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

Total No. of Questions : 09

MCA (2012 to 2014 Batch) (Sem.–3)

COMPUTER BASED OPTIMIZATION TECHNIQUES

Subject Code : MCA-302

Paper ID : [B1158]

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

SECTION-A

1. Solve by Simplex Method

   Maximize $Z = 30x_1 + 15x_2$

   Subject to Constraints :

   $x_1 + 3/2x_2 \leq 200$

   $2x_1 + x_2 \leq 200$

   $3x_1 \leq 200$

   $x_1, x_2 \geq 0$ 20

2. Explain the following terms :
   1) Constraints
   2) Degenerate solution
   3) Optimal region
   4) Basic & non basic variables
   5) Concept of Duality 4×5=20

SECTION-B

3. Solve by Vogel's Approximation Method. 20

Plants	Warehouse				Supply
	W1	W2	W3	W4	
P1	6	2	6	12	120
P2	4	4	2	4	200
P3	13	8	7	2	80
DEMAND	50	80	90	180	400

4. a) Explain in detail 'Stepping stone method' for transportation problem with illustration. 10

   b) Explain with example how Initial Basic Feasible Solution for transportation problem using Least Cost Method. 10

SECTION-C

5. a) What is Conditional Probability? Explain addition and multiplication laws of probability. 10

   b) What are applications of dynamic programming? 10

6. a) In a class, there are 15 boys and 10 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected, is : 10

   b) One card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is not a face card (Jack, Queen and King only)? 10

SECTION-D

7. What are various models of Integer programming? Explain **any two.** 20

8. Solve the following IPP by using Gomory method.

   Maximize $Z = -4x_1 + 5x_2$

   Subject to $-3x_1 + 3x_2 \leq 6$

   $2x_1 + 4x_2 \leq 12$

   $x_1 \geq 0, x_2 \geq 0$ and Integer. 20

SECTION-E

9. Write briefly :

a) Write four assumptions of linear programming.

b) Describe post optimality analysis.

c) What is key relationship between dual and primal problems?

d) Write a short note on Sensitivity analysis.

e) Give two applications of dynamic programming.

f) In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?

g) What is the probability of getting a sum 9 from two throws of a dice?

h) Three unbiased coins are tossed. What is the probability of getting at most two heads?

i) Write a short note on Branch and Bound Method.

j) How LPP is solved using graphical method? 2×10=20