THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. /B.Ed. Degree Programme

APPLIED MATHEMATICS-LEVEL 05

APU3141/APE5141- Linear Programming

OPEN BOOK TEST 2016/2017

Duration: One Hour.

Date: 30.04.2017	**Time: 01.00 p.m- 02.00 p.m**

Answer all questions.

(1) A firm is engaged in producing two products *A* and *B*. Each unit of product *A* requires 2kg of raw material and 4 labour hours for processing, whereas each unit of *B* requires 3 kg of raw materials and 3 labour hours for the same type. Every week, the firm has an availability of 60 kg of raw material and 96 labour hours. One unit of product *A* sold yields Rs.40 and one unit of product *B* sold gives Rs.35 as profit. A manager of the firm wants to formulate this as a Linear Programming Problem to determine as to how many units of each of the products should be produced per week so that the firm can earn maximum profit.

(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) The tableau below is the initial tableau for a linear programming problem in *x*, *y* and *z*. The objective is to maximize the profit, Z.

Basic variable	x	y	z	s_1	s_2	s_3	value
s_1	12	4	5	1	0	0	246
s_2	9	6	3	0	1	0	153
s_3	5	2	-2	0	0	1	171
-Z	2	4	3	0	0	0	0

Using the information in the tableau, write down

(i) the objective function,

(ii) the three constraints as inequalities with integer coefficients.

(iii)Taking the most positive number in the profit row to indicate the pivot column at each stage, solve this linear programming problem.