

2008

COMPUTER GRAPHICS

PAPER—CS/MCA/2401

Full Marks : 70

Time : 3 hours

Answer any seven questions

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. (a) What do you mean by frame buffer? If the resolution of a screen is 1024×768 and each pixel requires 8 bits then calculate required the memory size.

(b) Define pixel, resolution, aspect ratio, dot pitch.

4 + 6

(Turn Over)

2. (a) What do you mean by refresh rate and interlacing?
- (b) Distinguish raster scan and random scan.
- (c) What do you mean by VGA and SVGA monitors? 4 + 4 + 2
3. (a) Give Bresenham's line drawing algorithm.
- (b) Digitalise a line from point (0, 2) to point (4, 5) by using Bresenham's line drawing algorithm. 6 + 4
4. (a) Give Mid point circle drawing algorithm.
- (b) Find out the pixel location approximating the first octant of a circle having center at (0, 0) and radius 4. 6 + 4
5. (a) Find the transformation matrix for rotation of a point about an arbitrary pivot point (anticlockwise)
- (b) Distinguish uniform scaling and differential scaling. 7 + 3

6. (a) A unit square is transformed by a 2×2 transformation matrix. The resulting position vectors are

$$\begin{bmatrix} 0 & 2 & 8 & 6 \\ 0 & 3 & 4 & 1 \end{bmatrix}$$

what is the transformation matrix?

- (b) In 2D graphics, obtain the 3×3 transformation matrix for translating a point by 1, -2. Calculate the inverse of this matrix and show that the result is a matrix that translates a point by 1, -2.

5 + 5

7. (a) A triangle is defined by

$$\begin{bmatrix} 2 & 4 & 4 \\ 2 & 2 & 4 \end{bmatrix}$$

Find the transformed coordinates after the following transformations.

- (i) 90° rotation about origin.
- (ii) reflection about line $y = -x$.
- (b) Show that a 2D reflection through X axis followed by 2D reflection through the line $y = -x$ is equivalent to pure rotation about the origin.

5 + 5

8. (a) What do you mean by projection? How many types of projections are there? Distinguish parallel projection and perspective projection.
- (b) What do you mean by homogeneous coordinate? What is its use? 6 + 4
9. (a) What do you mean by clipping?
- (b) Write down the Cohen - Sutherland line clipping algorithm. 2 + 8
10. (a) Write down boundary fill algorithm to fill a region. (both 4 and 8 connected).
- (b) What is RGB? 8 + 2
11. Write short notes (any two): 10
- (i) Animation
 - (ii) Bezier curve
 - (iii) DVST
 - (iv) Flat panel display
 - (v) Multimedia.
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