

MCA (Revised)
Term-End Examination
June, 2007

**MCS-053 (S) : COMPUTER GRAPHICS AND
MULTIMEDIA**

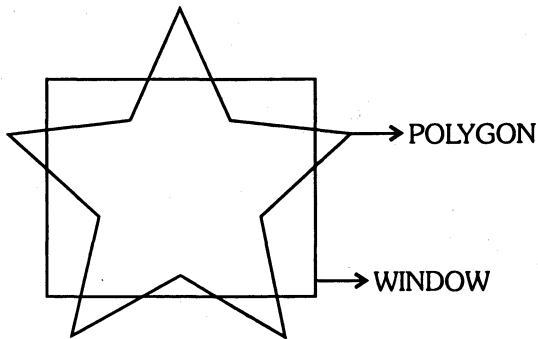
Time : 3 hours

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 ($\theta = 45^\circ$) 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 6th 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