

THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. /B.Ed. Degree Programme

APPLIED MATHEMATICS-LEVEL 05

APU3141/APE5141- Linear Programming

OPEN BOOK TEST 2015/2016



**Duration: One Hour.**

**Date: 09.04.2016**

**Time: 01.00 p.m- 02.00 p.m**

**Answer all questions.**

(1) A person requires 10, 12, and 12 units of chemicals  $A$ ,  $B$  and  $C$  respectively for his garden. A liquid product contains 5, 2 and 1 units of  $A$ ,  $B$  and  $C$  respectively per jar. A dry product contains 1, 2 and 4 units of  $A$ ,  $B$  and  $C$  per carton. If the liquid product sells for Rs.3 per jar and the dry product sells for Rs.2 per carton, how many of each should be purchased, in order to minimize the cost and meet the requirements?

(i) Identify and define the decision variables for the problem.

(ii) Define the objective function.

(iii) State the constraints to which the objective function should be optimized.

(iv) Solve the formulated problem using the graphical method.

(2) Solve the following linear programming problem using Simplex method:

$$\text{Maximize } Z = 3x_1 + 4x_2,$$

Subject to

$$4x_1 + 2x_2 \leq 80,$$

$$2x_1 + 5x_2 \leq 180,$$

$$x_1, x_2 \geq 0.$$

\*\*\*\*\*