

**EASTERN UNIVERSITY, SRILANKA**

**FACULTY OF COMMERCE AND MANAGEMENT**

**Part II Examination in BBA/COM 2000/2001 (Repeat) June /July 2007**

**External Degree**

**BBA 305 Management Science**

Answer any 5 Questions

Time : 03 Hours

Q1. A Company wishes to determine an investment strategy for each of the next four years. Five investment types have been selected, investment capital has been allocated for each of the coming four years, and maximum investment levels have been established for each investment type. An assumption is that amounts invested in any year will remain invested until the end of the planning horizon of four years. The following table summarizes the data for this problem. The values in the body of the table represent net return on investment of one rupee upto the end of the planning horizon. For example, a rupee invested in investment type B at the beginning of year 1 will grow to Rs. 1.90 by the end of the fourth year, yielding a net return of Rs. 0.90

Investment made at the beginning of year	Investment Type					Rupees available (in 000's)
	A	B	C	D	E	
	<b>NET RETURN DATA</b>					
1	0.80	0.90	0.60	0.75	1.00	500
2	0.55	0.65	0.40	0.60	0.50	600
3	0.30	0.25	0.30	0.50	0.20	750
4	0.15	0.12	0.25	0.35	0.10	800
Maximum Rupees Investment (in 000's)	750	600	500	800	1000	

The objective in this problem is to determine the amount to be invested at the beginning of each year in an investment type so as to maximize the net rupee return for the four-year

period.

Solve the above transportation problem and ,

i) Get an optimal solution. (15 Marks)

ii) Calculate the net return on investment for the planning horizon of four year period (05 Marks)

(Total 20 Marks)

**Q2.** Use the simplex method to solve the following Linear Programming Problem:

Minimize  $Z = 30x_1 + 20x_2$

Subject to constraints:

$-x_1 - x_2 \geq -8$

$-6x_1 - 4x_2 \leq -12$

$5x_1 + 8x_2 = 20$

$x_1, x_2 \geq 0$

(Total 20 Marks)

**Q3.** The table below provides cost and time estimates of seven activities of a project:

Activity	Dependence	Normal Duration (Days)	Crash Duration (Days)	Normal Cost (Rs.)	Crash Cost (Rs.)
C	A	5	5	500	500
E	B,C	7	4	700	1000
G	E,F	6	4	800	1600
A	-	7	5	500	900
D	A	6	4	800	1000
F	C,D	5	2	800	1400
B	A	4	2	400	600

I) Draw the network diagram and find out the normal duration and normal cost

(10 Marks)

II) Find out the minimum duration and associated cost

(10 Marks)

(Total 20 Marks)

**Q4.** i) Briefly describe the term “Economic Order Quantity (EOQ)” and how it determined?

(05 Marks)

- ii) Toyo Tools Company experiences annual demand 50000 electric motors per year. Every time the company places an order to the manufacturer there is a fixed charge of Rs.3000 independent of the size of the order. It costs Rs.6 to hold a motor in inventory for a year.

Based on the above information find out the following:

- The Economic Order Quantity
- The optimal number of orders per year
- The optimal time between orders

(15 Marks)

**(Total 20 Marks)**

- Q5. i) Discuss the similarities and differences between the traditional MRP and MRP – II.

(08 Marks)

- ii) The lead time to procure Paracetamol from a supplier is four weeks. At present, 54kg of the drug is available with us. There is also a scheduled receipt of 45kg of it in four weeks. The production requirements of paracetamol over the next nine weeks are as follows:

Week	1	2	3	4	5	6	7	8	9
Amount in kg	24	-	29	11	-	5	19	27	18

If we use an order of 45kg, when shall we release the orders for Paracetamol?

(12 Marks)

**(Total 20 Marks)**

- Q6. Household Equipments Ltd. is producing kitchen equipment from five components three of which are made using general – purpose machines and two by manual labour. The data for the manufacture of the equipment is as follows:

Components	A	B	C	D	E	Total
Machine hours reqd. Per unit	10	14	12	-	-	36
Labour hours reqd. Per unit	-	-	-	2	1	03
Variable cost per unit (in Rs.)	32	54	58	12	4	160
Fixed cost per unit (apportioned)	48	102	116	24	36	316
Total component cost	80	156	174	36	30	476
Assembly cost / unit (all variables)						Rs.40
Selling price / unit						Rs.600

The marketing department of the company anticipates 50% increase in demand during the next period. General purpose machinery used to manufacture A, B and C is already working to the maximum capacity of 4752 hours and there is no possibility of increasing this capacity during the next period. But labour is available for making components D and E and also for assembly according to demand. The management is considering the purchase of one component A, B or C from the market to meet the increase in demand. These components are available in the market at the following prices:

	(Rs.)
Components A	80
Components B	160
Components C	125

Required:

- i) Profit made by the company from current operations. (05 Marks)
- ii) If the company buys any one of the components A, B or C, what is the extent of additional capacity that can be created? (10 Marks)
- iii) Assuming 50% increase in demand during the next period, which component should the company buy from the market? (05Marks)

**(Total 20 Marks)**