



USN

Sixth Semester B.E. Degree Examination, Jan./Feb. 2023

**Computer Graphics and Visualization**

10CS65

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.**PART – A**

- 1 a. Briefly explain applications of computer Graphics. (08 Marks)  
b. Explain the process of image formation with pinhole camera as example. Derive the expression for angle of view. (12 Marks)
- 2 a. What is an OpenGL interface? Write an OpenGL program for a 2D-Sierpinski gasket using midpoint of each triangle. (10 Marks)  
b. Explain any two control functions used in OpenGL. (04 Marks)  
c. Explain the additive, subtractive and indexed color formation in computer graphics. (06 Marks)
- 3 a. Explain the different classes of logical input devices. (06 Marks)  
b. Explain Request mode and Event mode model. (08 Marks)  
c. Explain logic operations in input interactions. (06 Marks)
- 4 a. What are vertex arrays? Show how vertex arrays can be used to represent a cube in OpenGL. (10 Marks)  
b. A square in a two dimensional system is specified by its vertices (6,6), (10, 6), (10, 10) and (6, 10). Implement the following by first finding a composite transformation matrix for the sequence of transformation involved. Sketch the original and transformed square.  
(i) Rotate the square by 45° about its vertex (6, 6)  
(ii) Scale the original square by a factor of 2 about its centre. (10 Marks)

**PART – B**

- 5 a. What is concatenation transformation? Explain rotation about a fixed point. (08 Marks)  
b. Explain how quaternions are used in rotation in a three-dimensional space, also list some of its advantages. (12 Marks)
- 6 a. Explain the various types of views that are employed in computer graphics systems. (10 Marks)  
b. Explain g/Frustrum( ) with syntax. (06 Marks)  
c. Define the term Axonometric projection, also list its types. (04 Marks)
- 7 a. Describe the Phong lightening model. What are its advantages? (10 Marks)  
b. Briefly explain the different types of light sources supported by OpenGL. (10 Marks)
- 8 a. Explain the cohen-sutherland line clipping algorithm in detail. (10 Marks)  
b. Discuss the Bresenham's rasterization algorithm. How is it advantageous when compared to other existing methods? Describe. (10 Marks)

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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.