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

Total No. of Questions : 09

MCA (2013 and 2014 Batch) (Sem.–3)

COMPUTER BASED OPTIMIZATION TECHNIQUES

Subject Code : MCA-302

M.Code : 70773

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTION TO CANDIDATES :

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

SECTION-A

1. What are the problems that fall within the domain of O.R.? Discuss the nature and characteristics of O.R. in detail.

2. Using Simplex method, solve the L.P. problem: Minimize $Z = 4x_1 + 8x_2 + 3x_3$, subject to:

   $x_1 + x_2 \geq 2$

   $2x_1 + x_3 \geq 5$

   $x_1, x_2, x_3 \geq 0$

SECTION-B

3. Determine the optimal transportation plan from the following table giving the plant to market shipping costs and qualities required at each market and available at each plant:

Plant	Market				Availability
	W_1	W_2	W_3	W_4	
F_1	11	20	7	8	50
F_2	21	16	10	12	40
F_3	8	12	18	9	70
Requirement	30	25	35	40	

4. What is an Assignment problem? How is it different from Transportation problem? Write the Assignment algorithm. What is an unbalanced assignment problem? Explain with the help of suitable example.

SECTION-C

5. A pair of fair dice is rolled once. Let x be the random variable whose value for any outcome is the sum of the two numbers on the dice.

   a) Find the probability function x, construct the probability table and a probability chart.

   b) Find the probability that x is an odd number.

   c) Find P ($3 \leq x_i \leq 9$) and P ($0 \leq x_i \leq 4$)

6. What is Dynamic Programming? What are its features? Explain with examples, the applications of dynamic programming approach.

SECTION-D

7. Discuss the following decision making models and explain how problems under each is solved:

   a) Decision making under assumed certainty.

   b) Decision making under risk.

   c) Decision making under uncertainty.

8. Use Branch and Bound method to solve the following integer L.P.P.:

   Maximize $Z = x_1 + 2x_2$ subject to the constraints:

   $x_1 + 2x_2 \leq 12$,

   $4x_1 + 3x_2 \leq 14$, where $x_1, x_2 \geq 0$ and integers.

SECTION-E

9. Answer briefly :

   a) Discuss briefly the origin and development of OR.

   b) What is a Model in O.R.? Give examples.

   c) Define Duality.

   d) Differentiate between basic variable, slack variable and surplus variable.

   e) What is unbalanced Transportation Problem? Give example.

   f) Show that optimum assignment schedule remains unaltered if we add or subtract a constant to/from all the elements of the row or column of the assignment cost matrix.

   g) What is a Payoff Matrix?

   h) Differentiate between deterministic and probabilistic dynamic programming.

   i) Define Conditional Probability.

   j) State the addition law of probability.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.