

NOV-DEC
2011

Total No. of Questions—12]

[Total No. of Printed Pages—4+1

[4062]-213

S.E. (IT) (II Sem.) EXAMINATION, 2011

COMPUTER GRAPHICS

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

- N.B. :—**
- (i) Answer *three* questions from Section I and *three* questions from Section II.
 - (ii) Answers to the two Sections should be written in separate answer-books.
 - (iii) Neat diagrams must be drawn wherever necessary.
 - (iv) Figures to the right indicate full marks.
 - (v) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
 - (vi) Assume suitable data, if necessary.

SECTION I

1. (a) Give the algorithm for Bresenham circle drawing. Derive the necessary equations. [10]
- (b) Explain the following devices :
- (i) Scanners
 - (ii) Digitizers. [6]

P.T.O.

Or

2. (a) Explain the term display file. Give *four* different ways to implement display file along with data structures. [8]
- (b) Give the algorithm to draw a line using DDA. Use this algorithm to rasterize the line whose end points are (3, 2) and (10, 8). [8]
3. (a) Derive the general transformation matrix for mirror reflection of any polygon about an arbitrary line whose equation is given by $y = mx + b$, m is the slope of line and b is y -intercept. [12]
- (b) Use the above transformation matrix to reflect the polygon with vertices A(2, 5), B(7, 10) and C(10, 2) about the line $y = -10x + 5$. [4]
- (c) Perform X-shear on the polygon whose vertices are A(0, 0), B(0, 4), C(4, 4), D(4, 0) by 2 units. [2]

Or

4. (a) Explain scanline method for polygon filling. [8]

- (b) Perform a 45 degree rotation of a triangle with vertices A(10, 10), B(15, 15), C(20, 10) :
- about origin
 - about the point (5, 5). [8]
- (c) Translate the polygon with coordinates A(0, 0), B(0, 4), C(4, 4), D(4, 0) by 2 units in X direction and 3 units in Y direction. [2]
5. (a) Obtain the general 3D transformation matrix for rotation about any arbitrary axis. [12]
- (b) Write a short note on polygon meshes. [4]

Or

6. (a) Obtain general parallel projection onto a given view plane. The view plane passes through a point $V(x_0, y_0, z_0)$ and normal to the view plane is given by $N = n_1 i + n_2 j + n_3 k$. The direction of projection is given by vector $V = a_i + b_j + c_k$. Give your answer stepwise along with transformation matrix at each step. [12]
- (b) Explain any *one* quadric surface with figure, its equation and parametric form. [4]

SECTION II

7. (a) Explain RGB, HSV color models. [8]
(b) What are the steps in design of animation sequence ? Describe each step in detail. [8]

Or

8. (a) Explain CIE chromaticity diagram. How is RGB to CMY conversion done ? Explain. [8]
(b) Write short notes on :
(i) Key frame systems
(ii) Morphing. [8]
9. (a) Describe diffuse illumination. [4]
(b) Explain Lambert's cosine law. [4]
(c) Explain with diagram :
(i) Ray tracing to find shadows
(ii) Ray tracing to find reflections. [8]

Or

10. (a) Compare Gouraud and Phong's methods of shading. [8]
(b) Write short notes on :
(i) Z buffer
(ii) Ray tracing to solve hidden surface problem. [8]

11. (a) Give the set of equations for generating Bezier curve. Give the algorithm for drawing a Bezier curve section using *four* points. [10]
- (b) Explain how fractals are used to generate fractal surfaces. Give *two* examples of fractal surfaces. [8]

Or

2. (a) Explain Monte-Carlo method for rendering. [6]
- (b) Write short notes on :
- (i) Properties of Bezier curve
 - (ii) Antialiasing
 - (iii) Features of any Graphics Tool. [12]