

# CBCS SCHEME

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17CS62

## Sixth Semester B.E. Degree Examination, June/July 2023 Computer Graphics and Visualizations

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- What is computer graphics? Explain any four applications of graphics. (05 Marks)
  - Demonstrate working of CRT with neat diagram. (05 Marks)
  - Write code snippet for DDA algorithm and digitize line segment with vertices (0, 0) to (5, 6). (10 Marks)

OR

- With examples, explain different line functions in OpenGL. (05 Marks)
  - Give code snippet for display window management using GLVT. (05 Marks)
  - Construct a circle using midpoint circle algorithm with radius = 10 (assume circle is centered at origin). (10 Marks)

### Module-2

- Explain scan line polygon filling algorithm in detail. (10 Marks)
  - Discuss steps involved in inside-outside tests for a polygon filling. (05 Marks)
  - Scale the given object with given values of  $S_x = 0.5$  and  $S_y = 1$ .

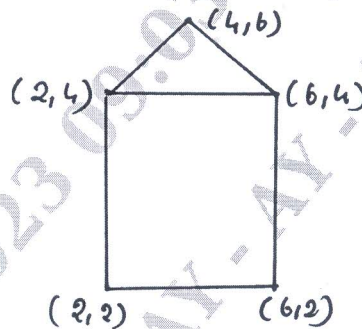


Fig.Q3(c)

(05 Marks)

OR

- Explain 2D transformations with suitable matrix representations. (10 Marks)
  - Show that 2 successive rotation are additive. (05 Marks)
  - Demonstrate polygon fill area primitives with examples. (05 Marks)

### Module-3

- Explain Sutherland Hodgmann polygon clipping with suitable example. Give detailed steps. (10 Marks)
  - A homogeneous coordinate point  $P(3, 2, 1)$  is translated in x, y, z direction by  $-2, -2, -2$  units respectively followed by successive rotations of  $60^\circ$  degrees about x-axis. Find the final position of homogeneous coordinates. (05 Marks)
  - Briefly explain RGB and CMY color models. (05 Marks)

OR

- 6 a. Define Clipping. Briefly explain concept of Cohen-Sutherland line clipping algorithm with advantages and disadvantages. (10 Marks)
- b. Explain Phong Lighting model. (05 Marks)
- c. Give OpenGL functions for setting material properties in illumination. (05 Marks)

**Module-4**

- 7 a. Explain Z-buffer or Depth buffer method and give OpenGL visibility detection functions. (10 Marks)
- b. Explain the following 3D OpenGL viewing functions with its parameters:  
(i) gluLookAT (ii) glOrtho (iii) gluPerspective  
(iv) glFrustum (v) glviewPort (05 Marks)
- c. Describe 3D viewing pipeline architecture with neat diagram. (05 Marks)

OR

- 8 a. Explain orthogonal projections in detail. (10 Marks)
- b. Illustrate the differences between perspective projection and parallel projection with examples. (05 Marks)
- c. What are vanishing points for perspective projections? (05 Marks)

**Module-5**

- 9 a. How does display processor architecture overcomes problems of early graphics architecture? Give OpenGL function calls for creating, manipulating and displaying display lists. (10 Marks)
- b. List and explain different classes of logical input devices. (05 Marks)
- c. Differentiate between request mode and event mode of input control. (05 Marks)

OR

- 10 a. Explain Bezier spline curves in detail. (10 Marks)
- b. Explain different OpenGL quadratic surfaces. (05 Marks)
- c. List and explain properties of Bezier curves. (05 Marks)

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