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**18ME56**

### Fifth Semester B.E. Degree Examination, Feb./Mar.2022
## Operations Management

Time: 3 hrs.                                                                 Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

1   a. Explain briefly with a schematic model the functions of business organization and operation management within them. **(08 Marks)**
    b. Define productivity and explain the factors that affect productivity. **(06 Marks)**
    c. Determine the productivity and multi factor productivity respectively for the cases:
       (i)   Four workers installed 720 sq m of carpeting in 8 hours.
       (ii)  For the combined input of labour and machine time using the following :
    Output : 7040 units
    Input : Labour : Rs. 1000.00
              Materials : Rs.520.00
              Overhead : Rs.2000.00 **(06 Marks)**

### OR

2   a. What are models? Explain different types of models. **(06 Marks)**
    b. A firm produces two types of microcomputers. The following data is available:

| Profit/Unit | Rs.6000.00 | Rs.5000.00 |
|---|---|---|
| Assembly time per unit | 4 hours | 10 hours |
| Inspection time per unit | 2 hours | 1 hour |
| Storage space per unit | 3 cub ft | 3 cub ft |

The available resources :

| Resource | Amount available |
|---|---|
| Assembly time | 100 hours |
| Inspection time | 22 hours |
| Storage space | 39 cubic feet |

Formulate as LPP and solve by graphical method to find quantities of Type 1 and Type 2. **(14 Marks)**

### Module-2

3   a. Explain the following forecasting methods :
       (i)   Linear regression
       (ii)  Exponential smoothing. **(08 Marks)**
    b. Given the following data:

| Period | Number of complaints |
|---|---|
| 1 | 60 |
| 2 | 65 |
| 3 | 55 |
| 4 | 58 |
| 5 | 64 |

Prepare a forecast using each of these approaches:
       (i)   A three period moving average.
       (ii)  A weighted average using weights of 0.5 (most recent), 0.30 and 0.2.
       (iii) Exponential smoothing with a smoothing constant of 0.40. **(12 Marks)**

**OR**

4 a. Explain the steps in the forecasting process. (06 Marks)

b. What is Delphi method? Brief. (04 Marks)

c. The mobile phone sales for a company over the last 10 weeks are shown in below table. Plot the data and visually check to see if a linear trend line would be appropriate. Then determine the equation of the trend line and predict sales for weeks 11 and 12.

| Week | Unit sales | Week | Unit sales |
|------|-----------|------|-----------|
| 1 | 700 | 6 | 742 |
| 2 | 724 | 7 | 756 |
| 3 | 720 | 8 | 750 |
| 4 | 726 | 9 | 770 |
| 5 | 738 | 10 | 780 |

(10 Marks)

## Module-3

5 a. List the factors that determine effective capacity and explain any four. (06 Marks)

b. Explain bottle neck operation with a neat diagram. (06 Marks)

c. A small firm produces and sells automotive items in a five state area. The firm experts to consolidate assembly of its battery chargers line at a single location. Currently operations are in three widely scattered locations. The leading candidate for location will have a monthly fixed cost of Rs.42 lakhs and variable cost of Rs.200/charger. Chargers sell for Rs.700 per charger. Prepare a table that shows total profits, fixed costs variable costs, and revenues for monthly volumes of 10,000, 12,000 and 15,000 units. What is the break even point? Determine the profit when volume equals 22000 units. (08 Marks)

**OR**

6 a. What are factors that affect location decision? Explain. (10 Marks)

b. Fixed and variable costs for four potential plant locations are shown below:

| Location | Fixed cost/year | Variable cost/unit |
|----------|----------------|-------------------|
| A | Rs.2,50,000.00 | Rs.110.00 |
| B | Rs.1,00,000.00 | Rs.300.00 |
| C | Rs.1,50,000.00 | Rs.200.00 |
| D | Rs.2,00,000.00 | Rs.350.00 |

(i) Plot the total cost lines for these locations on a single graph.

(ii) Identify the range of output for which each alternative is superior.

(iii) If expected output at the selected location is to be 8000 units/year, which location would provide the lowest total cost? (10 Marks)

## Module-4

7 a. Briefly explain the aggregate planning with the help of a flow chart. (06 Marks)

b. Given the following information setup the problem in a transportation table and solve for the minimum cost plan by least cost method.

| | Period | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Demand | 500 | 700 | 750 |
| Regular | 500 | 500 | 500 |
| Capacity over time | 50 | 50 | 50 |
| Sub contract | 120 | 120 | 100 |

Costs : Initial Inventory : 100

Regular time : Rs. 60/unit

Sub contracting : Rs. 90/unit

Inventory carrying cost : Rs.1/unit/month

Back order cost : Rs.3/unit/month

(14 Marks)

**OR**

8 a. Explain master scheduling process with the help of a flow chart. **(08 Marks)**

b. Determine : the projected on hand inventory, the master production schedule and the uncommitted inventory (ATP – Available To Promise) for the following data and production capacity is 70 pumps. Forecast are shown in table.

| Beginning Inventory 64 | June (weeks) | | | | July (weeks) | | | |
|---|---|---|---|---|---|---|---|---|
| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Forecast | 30 | 30 | 30 | 30 | 40 | 40 | 40 | 40 |
| Customer orders (committed) | 33 | 20 | 10 | 4 | 2 | - | - | - |

**(12 Marks)**

## Module-5

9 a. Explain with schematic model an overview of MRP. **(10 Marks)**

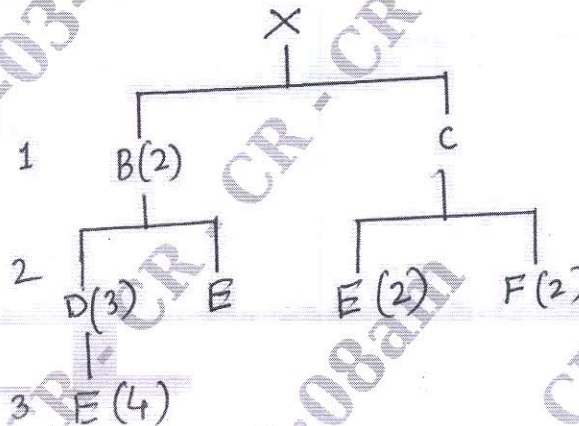b. The Fig.Q9 (b) shows product structure tree for end Item X i.e.Chairs



Fig. Q9 (b)

(i) Determine the quantities of B, C, D, E and F needed to assemble one X.

(ii) Determine the quantities of these components that will be required to assemble 10Xs, taking into account the quantities on hand (i.e. an inventory) of various components:

| Component | On Hand |
|---|---|
| B | 4 |
| C | 10 |
| D | 8 |
| E | 60 |

**(10 Marks)**

**OR**

10 a. What is supply chain? Explain supply chain management with a schematic model. **(10 Marks)**

b. Describe Bull whip effect with a diagram. **(05 Marks)**

c. Briefly explain elements of supply chain management. **(05 Marks)**

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