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MMTE–004

M. SC. MATHEMATICS WITH APPLICATIONS IN COMPUTER SCIENCE

[MSC(MACS)]

Term-End Examination

June, 2026

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 question no.* ***2*** *to* ***5****.*

(iii) Use of calculator is not allowed.

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1. State whether the following statements are true of False. Justify your answer : 5×2=10

   (a) Odd even rule and winding number rule always produce the same interior region.

   (b) A raster scan system that stores 24 bits/ pixel and has a 1024 × 1024 screen resolution requires a frame buffer of size 8 M bytes.

   (c) Cohen-Sutherland is a parametric line clipping algorithm.

   (d) If the bounding rectangle for a curve is inside the viewing window, the curve is trivially accepted.

(e) Two successive translations are additive and the commutative property also holds on this addition.

2. An object has to be rotated by 45^{o} about an axis passing through points (5, 0, 5) and (5, 2, 5). What will be the resulting rotation matrix ? 5

3. (a) Use Bresenham's line generation algorithm for tracing a line segment with vertices (10, 20) and (20, 28). 3

(b) Determine two points on the Cubic Bezier curve with control points (0, 0), (14, 10), (4, 0) and (– 4, 2). 2

4. Apply the Liang-Barsky line clipping algorithm to clip a line with end points (5, 10) and (15, 20). The diagonal end points for the clip window are (5, 12) and (15, 15). 5

5. (a) Determine the perspective projection of point (x, y, z) on $z = d$ plane, provided the center of projection is at point P $(0, 0, -d)$. 3

(b) Differentiate between parallel projection and perspective projection. 2

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