

ADMISSION NUMBER									

School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering

Mid Term Examination - Nov 2023

Duration : 90 Minutes

Max Marks : 50

Sem V - E2UC511T - Operational Research

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) What is feasible solution? K2 (2)
- 2) Discuss simplex method with an example. K1 (3)
- 3) Write dual of following problems:Max K2 (4)
 $z = x_1 + x_2, \text{ s/t } 2x_1 + x_2 = 5; 3x_1 - x_2 = 6; x_1, x_2 \geq 0$
- 4) A furniture dealer deals only two items viz., tables and chairs. He has to invest Rs.10,000/- and a space to store atmost 60 pieces. A table cost him Rs.500/- and a chair Rs.200/-. He can sell all the items that he buys. He is getting a profit of Rs.50 per table and Rs.15 per chair. Formulate this problem as an LPP, so as to maximize the profit. K2 (6)
- 5) Write Phase I for the following problem and then solve to show that the problem has no feasible solution. Max $Z = 2x_1 + 5x_2$ subject to $3x_1 + 2x_2 \geq 12; 2x_1 + x_2 \leq 4; x_1, x_2 \geq 0$ K3 (6)
- 6) Solve the following LPP by graphical method:Maximize $Z = 2x_1 + 5x_2$ K3 (9)
; subject to the conditions $x_1 + 4x_2 \leq 24, 3x_1 + x_2 \leq 21 ; x_1 + x_2 \leq 9$ and $x_1, x_2 \geq 0$
- 7) A company makes two products (X and Y) using two machines (A and B). Each unit of X that is produced requires 50 minutes processing time on machine A and 30 minutes processing time on machine B. Each unit of Y that is produced requires 24 minutes processing time on machine A and 33 minutes processing time on machine B. At the start of the current week there are 30 units of X and 90 units of Y in stock. Available processing time on machine A is forecast to be 40 hours and on machine B is forecast to be 35 hours. The demand for X in the current week is forecast to be 75 units and for Y is forecast to be 95 units. Company policy is to maximise the combined sum of the units of X and the units of Y in stock at the end of the week. • Formulate the problem of deciding how much of each product to make in the current week as a linear program. K4 (8)

- 8) Solve the following LPP using Two-Phase Method: $\text{Max } z = 3x_1 - x_2$, K4 (12)
subject to
 $2x_1 + x_2 \geq 2$; $x_1 + 3x_2 \leq 2$; $x_2 \leq 4$; $x_1, x_2 \geq 0$

OR

Solve the following LPP using graphical method: K4 (12)

$$\text{Max } Z = 8000x_1 + 7000x_2$$

subject to

$$3x_1 + x_2 \leq 66;$$

$$x_1 + x_2 \leq 45;$$

$$x_1 \leq 20;$$

$$x_1, x_2 \geq 0$$