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Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016

Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**
2. Support your answer with diagrams wherever necessary.

PART – A

- 1 a. With the aid of neat diagrams, explain the different Graphics architectures supported by graphics API. (10 Marks)
b. Explain the concept of a pinhole camera. Derive the expression for the angle of view. Also indicate the advantages and disadvantages of the pinhole camera. (10 Marks)
- 2 a. Write an OpenGL recursive program for 2D sierpinski gasket with relevant comments. (10 Marks)
b. List the major groups of API functions in OpenGL. With examples explain any four of them. (10 Marks)
- 3 a. What are the major characteristics that describe the logical behavior of an input device? Explain how OpenGL provides the functionality of each of the classes of logical input devices? (10 Marks)
b. Discuss the request mode, sample mode and event modes, with the figures wherever required. (10 Marks)
- 4 a. Differentiate vector space, Euclidian space and affine space. List the geometric objects and associated operations in affine space. Mention the advantages of affine space transformation. (10 Marks)
b. Explain the different OpenGL frames embedded in pipeline architecture. (10 Marks)

PART – B

- 5 a. Derive the 3D matrix representation for translation rotation scaling and shear. (10 Marks)
b. Derive an expression for the rotation of an object about an arbitrary axis. Give the matrix representation of the concatenated matrix. (10 Marks)
- 6 a. With diagrams, explain the different projections in classical viewing. Give the advantages and disadvantages of each projection. (10 Marks)
b. Discuss the following OpenGL functions:
i) gluLookAt ii) gluPerspective iii) glFrustum iv) glOrtho. (10 Marks)
- 7 a. Explain the Phong Lighting Model. Indicate the advantages and disadvantages of this model. (10 Marks)
b. Explain different shading models available for shading a polygonal mesh. (10 Marks)
- 8 a. Explain the Cohen – Sutherland line clipping algorithm. Mention the drawbacks of this algorithm and also mention how it is overcome. (10 Marks)
b. Explain the following hidden surface removal methods
i) z – buffer algorithm ii) Painter’s algorithm (10 Marks)

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