



Name :
Roll No. :
Invigilator's Signature :

CS/M.Tech(IEM)/SEM-1/IEM-104/2012-13

2012

**PRODUCTION PLANNING AND MATERIALS
MANAGEMENT**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer any *five* questions of the following. $5 \times 14 = 70$

1. a) Elucidate 'Production planning & control' activities in a manufacturing organisation. 5
- b) Technomech Engineering Ltd., has six jobs awaiting processing. Processing time and due dates are furnished in the following table. Assume that the jobs arrive in the order shown. Using the measures of effectiveness as (i) Average completion time, (ii) utilisation, (iii) average number of jobs in the system and (iv) average lateness,



compare the results of FCFS, EDD, SPT and LPT rules

for despatching and draw conclusions :

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Job	Job Processing Time (Days)	Job Due Date (Days)
A	13	46
B	25	29
C	29	63
D	4	38
E	21	52
F	8	71

2. a) Describe the 'Long' and 'Short' range plans in the context of hierarchical planning. 5

- b) Using mixed strategy of regular and overtime production, inventory holding and offloading, plan the aggregate quantities in production for air-cooling machine division of Trukool Ltd. Also determine the optimal cost of the plan. Projected demand for twelve months for a product range are presented below along with other details :

Monthwise demand in units (in hundreds) are :

14, 16, 25, 29, 32, 21, 16, 15, 15, 27, 29 and 16



Maximum regular time production per month = 19

Maximum overtime production per month = 3

Maximum offloading per month = 3

Cos of regular time production = Rs. 46,000/unit

Cost of overtime production = Rs. 51,000/unit

Cost of offloading = Rs. 55,000/unit

Inventory holding cost per period = Rs. 1,000/unit. 9

3. a) Determine the completion time of the following jobs and the idle time of Lathe and Milling machine at Bharat Heavy Engineering Ltd. It needs to process the jobs in Lathe first and thereafter in Milling machine. The processing time for each job is as follows :

Processing Time for job

(in hours)

Job	Lathe	Milling
A	10	5
B	7	8
C	6	6
D	8	5
E	4	7
F	11	10



- b) Fine Sys Engineering Company has received an order of 1500 units of 5 H.P. electrical motors. The standard norm for assembly including testing is 75 man-minutes per motor. Five assembly operators work per shift. Fine Sys operates on two shift basis. Working time in each shift is 450 minutes excluding out of an eight-hour shift. Average down time/day is 8% and average absenteeism is 10%. Considering average operator efficiency as 90% work out the delivery schedule on the basis of one day off per week.
4. a) What is the usefulness of carrying inventory in a manufacturing firm ? Enumerate the various costs related to inventory management. Explain the term EOQ. 2 + 3 + 2
- b) A manufacturing firm produces a particular item at a rate of 100 units per day. The demand is 18,000 items per annum. (Assume 300 working days in a year.) The cost of units produced is Rs. 3.60 per unit and the set-up cost is Rs. 175 per set-up. Now the firm decides to purchase the same item for suppliers who are charging



a price of Rs. 3.80 per unit. It will be incurring a procurement cost of Rs 90 per order. Assuming a constant consumption of the items and the cost of carrying the inventory to be Re. 1.00 per item per annum in both the situations, comment on the firm's decision.

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5. a) How is qualitative method of forecasting different from quantitative method ? Explain the role does α play in the Exponential Smoothing method of forecasting of demand.
 - b) The annual demand figures from 2002 to 2011 are 61, 73, 69, 79, 85, 96, 90, 97, 102 and 93 (all figures are in thousands). Based on the values of MAD, which of the following two methods gives a better result for forecasting the demand value for 2012 ?
- i) Forecasting using a linear trend equation, OR
 - ii) Forecasting using smoothing exponential method, if forecast value for 2002 is 60 and value of $\alpha = 0.4$.

2 + 3

9



6. a) The following information is known about a group of items. Classify the material in A, B, C classification. 9

Model No.	Annual Consumption (in pieces)	Unit Price (in Rs.)
M-01	300	100
M-02	8,000	50
M-03	800	100
M-04	11,000	50
M-05	6,000	150
M-06	22,000	100
M-07	1,500	50
M-08	28,000	150
M-09	400	50
M-10	3,000	100

- b) Briefly explain the importance of Vendor Relationship Management. 5
7. a) "Appropriate purchasing strategies are vital for a manufacturing organisation." Explain with reasons whether you agree or disagree with this statement. What is stock verification in "Stores Management" ?

4 + 2



- b) Explain the Role of Inventory Status File as an input to MRP. The following information is available on the product structure tree of a product *X*. *X* requires 6 units of *A*, 5 units of *B* and 9 units of *C*, *A* requires 4 units of *E* and 3 units of *B*. *B* requires 7 units of *F*. *C* requires 1 unit of *G* and 3 units of *B*. The inventory on hand is : 8 units of *A*, 18 units of *B*, 22 units of *C*, 8 units of *E* and 6 units of *G*. Calculate the No. of units required to be ordered for each of the components to manufacture 6 units of item *X*. 2 + 6
8. Write short notes on any two of the following : 7 + 7
- ABC-VED classification of materials
 - Delphi method of forecasting
 - Theory of constraints
 - Critical Ratio sequencing rule in production planning.

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