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10CS65

**Sixth Semester B.E. Degree Examination, Dec.2014/Jan.2015**  
**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. With a neat diagram, explain the graphics pipeline architecture. (10 Marks)
- b. What are the OpenGL API's for handling polygon types, color attributes, viewing and aspect ratio? (06 Marks)
- c. Briefly explain any two applications of computer graphics. (04 Marks)
- 2 a. What are the graphics functions which give good API support? Briefly explain each of them with example. (10 Marks)
- b. What are the different approaches of color in open GL? Explain with example. (10 Marks)
- 3 a. List the various features that a good interactive programs should include. Describe an open GL animating interactive program for the rotating square. (10 Marks)
- b. Explain how an event driven input can be performed for window and keyboard events. (10 Marks)
- 4 a. Briefly explain the order in which frames occurs in open GL pipeline. (08 Marks)
- b. With respect to modeling of color cube discuss;
  - i) Vertex array.
  - ii) Bilinear interpolation
  - iii) Data structure for object representation. (12 Marks)

**PART – B**

- 5 a. What are Affine transformation? Explain the basic transformation with respect to homogenous co-ordinate system in 3D. (10 Marks)
- b. What are Quaternion? With an example, explain how Quaternion are used in rotation in a 3D space. Give the mathematical representation of Quaternion. (10 Marks)
- 6 a. What are simple projections? Obtain prespective and orthogonal  $4 \times 4$  matrix representation. (10 Marks)
- b. Briefly explain different types of viewing with neat sketches. (10 Marks)
- 7 a. Explain the Phong lighting model. (10 Marks)
- b. Give the different classification of light material interactions. How are these supported in open GL? (10 Marks)
- 8 a. Explain the Cohen Sutherland line clipping algorithm and perform the clipping for line segment  $AB = [(-13,5)(17,11)]$ ,  $CD[(-2,3)(1,2)]$  against the window having lower left corner  $(-8,-4)$  and upper right corner at  $(12,8)$ . (10 Marks)
- b. Explain the scan line polygon filling algorithm. (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.