Sl. No.

C1-R4 : ADVANCED COMPUTER GRAPHICS

NOTE :
1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Total Time : 3 Hours | **Total Marks : 100**

1. (a) List any four applications of Computer Graphics.

(b) Differentiate between parallel and perspective projection techniques.

(c) What is the difference between geometric continuity and parametric continuity ?

(d) Differentiate between Gouraud shading and Phong shading model.

(e) Explain different type of text clipping in brief.

(f) What is Binary space partitioning trees ?

(g) Write transformation matrix in homogeneous co-ordinates system for y-shear.

(7x4)

2. (a) Consider the square A (1, 0), B (0, 0), C (0, 1), D (1, 1). Rotate the square ABCD by 45° anticlockwise about point A (1. 0).

(b) Obtain a transformation matrix for rotating an object about a specified pivot point.

(c) Describe Sutherland-Hodgeman algorithm for polygon clipping.

(4+6+8)

3. (a) Explain all types of parallel projection with examples.

(b) Explain Cohn-Sutherland line clipping algorithm. Using this algorithm to clip two lines having start point P1 at (40, 15) and end point P2 at (75, 45) and starting point of 2nd line P3 at (70, 20) and end point P4 at (100, 10) against a window A(50, 10), B(80, 10), C(80, 40) and D(50, 40).

(c) Explain 3D Viewing pipeline and Viewing coordinates.

(4+10+4)

4. (a) Determine the points at t = 02, t = .5 and t = 0.7 on Cubic Bezier curve having four control points at A(1, 0), B(3, 3), C(6, 3) and D(8, 1).

(b) Write short notes on B-splines curves in computer graphics.

(c) Write Rotation Transformation matrix in 3D for :

(i) Rotation about X-Axis

(ii) Rotation about Y-Axis

(iii) Rotation about Z-Axis

(6+6+6)

5. (a) Explain the following terms in brief (**Any two**) :

(i) Regularized Boolean set operations

(ii) Sweep representation

(iii) Octrees

(b) What is Constructive Solid Geometry (CSG). Explain with example.

(c) Explain Depth-Sort algorithm. **(6+6+6)**

6. (a) Explain the following terms in brief :

(i) Specular reflection

(ii) Diffused reflection

(b) Explain Ray tracing methods.

(c) Compare RGB, HVS, and CMY color model. **(6+6+6)**

7. (a) What are the different Methods that can be used for controlling Animation ? Explain any two.

(b) Define all these following terms in brief (i) Raster animations (ii) Key-frame systems and (iii) Motion specifications.

(c) Write short notes on : (**Any two**)

(i) Z-buffer algorithm

(ii) Transparency and Shadows

(iii) Bump mapping **(6+6+6)**

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