Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

MCA (Sem.–4)

COMPUTER BASED OPTIMIZATION METHODS

Subject Code : MCA-305

Paper ID : [B0116]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. **SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.**
2. **SECTION-E is COMPULSORY carrying TWENTY marks in all.**
3. Use of non-programmable **scientific calculator** is allowed.

SECTION-A

1. Define operation research. Describe briefly its applications. (10)

l to solve the following system of equations :

Maximize $Z = 4X_1 + X_2 + 3X_3 + 5X_4$

Subject to $4X_1 - 6X_2 - 5X_3 - 4X_4 \geq -20$

$-3X_1 - 2X_2 + 4X_3 + X_4 \leq 10$

$-8X_1 - 3X_2 + 3X_3 + 2X_4 \leq 20$

2 3 4 $X_1, X, X, X \geq 0$ (10)

SECTION-B

3. Solve the following transportation problem for which the transportation cost (rupees per unit), origin availabilities and destination requirements are given below : (10)

Destinations→ Origin↓	D_1	D_2	D_3	D_4	D_5	D_6	Availabilities
O_1	1	2	1	4	5	2	**30**
O_1	3	3	2	1	4	3	**50**
O_1	4	2	5	9	6	2	**75**
O_1	3	1	7	3	4	6	**20**
Requirements	**20**	**40**	**30**	**10**	**50**	**25**	**175**

4. State the assignment model. Describe an algorithm for the solution of the assignment problem. (10)

SECTION - C

5. What are the different decision making environments? Explain how decision making differs under conditions of certainty and risk. (10)

6. (a) Distinguish between dependent events and independent events. (5)

   (b) Write a note on conditional probability. (5)

SECTION-D

7. What is dynamic programming? How it is different from linear programming? Give some applications of dynamic programming. (10)

8. Explain the revised simplex method and compare it with the regular simplex method. (10)

SECTION - E

9. Answer the following questions in brief :

(a) What is unbounded solution in LPP?

(b) What is degeneracy in simplex method?

(c) What is V.A.M.?

(d) What is meant by unbalanced transportation problems?

(e) What is degeneracy in transportation problems?

(f) Define probability.

(g) What is joint probability?

(h) What are mutually exclusive events?

(i) What is integer programming.

(j) Define unrestricted variables.