Mid-Semester Exam                    Duration: 2hrs                    Date: Sept 11, 2014

1. State whether the following statements are true or false with due justification. (3*4=12)

   (a) For a L.P.P $\min z = 2x_1 + 3x_2$

   $$\begin{aligned} \text{subject to} \quad & x_1 \leq 4 \\ & x_1 + 2x_2 \geq 7 \\ & x_1, x_2 \geq 0 \end{aligned}$$

   the optimum solution is unbounded.

   (b) The L.P.P $\max z = 2x_1 + 2x_2$

   $$\begin{aligned} \text{subject to} \quad & x_1 + x_2 \leq 20 \\ & x_1 \leq 15 \\ & x_1, x_2 \geq 0 \end{aligned}$$

   has multiple solutions.

   (c) The L.P.P $\max z = -5x_1 - 12x_2$

   $$\begin{aligned} \text{subject to} \quad & x_1 \geq 7 \\ & x_2 \geq 4 \\ & x_1, x_2 \geq 0 \end{aligned}$$

   has no solution.

2. Express the following L.P.P in standard form and do the first iteration of simplex method                    (2*4=8)

   $$\begin{aligned} \max z = \quad & 3x_1 + 2x_2 + 5x_3 \\ \text{subject to} \quad & 2x_1 - 3x_2 \leq 3 \\ & x_1 + 2x_2 + 3x_3 \geq 5 \\ & 3x_1 + 2x_2 \leq 2 \\ & x_1, x_2 \geq 0 \end{aligned}$$

3. Solve the L.P.P                    (15)

   $$\begin{aligned} \min z = \quad & x_1 - 3x_2 + 2x_3 \\ \text{subject to} \quad & 3x_1 - x_2 + 3x_3 \leq 7 \\ & -2x_1 + 4x_2 \leq 12 \\ & -4x_1 + 3x_2 + 8x_3 \leq 10 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

4. What are the different types of sensitivity analysis possible in a L.P.P. Explain briefly any one of them.                    (10)