence, total fixed cost in the new case = ₹ 2,00,000 + ₹ 3,00,000 = ₹ 5,00,000

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: ₹ 6,00,000 ÷ ₹12,00,000 × 100 = 50%

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

Variable Cost Ratio = 100 - 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) (i) In this case the transfer price is to be fixed up as follows

Transfer Price = Marginal Cost + Opportunity Cost i.e. ₹ (5 + 5) = ₹10

Note: Marginal Cost = ₹2,50,000 / 50,000 units = ₹5

Opportunity cost ₹5 is computed on the basis that the Division A will sacrifice ₹ 5 if they sell the product to Division Y.

(ii) In this situation, the transfer price will be worked out as under:

Transfer price = Marginal Cost + Contribution + Profit foregone by Division Z = ₹(5 + 5 + 4) = ₹14

In situation (ii), if Division Y purchases from Division X, it will not purchase from external supplier.

Hence, the supplier will stop purchasing from Division Z, which will result in a loss of profit to Division Z @ ₹4 per unit, and therefore this amount will be recovered from the transfer price.

(b) **Marginal Cost Statement**

Particulars	Per Unit ₹
Materials	5.50
Labour	3.50
Variable Overheads	1.00
Marginal Cost	10.00

1. The marginal cost of producing the component is ₹ 10 per unit and fixed cost per unit is ₹ 2.50, thereby making a total cost of ₹ 12.50 per unit. But this component is available in the market at ₹ 11.50. As the market price per unit is less than the total cost, apparently it looks better to buy the component instead of making it. But a close observation reveals that the component will actually cost ₹ 14 (i.e. 11.50+2.50) if it is purchased, as the fixed cost of ₹ 2.50 is required to be incurred even if the component is purchased. Therefore, it may not be wise to buy a component which will actually cost ₹ 14, which is being manufactured at ₹ 12.50.

2. If the price offered by the supplier is ₹ 9.70 per unit, then it is advisable to purchase the component from the outside market as the outside market price of ₹ 9.70 is less than marginal cost of ₹ 10. There will be saving of ₹0.30 per unit if the component is purchased from outside market.

One of the best ways for sales promotion is to offer quotations at low rates. A company is producing 80,000 units (80% of capacity) and making a profit of ₹ 2,40,000. Suppose the Central Government has given a tender notice for 20,000 units. It is expected that the units taken by the Government will not affect the sale of 80,000 units which the company is already selling and the company also wishes to submit the lowest possible quotation. The company may quote any amount above marginal cost, because it will give an additional marginal contribution and hence profit.

5. (a)

Profit	₹ 89.20
Add back:	
Current depreciation (₹120 × 20%)	₹ 24.00
Development Costs (₹9.60 × 2/3)	₹ 6.40
Less: Replacement depreciation (₹168 × 20%)	₹ 33.60
Adjusted profit	86.00
Less: Cost of capital charge (13% × ₹168)[a]	21.84
EVA	64.16

Note: [a]13% × [Fixed assets (₹168 - (₹33.6) + working capital (₹27.2) + development costs (₹6.4)]

(b) (i) **1st Batch = 500 units**

Quantity	Cumulative Average Cost	Cumulative Total Cost
500 units	240 (120000 ÷ 500)	1200000 (given)
1000 units	192 (80% of 240)	192000
2000 units	153.6 (80% of 192)	307200

Cost of producing 2000 units	₹ 3,07,200
Less Initial Cost of producing 500 units	₹ 1,20,000
Cost of production of 1500 units (in next year)	₹ 1,87,200
Per Unit Cost ₹ 1,87,200 ÷ 1500 Units	**1,24,800**

(ii) **Limitations and problems associated with learning curve analysis include:**

a. Learning curve analysis is appropriate only for labour-intensive operations involving repetitive tasks where repeated trials improve performance. If the production process primarily relies on robotics and computer controls, little repetitive labour is involved and thus little opportunity exists for learning to take place.

b. The learning rate is assumed to be constant. In real life, the decline in labour time might not be constant.

c. The reliability of a learning curve calculation can be jeopardized because an observed change in productivity might actually be associated with factors other than learning, such as a change in the labour mix, the product mix, or other factors. If some factor or factors other than learning are affecting productivity, a learning model developed using the affected historical data will produce in-accurate estimates of labour time and cost.

6. (a) **Cash Budget**

For 3 months from August to October 2022

Particulars	August (₹)	September (₹)	October (₹)
Receipts:			
Opening balance	25,000	44,500	(66,750)
Sales	1,86,000	1,50,000	1,41,000
Total Receipts (A)	2,11,000	1,94,500	74,250
Payments:			
Purchases	1,44,000	2,43,000	2,46,000
Wages	14,000	11,000	12,000
Mfg. Exp.	3,500	3,750	4,750
Office Exp.	1,000	1,500	2,000
Selling Exp.	4,000	2,000	5,000
Total payments (B)	1,66,500	2,61,250	2,69,750
Closing Balance (A-B)	44,500	(66,750)	(1,95,500)

Notes to Solution:

1. Manufacturing Expense:

Particulars	August (₹)	September (₹)	October (₹)
July (₹4,000/2)	2,000	--	--
August (₹3,000/2)	1,500	1,500	--
September (₹4,500/2)	--	2,250	2,250
October (₹5,000/2)	--	--	2,500
Total	**3,500**	**3,750**	**4,750**

2. Sales

Particulars	August (₹)	September (₹)	October (₹)
June (₹1,80,000/2)	90,000	--	--
July (₹1,92,000/2)	96,000	96,000	--
August (₹1,08,000/2)	--	54,000	54,000
September (₹1,74,000/2)	--	--	87,000
Total	**1,86,000**	**1,50,000**	**1,41,000**

(b) The report should contain the following:

Particulars	Original budget	Flexible budget	Actual for March	Variance
	(1)	(2)	(3)	(2) – (3)
Units manufactured	12,000	14,000	14,000	
	₹	₹	₹	₹
Direct materials	48,000	56,000	53,000	3,000 (F)
Direct labour	24,000	28,000	29,000	1,000 (A)
Variable overhead	6,000	7,000	7,200	200 (A)
Fixed overhead	4,000	4,000	4,500	500 (A)
Total costs	82,000	95,000	93,700	1,300 (F)

The direct materials variance is 5.4% of the flexible budget amount and needs investigating even although it is favourable.

Two possible questions to investigate are:

(1) Did the budget estimates use outdated prices?

(2) Has the buying department chosen low price materials without perhaps considering the quality?

The labour variance is 3.6% of the flexible budget amount. Questions that could be asked here are:

(1) Has there been a rise in pay rates since the budget was set?

7. (a) Standard rate per unit (Budgeted overheads/Budgeted output) i.e.,
= (₹30,000/20,000 units) = ₹ 1.50
Standard time per unit (30,000/20,000) = 1.50 hours

(i) Efficiency Variance = Standard overhead rate (Standard hours for actual output – Actual hours worked)
₹1.00 (33,000 – 31,500) = ₹ 1,500 (F)
Standard hour for actual output = 22,000 units @ 1.5 hours = 33,000 hours.

(ii) Capacity Variance = Standard rate per hour (Actual hours worked – Budgeted hours for 27 days)
₹1 (31,500 – 32,400) = ₹ 900 (A)
Budgeted hrs for 25 days = 30,000 therefore, budgeted hours for 27 days = 32,400 i.e., (30,000÷25 ×27)

(iii) Calendar Variance
Standard Overheads rate per day (Actual working days – Budgeted working days)
₹1,200× (27 – 25) = ₹ 2,400 (F), where, Standard Overheads rate per day = ₹30,000÷25 days = ₹1,200

(iv) Volume Variance
Standard rate per unit (Actual Output – Budgeted output)
₹ 1.50 × (22,000 – 20,000) = ₹ 3,000 (Favourable).

(v) Expenditure Variance
Budgeted overheads – Actual overheads
₹ 30,000 – ₹ 31,000 = ₹1,000 (Adverse).

(b) Standard cost of output produced (18000 units)

	(₹)
Direct Material	8,64,000
Direct Labour	6,30,000
Variable production overhead	1,80,000
Fixed production overhead	9,00,000
	25,74,000

	Standard cost of output	Variances	Actual cost
	(₹)	(₹)	(₹)
Direct materials	8,64,000		
Price variance [a]		76,000 (F)	
Usage variance [b]		48,000 (A)	
Actual cost			8,36,000
Direct labour	6,30,000		
Rate variance [c]		16,800 (A)	

Efficiency variance [d]		42,000 (F)	
Actual cost			6,04,800
Variable production overhead	1,80,000		
Expenditure variance [e]		4,000 (A)	
Efficiency variance [f]		12,000 (F)	
Actual cost			1,72,000
Fixed production ove1head	9,00,000		
Expenditure variance [g]		30,000 (A)	
Volume variance [h]		1,00,000 (A)	
Actual cost			10,30,000
	25,74,000	68,800 (A)	26,42,800

Notes

[a] (Standard price - Actual price) x Actual quantity
(₹12 - ₹8,36,000/76,000) x 76,000
∴ (₹12 - ₹11) ×76,000 = ₹76,000 (F)

[b] (Standard quantity - Actual quantity) x Standard price
(18,000 x 4 kg – 76,000) x ₹12
∴ (72000 kg – 76,000 kg) × 12 = ₹48,000 (A)

[c] (Standard rate - Actual rate) x Actual hours
(₹7 - ₹6,04,800/84,000) x 84,000
∴ (₹7 - ₹7.2) × 84,000 hours = ₹16,800 (A)

[d] (Standard hours - Actual hours) x Standard rate
(18,000 x 5 hrs – 84,000) x ₹7 = ₹42,000 (F)

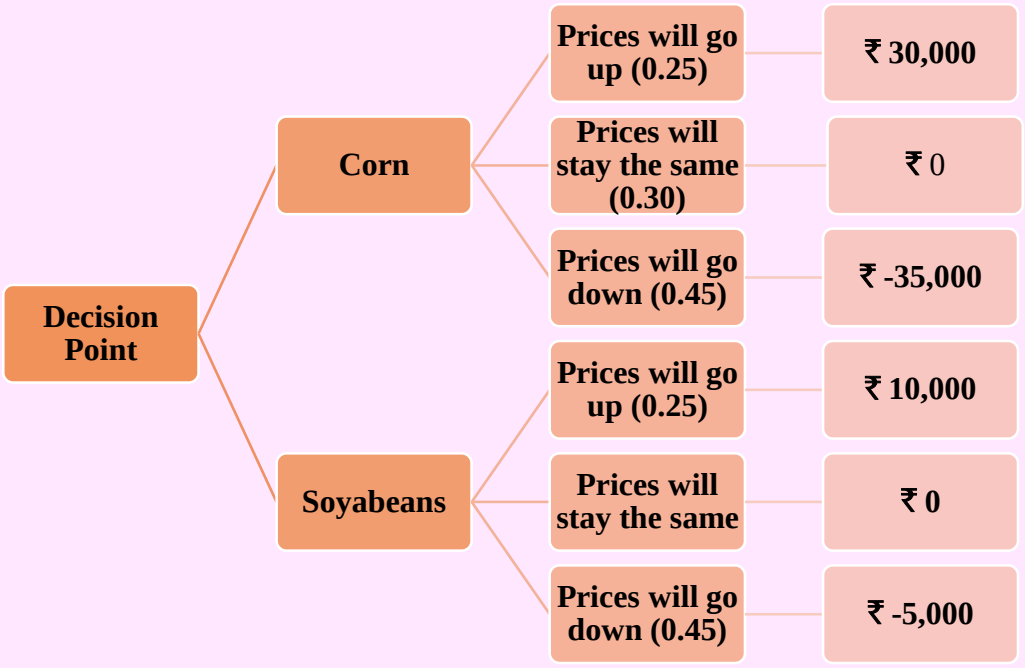
[e] (Actual hours x Standard rate) - Actual cost
(84,000 x ₹2 - ₹1,72,000) = ₹4,000 (A)

[f] (Standard hours - Actual hours) x Standard rate
(18,000 x 5 hrs – 84,000 hours) x ₹2 = ₹12,000 (F)

[g] Budgeted fixed overheads - Actual fixed overheads
(20,000 x ₹50 - ₹10,30,000) = ₹30,000 (A)

[h] (Actual output - Budgeted output) x Standard rate
(18,000 – 20,000) x ₹50 = ₹1,00,000 (A)

8. (a) (i)



(ii) EV(corn) = - ₹ 8,250, [(30000 × 0.25) + (- 35000 × 0.45)]

EV(soybeans) = ₹ 250, [(10000 × 0.25) + (- 5000 × 0.45)]

Therefore, select soybeans.

(b) The four criterions under uncertainty[1] are

1. The maximin Criterion
2. The Lapse Criterion
3. The savage Criterion
4. The Hurwicz Criterion

These are given below

(i) The Minimax Criterion (since it is a payoff maximisation)

	S1	S2	S3	S4	Row min	
A1	-20	60	30	-5	-20	
A2	40	50	35	0	0	
A3	-50	100	45	-10	-50	
A4	12	15	15	10	**10**	← maximin

[1] It is to be noted that this is a payoff maximisation problem and not a cost minimization problem.

(ii) The Laplace Criterion - Assume equal probabilities (1/4) as there are four states of finance

	S1	S2	S3	S4	EV= $\sum P(Xi) \times Xi$	Figures in ₹ thousand
A1	-20	60	30	-5	¼(-20+60+30-5)=16.25	₹16,250
A2	40	50	35	0	¼(40+50+35+0)=31.75	**₹ 31,250**
A3	-50	100	45	-10	¼(-50+100+45-10)=21.25	₹ 21,250
A4	12	15	15	10	¼(12+15+15+10)=13	₹ 13,000

Since it is a payoff maximization problem, decision A2 would be selected which implicates highest payoff of ₹31,250

(iii) Savage Criterion

This criterion posits the formulation of a regret matrix. The original matrix

	S1	S2	S3	S4
A1	-20	60	30	-5
A2	40	50	35	0
A3	-50	100	45	-10
A4	12	15	15	10

The regret matrix is determined by subtracting 40, 100, 45, and 10 from columns 1 to 4, respectively, and so the following regret matrix is obtained. Now we can calculate maximin (since it is a payoff maximization problem)

	S1	S2	S3	S4		
A1	-60	-40	-15	-15	**-15**	← maximin
A2	0	-50	-10	-10	0	
A3	-90	0	0	-20	0	
A4	-38	-20	-30	0	0	

(iv) The Hurwicz Criterion

The following table summarizes the computation

Alternative	Rowmin	Row Max	[α(Rowmax)+(1-α)(Rowmin)] [2]
A1	-20	60	[α(60)+(-20)(1-α)]= 60α -20+20α = 80α – 20 [3]
A2	0	50	[α(50)+(0)(1-α)]=50α
A3	-50	100	[α(100)+(-50)(1-α)]=150α - 50
A4	10	15	[α(15)+(10)(1-α)]=5α +10

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

[2] Since this is a Payoff Maximisation model.

[3] [α(60)+(-20)(1-α)]= 60α -20+20α and so forth (for the remaining values in the column).