No. of Printed Pages : 4

MMTE–004

M. SC. (MATHEMATICS WITH APPLICATIONS IN COMPUTER SCIENCE) [M. SC. (MACS)]

Term-End Examination

December, 2025

MMTE-004 : COMPUTER GRAPHICS

Time : 1½ Hours *Maximum Marks : 25*

Weightage : 50%

Note : *(i) Question No.* ***1*** *is compulsory.*

(ii) Attempt any ***three*** *questions out of Q. Nos.* ***2*** *to* ***5****.*

(iii) Use of calculator is not allowed.

---

1. State whether the following statements are True *or* False. Justify your answers with short explanation : 5×2=10

   (a) Bresenham's algorithm is generally more efficient than the DDA algorithm.

(b) Cohen-Sutherland algorithm divides the 2-D space into five parts.

(c) Infinite number of Bezier curves can be drawn with same start and end points.

(d) Shadow mask systems are mostly used in random scan systems.

(e) Ellipse can be drawn by approximating pixels in one octant.

2. Plot a circle with center at (100, 100), radius 20 units using midpoint circle drawing algorithm. Perform first five iterations. For the point obtained in fifth iteration, list eight symmetrical points on the circumference. 5

3. (a) Given a rectangular window with opposite corners at (0, 0) and (5, 5). Use the Cohen-Sutherland algorithm to clip the line segment joining points $P_1(2, 0)$ and $P_2(7, 6)$. 2

   (b) Find the equation of Bezier curve that passes through (0, 0) and (6, 2), and is controlled through (6, 6) and (4, 2). 3

4. (a) Write the rotational transformation matrix for the triangle with vertices A(4, 6), B(5, – 1) and C(1, 1) by 90° in clockwise direction. Also find the transformed triangle coordinates. 3

   (b) Determine the size of frame buffer (in bytes), required to store 12 bit per pixel, for a raster system with resolution 640 by 480. 2

5. Obtain the perspective projection of the pyramid PQRS with vertices P(5, 1, 0), Q($\frac{5}{2}$, 1, 1), R(7, 1, 0) and S($\frac{5}{2}$, $\frac{5}{2}$, 1), the viewpoint is parallel to XY-plane lying 7 units apart the origin and the projection reference point is (0, 0, 10). 5

× × × × ×