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) How do we represent a point in 3-D and, what are the advantages of homogeneous coordinates?
b) What is the difference between diffused and specular reflections?
c) Explain the term 'shadow masking'.
d) Differentiate between Intra-Object and Inter-Object synchronization.
e) What is antialiasing? How pixel phasing can help in line antialiasing?
f) Explain Ray Tracing algorithm for realistic shading.
g) What is the difference between entropy encoding and source encoding?

(7x4)

2.
a) What is a Particle system? What is color look up table?
b) A Polygon has four vertices located at A (20, 10), B (60, 10), C(60, 30) and D(20, 30). Indicate a transformation matrix to double the size of the polygon with point A located at the same place?
c) A rectangular field is described in 3-D coordinate system as follows:
J (-20, -20, 0), K (20, -20, 0), L (20, -20, -40), M (-20, -20, -40)
where y axis represents the vertical axis and z -axis is towards the viewer. A person is located at P (0, 0, 20) and is looking at the field. Obtain the perspective view generated on the XY plane.

(6+5+7)

3.
a) What is the coordinate of a unit cube after taking reflection about zx-plane?
b) Find the intersection q, if any, of the ray X and the cone Y with radius r and height h centered at the origin with axis the z-axis.

(8+10)

4.
a) Give the parametric representation of bazier curve. What are the Joining conditions for the Bezier curve?
b) Write the effectiveness of a visible surface detection method.
c) What are the applications of Rotation about an Axis parallel to a coordination axis and also find transformation matrix for it?

(8+3+7)

5.
a) What are the advantages of rendering polygons by scan line method?
b) Write the pseudo-code of Binary Space Partitioning tree algorithm for visible surface.
c) Illustrate the three perceived components of HSB color model. Give the formulae for transforming RGB to YIQ color model.

(4+8+6)

6.

a) Explain Depth sorting method.

b) Given a clipping window P(0, 0), Q(30, 0), R(30, 20), S(0, 20), use Sutherland- Cohen algorithm to determine the visible portion of the line A(10, 30) and B(40, 0).

c) Why is Gouraud shading also referred to as interpolation shading?

(7+6+5)

7.

a) Discuss and explain midpoint subdivision algorithm with suitable examples.

b) Explain the particle systems approach to approximate (model) flame/fire.

(9+9)