Roll No. .... Total Pages : 3

CMCA/M-20 **10537**

COMPUTER GRAPHICS
Paper–MCA-16-44

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer any four of the following questions in brief:

   (a) Distinguish between Raster scan and Random scan systems.

   (b) Explain using a suitable example, how x and y increments are computed using DDA algorithm for drawing lines.

   (c) Derive the general form of the Matrix for rotation about the origin.

   (d) What are the characteristics of Perspective projection? Describe, how you will obtain 2D screen coordinates from 3D viewing coordinates using Perspective projection.

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(e) The original position of the end points of a line are at A(6, 2) and B(4,10). After animation, the point A moves to (14, 2) and B moves to (20, 10). Find the interpolated positions of the endpoints of the line, when it moves from original position to final position using tweening technique. Choose the number of tweens as 8.

UNIT–I

2. What is the role of Coordinate systems in Graphics? How are pictures created and manipulated in graphics?

3. (a) Describe the working, advantages and applications of a mouse and touch panel.

   (b) Why is LCD known as a non-emissive display device? What technology is used to obtain a picture on LCD display?

UNIT–II

4. Explain using proper illustrations the drawing of a circle using Bresenham's method. Write the steps of the algorithm so obtained and use the same for obtaining the points on a circle with center (8, 8) and radius 4.

5. How is filling of a polygon done using scan line seed fill algorithm, when the polygon has monotonically increasing or decreasing edges?

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UNIT–III

6. What do you mean by Concatenation of Transformations? Show the use of concatenation of transformations for magnifying a triangle with vertices A(3, 4), B(9, 5) and C(6, 10) to twice its size keeping vertex A fixed. Also obtain the mirror reflection of vertex A with respect to the horizontal line y = 2.

7. Derive the equations for clipping a line against each of the edges of a view port using Cohen-Sutherland line clipping algorithm. Distinguish Liang-Barsky line clipping algorithm from Cohen-Sutherland algorithm on the basis of the line equation that is used by both.

UNIT–IV

8. What are the various representation schemes for solid objects based on Euclidean geometry? Give a brief overview of each.

9. (a) Define the equations for interpolating light intensities at various points on an object using Gouraud shading.

   (b) How are hidden surfaces identified using BSP tree method?