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10CS/IS661

Sixth Semester B.E. Degree Examination, June/July 2019
Operations Research

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the six phases of Operations Research study. **(08 Marks)**

b. A firm is engaged is producing two products A and B each unit of product A requires 2kg of raw material and 4 labour hours for processing, where as each unit of B requires 3kg of raw materials and 3 labour hours for the same type, every week, the firm has an availability of 60kg of raw material Rs. 96 labour hours. One unit of product A sold yield Rs.40 and unit of product B sold yields Rs. 35 as profit, formulate this as an linear programming problem to determine as to how many units of each product should be produced per week so that firm can earn maximum profit. **(06 Marks)**

c. Use graphical method to solve the following :

Minimize $z = -x_1 + 2x_2$

Subject to the constructs $-x_1 + 3x_2 \le 10$

$x_1 + x_2 \le 6$

$x_1 - x_2 \le 2$

and $x_1, x_2 \ge 0$. **(06 Marks)**

2 a. Solve the following LPP by using Simplex method :

Maximize $z = 2x_1 - x_2 + x_3$

Subject to the constraints $3x_1 + x_2 + x_3 \le 6$

$x_1 - x_2 + 2x_3 \le 1$

$x_1 + x_2 - x_3 \le 2$

and $x_1, x_2, x_3 \ge 0$. **(10 Marks)**

b. Explain the concept of Tie breaking in Simplex method. **(10 Marks)**

3 a. Solve the following LPP by using Big M Methods

Minimize $z = 4x_1 + 4x_2 + x_3$

Subject to $x_1 + x_2 + x_3 \le 2$

$2x_1 + x_2 \le 3$

$2x_1 + x_2 + 3x_3 \ge 3$

and $x_1, x_2, x_3 \ge 0$. **(10 Marks)**

b. Solve the following LPP by using two-phase method :

Minimize $z = 2x_1 + 3x_2$

subject to $\frac{1}{2}x_1 + \frac{1}{4}x_2 \le 4$

$x_1 + 3x_2 \ge 36$

$x_1 + x_2 = 10$

and $x_1, x_2 \ge 10$. **(10 Marks)**

4 a. Explain the steps involved is revised Simplex method. (10 Marks)

b. Use revised simplex method to solve the following LPP :

Maximize $z = 3x_1 + 5x_2$

Subject to $x_1 \le 4$

$2x_2 \le 12$

$3x_1 + 2x_2 \le 18$

and $x_1, x_2 \ge 0$. (10 Marks)

PART – B

5 a. Explain the parametric analysis with respect to change in c_j and b_j parameters. (10 Marks)

b. Explain general procedure for sensitivity analysis. (10 Marks)

6 a. Find the initial solution to the following transportation problem using VAM : (10 Marks)

		Destination				
		D_1	D_2	D_3	D_4	Supply
Factory	F_1	19	30	50	10	7
	F_2	70	30	40	60	9
	F_3	40	8	70	20	18
	Demand	5	8	7	14	34

b. Explain Hengarian algorithm with example. (10 Marks)

7 a. Solve the following game by graphical method :

		Player B		
		B_1	B_2	B_3
Player A	A_1	1	3	11
	A_2	8	5	2

(10 Marks)

b. With reference to game theory define the following with an example :

i) Pure strategy ii) Mixed strategy iii) Saddle point

iv) Payoff matrix v) Two-person-zero-sum-game. (10 Marks)

8 Explain briefly the following :

a. Tabu search algorithm

b. Genetic algorithm

c. Metaheuristics

d. Simulated annealing algorithm. (20 Marks)

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