



**Sixth Semester B.E. Degree Examination, Jan./Feb. 2021**  
**Computers Graphics and Visualization**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting at least TWO full questions from each part.

**PART – A**

- 1 a. What is Computer Graphics? List and explain the applications of the same. (06 Marks)
- b. Discuss the physical Imaging Systems and show the process of Image formation with pinhole camera. (06 Marks)
- c. With a neat sketch, discuss the major steps in Graphics Pipeline Architecture. (08 Marks)
- 2 a. List and explain the major groups of OpenGL API functions along with an example for each. (07 Marks)
- b. Discuss the subtractive and Additive color models. (05 Marks)
- c. What is Sierpinski Gasket? Write an OpenGL program for 3D gasket. (08 Marks)
- 3 a. Discuss the logical classification of input devices with their interaction types. (06 Marks)
- b. What are input modes? Explain the event driven input for keyboard and window events. (06 Marks)
- c. With a neat sketch, explain the display processor architecture along with the display lists creation and execution. (08 Marks)
- 4 a. What are scalar, points and vectors? Explain the procedure for converting a world object frame into camera or eye frame. (10 Marks)
- b. What do you mean by affine Transformation? Discuss the basic 2D transformations such as Rotation, Scaling and Translation along with their matrix representations. (10 Marks)

**PART – B**

- 5 a. Why do we require homogeneous coordinate system? Derive the composite transformation matrix for rotation about a fixed point  $(x_f, y_f)$  by an angle  $\theta$ . (06 Marks)
- b. Explain the 3D rotations with their representations in matrix form. Show how rotation about an arbitrary axis is done. (06 Marks)
- c. How OpenGL does support transformations. Write an OpenGL program to rotate a cube about x and y axes. Use mouse buttons to select the axis of rotation. (08 Marks)
- 6 a. With a neat diagram, explain the different types of views that are employed in computer graphics systems. (10 Marks)
- b. Derive the equations for perspective and parallel projections. Represent the same in matrix form. (10 Marks)
- 7 a. What are light sources? Explain the phong lighting model. (08 Marks)
- b. Explain any two methods for shading polygons. (06 Marks)
- c. How is sphere approximated? Explain. (06 Marks)
- 8 a. Explain the Cohen-Sutherland line clipping algorithm with a neat pseudo code. (10 Marks)
- b. Digitize the line from (5, 8) to (10, 10) using the DDA algorithm. (05 Marks)
- c. Write a note on Z-buffer algorithm for hidden surface removal. (05 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.