MASTER OF COMPUTER APPLICATIONS (MCA) (REVISED)
Term-End Examination
June, 2025

MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 Hours　　　　*Maximum Marks : 100*

Note : *Question No.* **1** *is compulsory. Answer any* **three** *questions from the rest.*

1. (a) Write 2D transformation matrix in Euclidean and homongeneous coordinate system for reflection and shear operations. 5

   (b) Explain Area Subdivision method of visible surface detection with diagram. 5

(c) What is Frame Buffer ? Explain the role of frame buffer in controlling colour and intensity of display.   5

(d) Differentiate between the following :

3×5=15

(i)   Cohen-Sutherland Algorithm *vs.* Sutherland-Hodgman Algorithm

(ii) Scanline Polygon fill Algorithm *vs.* Flood fill Algorithm

(iii) Parallel Projection *vs.* Perspective Projection

(e) Differentiate between Graphics and Animation. List various types of animations and explain any *one* of them.   5

(f) Write 2-D rotational transformation matrix in Euclidean coordinate system. Verify that *two* successive rotations are additive in nature.   5

2. (a) Write the Bresenham line generation algorithm. Illustrate it by digitizing the line with endpoints (20, 10) and (30, 18). 8

(b) Explain parametric continuities with suitable diagram. 6

(c) Compare and contrast Gourand shading and Phong shading. 6

3. (a) Given a triangle with vertices (0, 0), (1, 0) and (1, 1). Rotate the triangle by 90 degrees in anticlockwise direction with respect to origin and find the new coordinates. 7

(b) Write the mid-point circle generation algorithm and use it to generate an arc of $r = 10$ units in the 1st quadrant from $x = 0$ to $x = y$. 8

(c) What is the problem of aliasing ? How can this problem be resolved ? 5

4. (a) Explain the term Principal Vanishing Point in context of perspective projection with a suitable diagram. 6

(b) What are Bezier curves ? Discuss the equation and properties of Bezier curves. Also, prove that $P(u = 0) = p_0$. 8

(c) Write DDA Algorithm and use it to generate a line segment from (2, 4) to (9, 9). 6

5. Write short notes on the following : 4×5=20

(a) Taxonomy of Projection

(b) Z-Buffer Algorithm

(c) Authoring tools

(d) Windowing transformations

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