

The Open University of Sri Lanka  
 B.Sc/ B.Ed Degree Programme  
 Applied Mathematics – Level 05  
 ADU5300 – Linear Programming  
 Open Book Test (OBT) – 2023/2024  
**DURATION: ONE (01)–HOUR**



Date: 22.07.2023

Time: 04.00 p.m.- 05.00 p.m.

ANSWER ALL QUESTIONS.

1. A fruit juice company makes two special drinks by blending apple and pineapple juices. The first drink uses 30% apple juice and 70% pineapple juice, while the second drink uses 60% apple juice and 40% pineapple juice. There are 1000 liters of apple juice and 1500 liters of pineapple juice available. The profit for the first drink is Rs 0.35 per liter and that for the second drink is Rs 0.20.
- Define all the decision variables. (05 marks)
  - Formulate the above problem as a linear programming model to maximize the profit. (15 marks)
  - Without solving** the above problem, identify the behaviour of the solution. Justify your answer. (10 marks)
2. A manufacturer produces three types of plastic fixtures A, B and C. The time required for each process; molding, trimming, and packaging is given in the following table.  
 (Times are given in hours per dozen fixtures.)

Process	Type A	Type B	Type C	Total time available
Molding	1	2	$3/2$	12,000
Trimming	2	2	1	4,600
Packaging	$1/2$	1	$1/2$	2,400
Profit	Rs. 11	Rs. 16	Rs. 12	–

- a. Formulate the above problem as a linear programming model. (05 marks)
- b. Write down the formulated model in part a above in the standard form. (05 marks)
- c. Write down the **basic** variables and their values in the initial table. (05 marks)
- d. Write down the **non-basic** variables and their values in the initial table. (05 marks)
- e. Write down the **leaving variable** and **entering variable** in the initial table. (10 marks)
- f. Use simplex method to find, how many dozen of each type of fixture should be produced to obtain a maximum profit? (40 marks)

\*\*\*\*\* End of the question paper \*\*\*\*\*