MCS-053

MCA (Revised)

Term-End Examination

December, 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) Write a transformation matrix for a 3-D rotation, in homogenous co-ordinate system with respect to X, Y and Z axes respectively. 5

(b) What is the limitation of DDA line generation algorithm ? How does Bresenham line generation algorithm overcome this limitation ? 5

(c) Define an "oblique projection". Derive a general transformation matrix for an oblique projection. 5

(d) How can frame buffer be used to put colour and intensity control on the screen ? 5

(e) Explain the term "sweep representation". How can a cylinder be produced by using the concept of sweep representation ? 5

(f) What is the need of the concept of "Shading" in Computer Graphics ? List the merits and demerits of Phong Shading. 5

(g) Explain the terms "Cel animation" and "Sprite animation". Which of the two techniques is better for creating animation ? Justify your answer. 5

(h) Define the use of the following file formats : 5

(i) GIF

(ii) JPEG

(iii) WPG

(iv) MPEG

(v) TIFF

2. (a) Write pseudo code for Bresenham circle generation algorithm. Use this algorithm to produce a circle of radius r = 4 units, in the first quadrant from x = 0 to x = y. 10

(b) Write the pseudo code for DDA line drawing algorithm for a line segment with negative slope. 5

(c) Differentiate between the following (attempt any ***two***) : 5

(i) Drawing and Painting

(ii) CAD and CAM

(iii) Printer and Plotter

3. (a) Determine the final coordinates of the perspective projection of an object, when the object is first rotated w.r.t. the Y-axis by – 30° and w.r.t. X-axis by 45°, and finally it is projected onto Z = 0 plane with the centre of projection at (0, 0, – 5). 10

(b) Find the general transformation matrix for the reflection about the line y = – x. 5

(c) "Simultaneous shearing is not the same as shearing in one direction, followed by shearing in another direction." Justify the statement mathematically. 5

4. (a) Write the pseudo code for the Z-buffer algorithm for visible surface detection. What is the maximum number of objects that can be handled by Z-buffer algorithm ? Give two advantages and two disadvantages of Z-buffer algorithm. 10

(b) What is the difference between ray tracing and ray casting ? Explain, how a ray tracing method can be used to achieve realism in computer graphics. 5

(c) What is the problem of aliasing ? How does the technique of anti-aliasing work to get rid of the problem of aliasing ? 5

5. (a) Explain any ***four*** of the following : 10

(i) Compression in Digital Video

(ii) Morphing

(iii) Stochastic Animation

(iv) Icon based authoring tools

(v) Panning

(b) Discuss the role of image editing tools in creating and editing multimedia elements. Briefly describe the criteria behind the selection of an image editing tool. 10