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

Total No. of Questions : 09

MCA (2012 & Onward) (Sem.–3)

COMPUTER BASED OPTIMIZATION TECHNIQUES

Subject Code : MCA-302

Paper ID : [B1158]

Time : 3 Hrs. Max. Marks :100

INSTRUCTIONS 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.**
3. Use of non-programmable **scientific calculator** is allowed.

SECTION-A

1. State the different types of models used in operations research. Explain briefly the general methods for solving these operations research models.

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. Use duality to solve the following L.P.P. :

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

   $x_1 + 2x_2 \leq 10$, $x_1 + x_2 \leq 6$, $x_1 - x_2 \leq 2$, $x_1 - 2x_2 \leq 1$; $x_1, x_2 \geq 0$.

4. Explain N-W corner method with example.

SECTION-C

5. (a) From a bag containing 10 black and 05 white balls, a ball is drawn at random. What is the probability that it is white?

   (b) Divide a positive quantity in such a way that their product is maximum.

6. Use dynamic programming to find the value of maximum $Z = y_1 \cdot y_2 \cdot y_3$

   subject to the constraints : $y_1 + y_2 + y_3 = 5$, $y_1, y_2, y_3 \geq 0$.

SECTION D

7. Use branch and bound method to solve the following integer L.P.P. :

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

   $x_1 + 2x_2 \leq 12$, $4x_1 + 3x_2 \leq 14$; $x_1, x_2 \geq 0$, and are integers.

8. Find the optimum integer solution to the following L.P.P :

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

   $x_1 + x_2 \leq 7$, $2x_1 \leq 11$, $2x_2 \leq 7$; $x_1, x_2 \geq 0$, and are integers.

SECTION E

9. **Write briefly :**

   a. "*O.R. is no more than a quantitative analysis of a problem*". Comment.

   b. Explain the term Optimum Solution.

   c. Explain the meaning of the terms bounded and unbounded solutions of an L.P.P.

   d. Explain in brief the term artificial variables.

   e. Describe the transportation table.

   f. What is degeneracy in Transportation Problem?

   g. Give a mathematical formulation of the Assignment Problem.

   h. Define Probability.

   i. Define Normal Distribution.

   j. What do you mean by algebra of events? Explain.