MMTE-004

M.Sc. (MATHEMATICS WITH APPLICATIONS IN COMPUTER SCIENCE) M.Sc. (MACS)
Term-End Examination
June, 2021

MMTE-004 : COMPUTER GRAPHICS

Time : $1\frac{1}{2}$ hours   *Maximum Marks : 25*
(Weightage : 50%)

*Note : Question no. **1** is **compulsory**. Attempt any **three** questions out of questions no. 2 to 5. Use of calculator is **not** allowed.*

1. State whether the following statements are *True* or *False*. Justify your answers with a short proof or a counter example.   *5×2=10*

    (a) Width of an image having height of 4 inches and aspect ratio 1·5 is 6 inches.

    (b) A perspective projection preserves relative proportions.

    (c) Cohen Sutherland line clipping algorithm can be used for both 2D and 3D clipping using 4 bit binary region codes.

    (d) The reflection about the line $y = -x$ is attained by reversing x, y coordinates.

    (e) Boundary fill algorithm is suitable for regions with boundary having more than one colour.

2. (a) Reflect the pyramid A (1, 0, 0), B (0, 1, 0), C (0, 0, 1) and D (0, 0, 0) about xy-plane. *2*

(b) Use the Cohen Sutherland Algorithm to clip the line P1 (70, 20) and P2 (100, 10) against a window with lower left hand corner (50, 10) and upper right hand corner (80, 40). *3*

3. (a) Perform a 45° rotation of the triangle A (1, 0), B (0, 1) and C (1, 1)

(i) about the origin, and

(ii) about the point P (– 1, – 1). *4*

(b) Differentiate between Cabinet and Cavalier projections. Give two differences. *1*

4. (a) Draw a circle centred at (0, 0) having radius 8 units using midpoint circle algorithm up to three iterations. *3*

(b) Use the Bresenham line drawing algorithm to find the pixel points used for drawing the line segment with vertices (10, 5) and (15, 9). *2*

5. Find the equation of the Bezier curve which passes through (0, 0) and (– 4, 2) and controlled through (14, 10) and (4, 0). *5*

──────────