

# CBBCS SCHEME

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

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. What is computer graphics? Mention the list of applications. How they are classified? (06 Marks)
- b. Explain with neat diagram operation of cathode-Ray tubes and shadow-mask CRT. (08 Marks)
- c. Explain the logical organization of the video-controller. (06 Marks)

OR

- 2 a. Write Bresenham's line drawing algorithm. Using Bresenham's algorithm calculate the pixel positions for the screen coordinates (1, 1) and (6, 7). (10 Marks)
- b. Write midpoint circle algorithm. Draw the circle with 8 as radius. (10 Marks)

### Module-2

- 3 a. Explain scanline polygon filling algorithm with neat sketches and example. (06 Marks)
- b. With a neat figure explain various polygon types in OpenGL. (06 Marks)
- c. What is concatenation of transformation? Explain the following considered 2D:
  - i) Rotation about a fixed point
  - ii) Scaling about a fixed point. (08 Marks)

OR

- 4 a. Define the following two dimensional transformations translation, rotation, scaling reflection and shearing. Give example for each. (10 Marks)
- b. With a neat figure explain two dimensional viewing pipeline? Explain OpenGL 2D viewing functions. (10 Marks)

### Module-3

- 5 a. Explain window to view port coordinate transformation. (04 Marks)
- b. Explain the Cohen-Sutherland line clipping algorithm considering all cases. (08 Marks)
- c. With an example explain Sutherland-Hodgeman polygon clipping algorithm. (08 Marks)

OR

- 6 a. Discuss the OpenGL functions for the following 3D dimensional transformations:
  - i) Translation
  - ii) Scaling
  - iii) Rotation. (06 Marks)
- b. Explain the following color models:
  - i) RGB color model
  - ii) CMY color model. (08 Marks)
- c. Explain the basic illumination models. (06 Marks)

**Module-4**

- 7 a. What is three dimensional viewing? Explain three dimensional viewing pipeline with neat diagram. (08 Marks)
- b. Explain OpenGL three dimensional viewing functions, with example for each:  
i) gluLookAt ii) glOrtho iii) glPerspective iv) glFrustum. (12 Marks)

OR

- 8 a. Explain classification of visible surface detection and back face detection algorithm. (08 Marks)
- b. Explain Z-buffer or depth buffer algorithm for visible surface detection. (06 Marks)
- c. Discuss OpenGL visibility-detection functions with an example. (06 Marks)

**Module-5**

- 9 a. List and explain the various classes of logical input devices that are supported by OpenGL. With suitable diagrams, explain various input modes. (10 Marks)
- b. Explain how keyboard, window and mouse events are recognized by GLUT. Give suitable example. (10 Marks)

OR

- 10 a. How pop-up menus are created using GLUT? Illustrate with an example. (06 Marks)
- b. What are the features of a good interactive program? What are the advantages of double buffering? Explain. (08 Marks)
- c. Explain Bezier cubic curves. Give the properties of Bezier curves. (06 Marks)

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