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

Question Paper Code : 53319

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh/Eighth Semester

Mechanical Engineering

ME 6703 — COMPUTER INTEGRATED MANUFACTURING SYSTEMS

(Common to Mechanical Engineering/Mechanical and Automation Engineering/Robotics and Automation Engineering)

(Regulation 2013)

(Also Common to : PTME 6703 — Computer Integrated Manufacturing Systems for B.E. (Part-Time) Sixth Semester – Mechanical Engineering – Regulation 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the applications of Concurrent Engineering in the manufacturing field.

2. State the objectives of implementation of CIM.

3. Differentiate between Aggregate Production Planning and Master Production Schedule.

4. The annual demand for a certain item made-to-stock = 15,000 pc/yr. One unit of the item costs $20.00 and the holding cost rate = 18%/yr. Setup time to produce a batch = 5 hr. The cost of equipment downtime plus labor = $150/hr, Determine the economic order quantity and the total inventory cost for this case.

5. Mention the factors to be considered in selection of coding system.

6. Define the term Key machine in the Cellular Manufacturing

7. Write the difference between FMC & FMS systems.

8. Name the applications of AGVs in the manufacturing field.

9. Distinguish between repeatability and accuracy in a robotic manipulator.

10. How do the sensors are used in the Robotics?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail about the Computerised elements of CIM system with the neat diagram. (13)

Or

(b) Define the term JIT and explain the KANBAN System used in JIT with simple diagram showing the flow of materials. (13)

12. (a) Illustrate the steps involved in Variant Computer Aided Process Planning System. (13)

Or

(b) Illustrate the following Phases of Shop Floor control :

(i) Order Scheduling (8)

(ii) Order Progress. (5)

13. (a) Apply the ROC 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.

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

Or

(b) Four machines used to produce a family of parts are to be arranged into a GT cell. The From-To data for the parts processes by the machine are shown in the table below.

(i) Determine the most logical sequence of machines for this data using Hollier Method 2.

(ii) Construct the flow diagram for the data, showing where and how many parts enter and exit the system.

(iii) Compute the percentage of in-sequence moves and the percentage of backtracking moves in the solution.

(iv) Develop a feasible layout plan for the cell.

	To				
From	1	2	3	4	5
1	0	10	80	0	0
2	0	0	0	85	0
3	0	0	0	0	0
4	70	0	20	0	0
5	0	75	0	20	0

14. (a) Summarize the following FMS Layouts with the neat sketches.

(i) Open field layout (4)

(ii) Ladder Layout (4)

(iii) Robot Centered Layout. (5)

Or

(b) Summarize the following three technologies used in AGVs Guidance Systems.

(i) Imbedded guide wires (4)

(ii) Paint strips (4)

(iii) Self-guided vehicles. (5)

15. (a) Explain the following base on Robotics.

(i) Configuration

(ii) Work volume

(iii) Generation.

Or

(b) Explain the following with neat sketch.

(i) CAM Actuate gripper

(ii) Vacuum gripper

(iii) Magnetic gripper.

PART C — (1 × 15 = 15 marks)

16. (a) Describe the Direct Kinematic equation of SCARA Robot using D–H–Transformation matrix.

Or

(b) Discuss a case study of Robotics Applications in Bio Medical with suitable diagram.

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