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 tx=5, ty=10.
b) A parametric cubic curve passes through the points (0,0), (2,4), (4,3), (5, -2) which are parametrized at t = 0, ¼, ¾, 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)