

8E4050

B. Tech. (Sem. VIII) (Main) Examination, February/March - 2011
Mechanical Engg.
8ME2 : Operations Management

Time : 3 Hours]

[Total Marks : 80

[Min. Passing Marks : 24

Attempt any five questions, selecting one question from each unit.

All questions are carrying equal marks.

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.)

Units quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.
 (Mentioned in form No. 205)

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

1. (a) What operation manager do ? Discuss management process. 8

(b) What is productivity? Monthly sales data for a particular model of racing tyres for motorcycle are :

| Month | Jan | Feb | Mar. | Apr. | May | June |
|-------|-----|-----|------|------|-----|------|
| Sales | 101 | 104 | 100 | 92 | 105 | 95 |

Calculate the first order exponential smoothing forecasting using a smoothing coefficient of 0.2 and an initial forecast 100. 2+6

OR

1. (a) Discuss the limitation and dimensions of forecasting. Discuss also the criterion for selection of forecasting technique. 8

(b) A local building products store has accumulated sales data for 2×4 lumber (in board feet) and the number of building permits in its area for the past 10 quarters :

| Quarter | Building Permits (x) | Lumber sales (y) (1000s of board feet) |
|---------|----------------------|--|
| 1 | 8 | 12.5 |
| 2 | 12 | 16.4 |
| 3 | 7 | 9.3 |
| 4 | 9 | 11.5 |
| 5 | 15 | 18.1 |
| 6 | 6 | 7.6 |
| 7 | 7 | 6.2 |
| 8 | 8 | 14.2 |
| 9 | 10 | 15.0 |
| 10 | 12 | 17.8 |



Develop a linear regression model for these data and determine the strength of the linear relationship using correlation. If the model appears to be relatively strong, determine the forecast for lumber given ten building permits in next quarter.

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UNIT - II

- 2 (a) A manufacturer has the following information on its major product
Regular time production capacity = 2,600 units/period
Overtime production costs = Rs. 12/unit
Inventory costs = Rs. 2 unit/period
Backlog costs = Rs. 5/units/period
Beginning inventory = 400 units
Demand (in units) for period 1,2,3,4 is 4000, 3200, 2000 and 2800 respectively. Develop a level output plan that yields zero inventory at the end of period 4. What costs result from this plan?
- (b) What are the advantages and disadvantages of product system over process system?

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4+4

OR

- 2 (a) The annual cost data of an enterprise for the year 2008-09 are as follows :
Fixed cost = 5,00,000
Annual sales volume = 15,00,000
Input variable cost per unit Rs. 25
Unit sales price Rs. 150
Determine (i) Break even point (ii) Rs. 18,00,000 will be taken likely sales volume for the next budget period. Calculate the estimated contribution and profit. (iii) If a profit target of Rs. 7,50,000/- has been budgeted compute the sales volume required.
- (b) How the capacity is define and measure? Discuss different steps of capacity planning process.

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4+4

UNIT - III

- 3 (a) Discuss the objective of production planning. Discuss different planning horizons.

3+5



- (b) Complete the following MRP matrix for item X :

| Item : X LLC : 1 LT : 2 Lot size : min 50 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|----|----|----|----|----|----|----|----|
| Gross requirement | 20 | 30 | 50 | 50 | 60 | 90 | 40 | 60 |
| Scheduled receipts | | 50 | | | | | | |
| Projected on hand (40) | | | | | | | | |
| Net requirement | | | | | | | | |
| Planned order receipts | | | | | | | | |
| Planned order releases | | | | | | | | |

In what periods should orders be released and what should be the size of these orders?

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OR

- 3 (a) What are the objectives of an MRP system? What are limitations of MRP?

3+5

- (b) Describe the output of aggregate production planning. How is the aggregate planning process different when used for services rather than for manufacturing?

3+5

UNIT - IV

- 4 (a) List several alternatives for adjusting capacity. List various alternatives for managing demand.

4+4

- (b) Clean and shine car service has five cars waiting to be washed and waxed. The time required (in min) for each activity is given below. In what order should the cars be processed through the facility? When will the batch of cars be completed?

| Car | Wash | Wax |
|-----|------|-----|
| 1 | 5 | 10 |
| 2 | 7 | 2 |
| 3 | 10 | 5 |
| 4 | 8 | 6 |
| 5 | 3 | 5 |

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OR

- 4 (a) Mr. Ram Naresh has six jobs waiting to be processed through his machine. Processing time (in days) and due date information for each job are as follows :



| <i>Job</i> | <i>Processing time</i> | <i>Due Date</i> |
|------------|------------------------|-----------------|
| A | 2 | 3 |
| B | 1 | 2 |
| C | 4 | 12 |
| D | 3 | 4 |
| E | 4 | 8 |
| F | 5 | 10 |

Sequence the jobs by FCFS, SPT, SLACK and DDATE. Calculate the average completion time and average tardiness of the six jobs under each sequencing rule. Which rule would you recommend?

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(b) Discuss dispatching and expediting functions.

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UNIT - V

5 (a) Distinguish between a fixed order quantity system and fixed time period system and give an example of each.

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(b) Electronic village stocks and sells a particular brand of mobile. It costs the store Rs. 4500 each time it places an order with the manufacturer for mobile. The annual cost of carrying the mobile in inventory is Rs. 1700. The store manager estimates that the annual demand will be 1200 units. Determine the optimal order quantity and the total minimum inventory cost.

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OR

5 (a) What is material management? What are different objectives of it? Discuss material flow with suitable diagram.

2+3+3

(b) A manufacturing firm has been offered a particular component part it uses according to the following discount pricing schedule provided by the supplier :

| <i>Component part</i> | <i>Discount (in Rs)</i> |
|-----------------------|-------------------------|
| 1-199 | 65 |
| 200-599 | 59 |
| 600 + | 56 |

The manufacturing company uses 700 of the components annually, the annual carrying cost is Rs. 14 per unit, and the ordering cost is Rs. 275. Determine the amount the firm should order.

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