

Total No. of Questions—12]

[Total No. of Printed Pages—4+1

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[4657]-86**S.E. (I.T.) (Second Semester) EXAMINATION, 2014****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) Assume suitable data, if necessary.

SECTION I

1. (a) Give Bresenham's circle drawing algorithm and derive necessary mathematical expressions used in algorithm. [8]
- (b) Explain different character generation methods. [6]
- (c) Define Aliasing and Anti-aliasing. [2]

P.T.O.

Or

2. (a) Explain the term display file. Give *two* ways to implement display file along with data structure. [6]
- (b) Explain Bresenham's line drawing algorithm. Rasterize a line segment from A(5, 8) to B(9, 5) using Bresenham's algorithm. [10]
3. (a) Explain homogeneous coordinate system. What is the need of homogeneous coordinates ? Give the homogeneous coordinates matrices for 2D transformations : translation, rotation and scaling. [8]
- (b) Explain scanline method for polygon filling with suitable example. [8]
- (c) Translate the polygon whose vertices are 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]

Or

4. (a) A polygon coordinates are A(7, 3), B(9, 3), C(9, 5) and D(7, 5) after doing scaling $S_x = S_y = 2$ and reflection through origin followed by translation by 1 unit in both X and Y direction. Find the original figure. [8]

- (b) Explain different methods for testing a pixel inside or outside a polygon. [8]
- (c) Define Concave and Convex polygon. [2]
5. (a) Which are the different types of projections ? Explain any *one* in detail with mathematical treatment. [8]
- (b) What is meant by quadric surfaces ? Explain any *two* quadric surfaces with diagram and equations in both implicit and parametric form. [8]

Or

6. (a) Explain various steps to perform rotation about an arbitrary axis in 3D. [10]
- (b) Write short notes on (any *two*) : [6]
- (i) B-Spline
- (ii) Polygon Tables
- (iii) Polygon Mesh.

SECTION II

7. (a) What do you mean by morphing ? Explain with example how it is used in animation along with necessary mathematical treatment. [8]
- (b) What are the different ways in which motions of the objects can be specified ? Explain each in brief. [8]

Or

- 8.** (a) Explain CIE chromaticity diagram. Also explain HSV to RGB conversion. [8]
- (b) Write short notes on : [8]
- (i) Key frame systems
- (ii) Color mixing.
- 9.** (a) Explain with diagram : [9]
- (i) Ray Tracing to find shadows
- (ii) Ray Tracing to find reflections
- (iii) Ray tracing to solve hidden surface problem for every pixel.
- (b) Compare Gouraud and Phong's method of shading. [8]

Or

- 10.** (a) Explain Lambert's cosine law. Also describe point source illumination. [9]
- (b) What is Jittering ? State the advantages of distributed ray tracing. [4]
- (c) Describe diffuse illumination. [4]

11. (a) How are fractals used to generate fractal surfaces ? Give *two* examples of fractal surfaces. [9]
- (b) Write short notes on (any *two*) : [8]
- (i) Hilbert's curve
 - (ii) Anti-aliasing
 - (iii) Texture Mapping.

Or

12. (a) Explain Bezier curve generation using Mid-point subdivision. Also mention properties of Bezier curve. [9]
- (b) Explain in brief Monte-Carlo method for rendering. [8]

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