Roll No .....

MEIC - 104

M.E./M.Tech., I Semester

Examination, June 2013

Operation Research and Optimization

Time : Three Hours

Maximum Marks : 70

Note : 1. *Attempt any five questions.*
2. *All questions carry equal marks.*

1. a) Define linear programming problem and solve the given L.P.P. by graphical method.

$$\text{Max } Z = 2x_1 + 3x_2$$

Subject to
$$x_1 + x_2 \le 30$$
$$x_2 \ge 3$$
$$x_2 \le 12$$
$$x_1 - x_2 \ge 0$$
$$0 \le x_4 \le 20$$

RGPVONLINE.COM

b) Solve by simplex method.

$$\text{MaxZ} = 4x_1 + 10x_2$$

Subject to
$$2x_1 + x_2 \le 10$$
$$2x_1 + 5x_2 \le 20$$
$$2x_1 + 3x_2 \le 18$$

2. a) State the 'principle of optimality' in dynamic programming and give a mathematical formulation of a dynamic programming problems.

b) Use dynamic programming to show that

$$z = \sum_{i=1}^{n} P_i \log Pi$$

subject to constraints

$$\sum_{i=1}^{n} P_i = 1 \; and \; P_i \geq 0$$

is maximum when $P_1 = P_2 = P_3 = - - - - = P_n = \frac{1}{n}$.

3. a) State and prove Kuhu-Tucker necessary and sufficient conditions in non linear programming.
   b) Define Non Linear programming problem and explain different types of non Linear programming problem.

4. a) What is quadratic programming? Explain Walfe's method of solving it.
   b) Solve the integer programming problem.

Max $Z = 7x_1 + 9x_2$

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

$7x_1 + x_2 \leq 35$

$x_1 \geq 0, x_2 \geq 0$

and integers.

RGPVONLINE.COM

5. a) Explain Branch and Bound Algorithm.
   b) Find the optimal solution to the given Transportation problem.

	D_1	D_2	D_3	D_4	Available
O_1	23	27	16	18	30
O_2	12	17	20	51	40
O_3	22	28	12	32	53
Required	22	35	25	41	

6. a) What do you mean by duality?
   What is its role in L.P.P.
   b) Solve the non-Linear programming problem.

Max $Z = 4x_1 - x_1^3 + 2x_2$

Subject to

$x_1 + x_2 \leq 1$

$x_1, x_2 \geq 0$

7. a) Minimize

$z = y_1^2 + y_2^2 + y_3^2$

Subject to $y_1 + y_2 + y_3 \geq 15$

$y_1, y_2, y_3, \geq 0$

Solve by forward recursion.

   b) State the assignment Model. Describe an algorithm for the solution of the assignment problem.

8. Write a short note (any four)
   i) Method of steepest descrent in non Linear programing
   ii) Maximizing Convex objective function
   iii) Degeneracy in Transportation Problem
   iv) Applications of Dynamic Programing
   v) Limitations of Integer programing
   vi) Revised Simplex Method

******

253