

Seat No.	
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B.E. (Civil) (Semester - VII) Examination, May - 2017

OPTIMIZATION TECHNIQUES

Sub. Code : 67570

Day and Date : Friday, 19 - 05 - 2017

Total Marks : 100

Time : 2.00 p.m. to 5.00 p.m.

- Instructions :**
- 1) Question 4 and Question 8 are compulsory from rest solve any two each section.
 - 2) Figures to the right indicate full marks.

SECTION - I

- Q1) a)** Explain optimization in detail with its essential characteristics? Explain engineering applications of optimization. **[6]**
- b)** Solve by Penalty method **[10]**

$$\text{Minimize } Z = 4x_1 + x_2$$

Subject to;

$$3x_1 + 4x_2 = 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

- Q2) a)** A company has factories at four different places which supply warehouses A, B, C, D & E. Monthly factory capacities are 200, 175, 150 & 325 respectively. Monthly ware house requirements are 110, 90, 120, 230 & 160 respectively. Unit shipping costs are given in the table below. The costs are in Rs. Shipments from 1 to B & from 4 to D is not possible determine optimum distribution to minimize shipping cost. **[10]**

	From					
		A	B	C	D	E
From	1	13	-	31	8	20
	2	14	9	17	6	10
	3	25	11	12	17	15
	4	10	21	13	-	17

P.T.O.

- b) Explain step by step how will you solve the Assignment problem for maximization by Hungarian method. [6]

Q3) a) What is decision tree? Explain with suitable example. [10]

- b) Solve the following problem to determine the strategies of the players. Also state the value of game. [6]

		Player B	
		B1	B2
Player A	A1	140	100
	A2	130	120
	A3	160	110

Q4) Write short notes on any three. [18]

- Big M Method.
- Importance of Duality Theory.
- Degeneracy in transportation problem.
- Standard and Canonical form of LPP.

SECTION - II

Q5) a) State various types of Deterministic and probabilistic Inventory Models. Describe in detail any one probabilistic model. [9]

- b) Ships arrive at a port at an average rate of 8 ships per week and their arrival pattern follows poisson's distribution. On an average 12 ships are loaded and unloaded with exponential distribution per week. Determine [9]

- The chance that ship will straight away be berthed for loading and unloading the proportion of time berthing facility being used.
- The average queue length & number of ships in the system.
- The average time spent by the ship waiting in the queue & in the system.
- Probability that there are two ships in the queue.

- Q6) a)** Describe all nonlinear programming techniques. [10]
 b) The average cost of manufacturing one unit of certain item is given as $C(x) = 8100 - 10x + 0.004x^2$ determine the value of 'x' that will minimize average cost per unit. [6]

- Q7) a)** State whether following functions are concave or convex [6]
 i) $f(x) = -4x$
 ii) $f(x) = 18x^2$
 b) A drug manufacturing concern has ten medical representatives working in three sales areas. The probability for each representative in three sales areas is as follows. [10]

No. of representatives	Probabilities (in thousands of Rs.)		
	Area I	Area II	Area II
0	15	26	30
1	22	35	38
2	30	40	44
3	38	46	50
4	45	55	60
5	48	62	65
6	54	70	72
7	60	76	80
8	65	83	85
9	70	90	90
10	70	95	85

Determine the optimum allocation of medical representatives in order to maximize profit.

- Q8) Write short notes on.** [18]
 a) Cutting plane method for integer programming problem.
 b) Forecasting techniques.
 c) Queuing theory applications in engineering.

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