# Sixth Semester B.E. Degree Examination, December 2010
## Operations Management

Time: 3 hrs.                                                                 Max. Marks:100

**Note:** *Answer any FIVE full questions, selecting*
*at least TWO questions from each part.*

## PART – A

1  a. Define operations management. Identify some principal factors affecting productivity.
    **(05 Marks)**
   b. Identify the major contribution of key individuals associated with the scientific management.
    **(05 Marks)**
   c. How do you distinguish between manufacturing and service systems?      **(05 Marks)**
   d. Mention the salient features of a mass production system.               **(05 Marks)**

2  a. Explain briefly the various characteristics of decisions.              **(04 Marks)**
   b. A shoe company plans to produce 30,000 pairs of shoes next year. They will be sold for Rs.700 each pair. The fixed costs of operation are Rs.50 lakh and total variable costs are Rs.60 lakh. What is the breakeven point?       **(04 Marks)**
   c. A glass factory, specializing in crystal is experiencing a substantial backlog and the management is considering three courses of action. A) arrange for sub contracting B) begin overtime production and C) construct new facilities. The correct choice depends largely upon the future demand, which may be low, medium or high. By consensus, the management ranks the respective probabilities as 0.10, 0.50 and 0.40. A cost analysis reveals the effect on profits as shown in the following table:

| | Profit (Rs.) if the demand is | | |
|---|---|---|---|
| | Low (p = 0.10) | Medium (p = 0.50) | High (p =0 .40) |
| A = Arrange subcontracting | 10 | 50 | 50 |
| B = Begin overtime | -20 | 60 | 100 |
| C = Construct facilities | -150 | 20 | 200 |

   State which course of action would be taken under a criterion of i) Maximax   ii) Max | min   iii) Maximum probability   iv) Maximum expected value.  Show this decision situation schematically in the form of a decision tree.      **(08 Marks)**
   d. Mention the characteristics of decision tree analysis.                  **(04 Marks)**

3  a. Define the design capacity and system capacity.                        **(02 Marks)**
   b. What steps should be included in making a facility location decision, for a manufacturing and service organization?        **(06 Marks)**
   c. An automobile equipment supplier wishes to install a sufficient number of ovens to produce 400,000 good castings/year. The baking operation takes 2.0 minutes per casting but the oven output is typically about 6 percent defective. How many ovens will be required, if each one is available for 1,800 hours (of capacity) per year?      **(06 Marks)**
   d. Mention the advantages and disadvantages of process/functional layouts.  **(06 Marks)**

4  a. With respect to time series methods, explain the following terms:
      i) Trend  ii) Seasonal      iii) Cyclical factors     iv) Random components.    **(04 Marks)**
   b. Use the mid-deviation method to develop a linear trend equation for the data shown below. State the equation, complete with the signature. Forecast a trend value for the year 16.

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Shipment (kgs) | 2 | 3 | 6 | 10 | 8 | 7 | 12 | 14 | 14 | 18 | 19 |

    **(08 Marks)**

c. In what manner correlation methods differ from regression methods? (03 Marks)

d. Results of a study, to determine the correlation between no. of tyres required for trucks (Y) and distance traveled (X) are as follows:

$\Sigma X = 184$ ; $\Sigma Y = 80$ ; $n = 8$ ; $\Sigma X^2 = 5,006$ ; $\Sigma Y^2 = 950$ ; $\Sigma XY = 2,146$.

Compute the correlation coefficient. (05 Marks)

## PART – B

5 a. Mention the decision variables and associated costs in aggregate planning. (05 Marks)

b. A customer furniture company, currently has 100 employees and has forecast quarterly demands shown in the table below. The historical average production rate is 40 units per employee/quarter and the firm has a beginning (safety stock) inventory of 1,000 units. The hiring and training cost is Rs.400/employee and the layoff cost is Rs.600/employee. Inventory is carried at a cost of Rs.8 per unit per quarter. Use the data to develop an aggregate plan that uses variable employment and inventory to meet the demand.

Quarterly demand forecast for furniture manufacture

| Quarter | 1 | 2 | 3 | 4 | Total |
|---|---|---|---|---|---|
| Demand | 3,500 | 5,000 | 4,000 | 3,450 | 15,950 |

(08 Marks)

c. i) Find the ATP inventory values for the master schedule shown in the following table:

Master schedule for tractor levellers

| On-hand 23 | Lot size 25 | | | | | Panning time fence 6 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Period | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Forecast | 10 | 10 | 10 | 10 | 20 | 20 | | | |
| Customer orders (Booked ) | 13 | 5 | 3 | 1 | | | | | |
| Projected available balance | 10 | 0 | 15 | 5 | 10 | 15 | | | |
| Master production schedule | | | 25 | | 25 | 25 | | | |

ii) Define ATP. Where is it used? (07 Marks)

6 a. Why is the inventory control such a dominant consideration in production operations? (04 Marks)

b. With the help of a block diagram, mention the scope of materials management. (05 Marks)

c. Briefly explain the ABC analysis. (06 Marks)

d. An oil engine manufacturer purchases lubricants at the rate of Rs. 42 per piece from a vendor. The requirements of these lubricants are 1800 per year. What should be the ordering quantity per order? The cost per placement of an order is Rs.16 and inventory carrying charges per rupee per year are 20 paise. (05 Marks)

7 a. What do you mean by MRP and CRP? (03 Marks)

b. What are the essential inputs and outputs in a MRP system? (03 Marks)

c. Complete the material requirement plan shown below. Find the amount of inventory on hand at the end of week 8. (08 Marks)

| Order quantity = 500 Lead time = 4 weeks | Week | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Projected requirements | 150 | 150 | 150 | 150 | 200 | 200 | 180 | 320 |
| Receipts | | | 500 | | | | | |
| On hand at the end of period 300 | 150 | 0 | 350 | 200 | | | | |
| Planned order release | | | | | | | | |

d. Mention the various steps involved in capacity management. (06 Marks)

8 a. What are the major responsibilities of the purchasing department? (05 Marks)

b. Mention the important variables to select the supplier. (04 Marks)

c. What do you mean by make-or-buy decision? How do you assess the above decision through the BEP chart? (06 Marks)

d. Mention the parameters for purchasing. (05 Marks)

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