Code No: 156AG **R18**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech III Year II Semester Examinations, March - 2024**
**CAD AND CAM**
**(Mechanical Engineering)**

**Time: 3 Hours** **Max. Marks: 75**

**Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

## PART – A

**(25 Marks)**

| | | |
|---|---|---|
| 1.a) | What is RAM and ROM? | [2] |
| b) | Differentiate between system software and application software in the context of CAD. | [3] |
| c) | Discuss the significance of blending functions in surface modeling. | [2] |
| d) | Define the concept of algebraic and geometric forms in surface modeling | [3] |
| e) | What is role of NC in CAM? | [2] |
| f) | State the functions of the following G and M codes:<br>(i) G01 (ii) G03 (iii) M03 (iv) M06 | [3] |
| g) | List various types of statements used in APT language. | [2] |
| h) | Explain the concept of composite part (in Group Technology) with an example. | [3] |
| i) | Give economic justification of FMS. | [2] |
| j) | Discuss working and screen coordinate systems. | [3] |

## PART – B

**(50 Marks)**

2.a) Explain the concept of a CAD/CAM database. What is its structure, and how does it support data storage and retrieval in design and manufacturing processes?

b) Describe computer peripherals used for CAD/CAM. What is the significance of a design workstation and a graphic terminal in CAD/CAM environments? [5+5]

**OR**

3.a) Discuss interpolation and approximation techniques used in geometric modeling.

b) How are these techniques applied to generate curves and surfaces in CAD/CAM systems? [5+5]

4.a) Explain the sweep representation technique in solid modeling. How is it used to create complex solid shapes by sweeping a 2D profile along a path?

b) Describe boundary representations (B-rep) in solid modeling. How are boundaries defined and represented in B-rep models? [5+5]

**OR**

5. Discuss various types of surfaces, including cylindrical, ruled, surface of revolution, spherical, composite, Bezier, B-spline, regenerative, and surfaces with pathological conditions. Provide examples of applications for each type. [10]

6.a) Define CNC systems and their advantages over conventional NC systems. How do CNC systems improve machining accuracy and productivity?

b) Explain the recent advances in CNC machining centers. [6+4]

**OR**

7.a) Explain i) canned cycles ii) Tool nose radius compensation.

b) Explain the concept of adaptive control systems in CNC machining. How do adaptive control systems optimize machining processes based on real-time feedback? [5+5]

8.a) Explain Capacity Requirements Planning (CRP) and its significance in aligning production capacity with demand forecasts.

b) How does CRP help optimize resource utilization and minimize production bottlenecks? [5+5]

**OR**

9.a) Discuss the benefits of implementing Material Resource Planning (MRP) systems in manufacturing organizations.

b) How does MRP improve inventory management and production efficiency? [5+5]

10.a) Describe analysis methods used to evaluate the benefits of FMS. What metrics and criteria are typically used to measure the performance and effectiveness of FMS implementations?

b) Explain in detail the different types of database requirements in CIM. [5+5]

**OR**

11.a) Write short notes on any of the following: (i) Types of Manufacturing systems (ii) Computer control system (iii) Automated Guided Vehicles.

b) Explain different FMS layouts. How do layout designs influence the efficiency and effectiveness of FMS operations? [5+5]

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