THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
BACHELOR OF TECHNOLOGY - LEVEL 4
FINAL EXAMINATION - 2010/2011

MEX4235– PRODUCTION MANAGEMENT
DATE : 25th March 2011
TIME : 1400hours – 1700hours
DURATION : 03 Hours

INSTRUCTIONS:

- **Answer any five (05) questions.**
- **All questions carry equal marks.**

1. i. Discuss the importance of forecasting in the fields of sales and production.

ii. The recorded monthly demand data for an item, is given in Table 01.

Month	Demand
January	75
February	78
March	81
April	92
May	108
June	116
July	110
August	108
September	92
October	87
November	78
December	72

Table 01

(a) Calculate 3- month moving average forecast for months from April to December.

(b) Calculate the single exponentially smoothed forecast, using a smoothing factor α of 0.2 , for months from April to December.

iii. Compare the results of the two forecasts obtained in (a) and (b), Clearly justifying which method is the most appropriate.

2. i. Briefly explain the strategies available to the production manager for control the capacity of a production system.

ii. An agent has agreed to supply Graphite to four factories, A, B, C, D from three warehouses X, Y and Z. Supply (Metric Ton), demand(Metric Ton) and transportation cost Rs per metric ton from each warehouse to each factory (Rs) is given in table 02.

	Factory				
Warehouse	A	B	C	D	Supply
X	13	14	19	25	32
Y	18	20	28	24	20
Z	10	17	18	28	20
Demand	27	12	15	18	

Table 02

(a) Find the feasible basic solution.

(b) Solve the transportation problem for the minimum cost.

3. i. Explain the importance of having an inventory control system in a manufacturing organization.

ii. What are the assumptions underlie when developing the most basic EOQ model?

iii. GAMO Play Stereo Ltd, sells 750 super power amplifiers per year and expects sales to continue at that rate. The annual holding cost is 22 percent of the unit cost and the cost of a amplifier is Rs 180. The cost to process a purchase order is Rs. 15.

(a) What is the EOQ?

(b) Find the total average yearly cost of the company.

4. i. What benefits are to be associated with a critical path analysis?

ii What are the limitation of this method and what problems might be experienced for an attempt to apply this method for an Engineering project ? (Note: You may quote a suitable example to support your explanation)

iii. The costs and estimated time of activities of a certain project is given in Table 03.

Activity	Dependency	Duration (Weeks)	Normal cost (Rs '000)	Possible Crash Time (Weeks)	Crash cost/ week (Rs' 000)
A	-	4	300	2	100
B	-	3	150	2	75
C	A	2	350	1	250
D	A	5	450	2	125
E	B	2	500	1	275
F	C	3	200	1	100
G	D	2	100	1	75
H	E	1	125	1	150
I	FGH	3	225	1	100

Table 03

(a) Draw the project network and find the critical path.

(b) Calculate the normal cost of the project.

(c) If the project dead line is 12 days what will be the minimum total cost? Show your computations clearly.

5. i. Distinguish Product layout and Process layout in a facilities layout system.

ii. The production schedule for a component of a Motor bike calls for manufacturing approximately 8 units per hour for an extended period of time. The part undergoes five operations, each of which is performed with a different kind of machine. Actual time requirements per unit output are given in the Table 04.

Operation	Actual time per unit, min
1	7.7
2	14.8
3	22.5
4	7.2
5	15.1

Table 04

(a) Calculate the number of machines of each type needed to satisfy the established output requirement

(b) Would you recommend that the equipment be laid out on 'process basis' or 'product basis'? Explain clearly the benefits of your selection.

(c) Prepare a sketch of one possible arrangement of machines.

6. i. In what instances does the time study procedure apply?

ii. What are the factors considered when a job is breaking into elements during a time study?

iii. What are the allowances taken into consideration in time study and also explain why is it necessary to provide allowances?

iv. The following observations (refer Table 05) have been taken in a time study experiment.

Observation	Time (min)
1	0.11
2	0.10
3	0.11
4	0.10
5	0.14
6	0.10
7	0.10
8	0.09
9	0.12
10	0.09
11	0.12
12	0.11
13	0.10
14	0.12
15	0.14
16	0.09

Table 05

Determine the,

(a) observed time.

(b) normal time.

(c) standard time using a performance rating of 0.95 and an allowance of 8 percent.

7. i. What is meant by Quality Cost?

ii. List out main categories of quality costs associated with a product.

iii. What is the difference between "attributes inspection" and "variables inspection"? State a suitable application for each of the above two methods.

iv. Explain "preventive maintenance" and "breakdown maintenance", discussing their advantages and disadvantages.

8 Briefly explain **four** (04) of the following.

i. Breakeven point and uses of breakeven analysis in production management.

ii. State planned economy and free economy, clearly explaining the adoptability of such systems in Sri Lanka

iv. "Price elasticity of demand" of a commodity.

iv. Depreciation and methods of assessing the depreciation.

v. Costs that form overheads in production and administration.

vi. Opportunity cost and sunk cost as basic costing concepts.

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