

- (iii) Constant Intensity Shading  
(iv) Fast Shading. 10

**OR**

10. (a) Define Bezier Curve. Explain its properties. 7  
(b) Derive the parametric equation of the Bezier curve with four control points. 6
11. (a) Explain any three color models. 6  
(b) Explain chromaticity diagram in detail. 7

**OR**

12. (a) Explain basic principles of animation. 8  
(b) Explain types of animation systems. 5

**NTK/KW/15/7445**

**Faculty of Engineering and Technology**

**Fifth Semester B.E. (Information Technology)**

**(C.B.S.) Examination**

**COMPUTER GRAPHICS**

Time : Three Hours]

[Maximum Marks : 80

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.  
(2) Due credit will be given to neatness and adequate dimensions.  
(3) Assume suitable data wherever necessary.  
(4) Illustrate your answers wherever necessary with the help of neat sketches.
1. (a) Explain any two display devices in detail. 6  
(b) State the significance of the error term in Bresenham's line generation. Also state the algorithm. 8

**OR**

2. (a) Develop an algorithm to generate a circle in second quadrant in clockwise direction with origin as a centre and 'R' radius. 8

- (b) Explain aliasing. State and explain different methods for anti-aliasing. 6
3. (a) Explain the working of following polygon filling algorithm :
- (i) Edge Flag algorithm
- (ii) Fence Fill algorithm. 8
- (b) Write a short note on Normalized Device Co-ordinates (NDC). 5

**OR**

4. (a) Explain the steps for reflection about an arbitrary line. Also derive the transformation matrix. 7
- (b) Perform a  $45^\circ$  rotation of a triangle A(0, 0), B(1, 1), C(5, 2) :
- (i) About the Origin
- (ii) About the point P(-1, -1). 6
5. (a) Explain Mid-point Subdivision line clipping algorithm with suitable example. 6
- (b) Write an algorithm for creating a segment. Also describe various operations carried out on the segment. 7

**OR**

6. (a) Clip a line  $P_1(70, 20)$  and  $P_2(100, 40)$  using Cohen-Sutherland algorithm against a window lower left corner (50, 10) and upper right corner (80, 40). 6
- (b) Explain what is Viewing transformation. Derive the transformation matrix for the same. 7
7. Explain following :
- (i) Painter's algorithm
- (ii) Z-buffer algorithm
- (iii) Warnock's algorithm
- (iv) Back face removal algorithm. 14

**OR**

8. (a) Explain parallel and perspective projection. Derive the projection matrix. 8
- (b) Find the transformation matrix for translation, rotation, scaling in 3-D. 6
9. (a) Define Interpolation. 3
- (b) Explain following surface rendering methods :
- (i) Gourand shading
- (ii) Phong shading