CBCS SCHEME

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17MA751

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Operations Management

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Draw neat diagrams wherever necessary.***

Module-1

1 a. Explain with a neat sketch our use of resources. **(10 Marks)**
b. Explain the framework for decisions. **(10 Marks)**

OR

2 a. Write a note on decision methodology. **(10 Marks)**
b. Define operations management and briefly explain four major stages of historical development of production operations. **(10 Marks)**

Module-2

3 a. What are forecasting variables? Explain them in brief. **(10 Marks)**
b. A metal processing firm wishes to install enough automatic molders to produce 250000 good castings per year. The molding operation takes 1.5 minutes per casting, but its output is typically about 3% defective. How many molders will be required if each one is available for 2000 hrs (% capacity) per year. **(05 Marks)**
c. Draw a neat block diagram for relationship between capacities and output. **(05 Marks)**

OR

4 a. Compare long-term and short-term capacity strategies. **(05 Marks)**
b. Write a brief note on exponential smoothing. **(05 Marks)**
c. Shipment in tons of welded tube by an aluminum producer are shown below:

Year	1	2	3	4	5	6	7	8	9	10	11
Tons	2	3	6	10	8	7	12	14	14	18	19

(i) Graph the data and comment on the relationship.
(ii) Compute a 3-year moving average, plot it as a dotted line, and use it to forecast shipment in year 12.
(iii) Using a weight of 3 for the most recent data, 2 for the next, and 1 for the oldest, forecast shipments in year 12. **(10 Marks)**

Module-3

5 a. What are aggregate planning guidelines? Explain in brief. **(08 Marks)**
b. Ramsay computers produces mini-computers, that have seasonal demand pattern. The available production capacity during regular time and overtime, as well as other cost data are as follows:

Available Production Capacity

Period	Regular Time	Overtime	Subcontract
1	900	350	600
2	1000	350	600
3	1100	350	600
4	700	350	600

Demand Forecast

Period	1	2	3	4
Units of Demand	700	1000	2000	1200

Available initial inventory = 200 units
Desired final inventory = 150 units
Regular time cost/unit = Rs.125
Overtime cost/unit = Rs.150
Subcontracting cost/unit = Rs.175
Investment cost/unit/period = Rs.25
Formulate this problem as a transportation model, and find the Basic Feasible Solution. **(12 Marks)**

OR

6 a. What is master production schedule? What are the functions of master schedule? **(08 Marks)**

b. Write a note on aggregate planning methods. **(06 Marks)**

c. An appliance manufacturer produces a motor assembly (X) that is used in several hand held appliances. They currently have 60 units in stock and will manufacture mote in production runs (lots) of 90 units. Develop a tentative master schedule for the demand shown:

Initial Inv. 60	Week									
Production run 90	1	2	3	4	5	6	7	8	9	10
Customer forecast		5	30	40	50	40	50	50	50	50
Interplant forecast			5			5			5	
Customer orders	40	40	30	10	10	5				
Warehouse orders	15	10		5						

(06 Marks)

Module-4

7 a. Define the terms:
(i) Material Requirements Planning (MRP) (ii) Capacity Requirements Planning (CRP)
(iii) Dependent demand (iv) Lot size
(v) Time bucket (vi) Bill of materials **(06 Marks)**

b. Write a note on MRP system outputs with a neat block diagram. **(06 Marks)**

c. Complete the MRP format shown below. How many units are on hand at the end of the period 8?

Order quantity:200		Week							
Lead time: 3 weeks		1	2	3	4	5	6	7	8
Projected Requirements		40	85	10	60	130	110	50	170
Receipts									
On hand at the end of period	140								
Planned order release									

(08 Marks)

OR

8 a. Write a brief note on MRP logic. **(06 Marks)**

b. A company produces two products X and Y, which have demand, safety stock, and product structure levels as shown. The on-hand inventories are as follows: X = 100, Y = 30, A = 70, B = 0, C = 200 and D = 800. The lot size for A is 250 and lot size for D is 1000 (or multiplies of those amounts); all the other items are specified on a lot-for-lot (LFL) basis (that is, the quantities are the same as the net requirements). The only scheduled receipts are 250 units of X due in period 2. Determine the order quantities and order release dates for all requirements using the MRP format. [Refer Fig.Q8(b)]

Product	SS	Demand in Period							
		1	2	3	4	5	6	7	8
X	50			300			200		250
Y	30							400	

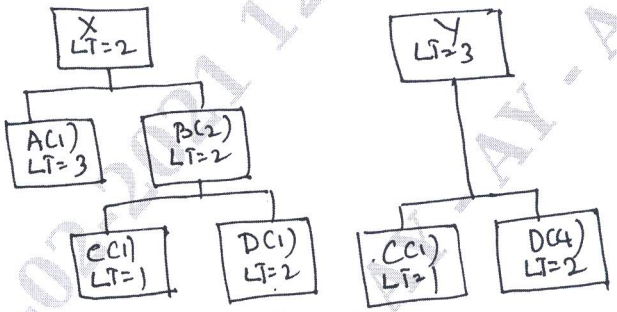

Fig.Q8(b) **(14 Marks)**

Module-5

9 a. Name and explain scheduling strategies. **(08 Marks)**

b. Consider the single machine scheduling problem.

Job (j)	1	2	3	4	5
Processing time (t_j) hrs	20	8	7	10	9

Find the optimal sequence which will minimize the mean flow time and also obtain the minimum mean flow time. **(06 Marks)**

c. Use the graphical method to minimize the time required to process the following jobs on the machines. Also calculate the total elapsed time to complete both jobs.

Job 1	Sequence	A	B	C	D	E
	Time (Hrs)	6	8	4	12	4
Job 2	Sequence	B	C	A	D	E
	Time (Hrs)	10	8	6	4	12

(06 Marks)

OR

10 a. With the help of a neat sketch explain priority control and capacity control. **(06 Marks)**

b. What are three types of scheduling methodologies? Explain any one. **(06 Marks)**

c. Consider the following 3 machines and 5 jobs flow shop problem. Check can you apply Johnson's rule to the problem below. If so, what is the optimal schedule and the corresponding market plan?

Job	Machine 1	Machine 2	Machine 3
1	11	10	12
2	13	8	20
3	15	6	15
4	12	7	19
5	20	9	7

(08 Marks)

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