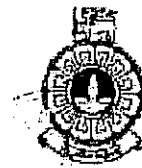The Open University of Sri Lanka

B.Sc Degree Programme/ Continuing Education Programme

Closed Book Test (CBT)- 2010/2011

Level 04- Applied Mathematics

AMU 2181/AME 4181 – Mathematical Modeling I

Duration :- One and half hours

Date:- 20.10.2010   Time:- 4.00p.m.-5.30p.m.

Answer All Questions.

1. Solve the following linear programming problem using simplex method.

$$\text{Maximize} \quad Z = x_1 + 2x_2 + x_3,$$
$$\text{subject to} \quad 2x_1 + x_2 - x_3 \le 2,$$
$$-2x_1 + x_2 - 5x_3 \ge -6,$$
$$4x_1 + x_2 + x_3 \le 6,$$
$$x_1, x_2, x_3 \ge 0.$$

2. Use Big-M method to solve the following linear programming problem.

$$\text{Minimize} \quad Z = 2x_1 + x_2,$$
$$\text{subject to} \quad 3x_1 + x_3 = 3,$$
$$4x_1 + 3x_2 \ge 6,$$
$$x_1 + 2x_2 \le 3,$$
$$x_1, x_2, x_3 \ge 0.$$

3. Consider the following linear programming problem:

$$\text{Minimize} \quad Z = x_1 + x_2,$$
$$\text{subject to} \quad 2x_1 + x_2 \ge 8,$$
$$3x_1 + 7x_2 \ge 21,$$
$$x_1, x_2 \ge 0.$$

(a) Write the dual of this problem.

(b) Solve the problem using the dual simplex method.