

G 209

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2003.

Fourth Semester

Computer Science and Engineering

CS 239 — INTERACTIVE COMPUTER GRAPHICS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why refreshing is needed in a refresh-CRT?
2. Define aspect ratio.
3. List the methods used for specifying a spline representation.
4. Write the parametric vector function for generating a Bezier surface.
5. Write the transformation matrix sequence required to produce scaling with respect to a selected fixed position (x_f, y_f) .
6. Define perspective projection.
7. Write 2 major steps of depth buffer algorithm.
8. What is the purpose of the depth field in A-Buffer algorithm?
9. In HLS color model what do H, L and S represent?
10. How does Fast Phong shading approximates the intensity calculations?

PART B — (5 × 16 = 80 marks)

11. (i) Describe the working of Flat Panel Displays. (8)
- (ii) Write and explain the DDA algorithm for line generation. (8)

12. (a) Describe the B-Spline curve generation algorithm and trace the algorithm for an example. (16)

Or

- (b) (i) Describe the steps involved in the construction of deterministic and statistically self-similar fractals. (10)
- (ii) Show the initiator, generator and the first three iterations in the generation of Koch curve. (6)
13. (a) (i) Derive the general transformation matrix for 2D reflection of an object about the line $y = x$. (8)
- (ii) Describe the shear transformation relative to x axis, y-axis and arbitrary reference line with examples. (8)

Or

- (b) (i) Describe two projection methods in detail with neat diagrams. (6)
- (ii) Derive the transformation matrix for perspective projection. (10)
14. (a) Describe the Depth-sorting and Area-Subdivision method used for removing hidden surfaces. Illustrate with necessary diagrams. (16)

Or

- (b) Write the algorithm for hidden surface elimination using Octree method and explain its working. (16)
15. (a) (i) Describe the Phong model for calculating the specular reflection range with necessary diagrams. (8)
- (ii) Describe how light intensity is calculated in a transparent surface. (8)

Or

- (b) (i) Describe in detail how the calculated intensities are displayed in non-linear display devices. (8)
- (ii) Describe the fast Phong shading method used for surface rendering. (8)