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10CS65

Sixth Semester B.E. Degree Examination, Aug./Sept. 2020
Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. What is graphics system? Explain the five major elements in the graphics system with a neat diagram. (06 Marks)
- b. Give the concept of pinhole camera. Explain how a point is projected in a pinhole camera. Derive the expressions for projection and the angle of view. (08 Marks)
- c. Write a program to construct a 2D Sierpinski Gasket by using 5000 points. (06 Marks)
- 2 a. What are the two color systems from the programmer's perspective, Give 2 API,s which supports each color system. Explain with neat diagrams. (10 Marks)
- b. Explain Orthographic view and 2 dimensional viewing with their supporting API's and neat diagrams. (06 Marks)
- c. What is hidden surface removal? Explain with its supporting API's. (04 Marks)
- 3 a. What are the different input modes, supported by input devices? (06 Marks)
- b. What are the different ways of programming the event-driven inputs? (10 Marks)
- c. Explain the concept of Double Buffering and how to use a timer in an OpenGL program. (04 Marks)
- 4 a. Explain about i) Geometric objects ii) Lines iii) Affine sums iv) Convexity v) Planes. (10 Marks)
- b. What are affine transformations? Explain affine transformation for Translation, Rotation and scaling. (10 Marks)

PART – B

- 5 a. Explain :
 - i) Rotation about a fixed point
 - ii) General Rotation
 - iii) Rotation about an Arbitrary Axis with respect to concatenation of Transformations. (10 Marks)
- b. What are Quaternions? How are they applied in rotation, Derive the supporting equation. (10 Marks)
- 6 a. Explain Simple Projection – Perspective projections and orthogonal projection. (08 Marks)
- b. Derive the matrix for OpenGL perspective Transformations. (06 Marks)
- c. Write a brief note on Projections and shadows. (06 Marks)
- 7 a. Explain the four basic types of Light sources in OpenGL. (08 Marks)
- b. Explain Phong shading. (06 Marks)
- c. Give the API's and specifications for different type of materials in OpenGL. (06 Marks)
- 8 a. Explain Cohen-Sutherland line clipping Algorithm, with an example in detail. (10 Marks)
- b. What is filling? Explain Scan-line filling algorithm for a polygon. (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.