22318

12425

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **5 × 2 = 10**

(a) Define :

(i) Bitmap Graphics

(ii) Resolution

(b) List any four applications of computer graphics.

(c) State the syntax of following graphics functions :

(i) initgraph( )

(ii) line( )

(d) State the demerits of DDA line generating algorithm.

(e) Define frame buffer.

(f) Give the matrix representation for reflection about the line as $y = -x$.

(g) Define projection and enlist its types.

2. Attempt any THREE of the following : **3 × 4 = 12**

(a) Differentiate between Raster Scan and Vector Scan.

(b) Explain scan line algorithm for polygon filling.

(c) Enlist the advantages of homogeneous co-ordinates in transformation. Give the matrix representation of translation and scaling in homogeneous co-ordinate.

(d) Explain window to viewport transformation.

3. Attempt any THREE of the following : **3 × 4 = 12**

(a) Enlist character generation methods and explain any two of them.

(b) Describe the term rotation about an arbitrary point.

(c) Explain midpoint subdivision line clipping algorithm.

(d) Construct the Bezier Curve of order three with control points $P_1(0, 0)$, $P_2(1, 3)$, $P_3(4, 2)$ and $P_4(2, 1)$. Generate at least five points on the curve.

4. Attempt any THREE of the following : **3 × 4 = 12**

(a) Explain the term augmented reality and virtual reality.

(b) Consider the line from (6, 6) to (12, 9). Use Bresenhaum's line drawing algorithm to rasterize this line.

(c) Scale the triangle ABC to reduce it to half of its size where A = (6, 6), B = (12, 6) and C = (12, 12).

(d) Apply the Liang Barsky algorithm to clip the line with the co-ordinate (45, 75) and (75, 40) where $(X_{min}, Y_{min}) = (25, 25)$ and $(X_{max}, Y_{max}) = (65, 65)$.

(e) Explain Hilbertz Curve with diagram.

5. Attempt any TWO of the following : **2 × 6 = 12**

(a) Consider the line from (0, 0) to (5, 5). Use DDA line drawing algorithm to rasterize this line.

(b) Rotate triangle ABC where A(0, 0), B(1, 1), C(5, 2) about the arbitrary point (–1, –1) for the angle of 45°.

(c) Write the DDA algorithm for arc generation.

6. Attempt any TWO of the following : **2 × 6 = 12**

(a) Derive the expression for decision parameter for Bresenhaum's circle drawing algorithm.

(b) Given a triangle with points (1, 1), (0, 0) and (1, 0). Apply shear parameter 4 on X-axis and 1 on Y-axis to find out the new co-ordinates of the object along X-axis, Y-axis.

(c) Apply the Cohen Sutherland line clipping algorithm to clip the line $P_1(40, 15) – P_2(75, 45)$ against the clipping window A(50, 10), B(80, 10), C(80, 40) & D(50, 40).