The Open University of Sri Lanka
Faculty of Engineering Technology

Study Programme	:	Diploma in Technology/Bachelor of Technology (Engineering)
Name of the Examination	:	Final Examination
Course Code and Title	:	**MEX4235 Production Management**
Academic Year	:	2012/13
Date	:	August 16, 2013
Time	:	0930 hrs. – 1230 hrs.
Duration	:	3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 8 questions. All questions carry equal marks.
3. Answer any 5 questions only.

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

   (ii) Table Q1 gives the monthly demand data for an item within a year.

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) Compute the 3-month moving average forecasts for the demand data.

(b) Forecast the demand using single exponential smoothing technique where α is 0.2 and the initial forecast is 100.

(c) Compare two forecasts obtained in (a) and (b), and justify which method is more appropriate for forecasting.

2. (i) Explain the strategies available for capacity planning in a production environment.

(ii) Table Q2 shows the demand, supply in kg and the transportations costs in Rs./kg of a product.

From	To			
	Site A	Site B	Site C	Supply (kg)
P	15	20	25	700
Q	20	18	9	600
R	12	30	15	300
Demand (kg)	600	500	500	

Table Q2

(a) Find a feasible basic solution using an appropriate method.
(b) Solve the problem to find the most suitable allocation which will minimize the transportation cost and also find the total 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 ABC Company purchases 20,000 units of an item that costs Rs. 1600.00 per unit. The cost of placing an order is Rs. 1200.00 and the cost to hold the item for one year is 20 present of the unit cost.

(a) Determine the economic order quantity.
(b) Determine the total average yearly cost if EOQ is used.

4. (i) What are the ergonomic factors that have to be considered when designing an operator's flat form for a lathe machine?

(ii) What are the effects of noise upon the workers in a manufacturing environment? Explain the methods available to avoid the harmful effects to workers due to such noise.

(iii) List out three main reasons to provide adequate lighting to a working environment. You may quote appropriate examples to support your answer.

(iv) Explain how the ergonomic improvements of a working environment affect the profitability of the industry?

5. (i) Discuss the benefits associated with the critical path analysis (CPA). Also discuss the limitations of CPA and the problems which can experience in attempting to apply CPA in a construction site.

(ii) WYZ company intends to introduce a new model of television set to the market and the activities which make up the project are given in Table Q5.

Activity	Description of the activity	Duration (weeks)
A	Order electrical components	4
B	Receive electrical components	4
C	Order cabinets	4
D	Receive cabinets	2
E	Order packing material	4
F	Receive packing material	6
G	Modify production line	4
H	Modify test equipment	6
I	Assemble TV set	4
J	Test TV set	2
K	Pack TV set	2

Table Q5

(a) Construct a network diagram of the project.

(b) Find the critical path and the normal time duration of the project.

6. (i) Explain the term "opportunity cost".

(ii) What is marginal cost? Briefly explain important features of marginal costing.

(iii) Lanka Dairy Products Ltd produces three types of flavoured milk to the market. They are Vanilla, Strawberry and Chocolate. According to the resources available, the company can produce 5000 packets of Vanilla flavoured milk and 3000 packets of Strawberry flavoured milk or 6000 packets of Chocolate flavoured milk. The sales costs of each Vanilla, Strawberry and Chocolate milk packet are Rs. 15.00, Rs. 17.00 and Rs. 25.00 respectively and the marginal costs are Rs. 8.00, Rs 9.00 and Rs. 12.00 per packet respectively.

(a) What would be the best product mix (option) for the company to achieve a maximum profit?

(b) Find the opportunity cost.

7. (i) Name the three main types of facility layouts and explain each concentrating their main characteristics and also state examples of the applications of these layouts.

(ii) The production schedule for a component of a car needs approximately 12 units per hour for an extended period of time. The component undergoes five operations, each of which is performed with a different kind of machine. The actual time requirements per unit of output are given the Table Q7.

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

Table Q7

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

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

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

i. Breakeven point and uses of breakeven analysis in production management.
ii. The planned economy and free economy. Also explain the adoptability of such economic systems to Sri Lanka.
iii. Price elasticity of demand of a commodity.
iv. Depreciation and methods of calculating depreciation.
v. Costs that form overheads in production and administration.
vi. Sunk cost and out of pocket cost as basic costing concepts.

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