Eastern University, Sri Lanka
Faculty of Commerce and Management
Department of Management

Part II Examination in Bachelor of Business Administration (Repeat)– 2002/2003
BBA 305 Management Science

Answer all questions. Time: 3 hrs.

1. You are given following information with regard to a project.
   a) Fixed cost of the project is Rs. 900/= per day
   b) A maximum of three days can be saved from each activity of the project. The additional cost for each day saved is 5% of the total normal cost of the activity.
   c) The normal cost of an activity is Rs. 1000/= per day
   d) Project activities information:

Activity	Preceding Activity	Duration in days
A	-	10
B	-	14
C	A	13
D	A, B	09
E	B	11
F	C, D	20
G	E	08
H	F, G	10

You are required to find the following.
   A) Normal duration, normal cost, and critical path of the project.
   B) Minimum duration and its associated cost of the project.

(28 marks)

2. X Limited has three factories (F1, F2, F3) and supplies to four markets (M1, M2, M3, M4). The following table provides information about per unit profit from a market, quantity demanded, and supply available to meet the demand.

From \ To	Unit profit (Rs.)				Supply
	M1	M2	M3	M4	
F1	2	3	7	1	3500
F2	2	2	4	5	3500
F3	1	3	5	4	3500
Demand	2500	2500	3000	2500	10500

As a general manager of the firm, find the minimum profit available to the firm.

Note: *Use northwest corner rule for initial allocation and MODI method for optimality testing.*

(24 marks)

3. You are given the following Linear Programming model.

$$\text{Max } Z = 40X_1 + 60X_2$$

$$\begin{aligned} \text{Subject to } \quad X_1 + 2X_2 &\leq 40 \\ 2X_1 + 5X_2 &\leq 60 \\ X_1 + X_2 &\leq 40 \\ X_1, X_2 &\geq 0 \end{aligned}$$

Required:

a) Solve the above model.
b) Write down the duality of the primal problem.
c) Convert the duality model into equality status.

(16 marks)

4.

a) Do you agree with Economic Order Quantity (EOQ) = $\left(\sqrt{\frac{2DC_o}{C_h}}\right)$?

b) Give the situation in which the EOQ is determined at the level where the total ordering cost does not equal to the total handling cost.

c) What is a lead-time in stock controlling process?

(Note: *Usual notations are in consideration*)

(16 marks)

5. Write short notes on the following

a) Assumptions of a linear programming model
b) Critical path of a project
c) Shadow price in linear programming
d) Total float of an activity.

(16 marks)