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

Question Paper Code : 41385

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Fifth/Sixth/Seventh Semester

Mechanical Engineering

ME 3792 — COMPUTER INTEGRATED MANUFACTURING

(Common to Industrial Engineering/Industrial Engineering and Management/Mechanical and Automation Engineering/Mechatronics Engineering/Production Engineering/Robotics and Automation)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define islands of automation.

2. List the analyzing software's used in CIM.

3. Name the four traditional (non-automated) methods for storing materials.

4. Define virtual manufacturing.

5. What is mono code?

6. What are the three capabilities that a manufacturing system must possess in order to be flexible?

7. State the stages of VPP.

8. Compare CAPP with Manual PP.

9. Differentiate PLC and SCADA.

10. What is the difference between a passive tag and an active tag?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Describe the various Levels of Integration in the evolution of CIM. (8)

(ii) How does workflow automation software help to improve team productivity? (5)

Or

(b) A manufacturing plant produces three product lines in one of its plants : A, B and C. Each product line has multiple models : 3 models within product line A, 5 models within B, and 7 within C. Average annual production quantities of model A is 400 units, 800 units for model B, and 500 units for model C. Determine the number of

(i) different product models and (5)

(ii) total quantity of products produced annually in this plant. (8)

12. (a) A single carousel storage system has an oval rail loop that is = 40 m long and 3 m wide. Fifty carriers are equally spaced around the oval. Suspended from each carrier are five bins. Each bin has a volumetric capacity = 0.95 m^3. Carousel speed = 100 m/min. Average pick-and-deposit time for a retrieval = 20 sec. Determine

(i) volumetric capacity of the storage system and (6)

(ii) hourly retrieval rate of the storage system. (7)

Or

(b) Explain the major components of Industry 4.0 with a neat block diagram. Why it is needed in the current scenario?

13. (a) Explain in brief of the following parts classification and coding system in group technology

(i) Opitz coding system (7)

(ii) MICLASS. (6)

Or

(b) What are exceptional elements and bottleneck machines? Explain in detail, how to eliminate exceptional elements?

14. (a) List the information's required for process planning. Describe the sequence of operations required for making a product from raw material. Also mention the factors to be considered for selection of manufacturing process.

Or

(b) Explain the methodology to be followed for developing a retrieval type of computer aided process planning system with block diagram.

15. (a) (i) Describe the three functions of adaptive control system with a block diagram. (6)

(ii) Compare DDC and Supervisory computer control in a computer process monitoring. (7)

Or

(b) Illustrate the bar code of a product which is used for an automatic identification method.

PART C — (1 × 15 = 15 marks)

16. (a) Enumerate on the vehicle management system and vehicle safety deployed in the material handling system of the FMS in an automobile industry.

Or

(b) How generative process planning differs from variant process planning and describe the forward, backward planning and decision logic methods of generative process planning?