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**18CS62**

**Sixth Semester B.E. Degree Examination, June/July 2024**

**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. With a neat diagram, explain the working nature of CRT with its different parts. (08 Marks)
- b. Write an OpenGL program to draw a line segment. (06 Marks)
- c. With suitable OpenGL code segments and examples, define different OpenGL line primitive constants available. (06 Marks)

**OR**

- 2 a. Explain DDA line drawing algorithm with necessary equations. (06 Marks)
- b. Illustrate the logic of Bresenham's line generation algorithm by digitizing the line with endpoints (20, 10) and (30, 18). Find out all intermediate pixel points along the line. (06 Marks)
- c. Explain the classification of Flat-Panel display monitors with examples. (08 Marks)

**Module-2**

- 3 a. With suitable code segments, define different polygon fill primitives available in OpenGL. (06 Marks)
- b. Explain general scan-line polygon fill algorithm. (08 Marks)
- c. Briefly explain the data-structures with respect to polygon table with an example. (06 Marks)

**OR**

- 4 a. Prove that :
  - (i) Two successive translations are additive in nature.
  - (ii) Two successive rotations are additive in nature.
  - (iii) Two successive scalings are multiplicative in nature.
- b. Derive the matrix for rotation about a fixed point. (08 Marks)
- c. With syntax and examples, define OpenGL functions available for basic transformation methods. (06 Marks)

**Module-3**

- 5 a. Explain the concept of Cohen-Sutherland line clipping algorithm with necessary sketches and equations. (08 Marks)
- b. Explain Sutherland-Hodgeman polygon clipping algorithm. (06 Marks)
- c. Apply Sutherland-Hodgeman polygon clipping to clip the following polygon Fig.Q5(c) against the given clipping window.

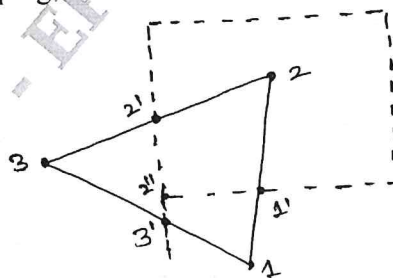


Fig.Q5(c)

(06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. In detail explain the 3-D transformations in homogeneous coordinate system with necessary matrices. (08 Marks)  
 b. Explain RGB and CMY color models. (06 Marks)  
 c. Briefly explain the different light sources. (06 Marks)

**Module-4**

- 7 a. With a neat diagram, explain 3-D viewing pipeline. (08 Marks)  
 b. Explain the transformation from world to viewing coordinates with necessary matrices and equations. (06 Marks)  
 c. With a neat sketch, define types of projections. Also compare them. (06 Marks)

OR

- 8 a. With necessary sketches, define the syntax of following OpenGL functions in 3D:  
 (i) For perspective projection  
 (ii) For orthographic projection  
 (iii) Look At function (08 Marks)  
 b. Briefly explain different OpenGL visibility detection functions available in OpenGL. (06 Marks)  
 c. Explain depth-Buffer algorithm in detail. (06 Marks)

**Module-5**

- 9 a. Explain the classifications of logical input devices. (06 Marks)  
 b. With a neat diagram, explain different input modes. (06 Marks)  
 c. With an example of code-segment, explain how to define and execute display lists using OpenGL. (08 Marks)

OR

- 10 a. With an example of code segment, explain different functions used to create menus in OpenGL. (08 Marks)  
 b. Describe how to generate text using OpenGL functions along with its types. (06 Marks)  
 c. Explain Bezier Spline curves with its necessary equations. (06 Marks)

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