Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
200 Level 2nd Semester Examination – Dec./Jan. 2016/17
SCT 212-1 Operation Research

Uva Wellassa University

**Instructions to candidates**
**Duration:** One (01) hour
**Number of questions:** Two (02) Essay Questions
**Mark allocation:** 100 mark
Use standard symbols without definition.
Scientific calculators are allowed.
**Answer all questions**

1. Two different types of switching circuits, **A** and **B**, are produced by a firm. The times required for assembling and testing a unit of each type of circuits are included in the following table.

| Circuit Type | Processing Time (hours) | |
|---|---|---|
| | Assembling | Testing |
| A | 1 | 2 |
| B | 2 | 1 |

Available staff resources provide a daily maximum of 80 hours for assembling and 55 hours for testing. The profit on the sale of each *A-circuit* is Rs. 40 and of each *B-circuit* is Rs. 50.

Management wants to determine how many units of each circuit to produce as to maximize profit.

a. Formulate a linear programming model for this problem. (10 mark)

b. Use **graphical method** or **simplex method** to determine the daily production schedule for maximum profit. (40 mark)

2. A company has factories at A, B and C places which supply warehouses at X, Y and Z. Weekly factory capacities of A, B and C factories are 100, 300 and 300 respectively. Weekly warehouse requirements of X, Y and Z are 300, 200 and 200 respectively. Unit shipping costs (in Rupees) are given in below table:

| From \ To | X | Y | Z | Supply |
|---|---|---|---|---|
| A | 5 | 4 | 3 | 100 |
| B | 8 | 4 | 3 | 300 |
| C | 9 | 7 | 5 | 300 |
| Demand | 300 | 200 | 200 | |





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The distribution manager wants to determine the best plan for how many shipments to send from each factory to the respective warehouses in each week. Manager's objective is to minimize the total shipping cost.

a. Formulate a mathematical model for this problem. (10 mark)

b. Use the **north-west corner rule** to obtain an initial basic feasible solution for the model formulated in part (a). (10 mark)

c. Starting with the initial basic feasible solution from part (b), find the optimal solution to this problem. (30 mark)