

Total number of printed pages-4

53 (CS 604) CPGR

2016

COMPUTER GRAPHICS

Paper : CS 604

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer **any five** questions.

1. (a) Explain the Bresenham line drawing algorithm. Compare the advantage of the algorithm over DDA line drawing algorithm.
(b) Find the pixels using the DDA line drawing algorithm, where end points of the line are (1,1) and (10,5) resp.

Contd.

2. (a) What do you mean by rotation ? Find the rotational matrix $R(\theta)$ (where θ is the rotational angle in anticlock-wise direction in 2D). Using the above matrix with $\theta = 90^\circ$, find the co-ordinate of the point (5, 5) after rotation.

(b) What is reflection ? Find the reflection matrix with respect to the line $y = mx$.
10+10

3. (a) Describe a technique to find out whether a given point is inside of a polygon. What do you mean by convex polygon ? Describe a boundary filling algorithm with a pseudo code.

(b) Describe the Cohen-Sutherland line clipping algorithm with advantages and disadvantages.
10+10

4. (a) Explain the mid-point circle drawing algorithm. Explain how using Eight-way symmetry we can save our computation.

(b) Using above algorithm find the pixels with centre at origin and radius=10.
12+8

5. (a) What is scaling ? If the equation of a line is $x = y$ and if we apply scaling operation over the line with $S_x = 1.5$ and $S_y = 2$ then what will be the new equation of the line after scaling ?

(b) Describe the rotations about the z -axis and about y -axis in 3D. Write down the respective rotational matrixes $R_z(\theta)$ and $R_y(\theta)$.

10+10

6. (a) What do you mean by interpolation curve ? Describe the Hermite cubic curve.

(b) Obtain the blending function for Hermite curve and show their graphical representation.

10+10

7. Write short notes on : **(any four)**

4×5=20

(a) Computer Graphics and Image Processing.

(b) Computer animation

- (c) Projection
- (d) Explicit, Implicit and Parametric representation of an equation.
- (e) Algebraic and tangent continuity of a curve.