

## C1-R4 : ADVANCED COMPUTER GRAPHICS

**NOTE :**

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

**Time : 3 Hours**

**Total Marks : 100**

1.
  - (a) What is YIQ color model ?
  - (b) Explain the term ray tracing. Where it is used ?
  - (c) Write a short note on point clipping.
  - (d) Compare laser versus optical mouse in brief.
  - (e) Write and explain the painter algorithm for hidden surface elimination.
  - (f) What do you mean by key frame animation ?
  - (g) What is anti-aliasing effect when you plot a line ? (7x4)
  
2.
  - (a) How to convert RGB color model to YCbCr ? Also discuss the HSL and HSV color model and its benefits. Which color model is best suited for colored printer ?
  - (b) What are the sweeps used to represent the solids in a 3D space ? How are the sweeps used for representing 3D objects in 3D space ? (9+9)
  
3.
  - (a) Discuss the Sutherland Hodgman algorithm to clip a convex 2D polygon. Can it be used for concave polygons ?
  - (b) What do you mean by polygon meshes ? What are the main elements of meshes ? (9+9)
  
4.
  - (a) Find out the middle point of the Bezier curve having following 5 control points (in order) : (0, 0), (5, 5), (20, 15), (35, 10) and (40, 40).
  - (b) Clip a line from P1(-4, 2) to P2 (-1, 7) using Cohen Sutherland algorithm. Window is from (-3, 1) to (2, 6). (9+9)
  
5.
  - (a) Write the properties of Bézier curves with respect to first order derivative and second order derivative at the endpoints.
  - (b) Where do you use Binary space partitioning and octree methods ? Compare both methods.
  - (c) What is orthographic projection ? (6+6+6)

6. (a) A Mirror is placed vertically such that it passes through (10, 0) and (0, 10). Find the reflected view of a triangle ABC : A(5, 50), B(20, 40), C(10, 70).  
(b) What are the basic rules for animation ? (9+9)
7. (a) What is Z-Buffer algorithm and where it is used ? What are its advantages and disadvantages ?  
(b) Derive the transformation matrix for perspective projection of a point P(x, y, z) onto the projection plane  $z=d$  with origin as centre of projection. (9+9)

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