

May - June - 2012

Total No. of Questions—12]

[Total No. of Printed Pages—4+2

Seat No.	
-------------	--

[4162]-213

S.E. (Information Technology) (Second Semester) EXAMINATION, 2012

COMPUTER GRAPHICS

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answer Q. Nos. 1 or 2, 3 or 4, 5 or 6 from Section I and Q. Nos. 7 or 8, 9 or 10 and 11 or 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) Assume suitable data, if necessary.

SECTION I

1. (a) Explain Vector Generation principal for gentle and sharp slope lines. [4]

(b) What is aliasing ? Explain different anti-aliasing techniques. [8]

P.T.O.

- (c) Explain display file structure. Why is display file interpreter used ? Which are the commands used in display file interpreter ? [6]

Or

2. (a) Explain DDA line generation algorithm. Rasterize the line segment with starting point as $A(1, 0)$ and end point as $B(5, 7)$. [8]
- (b) Differentiate between Raster scan and Vector scan display systems. [4]
- (c) Explain various methods for character generation with example. [6]
3. (a) Explain homogeneous coordinate system. What is the need of homogeneous coordinates ? Give the homogeneous coordinates matrices for the 2D transformation : translation, rotation and scaling. [8]
- (b) Translate the polygon $A(5, 7)$, $B(7, 11)$ and $C(12, 15)$ by 4 units in x-direction and 6 units in y-direction. [4]
- (c) Explain even-odd method for testing a pixel inside or outside the polygon. [4]

Or

4. (a) Define polygon. Explain different types of polygon with example. [4]
- (b) Find out the final coordinates of a figure bounded by coordinates A(1, 1), B(3, 4), C(5, 7) and D(10, 3) when rotated about a point (8, 8) by 30 in clockwise direction and scaled by two units in x -direction and three units in y -direction. [8]
- (c) Give the pseudocode for boundary fill algorithm for polygon filling. [4]
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 how an object is rotated about an arbitrary axis. [10]

(b) Write short notes on (any two) : [6]

(i) Polygon Meshes

(ii) Polygon Tables

(iii) Plane Equation.

SECTION II

7. (a) What is animation ? Explain the basic rules required for animation. [8]

(b) What are the different steps in animation sequence ? Explain each step in brief. [6]

(c) Differentiate between RGB and CMYK color model. [4]

Or

8. (a) Explain the terms tints, tones and shades in the terminology of color mixing. [4]

(b) Explain YIQ color model. Explain how YIQ to RGB conversion is done. [6]

(c) What are the different animation languages that are used ? Explain each with an example. [8]

9. (a) Explain Ray tracing with a proper figure for the following : [8]

(i) Ray tracing to solve hidden surface problem for every pixel

(ii) Ray tracing to find shadows

(iii) Ray tracing to find reflections.

(b) Define shading. What are the different methods used for shading.

Explain Gouraud Shading method used for shading. [8]

Or

10. (a) Explain the principle of pinhole camera. Which are the various secondary rays that are generated while viewing an object ? [8]

(b) What is ray tracing ? Explain how the ray is represented in its parametric form. [4]

(c) Explain Specular reflection with figure in detail. [4]

11. (a) Define Fractal with example. Give various methods in which fractals are classified. [8]

(b) Explain Bezier curve generation using Midpoint subdivision algorithm. Also give the properties of Bezier curve. [8]

Or

12. (a) Explain how fractal line algorithm can be used for generating fractal surface. [8]
- (b) Write short notes on any two : [8]
- (i) Hilbert's Curve
 - (ii) Rendering Equation
 - (iii) GPU
 - (iv) Texture Mapping.