2021

COMPUTER SCIENCE — GENERAL

Paper : DSE-A-3

(Computer Graphics)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer **question no. 1** and **any four** questions from the rest.

1. Answer **any five** questions : 2×5
   (a) Define Raster scan.
   (b) Mention properties of pixel.
   (c) Differentiate between monochrome and color monitor.
   (d) How shearing effect transformation of an object in 2D?
   (e) What do you mean by line drawing in graphics?
   (f) Write 2D reflection matrix about x-axis and y-axis.
   (g) Define computer animation.
   (h) Define clipping operation in Computer Graphics.

2. (a) Mention features of a CRT monitor.
   (b) Why translation matrix in 2D needs to be converted in homogeneous form? Explain in details.
   (c) What do you mean by scaling? Explain its types. 3+4+3

3. (a) Briefly explain the steps required for designing an animation sequence.
   (b) Define projection. Mention its application.
   (c) What do you mean by inverse transformation? 5+3+2

4. (a) Discuss commutative property of rotation and scaling in 2D.
   (b) Discuss about different types of parallel projections. 5+5

5. (a) Rotate a triangle with vertices (10, 20), (10, 10) and (20, 10) about the origin by 60°. Find the new co-ordinates of the triangle.
   (b) Show that the multiplication of transformation matrices for two successive scaling is commutative. 5+5

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6. (a) Explain the working principle of DDA line drawing algorithm.

   (b) Using DDA, find plotted pixels of straight line A(1, 2), B(4, 9).   5+5

7. (a) Discuss Cohen-Sutherland line clipping algorithm.

   (b) Apply Cohen-Sutherland line clipping algorithm to clip the line segment with co-ordinates (70, 20) and (100, 10) against the window (50, 10), (80, 10), (50, 40) and (80, 40).   5+5

8. (a) Why Bresenham's mid point line drawing algorithm is more efficient than DDA algorithm?

   (b) Why is it sufficient to determine pixels of only one octant of circle in circle drawing algorithms? Explain clearly.

   (c) Define refresh rate of a display device.   4+4+2