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

PAPER ID : 1434 Roll No.

M.C.A

(SEM III) ODD SEMESTER THEORY EXAMINATION 2009-10

COMPUTER BASED OPTIMIZATION TECHNIQUES

Time : 3 Hours] *[Total Marks : 100*

Notes : (1) *Attempt all questions.*
(2) *All questions carry equal marks.*

1 Attempt any **two** of the following : **10×2=20**

(a) For the optimum order quantity for a product for which the price breaks are as follows :

Quantity	**Unit cost price**
$0 \le q_1 \le 500$	10.00
$500 \le q_2$	9.25

The monthly demand for the product is 200 units, the cost of storage is 2% of the unit cost and the cost of ordering is Rs. 350.00. Find the optimum purchase quantity.

(b) (1) The annual consumption of an item is 200 items. The ordering cost is Rs, 100 per order. The carrying cost is Rs. 0.80 per unit per year. Assuming working days as 200 lead time 20 days and safety stock 100 units. Calculate :
(i) EOQ
(ii) The number of order per year
(iii) Re-order level
(iv) Total annual ordering and carrying cost.

(2) Illustrate single period inventory model with shortest cost in detail.

(c) (1) List the five applications of Inventory model.

(2) The probability p_n of failure just before age n is shown below. If individual replacement costs Rs. 12.50 and group replacement costs Rs. 3.00 per item, find the optimum replacement policy.

n	1	2	3	4	5
p_n	0.1	0.2	0.25	0.3	0.15

2 Attempt any **two** of the following : **10×2=20**

(a) (1) Enlist the algorithm of Simplex method for solving linear programming (LPP).

(2) Explain the Charnes' Big-M method of solving Linear Programming Problems (LPP).

(b) List the various steps of branch and bound method for solving Integer Linear Programming Problems.

(c) (1) What do you mean by sensitivity analysis ? Discuss its significance in solving LPP.

(2) Illustrate the important results (at least three) in Duality.

3 Attempt any **two** of the following : **10×2=20**

(a) Apply Dual Simplex Method to solve the LPP.

Max $Z = -3x_1 - 2x_2$

Subject to

$$x_1 + x_2 \geq 1$$
$$x_1 + x_2 \leq 7$$
$$x_1 + 2x_2 \geq 10$$
$$x_2 \leq 3$$
$$x_1, x_2 \geq 0$$

(b) Find the initial solution to the following TP using Vogel's Approximation Method (VAM) and Matrix-Minima (MM) method.

Factory	Destination				
		D_1	D_2	D_3	D_4	Supply
	F_1	3	3	4	1	100
	F_2	4	2	4	2	125
	F_3	1	5	3	2	75
	Demand	120	80	75	25	300

(c) A company has three plants A, B and C, 3 warehouses X, Y and Z. The number of units available at the plants is 60, 70, 80 and the demand at X, Y, Z are 50, 80, 80 respectively. The unit cost of transportation is given in the following table :

	X	Y	Z
A	8	7	3
B	3	8	9
C	11	3	5

Find the allocation so that the total transportation cost is minimum.

4 Attempt any **two** of the following : **10×2=20**

(a) Describe the Hungarian Method for Assignment problem (AP).

(b) Illustrate Wolfe's method for quadratic programming in detail.

(c) What do you mean by Dynamic Programming? Use the dynamic programing to solve the LPP.

Max $Z = x_1 + 9x_2$

Subject to the constraints

$$2x_1 + x_2 \leq 25$$

$$x_2 \leq 11$$

$$x_1, x_2 \geq 0$$

5 Attempt any **two** of the following : **10×2=20**

(a) Describe Multistage decision problem and its solution in context of dynamic programming.

(b) What do you mean by Queuing theory ? Describe basic elements of Queuing model.

In a public telephone booth the arrivals are on the average 15 per hour. A call on the average takes 3 minutes. If there is just one phone, find

(i) the expected number of callers in the booth at any time ?

(ii) the production of the time the booth is expected to be idle ?

(c) Write short notes on :

(i) Erlong Distribution and Poisson Distribution.

(ii) Markovian process, steady and transit state.
