

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) Explain Parallel Projection in detail.
 - b) What are the different representations for polygon meshes?
 - c) What are the properties of Bezier Curve?
 - d) What is the difference between ambient, diffuse, and specular reflection?
 - e) How window-to-viewport coordinate transformation usually implemented?
 - f) What are the 2D Cues to Depth? Explain in detail.
 - g) Explain toning and show intensity level.

(7x4)

2.
 - a) Derive the basis matrix for Cubic Hermite Curve.
 - b) What is Gouraud shading model? Write down advantage and disadvantage of this model.
 - c) Define additive and subtractive colors giving an example of each.

(9+5+4)

3.
 - a) Rotate a triangle with vertices (10,20), (10,10), (20,10) about the origin by 30 degrees and then translate it by $t_x=5$, $t_y=10$.
 - b) A parametric cubic curve passes through the points (0,0), (2,4), (4,3), (5, -2) which are parametrized at $t = 0$, $\frac{1}{4}$, $\frac{3}{4}$, and 1, respectively. Determine the geometric coefficient matrix and the slope of the curve when $t = 0.5$.

(9+9)

4.
 - a) Use the Cohen Sutherland algorithm to clip line P1 (70,20) and P2(100,10) against a window lower left hand corner (50,10) and upper right hand corner (80,40).
 - b) Explain RGB color model.
 - c) Explain how Digital differential analyzer (DDA) line drawing algorithm works.

(8+5+5)

5.
 - a) Explain what are various ways to control animation?
 - b) Explain Sutherland Hodgman Algorithm in detail.
 - c) What is Animation? What are the various animation techniques?

(6+6+6)

6.
 - a) What is illumination? Explain the model used for illumination.
 - b) What is HSV color model? Draw HSV hexcone.

(9+9)

7. Explain **any three** visible surface detection algorithms.
 - a) Scan-Line Method
 - b) Z-Buffer Algorithm
 - c) Depth-sort Algorithm
 - d) Binary Space Partitioning Trees

(3x6)