

Printed Pages : 4



CA-402

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 214402

Roll No.

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MCA

**(SEM. IV) THEORY EXAMINATION, 2014-15
COMPUTER BASED OPTIMIZATION TECHNIQUES**

Time : **3 Hours**]

[Total Marks : **100**

- Note: (1) Attempt All Questions.
(2) All Question carry equal marks.

- 1 Attempt any FOUR questions. (5×4=20)
- What do you mean by inventory? What are its types?
 - Define Economic Order Quantity?
 - Explain Linear Programming? What are the limitations of L.P.?
 - Briefly explain sensitivity analysis?
 - What do you mean by degeneracy in L.P. problem?
 - What are the main steps in the basic procedure of modified distribution method?

- 2 Attempt any FOUR questions. (5×4=20)
- (a) How could you compare the primal and dual while solving L.P.P.?
 - (b) Describe charnes' Big-M Method with one example.
 - (c) Discuss the ways to identify the following situations while solving L.P.P.
 - (i) Multiple optima
 - (ii) Redundant constraints
 - (d) Briefly define the disadvantages of revised simplex method over the original simplex method?
 - (e) What are the loops in transportation problem?
 - (f) How could you define an Assignment problem? Give one example.

- 3 Attempt any TWO questions. (10×2=20)

- (a) Solve the L.P. problem :

$$\text{Minimize: } Z = x_1 - 3x_2 + 2x_3$$

Subject to the constraints:

$$3x_1 - x_2 + 3x_3 \leq 7$$

$$-2x_1 + 4x_2 \leq 12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

$$\text{and } x_1, x_2, x_3 \geq 0$$

(b) Solve the following transportation problem :

	D_1	D_2	D_3	D_4	D_5	D_6	Available
O_1	9	12	9	6	9	10	5
O_2	7	9	7	7	5	5	6
O_3	6	5	9	12	3	11	2
O_4	6	8	11	2	2	10	9
Req.	4	4	6	2	4	2	22

(c) A factory needs 36,000 units annually of a component that cost Rs. 2 per unit. Cost of each order placing is Rs. 25 and inventory carrying cost is Rs. 10 per year.

- (i) Find the economic lot size and the total inventory cost.
- (ii) What is the time between placing of order?

4 Attempt any TWO questions. (10×2=20)

(a) Use Wolfe's method to solve the quadratic programming problem:

$$\text{Maximize: } Z = 2x_1 + 3x_2 - 2x_1^2$$

Subject to constraints :

$$x_1 + 4x_2 \leq 4$$

$$x_1 + x_2 \leq 4$$

$$\text{and } x_1, x_2 \geq 0$$

- (b) An aircraft company uses rivets at an approximate customer rate of 2500 kg per year. Each unit costs Rs. 30 per kg and the company personnel estimate that it costs Rs. 130 to place an order, and that the carrying cost of inventory is 10% per year. How frequently should orders for rivets be placed? Also determine the optimal size of each order.
- (c) What do you mean by multistage decision problem? Also discuss its solution by Dynamic Programming with finite number of stages.

5 Attempt any TWO questions. (10×2=20)

- (a) Use dynamic programming to solve the L.P.P.

$$\text{Maximize: } Z = x_1 + 9x_2$$

Subject to the constraints:

$$2x_1 + x_2 \leq 25$$

$$x_2 \leq 11$$

$$x_1, x_2 \geq 0$$

- (b) What are the basic elements of Queuing models?
- (c) Explain the role of exponential and Poisson distribution.