Sixth Semester B.E. Degree Examination, June/July 2017
Computer Graphics & Visualization

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least 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.   Write an OpenGL program to recursively subdivide a tetrahedron to form 3D Sierpinski gasket.   (10 Marks)
    b.   Explain the seven major groups of functions of a good API.   (05 Marks)
    c.   Briefly explain various polygon types in OpenGL.   (05 Marks)

3   a.   Enlist the features of a good interactive program.   (06 Marks)
    b.   How pop-up menus are created using GLUT? Illustrate with an example. (10 Marks)
    c.   What is double buffering? Explain the advantages of double buffering. (04 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 its 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.   Obtain the matrix representation for rotation of a point about an arbitrary axis in a 3D space.
                                                                               (10 Marks)
    b.   Show that the following three dimensional sequences are commute:
         (i)   A rotation and a uniform scaling.
         (ii) Two rotations about the same axis.   (10 Marks)

6   a.   Briefly explain the prespective and parallel views in OpenGL. Give example. (10 Marks)
    b.   What is mesh? With example explain how meshes are generated. Give OpenGL code.
                                                                               (10 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.   Use Liang Barsky line clipping algorithm to clip a line from starting point (30, 15) and ending at point (65, 35) against the window having its lower left corner at (40, 10) and upper right corner at (75, 25)   (10 Marks)
    b.   Use Bresenham's line algorithm to digitalize a line from point (0, 0) to point (6, 4).
                                                                               (10 Marks)

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