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**Uva Wellassa University
Faculty of Management**

**Degree of Bachelor of Business Management and
Entrepreneurship**

Year 2 Semester II Examination – June/July 2009

EMG 273-3 Scientific Decision making

Part III

Answer **THREE** Questions only

01. Galle Boats Ltd makes three different kind of boats .All can be made profitability in this company by the company's monthly production is constrained by the limited amount of labour, wood and screws available each month. The director will choose the combination of boats that maximize his revenue in view of the information given in the following table.

input	Types of boats			Monthly availability
	A	B	C	
Labour(Hours)	12	7	9	1260
Wood(Board feet)	22	18	16	19008 board feet
Screws(kg)	2	4	3	396 kg
Selling price	4000	2000	5000	

- a) Formulate the above as a linear programming problem (4 marks)
- b) Solve it by the simplex method. (10 marks)

From the optimal table of the solved linear programming problem, answer the following equation

- c) How many boats of each type will be produced and that will be the resulting revenue? (2marks)
- d) How much wood will be used to make all of the boats given in the optimum solution? (2 marks)
- e) State the dual of the formulated linear programming problem (2 marks)



- 2) A. The product development group of a firm has identified the activities and its duration for the introduction of a new product as follows.

Activity	A	B	C	D	E	F	G	H	I	J	K
Duration (Weeks)	13	8	10	9	11	10	8	6	7	14	18
Immediate Predecessor	-	A	B	C	B	E	D,F	E	H	G,I	J

Based on the data draw the network and determine the project completion time and critical activities

(10 marks)

- B. A final years in Degree of Bachelor of Business Management and Entrepreneurship in UWU plans questionnaire survey consisting of the following table.

Activity	Predecessor	T _m	T _o	T _p
A. Design of Questionnaire	-	5	4	6
B. Sampling Design	-	12	8	16
C. Testing of Questionnaire	A	5	4	12
D. Recruiting for interviewers	B	3	1	5
E. Training of interviewers	D,B	2	2	2
F. Allocation of areas to interviewers	B	5	4	6
G. Conducting interviewers	C,E,F	14	10	18
H. Evaluating of results	G	20	18	34

- What are the expected task durations and the variances of task duration?
- Draw a network for the project and find the critical path.
- What is the expected duration of the project?
- What is the probability that project will not exceed 60 days?

Formulas

(10 marks)

$$\text{Expected/ mean time} = \frac{O + 4M + P}{6}$$

$$\text{Standard Deviation} = \frac{P - O}{6}$$

$$Z = \frac{x - \mu}{\sigma}$$



02

03. A) what are the Different types of model used in Scientific Decision making? Explain in detail. (6 marks)

B) A company has three factories at Ampara, Badulla and Colombo which supply warehouses at Dambulla, Eravur, Fessala, and Gurunakale, respectively. Monthly production capacities of these factories are 250,300 and 400 units. if overtime production is utilized factories A and B can produce 50 and 75 additional units with an incremental cost of Rs 4 and Rs 5 respectively. The current warehouse requirements are 200,225,275 and 300 units, respectively.

Units transportation cost from factories to warehouse are as follows.

To	Dambulla	Eravur	Fessala	Gurunakale
From				
Ampara	11	13	17	14
Badulla	15	18	14	10
Colombo	21	24	13	10

Determine the optimal distribution for this company to minimize cost.

(Total 14Marks)

04. A) What is the ABC analysis? How does it assist inventory control? (4 marks)

B) A factory follows an economic order quantity details

Total ordering cost if 200 units are ordered each time, and total inventory carrying cost if 500 units are ordered each time

Purchase price per unit Rs.100.00
 Ordering cost per order Rs.360
 Annual Demand (Units) 15000
 Carrying cost per unit per year 30% of purchase price

- i. Compute the Economic Order Quantity (EOQ)
- ii. Total Ordering Cos
- iii. Total carrying cost
- iv. No of order needs per year
- v. Number of days supply in each order

(06 Marks)

C) There are four machines in a machine shop. On a particular day the shop got orders for executing five jobs (A, B, C, and D & E). The expected profit for each job on each machine is as follows:

	1	2	3	4
A	32	41	57	18
B	48	54	62	34
C	20	31	81	57
D	71	43	41	47
E	52	29	51	50

Find the optimal assignment of job to machines to maximize the profit. Which job should be rejected?

(10 Marks)

(Total marks 10 x 3 =30)

