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10CS/IS661

**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 :  $2x_1 + x_2 \leq 50$   
 $2x_1 + 5x_2 \leq 100$   
 $2x_1 + 3x_2 \leq 90$   
and  $x_1, x_2 \geq 0$ . (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  $2x_1 + 3x_2 \leq 30$   
 $3x_1 + 2x_2 \leq 24$   
 $x_1 + x_2 \geq 3$   
and  $x_1, x_2 \geq 0$ . (10 Marks)
- 4 a. Explain the economic interpretation of duality with an example. (10 Marks)  
b. Solve the following LPP by using revised simplex method.  
Maximize  $Z = x_1 + 2x_2$   
Subject to  $x_1 + x_2 \leq 3$   
 $x_1 + 2x_2 \leq 5$   
 $3x_1 + x_2 \leq 6$   
and  $x_1, x_2 \geq 0$ . (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

**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  
 $x_1 + 2x_2 \leq 10$   
 $x_1 + x_2 \leq 6$   
 $x_1 - x_2 \leq 2$   
 $x_1 - 2x_2 \leq 1$   
 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	

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

1	-3
3	5
-1	6
4	1
2	2
-5	0

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

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