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20MCM15

First Semester M.Tech. Degree Examination, Jan./Feb. 2021
Operation Management

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. Define operation management. Explain the functions of operation management within the business organization. **(10 Marks)**
   b. Explain with neat sketch the environment of operation management. **(10 Marks)**

OR

2 a. What is CAP-OM? Explain the role of production manager in the organization. **(10 Marks)**
   b. Define productivity. Explain the types of production system with examples. **(10 Marks)**

Module-2

3 a. Define slack variable and surplus variable. Find all the basic solution for the following problems and group them into basic feasible and basic infeasible solutions.

Maximize $Z = x_1 + 2x_1 + 0.s_1 + 0.s_2$

Subject to $x_1 - x_2 + s_1 = 10$

$2x_1 - x_2 + s_2 = 40$

and $x_1, x_2, s_1, s_2 \geq 0$ **(10 Marks)**

   b. Use graphical method to solve the following LP problem.

Maximize $Z = 2x_1 + x_2$

Subject to $x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1$ and $x_1, x_2 \geq 0$ **(10 Marks)**

OR

4 a. Solve the LPP:

Maximize $Z = 3x_1 + 2x_2$

Subject to $4x_1 + 3x_2 \leq 12$

$4x_1 + x_2 \leq 8$

$4x_1 - x_2 \leq 8$

$x_1, x_2 \geq 0$ **(10 Marks)**

   b. Solve LPP by using Big-M method.

Maximize $Z = -2x_1 - x_2$

Subject to constraints $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

$x_1, x_2 \geq 0$ **(10 Marks)**

Module-3

5 a. Define forecasting. Explain the steps in forecasting process. Explain the forecasting procedure for using time series methods. **(10 Marks)**

b. Using SES technique, determine the forecast for period 2 through 12 for which the actual figures are given below:

Period	1	2	3	4	5	6	7	8	9	10	11	12
Actual demand	200	211	190	198	210	230	195	200	215	198	200	212

Assume that the first period forecast is equal to actual demand in that period given alpha = 0.2. Also graphically compare your forecast demand with the actual demand. **(10 Marks)**

OR

6 a. Define system capacity, design capacity, capacity planning. Explain long term and short term capacity strategies. **(10 Marks)**

b. An automobile component manufacturer has the plan of buying a moulding machine which can manufacture 17,000 parts/year. The moulding machine is a part of product line and its efficient is 85%.
   (i) What is required capacity?
   (ii) Assume that 100 seconds time is required to mould each part and the plant operates for 2000 hrs/year. If the mould machine are used for 60% of the time and are 90% efficient, what is output of moulding machine/hrs.
   (iii) How many moulding machine would be required? **(10 Marks)**

Module-4

7 a. Mention the inventory control classifications. Explain the ABC analysis with graphical representation. **(10 Marks)**

b. A company uses annually 48,000 units of raw materials costing Rs.1.25/units. Placing order cost of Rs.45 and carrying cost is 15% of average inventory. Find EOQ and optimum time between each order. Suppose the company follows EOQ policy and it operates for 300 days in a year and the procurement time 12 days with safety stock of 500 units. Find the re-order point, the maximum, and the minimum and average inventory. **(10 Marks)**

OR

8 a. Explain the EOQ analysis with graphical representation. Mention the EOQ models. **(10 Marks)**

b. Determine the optimum order quantity for a component for which the cost breaks are as follows:

Quantity	Unit cost
$0 \le Q_1 \le 500$	10
$500 \le Q_2$	9.25

The monthly demand for the component is 200 units. The cost of storage is 2% of the cost; cost of ordering is Rs.350.
   (i) Find the optimum order size.
   (ii) If the order cost is changed to Rs.100 per order, find the optimum order size. **(10 Marks)**

Module-5

9 a. Define MRP and with a block diagram, explain the various inputs to an MRP system. **(10 Marks)**

b. Explain the structure of an ERP system. Discuss advantages and disadvantages of ERP. **(10 Marks)**

OR

10 a. Define Just In Time (JIT) production. Explain the elements of JIT manufacturing. **(10 Marks)**

b. Briefly explain: (i) Dual Card Kanban System (ii) Withdrawal Kanban
   (iii) Production Kanban (iv) Quality Circle **(10 Marks)**