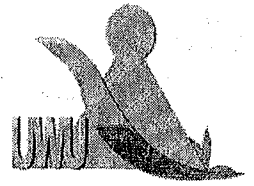


Uva Wellassa University, Sri Lanka.
End Semester Examination - August / September 2011
SCT 302-2 Advanced Mathematics II



Time: Two (2) hours

Answer all (04) questions.

Calculators are allowed.

Total three (03) pages.

01. a.) State limitation of solving LP problems by using the Graphical Method.

(3 marks)

b.) Agri Farm Limited must determine how many acres of strawberry and grapes to plant this year in Nuwara Eliya. An acre of grapes yield 25 tons of grapes and requires 10 hours of labor per week. An acre of strawberry yields 10 tons of strawberry and requires 4 hours of labor per week. All grapes can be sold at 4 million rupees per ton and all strawberry can be sold at 3 million rupees per ton. 7 acres of land and 40 hours per week labors are available. Agriculture department regulations require that at least 30 tones of Strawberry to be produced during current year. How many acres of plant in each type to be farmed in order to maximize the profit. Use the Graphical Method to solve the problem.

(20 marks)

(P.T.O)

02. a.) General Simplex Method, big M method and Two-Phase Simplex Method are three Simplex Methods in Linear Programming (LP), State the advantage of each over the others. (3 marks)

b.) There are three factories (A, B and C) surrounded the BARE LAKE Colombo. Each emits two types of pollutants (1 and 2) into the lake. If the waste from each factory is processed, the pollution in the river can be reduced. It costs Rs 15 to process a kilo of factory A waste, and each kilo produced reduces the amount of pollutant 1 by 0.10 kilos and the amount of pollutant 2 by 0.45 kilos. It costs Rs 10 to process a kilo of factory B waste, and each kilo produced reduces the amount of pollutant 1 by 0.20 kilos and the amount of pollutant 2 by 0.25 kilos. It costs Rs 20 to process a kilo of factory C waste, and each kilo produced reduces the amount of pollutant 1 by 0.40 kilos and the amount of pollutant 2 by 0.30 kilos. The Colombo Municipal Council wants to reduce the amount of pollutant 1 in the lake at least 30 kilos and the amount of pollutant 2 in the lake at least 40 kilos. Formulate an LP to minimize the cost and solve it by using Two-Phase Simplex Method.

(25 marks)

(P.T.O)

03. a.) Briefly explain the Hungarian Method.

(3 marks)

b.) Sport council in UWU is putting together a relay team for the 400 meters swimming relay. Each swimmer must swim 100 meters of breaststroke, backstroke, butterfly and freestyle. Council believes that each swimmer will attain the time given in the following table. In order to minimize the team's time for the race council wants to determine which swimmer should swim in which stroke.

Swimmer	Time (seconds)			
	Freestyle	Breaststroke	Butterfly	Backstroke
Chandena	54	54	51	53
Buddhika	51	57	52	52
Prasad	50	53	54	56
Nadith	56	54	55	53

(20 marks)

04. a.) North-West Corner Method, Minimum Cost Method and Vogel's Method can be used for the first phase of the Transportation Problems. State the advantage of each over the others.

(3 marks)

b.) Elcardo Industries Colombo Ltd. manufactures three types of steel at different plants. The time required manufacturing one ton of steel (regardless of type) and the costs at each plant are shown in the following table. Each week, 100 tons of each type of steel must be produced and each plant open 40 hours per week. Formulate balanced transportation problem to minimize the cost of meeting Elcardo's weekly requirement and then solve the problem by using Transportation Method.

plant	Cost(Rs)			Time (minutes)
	Steel 1	Steel 2	Steel 3	
Biyagama	60	40	28	20
Kadawatha	50	30	30	16
Maharagama	43	20	20	15

(23 marks)