MCS-053

MCA (Revised)

Term-End Examination

June, 2008

MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 hours *Maximum Marks : 100*

Note : *Question number 1 is* ***compulsory****. Attempt any* ***three*** *questions from the rest.*

1. (a) Compare and contrast Caligraphic display device with the Raster scan display device. How can we use frame buffer to control the intensity of the pixels ? Use suitable diagram to discuss the control over intensity. 5

(b) Explain Cohen – Sutherland algorithm for clipping a line segment. What are the limitations of Cohen – Sutherland algorithm ? How did Cyrus – Beck algorithm overtake these limitations ? 5

(c) Explain the difference between Gouraud shading and Phong shading. 5

(d) Compare and contrast Parallel projection with Perspective projection. 5

(e) Perform a 45° anticlockwise rotation of triangle A (0, 0), B (1, 1) and C (5, 2) 5

(i) about the origin.

(ii) about point P (–2, –2).

(f) How do we simulate acceleration in animation ? Briefly discuss the mathematical function involved in simulating the accelerated animation. With the help of the graph, describe how frame spacing is influenced by the function involved in production of accelerated animation. 5

(g) What are the principal vanishing points for the standard perspective projection ? 5

(h) Briefly describe any ***two*** of the following file formats : 5

(i) jpeg

(ii) tiff

(iii) gif

(iv) bmp

2. (a) What is the limitation of DDA line generation algorithm ? What steps are required to plot a line whose slope is between 0° and 45° using Bresenham's line generation method ? Draw a line joining (5, 4) and (11, 15) using the Bresenham's line generation algorithm. 8

(b) Find a normalization transformation from the window whose lower left corner is at (0, 0) and the upper right corner is at (4, 3) on to normalized device screen so that aspect ratios are preserved. 7

(c) Explain the difference between parametric and geometric continuities. 5

3. (a) After translation by 2, perform 60° rotation of a triangle (1, 1), (2, 1) and (1, 2) about the point (0, −1). 8

(b) Obtain a transformation matrix for perspective projection for a given object projected onto X = 4 plane as viewed from (6, 0, 0). 7

(c) Derive the transformation matrix for rotation about x-axis in 3-D. 5

4. (a) Briefly describe the term Bezier curve. How do Bezier curves contribute to the generation of Bezier surfaces. Give mathematical expression for both Bezier curves and surfaces. Give two utilities of each i.e. Bezier curve and Bezier surface. Given $p_0(1, 1)$; $p_1(2, 4)$; $p_2(3, 6)$; $p_3(4, 8)$ as control points of a Cubic Bezier curve, determine two points on the Bezier curve. 10

(b) What are the different polygon representation methods ? 5

(c) Describe basic ray tracing algorithm with example. How does the term ray tracing differ from ray casting ? 5

5. (a) What is the need of separate multimedia authoring tools ? Discuss the attributes, benefits and drawbacks of three types of authoring systems. 7

(b) Write short notes on (any ***two***) : 4

(i) Stochastic animation

(ii) Behavioural animation

(iii) Sprite animation

(c) Briefly discuss the Area Subdivision algorithm. Also give two applications of the algorithm. 5

(d) Differentiate between following : 4

(i) Graphics and Animation

(ii) Printer and Plotter

(iii) Frame buffer and Display buffer