

B.E. (Computer Engineering) Fifth Semester (C.B.S.)

Computer Graphics

P. Pages : 2

Time : Three Hours

**NRT/KS/19/3447**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Rasterize a line $\frac{x}{2} + \frac{y}{10} = 1$ using DDA line drawing algorithm. 7

b) Explain different types of display devices in detail any two. 7

OR

2. a) Generate a circle in first quadrant in clockwise direction with radius, $r = 5$ and having center (0, 0). 7

b) What is aliasing? Explain various antialiasing techniques in computer graphics. 7

3. a) A polygon is defined by following vertices $P_1(1,1)$, $P_2(1,8)$, $P_3(4,4)$, $P_4(9,6)$, $P_5(9,1)$. 10
Fill this polygon by following methods (any two).

- i) Simple ordered edge list algorithm.
- ii) Edge fill algorithm.
- iii) Fence fill algorithm

b) Explain display file interpreter. 3

OR

4. a) A polygon is defined by the vertices A (1, 1), B (8, 1), C (8, 4), D (6, 6), E (1, 6). Apply seed fill algorithm to fill the polygon. Let seed pixel be (4, 3). Solve using 4-connected. 8

b) Explain Normalized device coordinates in detail. 5

5. a) What is segment? Explain various operations that can be performed on segment. 6

b) Find a normalized transformation that maps a window defined by the coordinates lower left (0, 0) to (5, 5) upper right. 7

- i) Viewport that is normalized device screen
- ii) Viewport that has lower left corner at (1, 1) and upper right at (2, 2).

OR

6. a) Explain the Sutherland-Hodgeman Polygon Clipping algorithm. 7
b) What is viewing transformation? Obtain the matrix for viewing transformation. 6
7. a) Explain the different types of 2D transformation in detail. 7
b) Differentiate between parallel and perspective projection. Derive the matrix for both. 6

OR

8. a) Derive the transformation matrix for rotation about the arbitrary axis in 3D. 6
b) Find the reflection of triangle defined by the vertices A (1, 1), B (5, 1) and C (1, 5) about the line $y = 4x + 10$. 7
9. a) Explain Warnock's hidden surface removal algorithm. 7
b) What is interpolation? Explain different methods of interpolation. 6

OR

10. a) Explain Bezier curve with an example. State its properties. 7
b) Explain the process of priority assignment in painter's algorithm. 6
11. a) List & explain the properties of light. 5
b) Write short note on: 9
i) RGB color model ii) CMY color model
iii) Chromaticity Diagram

OR

12. a) What is animation? Explain the various types of animation. 6
b) Write short note on **any two**. 8
i) Design of animation sequences.
ii) Animation language.
iii) Key frame system.
