

OPERATIONS RESEARCH

Duration: 45 minutes

Marks: 15

Answer **ANY 3** of the following questions.

(3×5=15)

- 1) a manufacturer can produce two different products A and B, during a given time period. Each of these products requires 4 different manufacturing operations, namely grinding, turning, assembly and testing. The manufacturing requirements in hours per unit of the product are given below for A and B:

	A	B
Grinding	1	2
Turning	3	1
Assembly	6	3
testing	5	4

The contribution to profit is Rs.2 for each unit of A and Rs.3 for each unit of B. Formulate the problem as a LPP model to maximize profit.

- 2) Solve the following LPP using graphical method.

$$\begin{aligned} \text{Max } z &= 3x + 5y \\ \text{s. t. } x &\leq 4 \\ 2y &\leq 12 \\ 2x + 2y &\leq 18 \\ x, y &\geq 0 \end{aligned}$$

- 3) A company has 2 products A & B. to produce product A, 2 units of material X and 4 units of material Y are required. To produce product B, 3 units of material X and 2 units of material Y are required. As the raw material X is in short supply, not more than 16 units of material X can be used and at least 16 units of material Y must be used. The cost of manufacturing product A and B are Rs.6 and Rs.8 respectively. Formulate a LPP to minimize the cost of production.

- 4) Solve the following LPP using simplex method.

$$\begin{aligned} \text{Max } z &= 50x_1 + 40x_2 \\ \text{s. t. } 3x_1 + 5x_2 &\leq 150 \\ x_2 &\leq 20 \\ 8x_1 + 5x_2 &\leq 300 \\ x_1, x_2 &\geq 0 \end{aligned}$$

- 5) Solve the following LPP using simplex method.

$$\begin{aligned} \text{Max } z &= 7x_1 + 5x_2 \\ \text{s. t. } 2x_1 + x_2 &\leq 100 \\ 4x_1 + 3x_2 &\leq 240 \\ x_1, x_2 &\geq 0 \end{aligned}$$