

## 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) Briefly explain polygon clipping.
- b) Describe Hermit and Bezier curves with examples.
- c) Define subdivision of curves using Chaikin's algorithm with an example.
- d) What is Appel's algorithm and where is it used?
- e) What is halftone and explain different halftone pattern in  $3 \times 3$  image block
- f) What are the differences between HSV and RGB color model? Convert HSV to RGB and vice versa.
- g) What are the different methods for controlling the animation? Describe each of them briefly.

(7×4)

2.

- a) How many principles are there in computer animation? Describe each of them.
- b) What are the specifications for motions in animation?
- c) What is Z-Buffering?

(10+5+3)

3.

- a) Explain YIQ and HLS color model.
- b) Briefly describe Phong illumination model.
- c) Explain the role of key-frame in animation.

([4×2]+7+3)

4.

- a) Describe the logical input devices.
- b) Describe different 3D geometric transformation techniques. Translate a triangle with vertices at original coordinates (10, 25, 5), (5, 10, 5), (20, 10, 10) by  $t_x=15$ ,  $t_y=5$ ,  $t_z=5$ . Then plot the x and y values of the original and resultant triangles, with approx locations of z values.

(6+12)

5.

- a) What is CSG (Constructive Solid Geometry) with example? What are the application areas of CSG?
- b) What is space-portioning with the application in computer graphics? Explain about BSP (Binary Space Partition).
- c) What is raster animation? Describe the advantages and disadvantages of this method.

(5+8+5)

**6.**

- a) Define different cubic curves.
  - b) Express the 3D geometric rotational matrices around X-axis, Y-axis & Z-axis. Also express the mirror transform over X-axis.
  - c) Define perspective projection. Describe different types of perspective projection with example.
- (3+[6+2]+7)**

**7.**

- a) Describe the effect of illumination in graphics.
- b) What is ray tracing method and why it is used?
- c) What is Painter algorithm? Why it is used? What are tested during the algorithm?
- d) How boundary is represented in solid modeling, explain it.

**(2+5+7+4)**