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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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