



Code No: RT32032

**R13**

**SET - 1**

**III B. Tech II Semester Regular/Supplementary Examinations, April -2018**  
**INTERACTIVE COMPUTER GRAPHICS**  
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1    a) What are the advantages and disadvantages of LCD over faster-scan CRT? [4M]  
    b) Compare homogeneous coordinates with screen coordinates. [3M]  
    c) What is the use of View Reference point? [4M]  
    d) Define Blending Functions. [4M]  
    e) Define classification. [3M]  
    f) How animation is used in multimedia? [4M]

**PART -B**

- 2    Describe the working methodology of various input devices used for developing graphics applications. [16M]
- 3    a) Describe the midpoint circle generation algorithm. State its advantages and disadvantages over DDA circle generation algorithm. [8M]  
    b) A point (3,5) is rotated anticlockwise by an angle of  $45^0$ . Find the rotation matrix and resultant point. [8M]
- 4    a) Explain Cyrus-beck line clipping algorithm. [8M]  
    b) What is the difference between window and viewport? How window-to-viewport transformation is done? [8M]
- 5    a) Explain the Properties of B - spline. How it is differ from Bezier? [8M]  
    b) How does the depth of a polygon determined by the painter algorithm? [8M]
- 6    A solid tetrahedron is given by position vectors A(1,1,1), B(3,1,1), C(2,1,3) and D(2,2,2) with a point light source is kept at P(2,3,4). Using back face detection method, find the surfaces on which the light falls and the surfaces which are to be shaded. [16M]
- 7    a) Discuss the important principles behind Computer Animation with suitable diagrams [8M]  
    b) What is animation? And give its application areas? [8M]

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**PART -A**

- 1 a) Give the functioning of Display processor. [4M]  
b) What are filled area primitives? [3M]  
c) How to Map a window to view port? [4M]  
d) Explain about diffuse illumination. [4M]  
e) What are composite transformations? [3M]  
f) Define frame by frame animation. [4M]

**PART -B**

- 2 Explain the principle of following video display devices: [16M]  
(i) Cathode Ray Tube. (ii) Liquid Crystal Displays
- 3 Digitize a line from (1, 2) to (12, 18) on a raster screen using Bresenham's straight line algorithm. Compare it with line generated using a DDA algorithm [16M]
- 4 Explain Sutherland Hodgeman polygon clipping algorithm. List and Explain its disadvantages and how to rectify them. [16M]
- 5 a) Explain how to generate a Bezier Curve using the blending functions. [8M]  
b) Give an overview of basic illumination methods. [8M]
- 6 Derive the matrix form for the geometric transformations in 3D graphics from the following operations: i) Translation ii) Scaling iii) Mirror reflection [16M]
- 7 a) Design a Storyboard layout and accompanying key frame for an animation of a single polyhedron. [8M]  
b) Describe various methods of controlling animation. [8M]

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**PART -A**

- 1 a) Distinguish between Raster and Random Scan display. [4M]  
b) Where does overstrike occur When Four way symmetry is used to obtain a full ellipse from pixel coordinates generated for first quadratic [3M]  
c) List the differences between aliasing and ant aliasing. [4M]  
d) What are the properties of a Bezier curve? [4M]  
e) Write down the uses of depth sorting algorithm. [3M]  
f) List any four animation techniques. [4M]

**PART -B**

- 2 a) Explain the role of computer graphics in picture analysis. Give the advantages of interactive graphics. [8M]  
b) List the important characteristics of video display device. [8M]
- 3 a) Distinguish the merits and demerits of scan line and flood fill algorithms. [8M]  
b) With respect to 2D transformations explain Translation, Rotation and Scaling. [8M]
- 4 Given a clipping window P (0, 0), Q (340, 0), R (340, 340) and S (0, 340). find the visible portion of the line AB [(-170, 595), (170, 225)] and CD [(425, 85), (595, 595)] against the given window, using Cohen - Sutherland algorithm, showing all the steps [16M]
- 5 a) What are the three equivalent methods for specifying spline representation? Describe. [8M]  
b) What is hermite spline and give the boundary condition for hermite curve? [8M]
- 6 a) Explain the concept of Depth Buffer algorithm for detecting visual surface of a 3D object. [8M]  
b) Define Tilting as a rotation about x axis followed by a rotation about y axis. Find the tilting matrix? Does the order of performing tilting matters. [8M]
- 7 a) How to specify Object motion in an animation system? [8M]  
b) List various types of animation languages. Describe various problems associated with animation. [8M]



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**PART -A**

- 1    a) What are the merits and demerits of plasma panel display? [4M]  
    b) Define shear transformations and give its matrix form. [3M]  
    c) Why there is a need for clipping? [4M]  
    d) Distinguish Clipping and Culling. [4M]  
    e) Discuss how wireframe displays might be generated with the various visible surface detection methods. [3M]  
    f) List the differences between conventional and computer assisted animation. [4M]

**PART -B**

- 2    a) Describe the working principle and applications of faster scan display devices. [8M]  
    b) What is the role of workstation in computer graphics? List various essential input devices. [8M]
- 3    Explain midpoint circle algorithm. Given a circle radius  $r=10$ , demonstrate the midpoint circle algorithm by determining positions along the circle octant in the first quadrant from  $x=10$  to  $x=y$ . [16M]
- 4    a) What is the need of homogeneous coordinates? Give the homogenous coordinates for translation, rotation, and scaling [8M]  
    b) Develop the transformation for finding the reflection of a point w.r.t the line  $ax+by+c=0$ . [8M]
- 5    Derive the 3D transformation matrix to transform world coordinates to view coordinates. [16M]
- 6    Determine the Bezier blending functions for five control points. Plot each function and label the maximum and minimum values. [16M]
- 7    a) Explain various steps in designing animation sequence. [8M]  
    b) What is an animation? Give basic rules of animation. [8M]

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