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Total No. of Questions—12]

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**[3762]-233**

**S.E. (I.T) (II Sem.) EXAMINATION, 2010**

**COMPUTER GRAPHICS**

**(2008 COURSE)**

**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 electronic pocket calculator is allowed.

**SECTION I**

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

(b) Explain the difference between raster scan and random scan displays. [4]

(c) Explain any *four* interactive devices with suitable diagrams. [8]

P.T.O.

Unit - 4/5/6

Or

2. (a) Explain DDA line drawing algorithm. Consider a line segment from A(2, 1) to B(7, 8). Use DDA line drawing algorithm to rasterize this line. [8]
- (b) Explain and derive the expression for the decision parameter in mid-point line drawing algorithm. [8]
- (c) Define aspect ratio, Resolution. [2]

3. (a) Consider a polygon with vertices A(10, 10), B(15, 15) and C(20, 10). Obtain the following rotations of the ploygon about the origin :
- (i) Counterclockwise by  $\pi$
- (ii) Clockwise by  $\pi/2$
- (iii) Counterclockwise by  $5\pi/4$
- (iv) Clockwise by  $3\pi/4$  [8]
- (b) Explain the homogeneous and normalised coordinate system. [4]
- (c) Explain the method for testing a pixel inside or outside a polygon. (even-odd method) [4]

Or

4. (a) (i) Prove that two scaling transformations commute, i.e.,  $S_1.S_2 = S_2.S_1$ .
- (ii) Show that the composition of two rotations is additive.  
 $R(\theta_1).R(\theta_2) = R(\theta_1 + \theta_2)$   
where,  $\theta_1$  and  $\theta_2$  are angle of rotation. [8]
- (b) Explain scan-line polygon filling algorithm. [8]

5. (a) Which are the different types of projections ? Explain any *one* in detail with mathematical treatment. [8]
- (b) What is Spline ? Give definitions of spline curve and spline surface. Explain with neat diagrams, which are the different parametric continuity conditions ? [8]

Or

6. (a) What is meant by quadric surfaces ? Explain any *two* quadric surfaces with figure, its equation and parametric form. [8]
- (b) Write short notes on (Attempt any *two*) :
- (i) Polygon meshes
  - (ii) Polygon equation
  - (iii) Polygon surface. [8]

## SECTION II

7. (a) Explain the following terms :
- (i) Complementary colors
  - (ii) Primary colors
  - (iii) Color gamut
- about colors with example. [6]
- (b) Explain Morphing in detail. [6]
- (c) Explain difference between RGB and CMY (K) color model. [6]



Or

8. (a) What are the different ways in which motions of the objects can be specified ? Explain each in brief. [10]
- (b) What are the different steps in animation sequence ? Explain each step in brief. [5]
- (c) Explain HSV color model. [3]

9. (a) Explain ray tracing with figure for the following :
- (i) Ray tracing to solve hidden surface problem for every pixel.
- (ii) Ray tracing to find shadows.
- (iii) Ray tracing to find reflections. [8]
- (b) Explain the following illumination models (any two) :
- (i) Ambient Light
- (ii) Diffuse reflection
- (iii) Specular reflection. [8]

Or

10. (a) Give calculations for the following ray surface intersection :
- (i) Intersection of a ray with the XY plane
- (ii) Intersection of a ray with any arbitrary point on the sphere. [8]
- (b) What is shading ? Enumerate and explain different shading methods in detail. [8]

11. (a) State the general equation representing the inter-reflection of light within an enclosure (i.e. Rendering equation). Explain in brief Monte-Carlo method for rendering. [6]
- (b) Give the set of equations of Bezier curve. Write the algorithm for drawing a bezier curve section using *four* points. [10]

Or

12. (a) Explain features of any Graphics tool you have studied. [8]
- (b) Write short notes on (any *two*) :
- (i) Hilbert's curve
  - (ii) Antialiasing
  - (iii) GPU. [8]