B.E. (Information Technology) Fifth Semester (C.B.S.)
Computer Graphics

Notes :
1. Solve Question 1 OR Questions No. 2.
2. Solve Question 3 OR Questions No. 4.
3. Solve Question 5 OR Questions No. 6.
4. Solve Question 7 OR Questions No. 8.
5. Solve Question 9 OR Questions No. 10.
6. Solve Question 11 OR Questions No. 12.
7. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Develop an algorithm to generate circle in second quadrant in anticlockwise direction with Origin as centre and radius "R". — 9

   b) Explain DDA line generation algorithm in detail. — 5

OR

2. a) Differentiate between Raster scan and Random scan display device. — 6

   b) Explain Bresenham's line generation (generalized) algorithm. Also rasterise a line from (1, 1) to (8, 5). — 8

3. a) Explain following polygon filling algorithms.
   i) Edge fill algorithm. — 3
   ii) Fence fill algorithm. — 3
   iii) Edge flag algorithm. — 4

   b) Write a note on Normalized Device Co-ordinates (NDC). — 4

OR

4. a) Reflect a triangle A (2, 4), B (4, 6), and C (2, 6) about the line $y = \frac{1}{2}(x+4)$. — 6

   b) Explain following transformation with its matrices.
   i) Rotation. — 2
   ii) Reflection. — 3
   iii) Rotation with arbitrary point. — 3

5. a) Explain segment table in detail. — 5

   b) Explain the algorithm for creating a segment. — 4

   c) Explain segment deletion operation. — 4

6. a) Derive the transformation matrix for window to viewport mapping. Also explain viewing transformation.   7

b) A clipping window ABCD is specified as bottom left corner of $(0, 0)$ and top right corner $(40, 40)$. Clip the line $P_1(-10, 40)$ and $Q(50, 10)$ using Cohen Sutherland line clipping algorithm.   6

7. a) Write short note on isometric projection.   5

b) Explain following hidden surface removal algorithms.   8
    i) Z-buffer algorithm   ii) Warnock's algorithm.

8. a) Derive the matrices for parallel and perspective projection.   7

b) Find 3D transformation matrix for scaling, rotation, and translation.   6

9. a) Explain Interpolation. Derive its matrix.   6

b) What are the properties of Bezier curve? Derive the matrix for cubic Bezier curve.   7

10. a) Explain following surface rendering methods.   8
    i) Phong shading
    ii) Gaurand shading
    iii) Flat shading

b) Explain properties of B-spline curve.   5

11. a) Explain different types of colour models.   10

b) Define: 3
    i) Hue   ii) Saturation
    iii) Lightness

12. a) Explain various principles of Animation.   7

b) Explain various Hardware and Software Animation tools in detail.   6

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