INDIAN STATISTICAL INSTITUTE

Assignment

M. Stat. – Ist Year, 2017-2018

Optimization Techniques

(Q1)

$$\begin{aligned} \text{Maximize} \quad & 3x_1 + 2x_2 & \\ \text{subject to} \quad & x_1 - 2x_2 & \leq 1 \\ & x_1 - x_2 & \leq 2 \\ & 2x_1 - x_2 & \leq 6 \\ & x_1 & \leq 5 \\ & 2x_1 + x_2 & \leq 16 \\ & x_1 + x_2 & \leq 12 \\ & x_1 + 2x_2 & \leq 21 \\ & x_2 & \leq 10 \\ & x_1, x_2 & \geq 0 \end{aligned}$$

(Q2)

$$\begin{aligned} \text{Maximize} \quad & x + y + z + w & \\ \text{subject to} \quad & x + 3y + 2z + 4w & \leq 5 \\ & 3x + y + 2z + w & \leq 4 \\ & 5x + 3y + 3z + 3w & = 9 \\ & x, y, z, w & \geq 0 \end{aligned}$$

(Q3)

$$\begin{aligned} \text{Maximize} \quad & 3x_1 + 2x_2 + x_3 & \\ \text{subject to} \quad & 4x_1 + x_2 + x_3 & = 30 \\ & 2x_1 + 3x_2 + x_3 & \leq 60 \\ & x_1 + 2x_2 + 3x_3 & \leq 40 \end{aligned}$$

(Q4)

$$\begin{aligned} \text{Maximize} \quad & x_1 + 2x_2 + x_3 & \\ \text{subject to} \quad & x_1 + \tfrac{x_2}{2} + \tfrac{x_3}{2} & \leq 1 \\ & \tfrac{3x_1}{2} + 2x_2 + x_3 & \geq 8 \\ & x_1, x_2, x_3 & \geq 0 \end{aligned}$$

(Q5)

$$\begin{aligned} \text{Maximize} \quad & -2x_1 + 4x_2 + 7x_3 + x_4 + 5x_5 & \\ \text{subject to} \quad & -x_1 + x_2 + 2x_3 + x_4 + 2x_5 & = 7 \\ & -x_1 + 2x_2 + 3x_3 + x_4 + x_5 & = 6 \\ & -x_1 + x_2 + x_3 + 2x_4 + x_5 & = 4 \\ & x_1, x_2, x_3, x_4, x_5 & \geq 0 \end{aligned}$$