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Question Paper Code : 82326

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Seventh Semester

Mechanical Engineering

ME 3792 — COMPUTER INTEGRATED MANUFACTURING

(Common to: Production Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define Computer Integrated Manufacturing (CIM).
2. What are the major elements of a CIM system?
3. What is an Automated Guided Vehicle (AGV)?
4. State any three principles of material handling.
5. What is Group Technology?
6. Name the components of a Flexible Manufacturing System (FMS).
7. What is Process Planning?
8. Define variant process planning.
9. What is a Programmable Logic Controller (PLC)?
10. What is Statistical Process Control (SPC)?

PART B — ($5 \times 13 = 65$ marks)

11. (a) Explain the evolution of CIM and discuss how it has transformed manufacturing industries.

Or

- (b) Describe the CIM wheel and explain its significance in understanding the integration of various manufacturing functions.

12. (a) Discuss the different types of automated storage and retrieval systems(AS/RS) and their applications in modern manufacturing.

Or

- (b) Explain the concept of deadlocks in automated manufacturing systems and describe how Petri net models can be used to detect and avoid them.

13. (a) Illustrate the rank order clustering method used in group technology for grouping parts and machines, with a suitable example.

Or

- (b) Describe the architecture of a Flexible Manufacturing System (FMS) and explain the role of each component in detail.

14. (a) Explain the steps involved in Computer-Aided Process Planning (CAPP) and discuss its advantages over manual process planning.

Or

- (b) Compare and contrast variant and generative approaches to process planning, highlighting their respective strengths and weaknesses.

15. (a) Discuss the working principle of a linear feedback control system and its application in manufacturing process control.

Or

- (b) Explain the concept of Supervisory Control and Data Acquisition (SCADA) and describe its role in monitoring and controlling manufacturing processes.

PART C — (1 × 15 = 15 marks)

16. (a) Design a layout for a Flexible Manufacturing System (FMS) that includes at least three different types of workstations (eg., machining, inspection, assembly), an automated material handling system, and a central control system. Explain how the system handles part variety and production flexibility.

Or

- (b) Analyze how the implementation of industry 4.0 technologies, such as IoT, big data analytics, and cyber-physical systems, can transform a traditional manufacturing plant into a smart factory. Discuss specific benefits and challenges, with examples.