

Part B

Answer any four (4 x 10 = 40 marks)

1. What are the factors that influence plant layout decisions? Explain in detail.
2. What is "Forecasting"? List any four methods of forecasting and outline their limitations if any.
3. Differentiate manufacturing operations from Service Operations?
4. a) How service operation facility is located? Explain with an example
b) Explain (i) Product Layout and (ii) Gravity Location Model.
5. a) Schedule the following six jobs through the machines in sequence to minimize the flow time using Johnson's rule.

Job	Operation Time - M ₁	Operation Time - M ₂
A	9	6
B	18	15
C	2	9
D	13	11
E	17	3
F	18	7

- b) Explain major features of ISO 9001 standards.
6. Differentiate a JIT production process and non JIT production process.

Part C

Answer all the four (4 x 10 = 40 marks)

1. Consider the following data of a project.

Activity	Predecessor(s)	Duration (Weeks)		
		Optimistic	Most likely	Pessimistic
A	-	3	5	8

B	-	6	7	9
C	A	4	5	9
D	B	3	5	8
E	A	4	6	9
F	C, D	5	8	11
G	C, D, E	3	6	9
H	F	1	2	9

- a) Construct the project network.
 - b) Find the expected duration and variance of each activity.
 - c) Find the critical path and the expected project completion time.
 - d) What is the probability of completing the project on or before 30 weeks?
 - e) If the probability of completing the project is 0.9, find the expected project completion time.
2. Consider the following 3 machines and 5 jobs flow shop problem.

Job	Processing time		
	M/C-1	M/C-2	M/C-3
1	7	4	3
2	9	5	8
3	5	1	7
4	6	2	5
5	10	3	4

Check whether Johnson's rule can be extended to this problem. If so, find the optimal schedule and the corresponding makespan.

3. The following data were obtained over a five-day period to indicate \bar{X} and R control chart for a quality characteristic of a certain manufacturing product that had required a substantial amount of rework. All the figures apply to the product made on a single machine by a single operator. The sample size was 5. Two samples were taken per day. Comment on the process using \bar{X} and R charts.

Job	Processing time				
	1	2	3	4	5
1	10	12	13	8	9
2	7	10	8	11	9
3	11	12	9	12	10
4	10	9	8	13	11
5	8	11	11	7	7
6	11	8	8	11	10
7	10	12	13	13	9
8	10	12	12	10	12
9	12	13	11	12	10
10	10	13	7	9	12

4. A firm producing Hand trolley has the following master production schedule (MPS).

Weeks	1	2	3	4	5	6	7	8
Demand	200	-	-	240	-	240	-	220

Each hand trolley has a bin, 2 wheel assemblies, 2 handle bars and a mounting base. Each wheel assembly has a wheel and 2 bearings. Order quantities, lean time and inventories on hand at the beginning of period 1 are shown below:

Part	Order Quantity	Lead Time (Week)	Inventory on Hand
Hand Trolley	350	1	220
Bin	440	2	250

Wheel assemblies	800	2
Handle bars	850	2
Mounting base	250	1
Wheel	600	2
Bearing	1500	2

A shipment of 800 wheel assemblies is already scheduled to be received at the beginning of week 2. Also, another shipment of 250 mounting base is scheduled to be received at the beginning of week 3. Complete the material requirements plan for the Bin, Wheel assemblies, Handle bars, Mounting base, Wheel and Bearing and show what quantities of orders must be released and when they must be released
