

Total No. of Questions : 12]

SEAT No. :

P645

[Total No. of Pages : 3

[4457] - 123

S.E. (Information Technology) (Semester - II)

COMPUTER GRAPHICS

(2008 Course)

Time : 3 Hours]

[Max. Marks :100

Instructions to the candidates:

- 1) *Answer Question 1 or 2, 3 or 4, and 5 or 6 from section - I and Question 7 or 8, 9 or 10, and 11 or 12 from section - II.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Assume suitable data if necessary.*

SECTION - I

- Q1)** a) Give Bresenham's line drawing algorithm for generating points on line segment when two end points are given as input. Digitize the line with end points (5, 5) and (13, 9) using the same algorithm. [8]
- b) Explain any two techniques for character generation. [4]
- c) Explain the vector generation principle for gentle and sharp slope lines. [4]

OR

- Q2)** a) Explain the term display file. Give two ways to implement display file along with data structure. [8]
- b) Explain DDA line drawing algorithm. Consider a line segment from A(0, 0) to B(4, 6). Use DDA line drawing algorithm to rasterize this line. [8]

- Q3)** a) Give 2D transformation matrices for translation and scaling. Prove that two successive 2D-rotations commute. [8]
- b) Explain flood-fill method for polygon filling with suitable example. [6]
- c) Explain even-odd method for testing a pixel inside or outside a polygon. [4]

OR

P.T.O.

- Q4)** a) Derive the general transformation matrix for mirror reflection of any polygon about an arbitrary line whose equation is given by $y = mx + c$, m is slope of line and c is y-intercept. [10]
- b) Consider a square $P(5, 5)$, $Q(5, 15)$, $R(15, 15)$, $S(15, 5)$. Rotate the square about fixed point $R(15, 15)$ by 60 degrees(anticlockwise). Find the resultant transformation of the square. [8]
- Q5)** a) Which are the different types of projections? Explain anyone 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

- Q6)** a) Explain 3D viewing process. Derive the transformation matrix for rotation about all axes. [10]
- b) Write short notes on [6]
- B-Spline
 - Polygon Tables

SECTION - II

- Q7)** 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]

OR

- Q8)** a) What are the steps in design of animation sequence? Describe about each step briefly. [8]
- b) Write short notes on: [8]
- Key Frame Systems.
 - Color mixing.
- Q9)** a) What is Jittering? State the advantages of distributed ray tracing. [4]
- b) Describe diffuse illumination. [4]
- c) Explain with diagram: [9]
- Ray Tracing to find shadows
 - Ray Tracing to find reflections
 - Ray tracing to solve hidden surface problem for every pixel.

OR

- Q10)**a) Compare Gauraud and Phong's method of shading. [8]
b) Explain Lambert's cosine law. Also describe point source illumination. [9]
- Q11)**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]

OR

- Q12)**a) Write a short note on (any three): [9]
i) Hilbert's curve.
ii) Anti aliasing.
iii) Hermit's Curve.
iv) Raster animations.
- b) How fractals are used to generate fractal surfaces? Give two examples of fractal surfaces. [8]

