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Total No. of Questions—12]

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[3962]-213

S.E. (Infor. Techno.) (Second Semester) EXAMINATION, 2011

COMPUTER GRAPHICS

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answer Question No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 from Section I and Answer Q. No. 7 or Q. No. 8, Q. No. 9 or Q. No. 10, Q. No. 11 or Q. No. 12 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 *two* different data structures for implementing display file and compare these data structures for time complexity for deletion operation. [6]
- (b) Explain any *two* techniques for character generation. [4]
- (c) Give Bresenham circle drawing algorithm and derive necessary mathematical expressions used in algorithm. [8]

P.T.O.

Or

2. (a) Give Bresenham line drawing algorithm for generating the points on line segment, when two end-points are given as input. Digitize the line with end-points (20, 10) and (30, 18) using the same algorithm. [10]
- (b) Explain the following input/output devices. [8]
- (i) Touch panels;
 - (ii) Joystick;
 - (iii) Light Pen system;
 - (iv) Tablets.
3. (a) Consider the square $P(5, 5)$ $Q(5, 15)$ $R(15, 15)$ $S(15, 5)$. Rotate the square about fixed point $R(15, 15)$ by an angle of 60 degrees (anticlockwise) followed by scaling by 2 units in X direction and 2 units in Y direction. [8]
- (b) Explain scan-line Polygon Filling Algorithm. [8]

Or

4. (a) Perform a 45 degrees rotation of a triangle $A(10, 10)$ $B(15, 15)$ $C(20, 10)$. [8]
- (i) About the origin
 - (ii) About $P(5, 5)$.
- (b) Show that transformation matrix of reflection about a line $Y = X$ is equivalent to reflection to X-axis followed by anti-clockwise rotation by 90° degrees. [8]

5. (a) Obtain the 3D transformation matrices for : [8]
- (i) Translation;
 - (ii) Scaling;
 - (iii) Rotation about Z-axis.
- (b) Explain the 3D viewing process with various 3D viewing parameters. [8]

Or

6. (a) Derive the transformation matrix for rotation about any arbitrary axis. [10]
- (b) What are parallel projection and perspective projection ? Explain various types of parallel and perspective projection. [6]

SECTION II

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

Or

8. (a) Explain CIE chromaticity diagram. Also explain HSV to RGB conversion. [8]
- (b) What do you mean by morphing ? Explain with example how it is used in animation along with necessary mathematical treatment. [8]

9. (a) Describe Diffuse Illumination. [4]
(b) Explain Lambert's cosine law. [4]
(c) Explain various techniques used in motion specification. [8]

Or

10. (a) Explain Gouraud and Phong methods of shading. [8]
(b) Explain Ray tracing with basic algorithm for ray tracing. [8]
11. (a) Explain how Bezier curve and B-spline blending functions are used for generating curves. [10]
(b) Explain how fractals are used to generate fractal surfaces. Give two examples of fractal surfaces. [8]

Or

12. (a) Explain the term texture mapping and explain procedural texturing methods. [8]
(b) Write a short note on GPU. [6]
(c) Explain the Monte Carlo method for rendering. [4]