

INTERMEDIATE EXAMINATION GROUP II (SYLLABUS 2012)

SUGGESTED ANSWERS TO QUESTIONS DECEMBER 2015

Paper-10: COST AND MANAGEMENT ACCOUNTANCY

Time Allowed : 3 Hours

Full Marks : 100

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

This paper contains four questions.

All questions are compulsory, subject to instruction provided against each question.

All workings must form part of your answer.

Assumptions, if any, must be clearly indicated.

Please (i) Write answers to all parts of a question together.

(ii) Open a new page for answer to a new question.

(iii) Attempt the required number of questions only.

1. Answer all questions.

(a) Given: Sales ₹ 2,00,000; Fixed Cost ₹ 40,000; BEP ₹ 1,60,000. Ascertain the profit. 2

(b) A contract is expected to be 80% complete in its first year of construction, as certified. The Contractee pays 75% of the work certified as and when certified and makes final payment on the completion of the Contract. The following information is available for the first year:

	(₹)
Cost of Work uncertified	80,000
Profit transferred to Profit and Loss Account at the end of year 1 on incomplete contract	60,000
Cost of Work to date	8,80,000

Compute the Notional Profit. 2

(c) Narrate any two practical difficulties in installing a costing system. 2

(d) State any two limitations of inter-firm comparison. 2

(e) Calculate the efficiency ratio from the following figures:

Budgeted production	160 units	
Actual production	120 units	
Standard time per unit	10 hours	
Actual hours worked	1000	2

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- (f) Is a cost auditor required to audit and certify monthly, quarterly, half-yearly and yearly cost statements? 2
- (g) Is the provision of rotation of auditors applicable to cost auditors also? 2
- (h) What is 'shadow price'? 2
- (i) Mention two conditions for price discrimination. 2
- (j) If Total Revenue (₹) = 20Q and Total Cost (₹) = 400 + 12Q, find Break Even Point in units. Given, Q = number of units. 2

Answer:

1.

- (a) $P/V \text{ Ratio} = \text{Fixed Cost} / \text{BEP} = 40,000 / 1,60,000 = 0.25$
Total Contribution = Sales \times P/V = 200000 \times 0.25 = ₹ 50000
Profit = Contribution - Fixed Cost = 50,000 – 40,000 = ₹ 10,000.
- (b) As the Contract is 80% complete, 2/3rd of Notional Profit on Cash basis has been transferred to P/L A/C in the 1st year of the contract.
Thus, amount transferred to P/L A/C = 2/3 \times Notional Profit \times % of cash received
Or, ₹ 60,000 = 2/3 \times Notional Profit \times 75%
Or, Notional Profit – 60,000 \times (3/2) \times (100/75) = ₹ 1,20,000
- (c) Practical difficulties in installing a costing system: Any two of the following:
- Lack of support from top management.
 - Resistance from the existing staff.
 - High cost of operating the system.
 - Shortage of trained staff.
- (d) Limitations of inter-firm comparisons (any two):
- Top management may not be convinced of the utility of the inter-firm comparison
 - Reluctance to disclose data which a concern considers confidential
 - Non-availability of a suitable base for comparison.
 - Absence of proper cost accounting system to produce reliable figures for comparison.
- (e) Efficiency Ratio = standard hours for actual production/actual hours worked = (10 hours \times 120 units/ 1000) \times 100 = 120%
- (f) The cost auditor is appointed to conduct audit of the cost records and make report thereon for the financial year for which he is appointed. It is not incumbent upon the cost auditor to certify monthly, quarterly, half-yearly cost statements.
- (g) The Act does not provide for rotation in case of appointment of cost auditors and the same is not applicable to a cost auditor.
- (h) Shadow Price is the imputed value. It shows the marginal contribution of a factor of production employed. When resources are constraints in a Primal LPP, the solution of its Dual indicates the Shadow Prices of the resources.
- (i) Mention two conditions for price discrimination.
Price discrimination is possible if the following conditions are satisfied:

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- There must be two or more separate markets.
 - Elasticity of demand in each market must be different.
- (j) Total Cost (₹) = 400 + 12Q; Total Revenue (₹) = 20Q
Hence, Fixed Cost = ₹ 400, Variable Cost per unit = ₹ 12, Price per unit = ₹ 20,
Contribution per unit = 20 - 12 = ₹ 8;
BEP = Fixed Cost/ Contribution per unit = 400/8 = 50 units.

2. Answer any two questions (Carrying 20 marks each):

- (a) (i) In 2014 the turnover of Akash Ltd., which operated at a margin of safety of 25%, amounted to ₹ 12,00,000 and its profit volume ratio was 40%. During 2015 the company estimated that although the same volume of sales would be maintained, the sale value would go down due to decrease in selling price. There will be no change in variable costs. The company proposes to reduce its fixed costs through an intensive cost reduction programme. These changes will alter the profit volume ratio and margin of safety to $\frac{100}{3}\%$ and 40% respectively in 2015.

You are required to present a comparative statement indicating sales, variable costs, fixed costs and profits of the company for 2014 and 2015. 10

- (ii) Chinu Enterprize has furnished the following information from the financial books for the year ended on 31st March, 2015:

	(₹)		(₹)
Opening Stock (1000 units @ ₹ 140 each)	1,40,000	Sales (10250 units)	28,70,000
Material consumed	10,40,000	Closing stock (750 units @ ₹ 200 each)	1,50,000
Wages	6,00,000		
Gross Profit c/d	12,40,000		
	30,20,000		30,20,000
Factory Expenses	3,79,000	Gross Profit b/d	12,40,000
Administration Expenses	4,24,000	Bad debts recovered	5,000
Selling Expenses	2,20,000	Rent received	40,000
Bad debts	16,000		
Discount Allowed	20,000		
Net Profit	2,26,000		
	12,85,000		12,85,000

The cost sheet shows the cost of materials at ₹ 104 per unit and the labour cost at ₹ 60 per unit. The factory overheads are absorbed at 60% of labour cost and administration overheads at 20% of factory cost. Selling expenses are charged at ₹ 25 per unit. The opening stock of finished goods is valued at ₹ 180 per unit.

You are required to prepare:

- I. A statement showing profit as per Cost Accounts for the year ended on 31st March, 2015; and 5
- II. A statement showing the reconciliation of profit as disclosed in Cost Accounts with the profit shown in Financial Accounts. 5

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Answer:

2. (a) (i) Comparative statement indicating sales, variable costs, fixed costs and profits of the company for 2014 and 2015

	2014		2015	
	Note no.	(₹)	Note no	(₹)
Sales (S)		12,00,000	7	10,80,000
Variable Cost (VC)	1	7,20,000	6	7,20,000
Contribution (C)	2	4,80,000	8	3,60,000
BEP	3	9,00,000	9	6,48,000
Fixed Cost (FC)	4	3,60,000	10	2,16,000
Profit (P)	5	1,20,000	11	1,44,000

Working Notes:

2014:

P/V Ratio = 0.4 (Given)

$VC/S = 1 - P/V = 1 - 0.4 = 0.6$

MOS = $0.25 \times S$ (Given)

1. $VC = (VC/S) \times S = 0.6 \times 1200000 = ₹ 7,20,000$
2. $C = S - VC = ₹ 4,80,000$
3. $BEP = S - MOS = S - 0.25 \times S = 0.75 \times S = ₹ 9,00,000$
4. $FC = BEP \times P/V = 9,00,000 \times 0.4 = ₹ 3,60,000$
5. $P = C - FC = 4,80,000 - 3,60,000 = ₹ 1,20,000$

2015:

6. $VC = ₹ 7,20,000$ (Same as 2014)
P/V Ratio = $100/3\% = 1/3$ (Given)

$VC/S = 1 - 1/3 = 2/3$

MOS = $0.40 \times S$ (Given)

7. $S = VC \times (3/2) = 7,20,000 \times 3/2 = ₹ 10,80,000$
8. $C = S - VC = 10,80,000 - 7,20,000 = ₹ 3,60,000$
9. $BEP = S - MOS = 10,80,000 - 0.40 \times S = 10,80,000 - 4,32,000 = ₹ 6,48,000$
10. $FC = BEP \times P/V = 6,48,000 \times 100/3\% = ₹ 2,16,000$
11. $P = C - FC = 3,60,000 - 2,16,000 = ₹ 1,44,000$

Alternative Answer:

Marginal Cost Statement:

Particulars	Year 2014	Year 2015
Sales (S)	12,00,000	$7,20,000 \div \frac{2}{3} = 10,80,000$
Less: Variable Cost	(Bal fig) = (Sales – Contrib.) 7,20,000	(no change in volume) =7,20,000
Contribution	(at 40% of Sales) 4,80,000	(Sales – Variable Cost) 3,60,000
Less: Fixed Cost	(Bal fig) = (Contrib. – Profit) 3,60,000	(bal fig) = (Contrib. – Profit) 2,16,000

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Profit	(See computation below) 1,20,000	(See computation below) 1,44,000
Margin of Safety	(25% of 12,00,000) = 3,00,000	(40% of 10,80,000) = 4,32,000
PV Ratio	(Given) 40%	(Given) 100/3%
Profit = MOS × PVR	3,00,000 × 40% = 1,20,000	4,32,000 × 100/300 = 1,44,000

Note: Since there is no change in volume, **Total Variable Cost will remain the same** for both years. Since PV Ratio for 2015 is 100/3%, Variable Cost = $1 - 1/3 = 2/3$. Hence Sales figure is derived there from.

(ii) Working Note 1: Statement of Cost (10000 units)

	Total cost (₹)	Cost per unit (₹)
Materials	10,40,000	104
Wages	6,00,000	60
Factory Overhead 60% of Wages	3,60,000	36
Factory cost	20,00,000	200
Administrative overhead 20% of factory cost	4,00,000	40
Total cost	24,00,000	240

Statement of Profit as per Cost Accounts

	Units	₹
Opening stock @ ₹180 per unit	1000	1,80,000
Cost of production @ ₹240 per unit (WN 1)	10000	24,00,000
Total	11000	25,80,000
Less: Closing stock @ ₹240 per unit	750	1,80,000
Cost of Goods Sold	10250	24,00,000
Selling expense @ ₹ 25 per unit		2,56,250
Cost of sales		26,56,250
Profit (Balancing figure)		2,13,750
Sales	10250	28,70,000

Reconciliation Statement for the year ending 31 March 2015

	(₹)	(₹)
Profit as per Cost Accounts		213,750
Add: Over valuation of opening stock in Cost Accounts (1,80,000 – 1,40,000)	40,000	
Over recovery of selling expenses in Cost Accounts (2,56,250 – 2,20,000)	36,250	
Income included only in Financial Accounts:		
Bad debt recovered	5,000	
Rent received	40,000	121,250
		335,000
Less: Over valuation of closing stock in Cost Accounts (1,80,000 – 1,50,000)	30,000	
Under recovery of factory overheads in Cost Accounts (3,79,000 – 3,60,000)	19,000	
Under recovery of admin, overheads in Cost Accounts (4,24,000 – 4,00,000)	24,000	
Expenses included only in Financial Accounts:		
Bad debts	16,000	
Discount allowed	20,000	109,000
Profit as per Financial Accounts		226,000

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- (b) (i) A manufacturing company operates a costing system and showed the following data in respect of the month of November, 2015.

Budgeted		Actual	
Working days	20	Working days	22
Man hours	4,000	Man hours	4,200
Fixed Overhead Cost (₹)	2,400	Fixed Overhead Cost (₹)	2,500
Output (units)	800	Output (units)	900

You are required to calculate fixed overhead variances from the above data. 6

- (ii) From the following data, prepare a Production Budget for ABC Co. Ltd., for the six months period ending on 30th June, 2015.

Stocks for the budgeted period:

(in units)

Product	As on 01 January, 2015	As on 30 June, 2015
A	6,000	10,000
B	9,000	8,000
C	12,000	17,500

Other relevant data:

Product	Normal loss in production	Requirement to fulfill sales programme (units)
A	4%	60,000
B	2%	50,000
C	5%	80,000

6

- (iii) Naitik Ltd. provides the following cost data of a product passing through two manufacturing processes: Process A and Process B.

(Amount in ₹)

	Process A	Process B
Input: 8800 units	9,59,200	—
Material	46,500	93,680
Labour Cost	1,45,000	95,000
Electric Power	48,000	32,000
Normal loss	5%	4%
Value of scrap per unit	10	12
Output (units)	8,300	8,000

Other manufacturing expenses are ₹ 1,68,000 to be charged on the basis of labour cost.

You are required to prepare the Process Accounts, Abnormal Loss Account and Abnormal Gain Account. 8

Answer:

2. (b) (i) WN 1:

Standard fixed overhead per unit = budgeted fixed overhead cost/ budgeted units of output = 2400/800 = ₹ 3

Standard fixed overhead per man hour = budgeted fixed overhead cost/ budgeted man hours = 2400/4000 = ₹ 0.6

Standard fixed overhead per day = budgeted fixed overhead cost/ budgeted days = 2400/20 = ₹ 120

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WN 2:

- A. Standard Fixed Overhead Cost = Standard fixed overhead per unit × Actual Output (units) = ₹ 3 × 900 = ₹ 2700
- B. Fixed Overhead absorbed in actual hours = Standard fixed overhead per hour × Actual hours = ₹ 0.6 × 4200 = ₹ 2520
- C. Fixed Overhead Cost absorbed in actual days = Standard fixed overhead per days × Actual days = ₹ 120 × 22 = ₹ 2640
- D. Budgeted Fixed Overhead Cost = ₹ 2400
- E. Actual Fixed Overhead Cost = ₹ 2500

Computation of Variances:

Fixed Overhead Efficiency Variance = A - B = ₹ 2700 - ₹ 2520 = ₹ 180 (Favourable)
 Fixed Overhead Capacity Variance = B - C = ₹ 2520 - ₹ 2640 = ₹ 120 (Adverse)
 Fixed Overhead Calendar Variance = C - D = ₹ 2640 - ₹ 2400 = ₹ 240 (Favourable)
 Fixed Overhead Volume Variance = A - D = ₹ 2700 - ₹ 2400 = ₹ 300 (Favourable)
 Fixed Overhead Expenditure Variance = D - E = ₹ 2400 - ₹ 2500 = ₹ 100 (Adverse)
 Fixed Overhead Variance = A - E = ₹ 2700 - ₹ 2500 = ₹ 200 (Favourable)

(b) (ii)

Production budget for 6 months ending on 30 June 2015

Details	Products (units)		
	A	B	B
Budgeted sales	60000	50000	80000
Add: Closing stock	10000	8000	17500
Total required stock	70000	58000	97500
Less: Opening stock	6000	9000	12000
Net production	64000	49000	85500
Add: Normal loss in production = Net production × Normal Loss % / (100 - Normal Loss %)	(4%) 2666.67	(2%) 1000.00	(5%) 4500.00
Gross production	66666.67	50000.00	90000.00

(b) (iii)

Process A Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Input	8800	9,59,200	Normal Loss A/C (5% of 8800)	440	4,400
Material		46,500	Abnormal Loss A/C (WN 2)	60	9,300
Labour cost		1,45,000	Process B A/C (@ ₹155 pu)	8300	12,86,500
Electric Power		48,000			
Other manufacturing Expenses (WN 1)		1,01,500			
	8800	13,00,200		8800	13,00,200

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Process B Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Input	8300	12,86,500	Normal Loss A/C (4% of 8300)	332	3,984
Material		93,680			
Labour cost		95,000	Finished Stock A/C (@ ₹197pu)	8000	15,76,000
Electric Power		32,000			
Other manufacturing Expenses (WN 1)		66,500			
Abnormal Gain A/C (WN 3)	32	6,304			
	8332	15,79,984		8332	15,79,984

Abnormal Loss Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Process A A/c	60	9,300	Bank A/c	60	600
			P/L A/c		8,700
	60	9,300		60	9,300

Abnormal Gain Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
Normal Loss A/c	32	384	Process B A/c	32	6,304
P/L A/c		5,920			
	32	6,304		32	6,304

WN 1: Other Manufacturing Expenses charged as % of Labour Cost

$$= 1,68,000 \times 100 / (1,45,000 + 95,000) = 70\%$$

WN 2: Cost per unit = $(13,00,200 - 4,400) / (8,800 - 440) = ₹155$

$$\text{Value of Abnormal Loss} = 155 \times 60 = ₹ 9,300$$

WN 3: Cost per unit = $(15,73,680 - 3,984) / (8,300 - 332) = ₹197$

$$\text{Value of Abnormal Gain} = 197 \times 32 = ₹ 6,304$$

- (c) (i) XYZ Ltd., which has a system of assessment of Divisional Performance on the basis of residual income, has two Divisions, Alfa and Beta. Alfa has annual capacity to manufacture 15,00,000 units of a special component that it sells to outside customers but has idle capacity. The budgeted residual income of Beta is ₹ 1,20,00,000 and that of Alfa is ₹ 1,00,00,000.

Other relevant details extracted from the budget for the current year are as follows:

Particulars of Alfa:

Sale (Outside customers)	12,00,000 units @ ₹ 180 per unit
Variable cost per unit	₹ 160
Divisional fixed cost	₹ 80,00,000
Capital employed	₹ 7,50,00,000
Cost of Capital	12%

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Beta has received a special order for which it requires components similar to the ones made by Alfa. Fully aware of the idle capacity of Alfa, Beta has asked Alfa to quote for manufacture and supply of 3,00,000 units of the components with a slight modification during final processing. Alfa and Beta agreed that this will involve an extra variable cost to Alfa amounting to ₹ 5 per unit.

- I. Calculate the transfer price, which Alfa should quote to Beta to achieve its budgeted residual income. 6
- II. If Beta can buy the required components from open market at a price of ₹ 180 (situation A), ₹ 172 (situation B) or ₹ 160 (situation C), what should be its autonomous decision: buying from market at market price or buying from Alfa at the transfer price, in each of the situations? Also state with reason in what situation the decision of Beta may result in a sub-optimal decision for the company as a whole. 6

- (ii) Roshan Ltd., produces three products P, Q and R and for each of them uses three different machines X, Y and Z. Capacity of the machines are limited to 7000 hours for X, 8600 hours for Y and 5400 hours for Z per month. Relevant data for November 2015 are stated below:

Products	P	Q	R
Selling price per unit (₹)	10,000	8,000	6,000
Variable cost per unit (₹)	7,000	5,600	4,000
Machine hours required per unit			
X	20	12	4
Y	20	18	6
Z	20	6	2
Expected Demand (units)	200	200	200

Machine Z is identified as the bottleneck. Calculate the optimum product mix based on the throughput concept and ascertain the total profits if fixed cost amounts to ₹ 7,80,000. 8

Answer:

2.(c) (i)

- I. Contribution required for budgeted Residual Income of Alfa:

	₹
Fixed Cost	80,00,000
Capital Charge on 75000000 × 12%	90,00,000
Residual Income	1,00,00,000
Total Contribution required	2,70,00,000

	₹	₹
Contribution required from existing units	12,00,000 × 20	2,40,00,000
Contribution required on 300000 units	2,70,00,000 – 2,40,00,000	30,00,000
Required contribution per unit	30,00,000/300000	10
Variable cost per unit (existing)		160
Increase in variable cost per unit		5
Transfer Price per unit	10 + 160 + 5	175

- II. Statement showing optimality of autonomous decision of Beta

Situations	A	B	C
Market price per unit	180	172	160
Transfer price	175	175	175
Beta's decision (lower of the two prices)	Buy from Alfa	Buy from market	Buy from market

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Cost to company for divisional transfer (variable cost only)	165	165	165
Cost to company for buying from market	180	172	160
Minimum cost decision for the company	Buy from Alfa (165<180)	Buy from Alfa (165<172)	Buy from market (160 < 165)
Optimality of Decision of Beta	Optimal	Sub-optimal (as for buying from market company suffers extra cost of ₹7)	Optimal

2. (c) (ii)

Particulars	P	Q	R	
Selling price per unit (₹)	10000	8000	6000	
Variable cost per unit (₹)	7000	5600	4000	
Machine hours required per unit				
X	20	12	4	
Y	20	18	6	
Z	20	6	2	
Expected Demand (units)	200	200	200	
Contribution Per Unit (CPU) (₹)	3000	2400	2000	
Contribution per hour of Z (Bottleneck) = CPU/Machine hour per unit	150	400	1000	
Rank of preference	3	2	1	
Hours allotted in order of preference: R: $200 \times 2 = 400$ Q: $200 \times 6 = 1200$ P: Residual = $5400 - (400 + 1200)$	3800	1200	400	5400
Optimum Product Mix (Units): Max Demand for R and Q and $3800/20=190$ for P	190	200	200	
Contribution (₹): Units \times CPU	570000	480000	400000	1450000
Fixed Cost (₹)				780000
Total Profit (₹)				670000

3. Answer any two questions (Carrying 8 marks each):

(a) (i) A Company meets the threshold limits for both maintenance of cost records and cost audit in Year-0 and consequently comes under the purview of the Rules in Year-1. If turnover of the company gets reduced to lower than the prescribed threshold limit in Year-1, will Cost Records and Cost Audit be applicable for Year-2? 4

(ii) Is maintenance of cost accounting records mandatory for a multi-product company where all the products are not covered under the Rules even if the Turnover of the individual product/s that are covered under the Rules is less than rupees thirty five crores? 4

Answer:

3. (a) (i) Rule 3 of the Companies (Cost Records and Audit) Rules, 2014 states that a company engaged in the production of the goods or providing of services as prescribed having an overall turnover from all its products and services of rupees thirty five crore or more during the immediately preceding financial year, shall

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include cost records for such products or services in their books of account. Since the threshold limit for applicability of maintenance of cost accounting records is met in Year-0, the cost records are required to be maintained from Year-1. Once the maintenance of cost records becomes applicable, it would be maintained on a continuous basis in the subsequent years also. In the same line, cost audit will be applicable from Year-1 and for every year thereafter.

- (ii) The Rules provide threshold limits for the company as a whole irrespective of whether all its products are as per the prescribed industry/sector provided under Table A or Table B. The Rules do not provide any minimum product specific threshold limits for maintenance of cost accounting records and consequently the company would be required to maintain cost accounting records for the products covered under Table-A or Table-B or both even if the turnover of such products is below rupees thirty five crores.

(b) What are the duties of the Companies in relation to provisions of Section 148 of the Companies Act, 2013 und the Rules framed there under? 8

Answer:

3. (b) Every company required to get cost audit conducted under Section 148(2) of the Companies Act, 2013 shall:-
- (I) Appoint a cost auditor within one hundred and eighty days of the commencement of every financial year;
 - (II) Inform the cost auditor concerned of his or its appointment;
 - (III) File a notice of such appointment with the Central Government within a period of thirty days of the Board meeting in which such appointment is made or within a period of one hundred and eighty days of the commencement of the financial year, whichever is earlier, through electronic mode, in **form CRA-2**, along with the fee as specified in Companies (Registration Offices and Fees) Rules, 2014;
 - (IV) Within a period of thirty days from the date of receipt of a copy of the cost audit report, furnish the Central Government with such report along with full information and explanation on every reservation or qualification contained therein, in **form CRA-4** along with fees specified in the Companies (Registration Offices and Fees) Rules, 2014.

(c) What are the eligibility criteria for appointment as a cost auditor? 8

Answer:

3. (c) Eligibility Criteria under Section 141 of the Companies Act, 2013 read with Rule 10 of the Companies (Audit and Auditors) Rules, 2014 and Section 148 of the Companies Act, 2013. The following persons are not eligible for appointment as a cost auditor:
- (I) A body corporate. However, a Limited Liability partnership registered under the Limited Liability Partnership Act, 2008 can be appointed. [Section 141(3)(a)].
 - (II) An officer or employee of the company. [Section 141(3)(b)].
 - (III) A person who is a partner, or who is in the employment, of an officer or employee of the company. [Section 141(3)(c)].
 - (IV) A person who, or his relative or partner is holding any security of or interest in the company or any of its subsidiary or of its holding or associate company or a subsidiary of such holding company. [Section 141(3)(d)(i)].

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- (V) Relatives of any partner of the firm holding any security of or interest in the company of face value exceeding ₹ 1 lakh. [Section 141(3)(d)(i) and Rule 10(1) of Companies (Audit and Auditors) Rules, 2014].
- (VI) A person who is indebted to the company or its subsidiary, or its holding or associate company or a subsidiary or such holding company, for an amount exceeding ₹ 5 lakhs. [Section 141(3)(d)(ii) and Rule 10(2) of Companies (Audit and Auditors) Rules, 2014].
- (VII) A person who has given any guarantee or provided any security in connection with the indebtedness of any third person to the company or its subsidiary, or its holding or associate company or a subsidiary of such holding company, for an amount exceeding ₹ 1 lakh. [Section 141(3)(d)(iii) and Rule 10(3) of Companies (Audit and Auditors) Rules, 2014].
- (VIII) A person or a firm who, whether directly or indirectly, has business relationship with the company or its subsidiary, or its holding or associate company or subsidiary of such holding company or associate company. [Section 141(3)(e) and Rule 10(4) of Companies (Audit and Auditors) Rules, 2014].
- (IX) A person whose relative is a director or is in the employment of the company as a director or key managerial personnel of the company. [Section 141(3)(f)].
- (X) A person who is in the full time employment elsewhere or a person or a partner of a firm holding appointment as its auditor if such person or persons is at the date of such appointment or reappointment holding appointment as auditor of more than twenty companies. [Section 141(3)(g)].
- (XI) A person who has been convicted by a court for an offence involving fraud and a period of ten years has not elapsed from the date of such conviction. [Section 141(3)(h)].
- (XII) Any person whose subsidiary or associate company or any other form of entity, is engaged as on date of appointment in consulting and providing specialised services to the company and its subsidiary companies: [Section 141(3)(i) and Section 144].
- accounting and book keeping services
 - internal audit
 - design and implementation of any financial information system
 - actuarial services
 - investment advisory services
 - investment banking services
 - rendering of outsourced financial services
 - management services

4. Answer any three questions (Carrying 8 marks each):

(a) (i) The total cost function of Krish Ltd. is $C = x^3/3 - 5x^2 + 27x + 10$, where C is the total cost (₹) and x is the output in units. A tax @ ₹ 3 per unit of output is imposed and producer adds it to his cost. The demand function is given by $P = 2055 - 5X$, where P (₹) is the price per unit of output. Find the profit maximizing output and the price at that level of output. 4

(ii) Z Ltd. Sells output in a perfectly competitive market. The average variable cost function is (₹) $AVC = 300 - 40Q + 2Q^2$ where, Q is the quantity in units.

Z Ltd. has an obligation to pay ₹ 500 irrespective of the output produced. What is the price below which Z Ltd. has to shut down its operation in the short run? 4

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Answer:

4. (a) (i) Given $C = X^3/3 - 5X^2 + 27X + 10 + 3X$ [Tax @ ₹ 3 per unit of output is added]

$$P = 2055 - 5X$$

$$\text{Revenue (R)} = XP - 2055X - 5X^2$$

$$\text{Profit} = R - C = 2055X - 5X^2 - (X^3/3 - 5X^2 + 27X + 10 + 3X)$$

$$= 2055X - 5X^2 - X^3/3 + 5X^2 - 27X - 10 - 3X$$

$$= -X^3/3 + 2025X - 10$$

$$d(\text{Profit})/dX = -3X^2/3 + 2025 = 0 \text{ [at maximization first derivative} = 0]$$

$$X^2 = 2025$$

$$X = 45$$

$D^2 (\text{Profit})/dX^2 = -2x$ [first order derivative = 0 and second order derivative is negative; conditions satisfied for maximization]

Maximum profit occurs at $X = 45$ (units)

$$\text{Price (₹)} = 2055 - 5 \times 45 = 1830$$

(ii) The firm will shut down in the short run if Price falls below minimum average variable cost.

$$AVC = 300 - 40Q + 2Q^2$$

AVC is minimum where $d(AVC)/dQ = 0$ and $d^2(AVC)/dQ^2 > 0$

$$\text{Or, } -40 + 4Q = 0 \text{ [and it is seen that } d^2(AVC)/dQ^2 = 4 > 0]$$

$$\text{Or, } Q = 10$$

$$\text{Hence, minimum AVC} = 300 - 40 \times 10 + 2 \times 100$$

$$= 100(\text{₹})$$

Thus if Price falls below ₹ 100 the firm has to shut down in short run.

(b) (i) A company sells two types of products, one is Super and the other is Delux. Super contains 5 units of chemical A and 2 units of chemical B per jar. Delux contains 3 units of each of chemical A and B per carton. The Super is sold for ₹ 7 per jar and the Delux is sold for ₹ 4 per carton.

A customer requires at least 150 units of chemical A and at least 120 units of chemical B for his business. How many of each type of the products should the customer purchase to minimize the cost while meeting his requirements?

Formulate LPP model for solving the above problem (do not solve it). 4

(ii) Total Cost (₹) = $300x - 12x^2 + \frac{x^3}{3}$, where x is the quantity of output. Calculate output at which (I) marginal cost is minimum and (II) marginal cost = average cost. 4

Answer:

4. (b) (i) LPP formulation:

	Products		Require Units
	Super	Delux	
Chemical A	5	3	150
Chemical B	2	3	120
Cost per unit ₹	7	4	

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Let x be the number of litres of Super
 y be the number of kilograms of Delux
 Z be the cost to customer

Objective function:

$$Z \text{ min} = 7x + 4y$$

Subject to (requirement constraints):

$$5x + 3y \geq 150$$

$$2x + 3y \geq 120$$

$$x, y \geq 0 \text{ (non-negativity constraint)}$$

(ii) Marginal Cost: $MC = dC/dX = 300 - 24X + X^2$

In order that MC is minimum, its first derivative must be equal to zero and second derivative must be positive.

$$dMC/dX = -24 + 2X = 0$$

$$X = 12 \text{ [second derivative} = 2 \text{ (positive)]}$$

(I) output at which marginal cost is minimum = 12 units

$$\text{Average Cost: } AC = \text{Total Cost}/X = 300 - 12X + 1/3 X^2$$

When $MC = AC$

$$MC - AC = 0$$

$$300 - 24X + X^2 - 300 + 12X - 1/3 X^2 = 0$$

$$-12X + 2/3X^2 = 0$$

$$2 X^2 - 36X = 0$$

$$2X(X-18) = 0$$

$$X = 0 \text{ or } 18$$

$$X=18$$

(II) Output at which marginal cost = average cost is 18 units.

(c) Given below are the figures of milk demand for last seven years:

Year	2009	2010	2011	2012	2013	2014	2015
Milk Demand (in lakh liters)	830	920	1020	1130	1060	1240	1410

You are required to determine the trend values by using least square method and estimate the demand of milk for the year 2017. 8

Answer:

4. (c) (i) Calculation of trend values by Least Squares Method

Year (T)	Sales (Y)	Time Deviation $X = (T-2012)/I$	XY	X^2	Trend Values $Y_c = a + b X$ (In Litres)
2009	830	-3	-2490	9	827.85
2010	920	-2	-1840	4	914.28

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2011	1020	-1	-1020	1	1000.71
2012	1130	0	0	0	1087.14
2013	1060	1	1060	1	1173.57
2014	1240	2	2480	4	1260
2015	1410	3	4230	9	1346.43
N = 7	$\sum Y = 7610$	$\sum X = 0$	$\sum XY = 2420$	$\sum X^2 = 28$	

Trend Values $Y_c = a + b X$

Where,

$$\text{Normal Eqn 1: } \sum Y = Na + b \times \sum X$$

$$7610 = 7 \times a + 0$$

$$a = 7610/7 = 1087.14$$

$$\text{Normal Eqn 2: } \sum XY = a \times \sum X + b \times \sum X^2$$

$$2420 = 0 + 28b$$

$$b = 2420/28 = 86.43$$

$$\text{Trend Values } Y_c = 1087.14 + 86.43 \times X$$

FOR 2009 TO 2015 (shown in table)

For 2017

$$X = 2017 - 2012 = 5$$

$$\text{Estimated Demand} = 1087.14 + 5 \times 86.43 = 1519.29 \text{ (Litres)}$$

(d) (i) What are the differences between ISO-quant curve and indifference curve? 4

(ii) Briefly explain the 'Penetration Price Policy'. 4

Answer:

4. (d) (i) Differences between ISO-quant curve and indifference curve.

- I. Indifference curve refers to two commodities. ISO-quant curve relates to combination of two factors of production.
- II. Indifference curve indicates level of satisfaction; ISO-quant curve indicates quantity of output.
- III. No numerical measurement of satisfaction is possible; so it cannot be labeled. ISO-quant curve can easily be labeled as physical units of output are measurable.
- IV. The extent of difference of satisfaction is not quantifiable in the indifference map. But in ISO-quant map we can measure exact difference between quantities represented by one curve and another.

(ii) Penetration Price Policy: Instead of setting a high price, the firm may set a low price for a new product by adding a low mark-up to the full cost. This is done to penetrate the market as quickly as possible. The assumptions behind the low penetration pricing policy are:

- I. The new product is being introduced in a market which is already served by well-known brands. A low price is necessary to attract gradually consumers who are already accustomed to other brands.

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- II. The low price would help to maximize the sales of the product even in the short period.
- III. The low price is set in the market to prevent the entry of new products.