

Paper Id:

140701

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B. TECH
(SEM-VII) THEORY EXAMINATION, 2019-20
CAD

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Define emissive and non-emissive display.
 - b. What are the essential requirements of CAD?
 - c. What are the basic rules that are considered before designing graphics software?
 - d. Write down 2D transformation matrix for Rotation and Reflection about origin.
 - e. What are essential requirements for synthetic curves?
 - f. Write any four properties of Bezier curve.
 - g. Differentiate between plane surface and ruled surface with neat sketch.
 - h. What are the limitations of wireframe modeling?
 - i. State the principal of minimum potential energy.
 - j. How element type and size play an important role for mesh generation?

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. What do you understand by computer Integrated Manufacturing (CIM)? Discuss its role or function in product development cycle with suitable block diagram.
 - b. Explain the DDA line generation techniques for line with different slopes. What are the limitations of DDA algorithms?
 - c. Prove that the Bezier polynomials obtained from Hermite form and that obtained from Bernstein polynomials are same.
 - d. Explain constructive solid geometry. What is the role of primitives and Boolean operations in CSG? Explain with suitable examples.
 - e. Using variational approach drive the element stiffness matrix for one dimensional bar element.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) Write short notes on followings:
 - (i) Light pen
 - (ii) Digitizer
 - (b) Discuss the differences between beam penetration method and shadow mask method for obtaining colour pictures on CRT display.
- 4. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain Bresenham's line algorithm and digitize the line with end points A (18, 10) and B (23, 22), also plot a pixel position using Bresenham's line algorithm.
 - (b) Find the transformed coordinates of a triangle having vertices A (4,1), B(7,1) and C(7,3) subjected to reflection through the line $2y = x+2$.

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5. Attempt any *one* part of the following: 10 x 1 = 10
- What do you understand by the interpolation spline and approximation splines? Explain each with suitable examples.
 - Generate parametric equation of a three-dimensional Bezier curve defined by the four-control points $P_0 (5, 4, 2)$, $P_1 (6, 2, 3)$, $P_2 (5, -2, 4)$ and $P_3 (6, -4, 2)$.
6. Attempt any *one* part of the following: 10 x 1 = 10
- Describe the following techniques used in solid modeling packages:
 - Sweep representation
 - Boundary representation
 - What is colour model? Differentiate between RGB and CYMK colour models.
7. Attempt any *one* part of the following: 10 x 1 = 10
- A force of 50 kN is applied at a connecting end of two-bar truss as shown in fig.1. Determine the reactions, stresses and strains on each member of truss. Take $E = 180 \text{ GPa}$, $A = 200 \text{ mm}^2$.

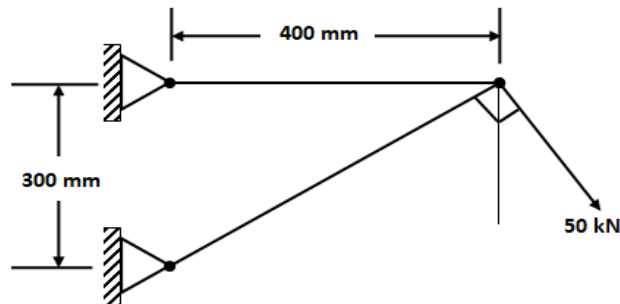


Figure.1

- What do you understand by Local coordinates, Global coordinates and Natural coordinates in FEM? Explain their utility with example.