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PGIVS-O 1530 A-2K14

M.Sc IVth Semester Degree Examination

Computer Science

(Optimization Techniques)

Paper -MSC-4.2

(Old)

Time :3 Hours Maximum Marks : 80

Instructions to Candidates:

1. *Section A is compulsory*
2. *Answer any five questions from section-B*

Section-A

I. Answer the following **(8x2=16)**

1. a) State different phases of OR study
   b) Define linear programming problem(LPP)
   c) What is sensitivity analysis
   d) Define a dual problem
   e) Briefly describe transportation problem
   f) What is CPM
   g) What is revised simplex method
   h) Compare pure strategies and mixed strategies for a game.
   i) Define a network model.
   j) Give an example of LP model in equation form.

Section-B

2. a) What is a basic feasible solution? Express the following LP in standard form

Max $Z = 2x_1 + 3x_2 + 5x_3$ subject to

$$x_1 + x_2 - x_3 \geq -6$$
$$-5x_1 + 6x_2 - 8x_3 \leq 52$$
$$x_1 + x_2 + 4x_3 = 8$$
$$x_1 \geq 0, x_2 \geq 0, x_3 \text{ } \textit{unrestricted}$$

b) Describe graphical solution of solving LPP solve the following problem graphically

$$Max\, Z = 3x_1 + 4x_2$$
$$S.T \quad 2x_1 + x_2 \leq 40$$
$$2x_1 + 5x_2 \leq 150$$
$$x_1, x_2 \geq 0$$

(4+8)

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3. a) Prove that dual of the dual is primal

b) Describe Big M method for solving an LPP

c) State applications of linear programming **(3+6+3)**

4. a) What is degeneracy problem in transportation problem and how such situation is addressed

b) Describe vogel's approximation method of obtaining initial basic feasible solution to transportation problem with an example **(4+8)**

5. a) Explain Hungarian method of solving an assigned problem(AP)

b) solve the following AP

		Persons			
		P_1	P_2	P_3	P_4
	T_1	8	3	10	12
Tasks	T_2	6	15	10	4
	T_3	7	9	11	12
	T_4	8	5	3	3

(6+6)

6. a) Outline the features of project evaluation and review technique (PERT)

b) Consider the following project

Activity	Estimated time	Activity	Estimated time
(0,1)	(1,3,2)	(3,5)	(1,7,2.5)
(0,2)	(2,8,2)	(3,6)	(1,3,2)
(1,3)	(1,3,2)	(4,5)	(6,8,7)
(2,3)	(1,11,15)	(4,6)	(3,11,4)
(2,4)	(0.5,7.5,1)	(5,6)	(4,8,6)

Draw the network satisfying above constraints and find the project completion time **(4+8)**

7. a) Describe parametric linear programming

b) Use dual simplex method to the following LPP

$$\begin{aligned} Max\ Z &= -2x_1 - x_3 \\ ST\quad & x_1 + x_2 - x_3 \geq 5 \\ & x_1 - 2x_2 + 4x_3 \geq 8 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

(4+8)

8. a) Explain zero-sum-two-person games **(12)**

b) Solve the following 2x4 game

		Player B			
PlayerA	I	2	2	3	-1
	II	4	3	2	6

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