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10CS/IS661

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
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. Explain the six phases of OR study. (12 Marks)
- b. A retailer deals in two items only, item A and item B. He has ₹ 50,000 to invest and a space to store at most 60 pieces. An item 'A' costs him ₹ 2,500 and 'B' costs ₹ 500. A net profit to him on item 'A' is ₹ 500, and item 'B' is ₹ 150. If he can sell all the items he purchases, how should he invest his amount to have maximum profit?
 (i) Give mathematical formulation to the LPP
 (ii) Use graphical method to solve the problem. (08 Marks)
- 2 a. Explain the concept of Tie breaking in simplex method. (10 Marks)
- b. Solve the following LPP by simplex method:
 Maximize $Z = 2x_1 + 2x_2$
 Subject to $5x_1 + 3x_2 \leq 8$
 $2x_1 + 4x_2 \leq 8$ and $x_1, x_2 \geq 0$ (10 Marks)
- 3 a. Explain the post optimality analysis of linear programming. (10 Marks)
- b. Solve the following LPP by Big-M method.
 Maximize $Z = 4x_1 + x_2$
 Subject to $3x_1 + x_2 = 3$
 $4x_1 + 3x_2 \geq 6$
 $x_1 + 2x_2 \leq 3$ and $x_1, x_2 \geq 0$ (10 Marks)
- 4 a. Apply revised simplex method to solve the following problem:
 Maximize $Z = 6x_1 - 2x_2 + 3x_3$
 Subject to $2x_1 - x_2 + 2x_3 \leq 2$
 $x_1 + 4x_3 \leq 4$ and $x_1, x_2, x_3 \geq 0$ (10 Marks)
- b. Explain the following:
 (i) The essence of duality theory (ii) Primal dual relationship (10 Marks)

PART – B

- 5 a. Solve the following LPP by using dual simplex method:
 Minimize $Z = 10x_1 + 6x_2 + 2x_3$
 Subject to $-x_1 + x_2 + x_3 \geq 1$
 $3x_1 + x_2 - x_3 \geq 2$ and $x_1, x_2, x_3 \geq 0$ (10 Marks)
- b. Explain general procedure for sensitivity analysis. (10 Marks)

- 6 a. Explain Hungarian algorithm with example. (10 Marks)
 b. The transportation costs per truck load of cement (in hundred of rupees) from each plant to each project site are as follows:

		Project Site				Supply
		2	3	11	7	
Factories	1	2	3	11	7	6
	2	1	0	6	1	1
	3	5	8	15	9	10
		7	5	3	2	17

Determine the optimal distribution for the company so as to maximize the total transportation cost. (10 Marks)

- 7 a. Two players 'A' and 'B' throw 2 coins on a table 'A' wins ` 8 when both coins show heads and ` 1 when both are tail. 'B' wins ` 3 when coin does not match. Prepare the payoff matrix and determine optimal strategies for each player. (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)
