

UNIVERSITY OF YAOUNDE II
FACULTY OF ECONOMICS AND MANAGEMENT
OPERATIONAL RESEARCH I

Galops d'essai U.V. RO February 2008
Time 1 hr. 30 mins

2007/2008
SECO3 & GEST3
(By BAYE MENJO)

EXERCISE 1

A coffee blending company mixes three different ingredients (A, B, C) in order to obtain two types of products. The following nutritional restrictions must be respected.

Product I: not more than 30% of A
not more than 50% or less than 20% of B
not less of B than there is of A

Product II: not less than 50% of A
not more than 30% of B
amount of B must be less than or equal to A

The cost of A, B, and C is 300 MU, 400 MU, and 350 MU per kg, respectively, and the supply available for these ingredients is 2000, 1000, and 3000 kgs, respectively. Carefully define the decision variables and formulate the relevant cost minimizing LP problem.

EXERCISE 2

A market gardener can use 2 types of fertilizer in his vegetable farm, Brand A and Brand B. The amounts (in Kgs) of nitrogen, phosphoric acid and chlorine in a bag of each brand are given in the accompanying table.

	Kg per bag	
	Brand A	Brand B
Phosphoric acid	4	4
Chlorine	2	1
Nitrogen	8	3

Tests indicate that the farm needs at least 1000 Kgs of phosphoric acid and at most 400 Kgs of chlorine.

- If the grower wants to maximize the amount of nitrogen added to the farm, how many bags of each mixture should be used? How much nitrogen will be added?
- If the grower wants to minimise the amount of nitrogen added to the farm, how many bags of each mix should be used? How much nitrogen will be added?

EXERCISE 3

A car manufacturing company has two factories, factory A and factory B, and two distribution outlets, outlet I and outlet II; Factory A can assemble at most 1000 cars a month, and factory B can assemble at most 500 cars a month. Outlet I must have at least 900 cars a month and outlet II must have at least 700 cars a month. Transportation costs for shipping one car from factory to each outlet are as follow; 6 MU from factory A to outlet I; 5 MU from factory A to outlet II; 4 MU from factory B to outlet I; 8 MU from factory B to outlet II. Find the shipping schedule that will minimize the total cost of shipping the cars from the assembly plants to the distribution outlets. What is this minimum cost?