

22318

**11920**

**3 Hours / 70 Marks**

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Give two applications of computer graphics.
- (b) List / name two line drawing algorithms.
- (c) Explain the need of homogeneous co-ordinates matrix.
- (d) Define Polygon Clipping.
- (e) Draw Cubic Bezier Curve.
- (f) Define Bitmap graphics.
- (g) List various character generation methods.

**2. Attempt any THREE of the following :**

**12**

- (a) Write short note on Augmented Reality.
- (b) Explain scan line algorithm of polygon clipping.
- (c) Write 2D and 3D scaling matrix.
- (d) Explain midpoint subdivision line clipping algorithm.
- (e) Explain interpolation technique in curve generation.

- 3. Attempt any THREE of the following :** **12**
- (a) Explain with diagram the technique of Raster Scan Display.
  - (b) Write procedure to fill polygon with flood fill.
  - (c) Explain 2D transformation with its types.
  - (d) Explain Koch curve with diagram.
  - (e) Explain Text Clipping.
- 4. Attempt any THREE of the following :** **12**
- (a) Explain inside and outside test for polygon.
  - (b) Explain composite transformation over arbitrary point.
  - (c) Use the Cohen Sutherland algorithm to clip two lines  
P1(35, 10), – P2 (62, 40) and P3 (65, 20) – P4 (95, 10) against a window A  
(50, 10), B(80,10), C(80, 40), D(50,40).
  - (d) Write DDA Arc generation algorithm.
- 5. Attempt any TWO of the following :** **12**
- (a) Use Bresenham's line drawing algorithm to rasterize line from (6, 5) to (15, 10).
  - (b) Find the transformation of triangle A(1, 0) B(0, 1) C(1, 1) by
    - (i) Rotating  $30^\circ$  about the origin.
    - (ii) Translating one unit  $x$  and  $y$  direction and then rotate  $45^\circ$  about origin.
  - (c) Write C program for Hilbert's curve.
- 6. Attempt any TWO of the following :** **12**
- (a) Explain character generation methods :
    - (i) Stroke
    - (ii) Starburst
    - (iii) Bitmap
  - (b) Apply shearing transformation to square with A(0, 0), B(1, 0), C(1, 1) and D(0, 1) as shear parameter value of 0.5 relative to the line  $Y_{\text{ref}} = -1$  and  $X_{\text{ref}} = -1$ .
  - (c) Explain Cyrusblek line clipping algorithm.
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