22318

22232

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

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

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

Marks

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

(a) Define :

(i) Pixel

(ii) Frame Buffer

(b) Define :

(i) Convex Polygon

(ii) Concave polygon

(c) Write matrix representation for X-shear and Y-shear

(d) List any four display devices.

(e) State any four general criteria applied for any line drawing algorithm.

(f) List any four properties of homogeneous co-ordinate system.

(g) Give any four applications of computer graphics.

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

(a) Differentiate between random scan and raster scan.

(b) State different character generation method. Describe any one in detail.

(c) Explain types of parallel projections with examples.

(d) Describe Sutherland Hodgeman algorithm for polygon clipping.

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

(a) Write and explain steps for DDA line drawing algorithm.

(b) Describe 2D transformation matrix for rotation about arbitrary point.

(c) Explain any two text clipping methods.

(d) Write a 'C' program to generate Hillbert's curve.

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

(a) Describe following :

(i) Virtual Reality

(ii) Augmented Reality

(b) Explain inside and outside test for the polygon with suitable example.

(c) Describe 3D scaling along with its matrix representation.

(d) Write down Cyrusbeck line clipping algorithm.

(e) Explain curve generation using Interpolation technique.

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

(a) Use Bresenham's line clipping algorithm to rasterize line from (6, 5) to (15, 10).

(b) Perform 2D scaling transformation on square ABCD with co-ordinate (0, 1), (4, 1), (4, 5), (0, 5) by 3-units for X-direction and 2-units for y-direction.

(c) Obtain the parameters for drawing a smooth bezier curve for the following points A(0, 0), B(10, 50), C(70, 40) and D(70, –20).

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

(a) Write boundary fill algorithm and flood fill algorithm with pseudo code.

(b) Show the transformation matrix for a reflection about the line Y = X is equivalent to reflection about X-axis followed by counter clockwise rotation of 90º.

(c) Apply the Liang-Barsky algorithm to the line with co-ordinates (30, 60) and (60, 25) against window :

$(X_{min}, Y_{min}) = (10, 10)$

$(X_{max}, Y_{max}) = (50, 50)$
