Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 80672

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Mechanical Engineering

ME 6703 — COMPUTER INTEGRATED MANUFACTURING SYSTEM

(Common to Mechanical and Automation Engineering)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define concurrent engineering.

2. What are the three basic elements of an automated system?

3. Differentiate process planning and production planning.

4. Distinguish materials requirement planning and manufacturing resource planning.

5. What is cellular manufacturing?

6. Explain composite part concept.

7. State any four benefits of FMS.

8. List out the types of AGV's.

9. Define pitch, yaw and roll.

10. What is accuracy and repeatability in industrial robots?

PART B — (5 × 16 = 80 marks)

11. (a) Write in detail about the production performance metrics. (16)

Or

(b) (i) Explain the concept of Lean manufacturing and Just-in-time production systems. (10)

(ii) The average part produced in a batch manufacturing plant must be processed sequentially through six machines on average. Twenty new batches of parts are launched each week. Average operation time = 6 min., average set up time = 5 hours, average batch size = 36 parts, and average non-operation time per batch = 10 hrs/machine. There are 18 machines in the plant working in parallel. Each of the machines can be set up for any type of job processed in the plant. The plant operates an average of 70 production hours per week. Scrap rate is negligible. Determine manufacturing lead time for an average part, plant capacity and plant utilization. (6)

12. (a) Explain in detail about the Computer Aided Process Planning. (16)

Or

(b) (i) What is MRP and explain the inputs of MRP. (8)

(ii) Enumerate shop floor control system. (8)

13. (a) Explain OPITZ parts classification and coding system. (16)

Or

(b) (i) Apply the rank ordering clustering technique to the part-machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters and machines are identified numerically. (8)

Parts

Machines	A	B	C	D	E
1	1				
2		1			1
3	1			1	
4		1	1		
5				1	

(ii) Four machines used to produce a family of parts are to be arranged into a GT cell. The from-to data for the parts processed by the machines are shown in the table below. Determine the most logical sequence of machines for this data by Hollier method. (8)

	To			
From	1	2	3	4
1	0	10	0	40
2	0	0	0	0
3	50	0	0	20
4	0	50	0	0

14. (a) Define FMS and explain in detail about the FMS components. (16)

Or

(b) Explain the vehicle guidance technology of AGVs. (16)

15. (a) (i) Explain the types of mechanical joints commonly used in industrial robot construction, with neat sketch. (8)

(ii) Explain about any three types of robot control systems. (8)

Or

(b) Explain in detail about the types of robot part programming. (16)