



NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
TIRUCHIRAPPALLI - 620 015, TAMIL NADU, INDIA

Probability & Operations Research
(MAIR 31)

Assessment - I
(Computer Science Engineering)

Date - 19/09/2022

Answer all the questions (Full Marks - 25)

1. Solve the following linear programming problem (LPP)

[3+3]

$$\text{Minimize } Z = 7x_1 + 10x_2$$

$$\text{Subject to } 2x_1 + 3x_2 \geq 6,$$

$$x_1 \leq 4,$$

$$x_2 \leq 7,$$

$$4x_1 + 3x_2 \leq 18,$$

$$x_1, x_2 \geq 0.$$

a) Using graphical method, and

b) Using Big - M method. Verify both the solutions.

2. Solve the following LPP

[6+3]

$$\text{Maximize } Z = 20x_1 + 15x_2 + 15x_3$$

$$\text{Subject to } 8x_1 + 6x_2 + 2x_3 \geq 60,$$

$$5x_1 + x_2 + 5x_3 \geq 40$$

$$2x_1 + 6x_2 + 3x_3 \leq 30, \quad x_1, x_2, x_3 \geq 0.$$

a) using Big - M method, and
b) Dual - simplex method.

3. Solve the following LPP using simplex method

[5]

$$\text{Maximize } Z = 3x_1 + 2x_2 + 5x_3$$

$$\text{Subject to } x_1 + 2x_2 + x_3 \leq 43,$$

$$3x_1 + 2x_3 \leq 46,$$

$$x_1 + 4x_2 \leq 42,$$

$$x_1, x_2, x_3 \geq 0.$$

4. Solve

[5]

$$\text{Maximize } Z = 3x_1 + 2x_2 - 5x_3$$

$$\text{Subject to } 2x_1 + x_2 - 5x_3 \leq 6,$$

$$x_1 + x_2 \leq 2,$$

$$x_1 - x_2 + 3x_3 = 0,$$

$$x_1, x_2, x_3 \geq 0.$$

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