

B. TECH
(SEM VII) THEORY EXAMINATION 2018-19
COMPUTER AIDED DESIGN

Time: 3 Hours**Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

- a. What are the elements of CAD?
- b. Wright down the differences between Random Scan Display and Raster Scan Display.
- c. What is the need of graphics standards? List some of the graphics standards.
- d. What are the important functions of graphics software?
- e. What do you understand by the terms interpolation and approximation for representation of curve?
- f. What do you mean by order of continuity of curves?
- g. What do you understand by Blobby Objects?
- h. List the five editing commands used in Auto Cad.
- i. What are different types of errors in FEM solutions?
- j. What are pre-processors and post-processors?

SECTION B**2. Attempt any three of the following:****10 x 3 = 30**

- a. What are the main components of Cathode Ray Tube? Explain its principle of operation with a line diagram.
- b. Using midpoint Bresenham's circle generating algorithm, determine pixel positions along circle in the first quadrant from line $x = 0$ to line $x = y$. The radius of circle is 10 units. Plot the generated pixel positions.
- c. Determine Blending functions of Hermite curve. What are the limitations of Hermite curves? How do they remove in Bezier curves?
- d. What do you mean by solid modeling? What are the different techniques of solid modeling used in 3D graphics? Explain with suitable examples.
- e. Derive an expression for stiffness matrix of one dimensional truss element.

SECTION C**3. Attempt any one part of the following:****10 x 1 = 10**

- (a) How the computer is useful in design and manufacturing of a product? Explain briefly the following in CAD environment – CAE, CAM, CIM
- (b) Explain the working principles of the following graphics devices with neat line sketches:
 - (i) Digitizers
 - (ii) Liquid Crystal Display (LCD)

4. Attempt any *one* part of the following:

10 x 1 = 10

- What do you understand by the term windowing and clipping during the viewing transformations of images in computer graphics? Explain with suitable examples.
- Find the transformation matrix and transformed coordinates of a square ABCD converted to half its size with centre remains at the same position. The coordinates of vertices are A (2, 2), B (4, 2), C (4, 4) and D (2, 4) with centre at (3, 3).

5. Attempt any *one* part of the following:

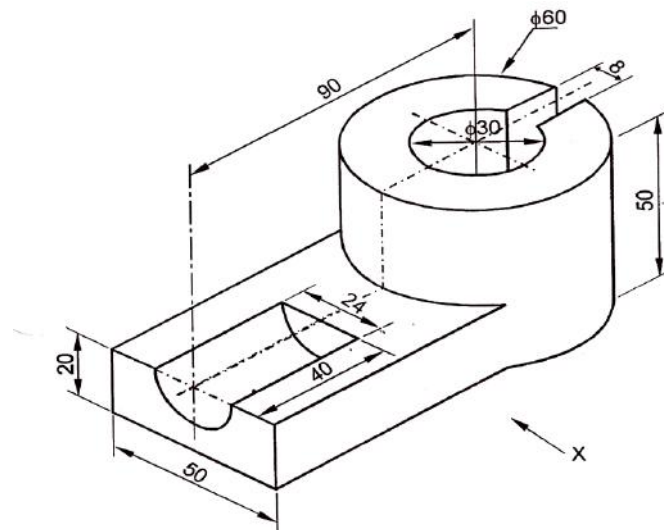
10 x 1 = 10

- Distinguish between the analytic curves and synthetic curves. Describe essential requirements for the synthetic curves in computer graphics.
- Generate parametric equation of a planer Bezier curve defined by the four control points P_0 (1, 2), P_1 (3, 4), P_2 (6, -6) and P_3 (9, 7) and plot them.

6. Attempt any *one* part of the following:

10 x 1 = 10

- Draw a schematic diagram and explain the working of colour monitor display devices. Also explain RGB and CMY colour models.
- Construct the following model using CSG standard primitives and also to develop the history tree.



7. Attempt any *one* part of the following:

10 x 1 = 10

- Explain general methodology of solving a design problem using finite element method. Also write the advantages of FEM.
- Determine the nodal displacements, element stresses and support reactions for the bar shown in figure below. The cross-sectional areas are 250 mm^2 and 400 mm^2 . Young modulus $E = 200 \times 10^9 \text{ N/m}^2$.

