MCA (Revised)

Term-End Examination

June, 2010

09442

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) What are the number of memory bits required for 8 - bit plane frame buffer for a 512×512 raster ? Also calculate the refresh rate for the same raster (512×512), if pixels are accessed at the rate of 250 nano seconds. **5**

(b) Differentiate between Random and Raster Scan display devices. **5**

(c) Use DDA line generation algorithm to draw a line from (2, 2) to (8, 6). **5**

(d) Derive a general transformation matrix for 3-D rotation about x-axis. **5**

(e) Perform a 45° rotation of a triangle A (1, 1), B (5, 1), C (3, 5) about an arbitrary point (3, 3). **5**

(f) Explain any one method of polygon Representation with the help of an example. 5

(g) How many key frames does a 45 seconds animation film sequence with no duplications require if there are four in between frames for each pair of key frames ? What will happen if duplication is allowed ? 5

(h) Why file Compression Techniques are beneficial in Computer Graphics ? 5

2. (a) Write a procedure to implement the Bresenham line generation algorithm. What are the advantages of this algorithm over the DDA line generation algorithm ? 8

(b) Differentiate between the following : 6

(i) Graphics and Animation

(ii) Drawing and painting

(c) What are the merits and demerits of Gourand Shading, constant shading and phong shading ? 6

3. (a) Explain all the four cases of Sutherland - Hodgman polygon clipping algorithm. 5

(b) Derive the 2-D transformation matrix for reflection about the line $y = mx + c$, where m and c are constants. Use this transformation matrix to reflect the triangle A (0, 0), B (4, 0) and C (4, 4) about the line $y = 2x + 5$. 10

(c) Discuss different file formats used for multimedia applications. 5

4. (a) Explain z-buffer algorithm for visible surface detection. 3

(b) Explain the terms window and viewport in the context of clipping. Derive a general transformation matrix for window to viewport mapping. 8

(c) Explain the following with suitable diagram : 9

(i) Ambient Reflection

(ii) Diffuse Reflection

(iii) Specular Reflection

5. (a) Obtain a transformation matrix for perspective projection for a given object projected onto $x = 5$ plane as viewed from [8, 0, 0]. 8

(b) Differentiate between the following : 6

(i) Morphing and panning

(ii) Motion Specific animation and Motion Generalised animation.

(c) Given P_0 (1, 2), P_1 (2, 3), P_2 (4, 3), P_3 (3, 2) as vertices of Bezier curve, determine 5 points on Bezier curve. 6