

Roll No.

Total No. of Questions – 7

Total No. of Printed Pages – 16

Time Allowed – 3 Hours

Maximum Marks – 100

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Answers to questions are to be given only in English except in the case of candidates who have opted for Hindi medium. If a candidate has not opted for Hindi medium, his/her answers in Hindi will not be valued.

Question No. 1 is compulsory.

Answer any five questions from the remaining six questions.

Working notes should form part of the answer.

No statistical or other table will be provided with this question paper.

Wherever necessary, candidates may make appropriate assumptions and clearly state them.

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1. (a) The following are cost data for three alternative ways of processing work cases in an office system : 5

	A Manual (₹)	B Semi Automatic (₹)	C Fully Automatic (₹)
Total fixed cost per month	3,000	9,000	25,000
Variable cost per case	48	28	8

Calculate cost indifference points. Interpret your result. State for what volumes of cases will you prefer each of A, B and C.

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- (b) Classify the following items under appropriate categories of quality costs, viz., Prevention Costs (PC), Appraisal Costs (AC), Internal Failure Costs (IFC) and External Failure Costs (EFC) : **5**

- (i) Unplanned replacement to customers
- (ii) Correction of a bank statement
- (iii) Design review
- (iv) Equipment accuracy check
- (v) Staff training
- (vi) Reprocessing of a loan operation
- (vii) Product liability warranty
- (viii) Product acceptance
- (ix) Wastage of material
- (x) Planned maintenance of equipment

(Candidates may opt for the following format and fill in the appropriate Roman numerals under each column)

Costs →	PC	AC	IFC	EFC
Q. Nos. →				

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- (c) The unit profit matrix based on four factories and three sales depots of a company and unbalanced quantities of demand and supply are tabulated below. The main object of the company is to maximize profit. Assume that there is no profit in case of surplus production. 5

	Factories	Sales Depots			Supply (Nos.)
		S1	S2	S3	
Towns	F1	6	6	1	10
	F2	-2	-2	-4	150
	F3	3	2	2	50
	F4	8	5	3	100
Demand (Nos.)		80	120	150	

Formulate the above as a usual transportation minimization problem and find the initial solution by using Vogel's Approximation Method (VAM).

- (d) A and B are two customers of XYZ Electronics Ltd., a manufacturer of audio players. 5

Selling price per unit is ₹ 5400. Its cost of production per unit is ₹ 4,420.

Additional costs are :

Order Processing Cost ₹ 2,000 per order

Delivery Costs ₹ 3,500 per delivery

Details of customers A and B for the period are given below :

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	Customer A	Customer B
Audio Players purchased (nos.)	350	500
No. of orders	5 (each of 70 units)	10 (each of 50 units)
No. of deliveries	5	0

The company's policy is to give a discount of 5% on the selling price on orders for 50 units or more, and to further give 8% discount on the undiscounted selling price if a customer uses his own transport to collect the order. Assume that production levels are not altered by these orders.

- (i) You are required to analyse the profitability by comparing profit per unit for each customer.
- (ii) Comment on the discount policy on delivery.

2. (a) Innovation Ltd. has entered into a contract to supply a component to a company which manufactures electronic equipments. 8

Expected demand for the component will be 70000 units totally for all the periods. Expected sales and production cost will be

Period	1	2	3	4
Sales (units)	9500	17000	18500	25000
Variable cost per unit	30	30	32.50	35

Total fixed overheads are expected to be ₹ 14 lakhs for all the periods.

The production manager has to decide about the production plan.

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The choices are :

Plan 1 : Produce at a constant rate of 17500 units per period. Inventory holding costs will be ₹ 6.50 per unit of average inventory per period.

Plan 2 : Use a Just-In-Time (JIT) system

Maximum capacity per period normally · 18000 units

It can produce further up to 10000 units per period in overtime.

Each unit produced in overtime would incur additional cost equal to 30% of the expected variable cost per unit of that period.

Assume zero opening inventory.

- (i) Calculate the incremental production cost and the savings in inventory holding cost by JIT production system.
- (ii) Advise the company on the choice of a plan.
- (b) R_3C_2 denotes the element at the intersection of the third row and 2nd column. Under this notation, R_1C_1 , R_2C_1 , R_3C_1 , R_3C_2 , R_3C_3 , R_4C_3 , R_4C_4 were the only zero elements in a 4×4 minimisation assignment problem after the row minimum and column minimum operations. 8
- (i) In the next step to draw lines to cover zeroes, a student drew 4 horizontal lines covering rows R_1 , R_2 , R_3 and R_4 . Will he arrive at the optimal assignment at the next step ? Why ? Explain the concept.
- (ii) Independent of (i), if you are given the additional information that R_2C_2 element is lesser than the Row 1 and Row 2 non-zero values, how will you arrive at the optimal solution ?

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3. (a) Alpha Ltd. uses standard costing system for manufacturing its single product 'APS'. 8

Standard cost card is as follows :

	Per unit (₹)
Selling Price	120
Direct Material (1 kg per unit)	20
Direct Labour (6 hrs @ ₹ 8 per hour)	48
Variable Overheads	24
Contribution	<u>28</u>

Actual and budgeted activity levels in units for the month of September are :

	Budget	Actual
Sales	50,000	51,200
Production	50,000	52,000

Actual sales revenue and variable costs for the month of September are given as under :

Sales	6133760
Direct Material	1065600
Direct Labour (3,00,000 hrs)	2442000
Variable Overheads	1228000

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Calculate :

- (i) Direct Labour Rate Variance
- (ii) Direct Labour Efficiency Variance
- (iii) Sales Volume Variance
- (iv) Sales Price Variance
- (v) Comment on your findings in (i) and (ii) above.

(b) The following information is given for a certain project :

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Activity	Normal Duration	Crash Duration	Difference	Normal Cost	Crash Cost	Difference	Activity slope
	(Days)	(Days)	(Days)	(₹)	(₹)	(₹)	(₹/day)
	I	II	III = I - II	IV	V	VI = V - IV	VII = VI/III
1-2	9	6	3	640	700	60	20
1-3	8	5	3	500	575	75	25
1-4	15	10	5	400	550	150	30
2-4	5	3	2	100	120	20	10
3-4	10	6	4	200	260	60	15
4-5	2	1	1	100	140	40	40

- (i) What is the normal project duration ?

- (ii) Perform step-by-step crashing to reduce the project duration by 5 days. What is the cost incurred for the optimal crashing exercise ?
- (iii) Independent of (ii) above, if the Project Manager is able to save as per rates in Column VII of the above table for every day relaxed for the activities, compute the number of days and associated savings for 5 days of relaxation, in the order of optimality, without extending the project duration as per (i). The Project Manager is interested in this exercise to schedule resources.

4. (a) JCL Corporation manufactures and sells two products RB and RD. Three types of materials, A, B and C are required for producing these products. Projected information for 2015-16 is given below :

Product	Projected sales for 2015-16	Inventory (in units)		Direct Labour Requirement Hours/Unit
		on 1-4-2015	on 31-3-2016	
	Units			
RB	75,000	25,000	31,250	4
RD	50,000	10,000	11,250	6

Raw material stock and usage are as follows :

Direct Material	Required per unit		Inventory on 1-4-2015	Inventory on 31-3-2016
	RB	RD		
A	5 kg	5.00 kg	40000 kg	45000 kg
B	2.50 kg	3 kg	36250 kg	40000 kg
C	0	1 kg	7500 kg	8750 kg

You are required to prepare the following for 2015-16 :

- (i) Production budget (in units)
 - (ii) Direct material purchase budget in quantities for A, B and C.
 - (iii) After (i) and (ii), you are told that only 6,00,000 labour hours will be available for production. If there is no requirement to hold the stated level of finished goods closing inventory, what would be the principal budget factor ? Substantiate your view with appropriate figures.
- (b) Mr. X has ₹ 10 lacs which he wants to invest in the share market in anticipation of having good returns. He wants to invest only in two stocks and one mutual fund with an investment allowed in each stock or mutual fund not being more than ₹ 7 lacs.

	Expected rate of Return	Risk rating (on a scale of 0 to 10)
Stock L	15%	5
Stock M	18%	8
Mutual Fund	13%	4

He does not want to accept an average rate of return below 12% or a risk factor above 6.

How much money he should invest in each alternative so as to obtain the highest annual total return ?

Formulate the above as a linear program and present the inequalities with coefficients in their simplest integer forms.

5. (a) Four products P, Q, R and S are produced by profit centre Division A. 12

Each product is sold in the external market also. Data for the period are as follows :

	P	Q	R	S
Market price per unit (₹)	70	69	56	46
Variable cost of production per unit (₹)	66	59	36	37
Labour hours per unit	3	2	2	3
Specific fixed costs (₹) per 10,000 units of product	2500	12600	15000	18000

Product S can be transferred to Division B but the maximum quantity that might be required for transfer is 20,000 units of S. The specific fixed costs given above are avoidable if a product is not made. They are incurred for every 10,000 units.

The maximum sales (units) in the external market are :

P 30,000

Q 31,000

R 28,000

S 18,000

Division B can purchase the same product at a slightly cheaper price of ₹ 45 per unit instead of receiving transfers of product S from Division A without any extra transport/inspection costs. B can also take partial supplies from A.

The total labour hours available in Division A is 192000 hours.

- (i) What is A's optimal product mix and the corresponding contribution net of specific fixed costs ?
- (ii) How many units should A transfer to B and at what price ?
- (iii) Is it in the company's interest to transfer 20,000 units of S to B ?

- (b) The budgeted cost data of a product manufactured by XYZ Co. Ltd. is 4
furnished as below :

Budgeted units to be produced – 200000

Variable cost (₹) 32 per unit

Fixed cost (₹) 16 lacs

It is proposed to adopt cost plus pricing approach with a mark up of 25% on full budgeted cost basis.

However, research by the marketing department indicates that demand of the product in the market is price sensitive. The likely market responses are as follows :

Selling price (₹ per unit)	44	48	50	56	60
Annual Demand (units)	168000	152000	140000	128000	108000

Analyse the above situation and determine the best course of action.

6. (a) X Ltd. makes a single product with the following details :

Description	Current Situation	Proposed Change
Selling Price (₹/unit)	10	
Direct Costs (₹/unit)	5	
Present number of setups per production period, (before each production run, setup is done)	42	
Cost per set up (₹)	450	Decrease by ₹ 90
Production units per run	960	1008
Engineering hours for production period	500	422
Cost per engineering hour (₹)	10	

The company has begun Activity Based Costing of fixed costs and has presently identified two cost drivers, viz. production runs and engineering hours. Of the total fixed costs presently at ₹ 96,000, after the above, ₹ 72,100 remains to be analysed. There are changes as proposed above for the next production period for the same volume of output.

- (i) How many units and in how many production runs should X Ltd. produce in the changed scenario in order to break-even?
- (ii) Should X Ltd. continue to break up the remaining fixed costs into activity based costs? Why?

- (b) A dietician wants to simulate arrivals of her patients and her consultation time with the following random numbers. Her assistant has already prepared the random number allocation tables. 8

The dietician wants to have an idea of her idle time and patients' waiting time. She starts her consultation at 10:00 a.m. and wants to give an appointment an interval of 20 minutes. The Random Number table is as follows :

Arrival of patient	15	4	35	67	75	86	25
Consultation time	17	15	12	58	60	72	30

Random Number Allocation Table : 1

Patient Punctuality	Probability	Cumulative Probability	Random No.
Minutes early 3	0.05	0.05	00 - 04
2	0.18	0.23	05 - 22
1	0.40	0.63	23 - 62
On time	0.25	0.88	63 - 87
Minutes late 2	0.08	0.96	88 - 95
4	0.04	1.00	96 - 99

Random Number Allocation Table : 2

Consultation Time	Probability	Cumulative Probability	Random No.
15	0.13	0.13	00 – 12
18	0.15	0.28	13 – 27
20	0.28	0.56	28 – 55
25	0.34	0.90	56 – 89
30	0.10	1.00	90 – 99

- (i) Simulate the arrival and consultation times and find out the dietician's idle times and patients' waiting times.
- (ii) If clients are sensitive to waiting, how would you advise the dietician as a Management Accountant, based on the results of your exercise ?

7. Answer any **four** out of the following **five** questions :

- (a) A company is planning a new product. Market research information suggests that 40000 units of the product can be sold at a maximum of ₹ 25 per unit. The company seeks a minimum mark-up of 25% on product cost. It is estimated that the lifetime costs of the product will be as follows :

- (1) Research and development, design costs ₹ 1,50,000
- (2) Manufacturing costs ₹ 16 per unit
- (3) End of life costs ₹ 70,000
- (4) Promotion and capacity cost ₹ 20,000.

Should the product be manufactured ?

- (b) State the most appropriate pricing policy to be adopted in the following independent situations : 4

(Situations need not be copied. Only the Roman numeral and policy need to be mentioned in the answer book.)

- (i) Modern patented drug entering the market.
- (ii) The latest version of a mobile phone is being launched by an established, financially strong company.
- (iii) An established company has recently entered the stationery market segment and launched good quality paper for printing at home and office.
- (iv) A car manufacturer is launching an innovative, technologically advanced car in the highly priced segment.
- (c) What are the steps involved in Zero Based Budgeting ? 4
- (d) Proposal A is being evaluated against Proposal B. Fill up column IV of the following table : 4

I	II	III	IV
Sl. No.	Type of Cost	Classification	Condition under which the classification happens
(i)	Variable cost per unit	Irrelevant	
(ii)	Unavoidable fixed costs	Relevant	
(iii)	Out of pocket costs in future	Relevant	
(iv)	Sunk cost	Irrelevant	

(Only Columns I and IV are required to be presented in the answers)

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(e) State whether and why the following statements are valid or not valid :

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(Statements need not be copied into answer book.)

(i) Target costing is not applicable to a monopoly market.

(ii) Target costing ignores non-value added activities.

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