

I-1058

M.A./M.Sc. (Final) Examination, 2020

MATHEMATICS

Paper - VIII

(Operations Research)

Time Allowed : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 36

Note : Attempt any five questions. All questions carry equal marks.

Q. 1. Define operation research and discuss the importance of OR in decision making.

Q. 2. Solve by simplex method :

$$\text{Maximize } z = 5x_1 + 10x_2 + 8x_3$$

subject to constraints

$$3x_1 + 5x_2 + 2x_3 \leq 60$$

$$4x_1 + 4x_2 + 4x_3 \leq 72$$

$$2x_1 + 4x_2 + 5x_3 \leq 100$$

$$\text{and } x_1, x_2, x_3 \geq 0$$

I-1058

P.T.O.

(2)

Q. 3. Obtain the dual of the following L.P. problem :

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

subject to constraints

$$-2x_1 + x_2 + 3x_3 = 2$$

$$2x_1 + 3x_2 + 4x_3 = 1$$

$$\text{and } x_1, x_2, x_3 \geq 0$$

Q. 4. Solve the given L.P.P. and find the optimal solution :

$$\text{Maximize } z = 3x_1 + 2x_2$$

subject to

$$2x_1 + x_2 \leq 100$$

$$x_1 + x_2 \leq 80$$

$$x_1 \leq 40$$

$$\text{and } x_1, x_2 \geq 0$$

I-1058

(3)

Q. 5. What is game theory ? Discuss its importance to business decisions.

Q. 6. Describe the transportation problem. Distinguish between transportation model and assignment model.

Q. 7. What is goal programming ? Distinguish it from linear programming.

Q. 8. Solve the following game :

		Player B	
		B ₁	B ₂
Player A	A ₁	3	5
	A ₂	4	1

Q. 9. Use graphical method to solve the L.P.P. :

$$\text{Maximize } z = 45x_1 + 80x_2$$

(4)

subject to

$$5x_1 + 20x_2 \leq 400$$

$$10x_1 + 15x_2 \leq 450$$

$$\text{and } x_1 \geq 0, x_2 \geq 0$$

Q. 10. Explain the following :

- (i) Indecomposable and decomposable economics
- (ii) Petroleum refinery operations

