

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.

Time : 3 Hours

Total Marks : 100

1. Answer all the following questions.
 - (a) Explain the merits and demerits of Direct View Storage Tube(DVST).
 - (b) Derive a composite matrix to perform 2D rotation of an object about a pivot point. Explain with suitable diagrams.
 - (c) Define interactive computer graphics. List out its advantages.
 - (d) Explain isometric projection.
 - (e) Explain the steps used in depth-sort algorithm.
 - (f) Write shortly about back-face culling method.
 - (g) Briefly discuss diffused reflection. (7x4)

2. Answer all the following questions.
 - (a) Write the algorithm of midpoint subdivision Line Clipping. Let the window size is (-3, 1) to (2, 6). A line AB is given having co-ordinates of A (-4, 2) and B (-1, 7). Find the visible portion of the given line A B using midpoint subdivision.
 - (b) Given a homogeneous point (1, 2, 3). Apply rotation 90 degree towards X, Y and Z axis and find out the new coordinate points. (10+8)

3. Answer all the following questions.
 - (a) Explain 3-D viewing pipeline with a diagram. Explain the steps for computer generation of a view of a three-dimensional scene
 - (b) Consider a triangle whose vertices are (2 2), (4 2) and (4 4). Find the transformed vertices for rotation of 90° about the origin followed by reflection through the line $y = -x$. What is the effect if the transformations are reversed i.e. the triangle is reflected through the line $y = -x$ and then rotated 90° about the origin ?
 - (c) Explain perspective projection. Write down some characteristics of perspective projection. (6+4+8)

4. Answer all the following questions.

- (a) What are the properties of B spline curve ? Discuss the advantages of B spline over Bezier curve.
- (b) Given a Bezier curve with 4 control points- $B_0[1\ 0]$, $B_1[3\ 3]$, $B_2[6\ 3]$, and $B_3[8\ 1]$. Determine 5 points (for $t = 0, 0.2, 0.5, 0.7, 1$) lying on the curve. Also, draw a rough sketch of the curve.

(9+9)

5. Answer all the following questions.

- (a) Briefly discuss Raster Animation. Also highlight its advantage.
- (b) What does Y represent in YIQ color model ? Briefly discuss.
- (c) Explain different types of coherences used in Hidden Surface Removal algorithms. Differentiate between Object space and Image space method.

(4+5+9)

6. Answer all the following questions.

- (a) Explain binary space partitioning tree method to render 3D scenes composed of polygons. List out its limitations.
- (b) What is ray tracing ? Discuss different types of ray tracing techniques used for rendering.

(8+10)

7. Answer all the following questions.

- (a) Describe RGB and HSV color models used for color vision. How to convert RGB values to HSV?
- (b) Define animation. Discuss basic principles of animation.

(8+10)

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