

SE SEM III choice based R-19 'c' scheme JUNE 2025

12-6-2025

CMPN

(3 Hours)

Total Marks 80

N.B: 1) Question number 1 is compulsory.

2) Attempt any three out of the remaining.

3) Assume suitable data if necessary and justify the assumptions.

4) Figures to the right indicate full marks.

- 1 a) Define and explain the following terms with example [05]
 i. Scan Conversion
 ii. Rasterization
- b) Prove that two successive rotations are additive i.e $R(\theta_1) \cdot R(\theta_2) = R(\theta_1 + \theta_2)$ [05]
- c) Write a flood fill procedure to fill a polygon using the 8-connected approach. [05]
- d) Write short notes on [05]
 i. Motion Capture in Animation
 ii. Animation Deformation
- 2 a) Write a Bresenham's Line Drawing Algorithm. Apply this algorithm to find pixel coordinates along the line path. The endpoint coordinates of the line segment are (9, 18) and (14, 22) [10]
- b) Define window and viewport. Derive the composite transformation matrix for a window-to-viewport transformation. [10]
- 3 a) Derive a 2D composite transformation matrix to reflect an object about a line, $y = mx$ [10]
- b) Explain what is meant by the Bspline curve. Also, explain the properties of the Bezier and Bspline curve. [10]
- 4 a) Write and explain the hidden surface removal algorithm with an example [10]
- b) What are the drawbacks of the Sutherland Hodgeman polygon clipping algorithm? How Weiler Atherton polygon clipping algorithm overcome these drawbacks? [10]
- 5 a) Discuss and derive all equations of midpoint Circle drawing algorithm and write an algorithm [10]
- b) Clip the line segment using the Cohen Sutherland line clipping algorithm. The Coordinates of window boundaries are $(X_{wmin}, Y_{wmin}) = (4, 4)$ and $(X_{wmax}, Y_{wmax}) = (10, 9)$, and the coordinates of two endpoints of a line segment are (2, 5) and (8, 11) [10]
- 6 a) What is animation? What is traditional animation technique? Explain any 5 principles of animation. [05]
- b) Explain parallel and perspective projections. Derive the matrix for the perspective projection. [05]
- c) Write short note on Raster scan display [05]
- d) What is an antialiasing? Explain any 3 antialiasing techniques [05]
