Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
200 Level 2nd Semester Examination – Dec./Jan. 2017/18
SCT 212-1 Operational 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. The *Fido Dog Food Company* wishes to introduce two new brands of dog food (chicken-flavored and mutton-flavored food). Each chicken-flavored food generates a profit of Rs. 80 (per unit) and requires 3 hours of manufacturing time (per unit) and 4 hours of testing and packaging time (per unit). Each mutton-flavored food generates Rs. 50 of profit (per unit) and requires 3 hours of manufacturing time (per unit) and 2 hours of testing and packaging time (per unit). There are 360 hours of manufacturing time and 240 hours of testing and packaging time available in each month. The production manager must choose the optimal product mix of the food in order to maximize the company's profit.

   a. Formulate this as a linear programming problem. (15 mark)

   b. Use the **graphical method or simplex method** to solve the model formulated in part (a). (20 mark)

   c. What is the total profit of the dog food using optimal mix? (05 mark)

2. Suppose a manufacturing company has four (04) factories (sources) and distribute their products to three (03) different retail agencies (destinations). The following table shows the capacities of the four factories, the quantity of products required by the various retail agencies and the cost of distribution one unit of the product from each of the four factories to each of the three retail agencies. The distribution manager, now wants to determine best plan for how many units to send form each factory to the respective in each retail agency in each month. Manager's objective is to minimize the total distribution cost.

Retail agency / Factory	1	2	3	Supply
1	10	8	9	15
2	5	2	3	20
3	6	7	4	30
4	15	6	9	35
Demand	25	26	49	

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

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