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

Computer Graphics

P. Pages : 2 **NRJ/KW/17/4502**

Time : Three Hours * 0 4 2 5 * 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.

1. Explain Bresenham's circle generation algorithm in first quadrant in clockwise direction. Also draw a circle with radius $r = 8$ and having centre $(0, 0)$. **14**

OR

2. a) What is the significance of error term? Rasterize a line from (0, 0) to $(-8, -4)$ using generalized Brensenham's algorithm. **7**

b) What is aliasing? Explain various anti-aliasing techniques in computer graphics. **7**

3. a) Explain the polygon filling algorithms **any two** **8**

i) Simple ordered edge list.

ii) Edge fill

iii) Fence fill

b) Write short note on Display File Interpreter. **5**

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 the structure of segment table in detail. **6**

b) A window is defined by the vertices $V_1(1,0)$, $V_2(0,1)$, $V_3(0,2)$, $V_4(1,3)$, $V_5(2,3)$, $V_6(3,2)$, $V_7(3,1)$, $V_8(2,0)$. Clip a line $P1(-1,1)$ to $P2(3,3)$ using Cyrus Beck algorithm. **7**

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 transformations in detail. **7**

b) Derive the transformation matrix for rotation about arbitrary point in 2D. **6**

OR

8. a) Differentiate between parallel & perspective projection. Also derive the matrix for both. **7**

b) Find the reflection of a triangle defined by the vertices A (1 , 1), B(5 , 1) and C (1 , 5) about the line $y = 4x + 10$. **6**

9. Explain any three Hidden Surface Removal Algorithms in detail. **13**

OR

10. a) Explain the following in detail **any two.** **7**

i) Gouraurd shading

ii) Phong shading

iii) Constant Intensity shading

b) What is interpolation? Explain different methods of interpolation. **6**

11. a) Explain the basic color models in detail & also list all the other color models. **8**

b) Explain CIE chromaticity diagram. **6**

OR

12. a) What is animation? Explain the various types of animation. **6**

b) Write short notes on **any two**. **8**

i) Design of animation sequences.

ii) Animation language

iii) key frame system

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