

# RAGHUNATHPUR COLLEGE

U.G. 5<sup>th</sup> Semester Internal Examination-2020

## MATHEMATICS

Course Code: BMTMDSHT1

Course Title: Linear Programming

**Full Marks: 10**

Answer any **two** questions.

5x2=10

1. a) Solve the L.P.P. graphically

$$\text{Max. } Z = 10x_1 + 15x_2$$

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

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

- b) Solve the following L.P.P.

$$\text{Min. } Z = -7x_1 - 12x_2 - 16x_3$$

$$\text{Subject to } 2x_1 + x_2 + x_3 \leq 1$$

$$x_1 + 2x_2 + 4x_3 \leq 2 \quad x_1, x_2 \geq 0$$

2+3

2. a) Find the dual of the following Primal Problem

$$\text{Max. } Z = 6x_1 + 5x_2 + 10x_3$$

$$\text{Subject to } 4x_1 + 5x_2 + 7x_3 \leq 5$$

$$3x_1 + 7x_3 \leq 10$$

$$2x_1 + x_2 + 8x_3 = 20$$

$$2x_1 + 9x_3 \geq 5$$

$$x_2 \text{ unrestricted in sign \& } x_1, x_3 \geq 0$$

- b) Using simplex method, obtain the inverse of the matrix  $A = \begin{pmatrix} 2 & 3 \\ -3 & 2 \end{pmatrix}$

$$2\frac{1}{2} + 2\frac{1}{2}$$

3. a) Solve the following L.P.P. using Big-M method

$$\text{Max. } Z = 3x_1 + 2x_2$$

$$\text{Subject to } x_1 + x_2 \geq 1$$

$$2x_1 + x_2 \leq 4$$

$$5x_1 + 8x_2 \leq 15 \quad x_1, x_2 \geq 0$$

- b) Solve the following problem by two-phase Method

$$\text{Max. } Z = 5x_1 + 3x_2$$

$$\text{Subject to } 2x_1 + x_2 \leq 1$$

$$3x_1 + 4x_2 \geq 16 \quad x_1, x_2 \geq 0$$

3+2