G 6275

M.E. DEGREE EXAMINATION, MAY/JUNE 2007.

First Semester

Industrial Engineering

IE 1603 — PRODUCTION AND INVENTORY MANAGEMENT

(Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Give few examples for flow shop and job shop production systems.

2.   What are the strategies of manufacturing system management?

3.   State the factors that are considered for the selection of forecasting technique.

4.   Define "Mean Forecast Error".

5.   What is the product structure for a final assembly?

6.   List the various modules of manufacturing resource planning.

7.   What are the objectives of manufacturing scheduling?

8.   State the principle of theory of constraints.

9.   Compare fixed order quantity and periodic review model of inventory control systems.

10. What are the reasons for safety-stock items held in inventory?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the systems concept of production. (8)

   (ii) List and explain the corporate strategies needed for manufacturing management. (8)

Or

(b) (i) Explain typical 'production planning and control functions'. (8)

   (ii) What are the key concerns of manufacturing systems engineering? Explain. (8)

12. (a) The ABC company has recorded the demand of a particular type of masala mix during the last six weeks as shown below :

Week :	1st week of May	2nd week of May	3rd week of May	4th week of May	1st week of June	2nd week of June
Demand (in thousands of pockets) :	200	250	350	270	290	210

   (i) Calculate a 3-week moving average for the data to forecast demand for the next week. (8)

   (ii) Calculate a weighted average forecast for the data, using a weight of 0.6 for the most recent data, and weights of 0.3 and 0.1 for the successive older data. (8)

Or

(b) (i) What are the two objective forecasting methods? Describe them briefly. (8)

   (ii) A simple forecasting method for weekly sales of CD drives used by a local computer dealer is to form the average of two most recent sales figures. Suppose sales for the drives for the past 12 weeks were

Week	1	2	3	4	5	6	7	8	9	10	11	12
Sales	86	75	72	83	132	65	110	90	67	92	98	73

   Determine the one-step ahead forecasts made for periods 3 through 12 using this method and determine forecast errors for these periods. (8)

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(i) What is master production scheduling? Why is it essential for MRP?(8)

(ii) PC world produces mini computers that have a seasonal demand pattern. The available production capacities during regular time and overtime, as well as other cost data are as follows :

Available production capacity and demand

Period	1	2	3	4
Regular time	900	1000	1100	700
Overtime	350	350	350	350
Subcontract	600	600	600	600
Demand	700	1000	2000	1200

Available initial inventory	=	200 units
Desired final inventory	=	150 units
Regular time cost/unit	=	Rs. 125
Over time cost/unit	=	Rs. 150
Subcontracting cost/unit	=	Rs. 175
Inventory cost/unit/period	=	Rs. 25

Formulate this problems as a transportation model to determine optimum production levels and means of production for the next four quarter periods. (8)

Or

(b) (i) What do you mean by aggregate planning? Explain the various strategies (pure and mixed) of aggregate planning. (8)

(ii) Consider an item that has projected requirement as given in the following table :

Month :	1	2	3	4	5	6	7	8
Projected requirement :	–	3500	3000	4500	–	1000	4000	5500

The initial stock on hand is 1150 units. The carrying cost is Rs. 5 per unit/month. The set up cost per set-up is Rs. 4,000. Develop an Least Unit Cost (LUC) solution and calculate total relevant cost. (8)

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14. (a) (i) Briefly explain different long term capacity strategies for activity control. (8)

   (ii) What is meant by synchronous manufacturing? Explain with simple example. (8)

Or

(b) Write short notes on :

   (i) Capacity planning for a machine tool industry. (8)

   (ii) Theory of constraints application to analyse an engineering foundry. (8)

15. (a) (i) State and explain the different characteristics of inventory system towards global manufacturing. (8)

   (ii) BCB company prints a particular Chrismas card. It costs 50 paise to print each card and the company receives 65 paise for each card sold. The cards that are not sold are discarded. The probability distribution of the number of cards that would be sold is estimated as given below :

Quantity :	100000 to 150000	150001 to 200000	200001 to 250000	250001 to 300000	300001 to 350000	350001 to 400000	400001 to 450000
Probability :	0.10	0.15	0.25	0.20	0.15	0.10	0.05

   Determine the number of cards that BCB should print this year. (8)

Or

(b) (i) Derive the EOQ formula for the purchase model with shortages. (8)

   (ii) The annual demand of a product is 48,000 units. The average lead time is 3 weeks. The standard deviation of demand during the average lead time is 100 units/week. The cost of ordering is Rs. 500 per order. The cost of purchase of the product per unit is Rs. 15. The cost of carrying per unit per year is 20% of the purchase price. The maximum delay in lead time is 2 weeks and the probability of this delay is 0.30. Assume a service level of 0.90. If 'Q' system is followed, find the reorder level. Draw the graph neatly. (8)

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