MATH-2.5

Sl.No. :

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II Semester M.Sc. Degree Examination, May/June - 2023
(Non-CBCS, SLM Scheme)
MATHEMATICS-II
Operational Research

Time : 3 Hours **Max. Marks : 80**

Instructions: ***1) Answer any five full questions.***
2) All questions carry equal Marks.

Q1) a) What is an operation Research? Describe the characteristics of operation Research.

b) Explain the following terms related to linear programming model.

i) Decision variables

ii) Objective function

iii) Constraints.

c) Solve the LPP by Graphical Method:

Maximize : $Z = 5x_1 + 4x_2$

Subjected to constraints : $6x_1 + 4x_2 \leq 24$

$x_1 + 2x_2 \leq 6$

$-x_1 + x_2 \leq 1$

$x_2 \leq 2$

$x_1, x_2 \geq 0$

[5+5+6]

Q2) a) Explain

i) Basic feasible variable

ii) Slack and surplus variables.

b) Write an algorithm of simplex method. Using the method solve the following LPP.

Maximize : $Z = 3x_1 + 8x_2$

Subject to constraints : $3x_1 - 5x_2 \geq -10$

$$2x_1 - x_2 - x_3 \leq 20$$

$$x_1 + 2x_2 \leq 15$$

$$x_1, x_2 \geq 0.$$

[6+10]

Q3) a) Solve by two-phase simplex method:

Maximize : $Z = 5x_1 + 8x_2$

Subjected to constraints : $3x_1 + 2x_2 \geq 3$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5$$

$$x_1, x_2 \geq 0$$

b) If either the primal of the dual linear programming problem has an unbounded objective function value, then show that the other problem has no feasible solution.

[10+6]

Q4) a) State and prove Duality theorem.

b) Write the algorithm of dual simplex method.

c) Explain the advantages of dual simplex method.

[6+6+4]

Q5) a) Write algorithm to find the limitial basic feasible solution to transportation problem by using row minima method.

b) Find the optimum solution for the following transportation problems.

	To			Available
From	2	7	4	5
	3	3	1	8
	5	4	7	7
	1	6	2	14
Required	7	9	18	34

[8+8]

Q6) a) State and prove duality theorem.

b) Solve LPP by dual simplex method

Manimize : $Z = 3x + y$

Subject to constraints : $x + y \geq 1$

$2x + 3y \geq 2$

$x, y \geq 0$

[6+10]

Q7) a) Explain the significance of the game theory.

b) Solve (3×3) game by the simplex method of linear programming whose pay off matrix given below.

3	–1	–3
–3	3	–1
–4	–3	3

[4+12]

Q8) a) Explain the measures of queing models.

b) Describe the properties of poisson process of Arrival in quening theory.

[8+8]

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