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Second Semester MCA Degree Examination, December 2010
Operations Research

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. List the different phases involved in OR study and hence explain any two different phases of OR study. (10 Marks)
 b. A furniture manufacturing company plans to make two products: chairs and tables from its available resources, which consist of 400 board feet of mahogany timber and 450 man hours. It knows that, to make a chair, it requires 5 board feet and 10 man-hours and yields a profit of Rs.45; while each table uses 20 board feet and 15 man-hours and has a profit of Rs.80. The problem is to determine how many chairs and tables the company can make, keeping within, its resource constraints so that it maximizes its profit. Formulate a LP model for this problem. (10 Marks)

- 2 a. Solve the following LPP by graphical method :
 Maximize, $z = 60x + 50y$,
 subject to the constraints, $x + 2y \leq 40$; $3x + 2y \leq 60$ and $x, y \geq 0$. (10 Marks)
 b. Explain in detail the special cases of graphical method. (10 Marks)

- 3 a. i) Write a procedure to solve LPP by two-phase simplex method. (10 Marks)
 ii) Define optimal solution and unrestricted variable. (10 Marks)
 b. Solve the following LPP by Charne's big M method:
 Minimize, $z = 60x_1 + 80x_2$
 Subject to, $x_2 \geq 200$; $x_1 \leq 400$; $x_1 + x_2 = 500$ and $x_1, x_2 \geq 0$ (10 Marks)

- 4 a. Define : i) Slack variable ii) Surplus variable
 iii) Feasible solution iv) Standard form of LPP (10 Marks)
 b. Use simplex method to maximize, $z = 5x + 8y$ subject to constraints $4x + 6y \leq 24$,
 $2x + y \leq 18$, $3x + 9y \leq 36$ and $x, y \geq 0$. (10 Marks)

- 5 a. Use the revised simplex method to solve the following problem :
 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 $x_1, x_2 \geq 0$. (15 Marks)
 b. Explain the role of duality in sensitivity analysis. (05 Marks)

- 6 a. Solve the following transportation problem and find the optimal solution (obtain the initial solution by VAM) : (10 Marks)

	X	Y	Z	Available
A	8	7	3	60
B	3	8	9	70
C	11	3	5	80
Requirement	50	80	80	

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.

- 6 b. Find the assignment of trucks from cities in surplus to cities in deficit so that total distance covered by vehicles is minimum : (10 Marks)

	1	2	3	4	5	6
A	12	10	15	22	18	8
B	10	18	25	15	16	12
C	11	10	3	8	5	9
D	6	14	10	13	13	12
E	8	12	11	7	13	10

- 7 a. Define : i) Mixed strategy
ii) Optimal strategy
iii) Zero sum game. (06 Marks)
- b. Define metaheuristics. Write the nature of metaheuristics. (07 Marks)
- c. What is Tabu search? Explain how the Tabu search is conducted. (07 Marks)

- 8 a. Reduce the following game by dominance property and find the game value: (10 Marks)

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

- b. Obtain optimal strategies (for both persons) and the value of the game for zero sum two person game whose pay off matrix is : (10 Marks)

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

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