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10ME81

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Operations Management

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define productivity. Explain the factors affecting productivity. **(08 Marks)**

b. Distinguish between manufacturing and service organization. **(06 Marks)**

c. Explain in brief, the functions of operations management. **(06 Marks)**

2 a. Explain the steps in Decision Making process. **(06 Marks)**

b. The values of a pay-off table are:

	New bridge	No new bridge
A	1	10
B	2	10
C	4	6

Determine the choice to make under maximin and Laplace strategies. **(07 Marks)**

c. Solve the following L.P.P. by graphical method:

Maximize $3x_1 + 5x_2$

Subject to $x_1 + 2x_2 \leq 2000$

$x_1 + x_2 \leq 1500$

$x_2 \leq 600$

$x_1, x_2 \geq 0$ **(07 Marks)**

3 a. Classify forecasting methods and explain Delphi Technique. **(05 Marks)**

b. A firm use simple exponential smoothing with $\alpha = 0.1$ to forecast demand. The forecast for the week of February 1 was 500 units, whereas actual demand turned out to be 450 units.

i) Forecast the demand for the week of February 8.

ii) Assume that the actual demand during the week of February 8 turned out to be 505 units. Forecast the demand for the week of February 15. Continue on forecasting through March 15, assuming that subsequent demands were actually 516, 488, 467, 554 and 510 units. **(07 Marks)**

c. The general manager of a building materials production plant feels that the demand for plasterboard shipments may be related to the number of construction permits issued in the country during the previous quarter. The manager has collected the data shown in the accompanying table. Determine the regression line. Find the forecast for plasterboard shipments when the number of construction permits is 30. **(08 Marks)**

Construction permits	15	9	40	20	25	25	15	35
Plasterboard shipments	6	4	16	6	13	9	10	16

4 a. Define plant layout. Explain product or line layout. **(05 Marks)**

b. Explain the factors to be considered while selecting location for the factory/industry. **(07 Marks)**

c. A metals processing firm wishes to install enough automatic moulders to produce 2,50,000 good castings per year. The moulding operation takes 1.5 minutes per casting, but its output is typically about 3% defective. How many moulders will be required if each one is available for 2000 hours (of capacity) per year? **(08 Marks)**

PART – B

5 a. Define aggregate planning and master scheduling. Explain the pure strategies used for aggregate planning in brief. **(08 Marks)**

b. The supply, demand, cost and inventory data for a company, which has a constant workforce, is given below:

Period	Demand forecast (units)	Supply capacity (units)		
		RT	OT	SC
1	100	60	18	1000
2	50	50	15	1000
3	70	60	18	1000
4	80	65	20	1000

Initial Inventory = 20 units
Final Inventory = 25 units
Regulator time (RT) cost/unit = Rs.100
(Labour = 50% of the cost)
Overtime (OT) cost/unit = Rs.125
Subcontracting (SC) cost/unit = Rs.130
Carrying cost/unit-period = Rs.2
Using transportation model format, allocate production capacity to satisfy demand at minimum cost. **(12 Marks)**

6 a. Explain the reasons for holding inventory. **(05 Marks)**

b. Derive EOQ for the lot size with uniform rate of demand and instantaneous demand. Write the assumptions. **(07 Marks)**

c. Find the optimum order quantity for a product for which the price break are as follows:

Quantity	Purchase cost (per units) Rs.
$0 \le Q_1 < 100$	20
$100 \le Q_2 < 200$	18
$200 \le Q_3$	16

The monthly demand for the product is 400 units. The storage cost is 20% of the unit cost of the product and the cost of ordering is Rs.25 per month. **(08 Marks)**

7 a. Define MRP, CRP and BOM. **(06 Marks)**

b. A Bill of Materials (BOM) is desired for a bracket (2100) that is made up of a base (A10), two springs (B11), and four clamps (C20). The base is assembled from one clamp (C20) and two housing (D21). Each clamp has one handle (E30) and each housing has two bearings (F31) and one shaft (G32).
Design a product structure tree that indicates level coding information. **(06 Marks)**

c. Complete the material requirements plan for item X shown below. Note that this item has an independent demand that necessitates that a safety stock of 40 units be maintained.

Order quantity = 70 Lead Time = 4 week Safety stock = 40	Week											
	1	2	3	4	5	6	7	8	9	10	11	12
Projected Requirement	20	20	25	20	20	25	20	20	30	25	25	25
Receipts		70										
On hand at the end of period 65												
Planned order release												

(08 Marks)

8 a. Explain procurement process in detail. (06 Marks)

b. Define tender and explain types of tenders. (04 Marks)

c. Drasco is a medium sized manufacturer of oil field pumps. The firm has developed a new model of its high-pressure, secondary recovery purge pump with improved performance. Manager of process engineering is trying to decide whether Drasco should make or buy the electronically controlled input valve for new pump. He had developed the following estimates.

	Make process A	Make process B	Buy
Annual volume (in units)	10,000	10,000	10,000
Fixed cost/year (Rs)	1,00,000	3,00,000	-
Variable cost/unit	Rs.75	Rs.70	Rs.80

i) Should Drasco make the valve using process A, make the valve using process B or buy the valve?

ii) At what annual volume, should Drasco switch from buying to making the valve using process A?

iii) At what annual volume should Drasco switch from process A to process B? (10 Marks)

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