

# University of Kelaniya – Sri Lanka

## External Examinations Branch

### Faculty of Commerce & Management Studies

#### Bachelor of Business Management (General) Degree Third Examination (External) – 2010

January 2011

#### BMGT E 3045 – Operations Management

No. of questions : 07

Time: 03 Hours

Answer any five (05) questions only

- (01) a) It is often said that the operations management is a transformation process.  
Do you agree with this statement?  
Support your answer with giving reasons.  
(05 marks)
- b) Explain the interrelationship between the operations function and other functions in an organization.  
(05 marks)
- c) What is the major contribution given by F.W.Taylor to operations management?  
(05 marks)
- d) What are the major components which include in an operations system. Explain.  
(05 marks)
- (Total 20 marks)
- (02) a) (i) Define the term "work measurement".  
(ii) Indicate briefly the steps in the process of work measurement.  
(08 marks)

- b) Based on work study in ABC Ltd. company the results shown as follows.

Work Element	Cycle observed timings (minutes)					Performance rating
	1	2	3	4	5	
A	0.09	0.08	0.09	0.10	0.09	90
B	0.12	0.11	0.12	0.11	0.12	110
C	0.13	0.13	0.14	0.12	0.12	100
D	0.07	0.06	0.06	0.08	0.07	120

Time allowances for an eight hour shift are,

Personal time - 30 minutes

Unavoidable delay - 15 minutes

The operator, is paid on a straight rate, at Rs. 300/= per hour. Material costs are Rs. 25 per unit. Overhead costs are 80% of the total of direct labour and material cost.

You are required to determine.

- (i) The number of units each operator produce per shift.
- (ii) The production cost per unit.

(12 marks)  
(Total 20 marks)

(03) a) What factors would you consider when planning a layout?

(03 marks)

b) What are the differences between a product layout and a process layout?

(03 marks)

c) The tasks given in following table are to be performed on an assembly line.

Task	Immediate Predecessor	Time (in seconds)
A	-	20
B	A	07
C	B	22
D	B	20
E	D	10
F	C	15
G	E, F	16
H	G	05

- (i) Construct an activity diagram for the tasks.
- (ii) If the assembly line works for 7 hours per day and the demand is 800 units per day, what is the cycle time?
- (iii) What is the theoretical minimum number of workstations?
- (iv) How would you assign these tasks into work stations?
- (v) Balance the assembly line'
- (vi) What is the efficiency of your line balance?

(14 marks)  
(Total 20 marks)

(04) a) (i) Define the concept of capacity.

(03 marks)

(ii) What do you mean by "Capacity Utilization Rate"?

(03 marks)

- b) A firm manufacturing two products A and B on which the profits earned per unit are Rs. 30 and Rs. 40 respectively. Each product is processed on two machines  $M_1$ , and  $M_2$ . Product A requires one minute of processing time on  $M_1$  and two minutes on  $M_2$ , while B requires one minute on  $M_1$  and one minute on  $M_2$ . Machine  $M_1$  is available for not more than 7 1/2 hours, while machine  $M_2$  is available for 10 hours during and working day.

Find the number of units of products A and B to be manufactured to get maximum profit.

(14 marks)

(Total 20 marks)

- (05) a) List the major reasons for maintaining an inventory. (04 marks)
- b) What are the costs associated with inventory? Explain. (04 marks)
- c) What is safety stock? How is it determined? (04 marks)

- d) A company purchases 2000 units of a particular item per year at a unit cost of Rs. 20. The ordering cost is Rs. 50 per order and the inventory carrying cost is 25%.

Using above information.

- (i) Find the optimal order quantity.
- (ii) If a 3% discount is offered by the supplier on lots of 1000 or more, should the company accept the offer?

Give reasons for your answer.

(08 marks)

(Total 20 marks)

- (06) a) Why is the importance of forecasting to an operations manager? (02 marks)
- b) What factors would you consider when selecting forecasting method? (02 marks)
- c) What are the different measures of forecasting accuracy? (02 marks)
- d) The monthly demand for a product ('000 of units) for the last year was as follows.

Month	Demand
January	45
February	46
March	43
April	47
May	53
June	50
July	56
August	51
September	57
October	60
November	66
December	63

- (i) Using a three month moving average, find the forecasted demand for January next year.
- (ii) Using single exponential smoothing with  $\alpha = 0.3$  find forecasted demand for January next year.
- (iii) Calculate the Mean Absolute Deviation (MAD) for the forecasts value.

(14 marks)  
(Total 20 marks)

- (07) a) What do you mean by project Management? (02 marks)
- b) How does network analysis help in project management? (02 marks)
- c) What are the differences and similarities between Programme Evaluation and Review Techniques (PERT) and Critical Path Method (CPM)? (04 marks)
- d) A construction company has to undertake the construction of a flyover bridge. The work involves a number of activities named by A to I. Their time estimates and precedence relationship are as follows:

Activity	Precedence activity	Duration (in months)
A	-	2
B	A	2
C	-	2
D	C	2
E	B, D	1
F	E	2
G	B, D	6
H	G	6
I	F, H	2

- (i) Draw the project network.
- (ii) Find the Critical Path and duration of the project.
- (iii) What activities need special attention for completion of the project in time?

(12 marks)  
(Total 20 marks)