

Master of Mechanical Engineering Examination, 2017
(2nd Semester)
Advanced Manufacturing Systems

Time: Three hours

Full marks: 100

Use a separate answer script for each group.

Group A

Answer any three questions.

1. (a) Discuss briefly the Opitz coding system and cite an example of a part design to develop the form code (first five digits) in this system.
 (b) Apply the ROC method to solve the following cell formation problem.

	Parts						
		A	B	C	D	E	F
Machines	1	1				1	
	2				1		1
	3	1	1				
	4			1	1		
	5		1			1	
	6			1	1		1

2. (a) Consider the small MRP tree.
 A-110 (10,1,1) → A-200 (30,2,3) → X-300 (65,1,2) Determine the L4L planned order releases for A-110, A-200 and x-300 assuming no scheduled order receipts for any item. The master schedule for the parent A-110 is as follows:

Time period	1	2	3	4	5	6	7	8	9
Gross Requirements	3	6	5	8	5	6	5	4	3

(b) How does MRP II work?

3. (a) A firm has developed the following supply, demand, cost, and inventory data. Allocate the production capacity to meet the demand at minimum cost. Assume that the initial inventory has no holding cost in the first period. Initial inventory – 20, regular-time cost per unit – Rs 100, overtime cost per unit – Rs 150, subcontract cost per unit – Rs 200, carrying cost per unit per month –Rs 4.

Month	RT	OT	SC	Demand Forecast
1	30	10	5	40
2	35	12	5	50
3	30	10	5	40

(b) Explain stochastic mixed-product line balancing.

4. Explain the quantitative bottleneck model of flexible manufacturing systems.

Group B

Answer any three questions.

(2 marks for neat and clean presentation)

1. (a) Discuss different types of safety monitoring system with the uses of sensors.
(b) Explain different levels of automation with suitable schematic diagram. (6+10=16)

2. (a) What are the basic elements of an automated system? Discuss in detail.
(b) What are the differences between a process parameter and a process variable?
Explain in detail.
(8+8=16)

3. (a) Discuss the importance of material handling system in FMS in detail.
(b) Explain a typical FMS layout with schematic diagram. (8+8=16)

4. (a) Explain CIM in today's context in manufacturing industry.
(b) Explain major elements of a CIM system. (8+8=16)

5. (a) Explain different parameters of an inventory policy in detail.
(b) The demand for a product is 5000 units per month. Every production requires a set up cost Rs. 3000. The production cost is Rs. 32 per unit. Find the optimal lot size if the annual rate of interest is 18%. (10+6=16)