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Sixth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Operations Research

Time: 3 hrs.   Max. Marks:100

**Note: *Answer FIVE full questions, selecting
at least TWO questions from each part.***

PART – A

1 a. Define OR. Explain the nature and impact of OR.   **(10 Marks)**

b. Old hens can be bought at Rs. 2 each but young ones at Rs. 5 each. The old hens lay 3 eggs per week and the young ones lay 5 eggs per week, each egg being worth 30 paise. A hen (young/old) costs Rs. 1 per week to feed. You have only Rs. 80 to spend for buying hens. How many of each kind should you buy to give a profit of more than Rs. 6 per week, assuming that you cannot house more than 20 hens. Write a mathematical model of the problem.   **(10 Marks)**

2 a. Explain the concept of tie breaking in simplex method.   **(10 Marks)**

b. Use simplex method to solve the following LPP :
Maximize $Z = 4x_1 + 10x_2$
Subject to constraints : $2x_1 + x_2 \le 50$
$$2x_1 + 5x_2 \le 100$$
$$2x_1 + 3x_2 \le 90$$
and $x_1, x_2 \ge 0$.   **(10 Marks)**

3 a. Explain the post optimality analysis in simplex method.   **(10 Marks)**

b. Solve the following LPP by using Big M Method.
Maximize $Z = 6x_1 + 4x_2$
Subject to constraints $2x_1 + 3x_2 \le 30$
$$3x_1 + 2x_2 \le 24$$
$$x_1 + x_2 \ge 3$$
and $x_1, x_2 \ge 0$.   **(10 Marks)**

4 a. Explain the economic interpretation of duality with an example.   **(10 Marks)**

b. Solve the following LPP by using revises simplex method.
Maximize $Z = x_1 + 2x_2$
Subject to $x_1 + x_2 \le 3$
$$x_1 + 2x_2 \le 5$$
$$3x_1 + x_2 \le 6$$
and $x_1, x_2 \ge 0$.   **(10 Marks)**

PART – B

5 a. Explain the essence of sensitivity analysis. (05 Marks)

    b. Solve the following LPP by using dual simplex method.
Maximize $Z = 2x_1 + x_2$
Subject to the constrains

$$x_1 + 2x_2 \leq 10$$
$$x_1 + x_2 \leq 6$$
$$x_1 - x_2 \leq 2$$
$$x_1 - 2x_2 \leq 1$$
$$\text{and } x_1, x_2 \geq 0$$

  (15 Marks)

6 a. Explain Hungarian Algorithm to solve assignment problem. (10 Marks)

    b. Solve the following Transportation problem.
        i) Use minimum cost method for IBFS
        ii) Use u-v method for obtaining optimum solution.

				Supply points
4	6	8	8	40
6	8	6	7	60
5	7	6	8	50

Demand points 20 30 50 50

  (10 Marks)

7 a. Explain the following terms :
        i) Pure strategy
        ii) Mixed strategy
        iii) Saddle point
        iv) Payoff matrix
        v) Two – person zero sum game. (10 Marks)

    b. Obtain the optimal strategies for both persons and the value of the game for zero – sum two – person game whose payoff matrix is as follows :

$$\begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{bmatrix}$$

  (10 Marks)

8   Write a short notes on :
    a. Nature of Metaheuristic
    b. Tabu Search algorithm
    c. Genetic algorithm
    d. Simulated Annealing. (20 Marks)

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