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**Sixth Semester B.E. Degree Examination, June/July 2014**

**Computer Graphics and Visualization**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Define computer graphics. List and explain the applications of computer graphics. (10 Marks)
- b. With a neat block diagram, explain the graphics pipeline architecture. (10 Marks)
- 2 a. Explain the different polygon types that are supported in OpenGL. (05 Marks)
- b. Write an OpenGL recursive program for 2D Sierpinski Gasket. (07 Marks)
- c. Write a typical main function that works for non interactive applications and explain each function call in it. (08 Marks)
- 3 a. What are the different modes in which an input device provides input to the application program? (10 Marks)
- b. What is a display list? Give the OpenGL code segment that generate a display list defining a RED square with vertices (-1.0,-1.0), (1.0, -1.0), (1.0, 1.0), (-1.0, 1.0). (05 Marks)
- c. Explain how an Event Driven Input can be programmed for a pointing device. (05 Marks)
- 4 a. Define the following:
  - i) Head-to-tail rule
  - ii) Point-vector addition (04 Marks)
- b. Explain different OpenGL frames. (06 Marks)
- c. Explain rotation, translation and scaling with respect to 2D. (10 Marks)

**PART – B**

- 5 a. Explain the basic transformations in 3D and represent them in matrix form. (12 Marks)
- b. Write an OpenGL program to rotate a cube about x, y and z axis. Use move buttons to select axis of rotation. Use GlRotatef( ) function. (08 Marks)
- 6 a. Explain GluLookAt function. (04 Marks)
- b. Briefly discuss the following along with functions used in OpenGL:
  - i) Perspective projections (10 Marks)
  - ii) Orthogonal projections. (06 Marks)
- c. What is projection normalization?
- 7 a. Describe the Phong lighting model. (12 Marks)
- b. Explain the different types of light sources supported by OpenGL. (08 Marks)
- 8 a. Explain the Cohen-Sutherland line clipping algorithm. (10 Marks)
- b. Explain Bresenham's line rasterization algorithm. (10 Marks)

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