THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DIPLOMA IN TECHNOLOGY - LEVEL 4
FINAL EXAMINATION - 2011/2012
MEX4235– PRODUCTION MANAGEMENT
DATE : 16th March 2012
TIME : 1400hours – 1700hours
DURATION : 03 Hours

INSTRUCTIONS:

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

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1. (i) Discuss the different techniques of demand forecasting in a business organization

   (ii) The monthly demand data for an item for a 12 months period is shown in Table Q1.

Month	Demand
1	96
2	106
3	92
4	114
5	108
6	98
7	99
8	115
9	106
10	91
11	102
12	99

Table Q1

(a) Calculate the demand using 3-month moving average forecast technique.

(b) Use single exponential smoothing technique to forecast the demand. The smoothing constant (α) of 0.2 and initial forecast (D) is 100.

(c) Plot the original demand data given in Table Q1 and the forecast data under (a) and (b). Compare and comment on the results.

2. (i) Explain the strategies available for **capacity planning** in a production environment.
   (ii) What are the objectives of **capacity smoothing** and state the methods available for capacity smoothing which could be adopted by a production manager.
   (iii) Demand (Kg) supply (Kg) and the transportation costs (Rs/kg) of a product are given in Table Q2.

From	To			
	Site A	Site B	Site C	Supply (Kg)
P	17	20	25	700
Q	20	18	9	600
R	12	30	17	300
Demand (Kg)	600	500	500	

Table Q2

   (a) Find the most suitable allocation which will minimize transportation cost and also find the minimum transportation cost.

3. (i) Define the following terms with reference to an inventory management system.
   (a) Reorder point,
   (b) Lead time,
   (c) Order cost,
   (d) Carrying cost

   (ii) Each year the Red Marble Company purchases 20,000 of an item that costs Rs 1600/- per unit. The cost of placing an order is Rs 1200/-, and the cost to hold the item for one year is 24 percent of the unit cost.

   (a) Determine the economic order quantity (EOQ).
   (b) Compute the average inventory level, assuming that the minimum inventory level is zero.
   (c) Determine the total average yearly cost, if EOQ is used.

4. (i) Briefly discuss the advantages and limitations of critical path analysis (CPA).
   (ii) Select any suitable project which you are familiar with. List at least seven activities, which needed to carryout in order to complete the project, and represent them in a project network diagram.

   Also assume and indicate the time taking to complete each activity in the network diagram.

   (iii) Discuss the difficulties which might be experienced in using CPA for the project discussed in part (ii).

5. (i) Name the three main types of **facility layouts** and explain the characteristic and the usage of these layouts.

(ii) The production schedule for a component needs approximately 12 units per hour for an extended period of time. The component undergoes five operations, and each operation is conducted in different machines. The actual time requirements per unit output are given in Table Q5.

Operation	Actual time per unit, (minutes)
1	10
2	12
3	30
4	15
5	20

Table Q5

(a) Calculate the number of machines of each type needed to fulfill the output.

(b) Would you recommend that the equipment be laid out on **process basis** or on **product basis**? Give reasons for your recommendation.

6. (i) What are the ergonomics factors that have to be considered when designing platform for a lathe machine

(ii) What are the effects of noise upon the workers in a machine shop and explain the methods used to minimize those effects.

(iii) List out three factors that an adequate lighting system should provide in a working environment.

(iv) How do the improvements of the working environment affect the profitability of the industry?

7. (i) What is meant by break-even point in the context of cost engineering

(ii) Explain the usage of Break-even analysis.

(iii) The sales details of a product is given below,

Total fixed cost (F) = Rs 40,000/-
Variable cost per unit (v) = Rs 2/-
Selling price per unit (s) = Rs 10/-

Calculate,

(a) Contribution per unit.
(b) Total contribution.
(c) Profit.
(d) Break-even point (BEP).

8. Clearly explain any **four** from the given topics below

(i) Types of work measurement techniques in work-study.
(ii) Causes of changes in demand of a commodity.
(iii) Elasticity of demand and elasticity of supply.
(iv) Depreciation and methods of assessing the depreciation.
(v) Breakdown maintenance vs. Preventive maintenance.
(vi) Quality costs of a manufacturing organization.

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