

This question paper contains 5 printed pages.

3082

Your Roll No.

MEM (PE)

J

Paper— ME.555

OPERATION PLANNING AND CONTROL

Time : 3 hours

Maximum Marks : 100

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

1. (a) Define operations management and explain its characteristics. What are the most important factors affecting operations management today?

(b) Explain the various decisions taken under operations management at different stages of the life cycle. How are these decisions taken? 10,10

2. (a) Differentiate between manufacturing systems and service systems. Briefly discuss the various decisions involved in the process selection.

(b) A firm needs to develop a sales forecast for next year. It believes that its annual sales are related to the sales of its industry. It has prepared these historical data:

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<i>Industry Sales</i> (in Rs. crore)	<i>Firm's Annual Sales</i> (in Rs. crore)
536	98
791	137
650	112
813	145
702	120
575	103
684	116

If estimates of industry sales next year are Rs. 725 crore, use linear regression to forecast annual demand of the firm. 10,10

3. (a) Why are location decisions important? Identify the factors to be considered in selecting the location of retail store of a chain. Assume three locations, apply any technique and select the best location.
- (b) What do you understand by JIT manufacturing? Write brief notes on (i) Kanban System, (ii) Value Stream Mapping. 10,10
4. (a) Explain why we balance production lines. Describe the Ranked Positional Weight Procedure.
- (b) The time to perform each task and the tasks that must immediately precede are shown below:

<i>Task</i>	<i>Task Time (in min)</i>	<i>Immediate Precedence</i>
A	0.25	-
B	0.08	A
C	0.12	B
D	0.17	B
E	0.06	C, D
F	0.05	E
G	0.09	E
H	0.11	E
I	0.16	F, G, H
J	0.8	I

If 150 units are to be produced per hour and 50 minutes per hour are productive:

- (i) Draw a diagram of precedence relationship.
 - (ii) Compute the cycle time.
 - (iii) Compute the minimum number of work stations required.
 - (iv) Use RPW technique to balance the line. Calculate line efficiency.
- (c) Briefly discuss the techniques to overcome monotony of job. 4,12,4
5. (a) Define and describe Aggregate Planning. Why is aggregate planning in produce-to-order firms

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difficult? Explain how linear programming can be used in aggregate planning.

- (b) Briefly discuss the concept of automation and flexibility. How do they help in improving the competitiveness of the organization? 10,10

6. (a) Differentiate between CPM and PERT.

The following maintenance job has to be performed periodically on the heat exchanger in a refinery:

<i>Task</i>	<i>Precedence</i>	<i>Duration Hours</i>
A	-	14
B	A	22
C	B	10
D	B	16
E	B	12
F	C	10
G	C	6
H	F, G	8
I	D, E, H	24
J	I	16

- (i) Draw the network diagram of activities and identify critical path.
- (ii) Calculate length of critical path and free float and independent floats of all the tasks.
- (b) Write brief notes on:
- (i) Material Requirement Planning

(ii) Flexible Manufacturing System. 10,10

7. (a) Discuss the various performance measures and the priority rules used in scheduling and sequencing.

Sequence the jobs in 6 jobs 3 machine problem to minimise the make span time.

<i>Job</i>	1	2	3	4	5	6	
<i>Process</i>	A	14	16	10	12	18	15
<i>Time</i>	B	7	8	9	4	5	8
	C	15	19	11	14	17	16

- (b) Write brief notes on:

(i) Make Buy decision

(ii) Product and process layout. 10,10