MCA (Revised)

Term-End Examination

June, 2007

MCS-053 Ⓢ : COMPUTER GRAPHICS AND MULTIMEDIA

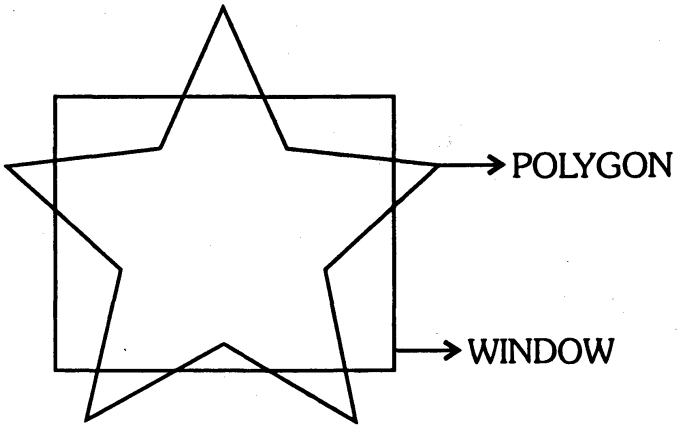
Time : 3 hours *Maximum Marks : 100*

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

1. (a) What do you mean by Presentation Graphics ? What are the various softwares available to produce presentation graphics ? Which illustration graphic would you like to use to produce a banner of size say 12′ by 12′ ? 5

(b) Modify the DDA algorithm, to produce line segments with negative slopes. 5

(c) Use Sutherland Hodgman polygon clipping algorithm to clip the polygon (star shaped) shown below. 5



(d) Derive the rotational transformation matrix for a 2-D system, provided the rotation is performed about the origin. 5

(e) Using the parametric equation of line, describe the difference between parallel and perspective projection. 5

(f) Prove for a Bezier curve that $\sum_{i=0}^{n} B_{n,\,i} = 1$. 5

(g) What are the relative merits of object space method and image space method ? 5

(h) What do you mean by the terms Morphing and Panning ? What is their significance in animation ? 5

2. (a) Differentiate between following : 5

(i) Printer and Plotter

(ii) Random scan and Raster scan display devices

(b) Draw the line segment joining (20, 10) and (25, 14) using Bresenham line generation algorithm. 7

(c) With the help of an example, describe the working of Cohen Sutherland line clipping algorithm. What are the limitations of Cohen Sutherland line clipping algorithm ? Which algorithm was proposed to overcome these limitations ? *8*

3. (a) Obtain the projection matrix, which represents the perspective projection of a point (x, y, z) on z = d plane, provided the centre of projection is at (0, 0, –d). *7*

(b) Determine the transformed coordinates of a triangle A(0, 0); B(–2, 2); C(–2, –2) when it is subject to the rotation by an angle (θ = 45°) about a line passing through (–1, 0) such that it is parallel to y-axis. *8*

(c) What do you mean by the term Vanishing point ? Under what conditions can the vanishing point be determined ? *5*

4. (a) An animation shows a bird flying in the sky such that its path is specified by a Bezier curve with the following control points :

x_k :	0	2	20	5
y_k :	0	4	1	13

The animation lasts 10 seconds and the key frames are to be computed at 1 second interval each. Determine the position of the bird in the sky at the start of 6^{th} second of animation. *10*

(b) Distinguish between Z buffer method and scan line method. What are the visibility tests made in these methods ? 6

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

(i) Ray tracing

(ii) Antialiasing

(iii) Ray casting

5. (a) With the help of graphs for respective mathematical functions, describe how the frame spacing is affected to produce non-zero accelerations. 7

(b) What do you mean by graphic file compression ? Briefly describe any two types of graphic file compression formats. 7

(c) What are image editing tools ? What is the selection criteria for image editing tools ? 6