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Sl. No. of Ques. Paper

: 6193

F-5

Unique Paper Code

: 2341503

Name of Paper : Computer Graphics

Name of Course : B.Tech. Computer Science

Semester : V

Duration: : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

The question paper consists of two Sections. Section A is compulsory.

Attempt any four questions from Section B.

SECTION A

(a) Consider a raster system with a resolution of 250×250. For a 10×11 screen, find the radius of each pixel.
 (b) What is interlacing?

2. (a) Differentiate between DDA and Bresenham Line Drawing algorithm.

(b) Discuss any two methods to draw a thick primitive.

3. (a) Give the structure of Global Edge table used in Polygon filling algorithm. 2

(b) Prove that two successive scaling operations are commutative.

4. (a) Show that the following 2d matrix represents a pure rotation:

$$\begin{bmatrix} \frac{1-t^2}{1+t^2} & \frac{2t^2}{1+t^2} \\ \frac{-2t}{1+t^2} & \frac{1-t^2}{1+t^2} \end{bmatrix}$$

(b) What is the value of Center of Projection w.r.t. parallel and perspective projection?

5. (a) Give the 3D rotation matrices for rotation by α , β and γ about X-axis, Y-axis and Z-axis respectively.

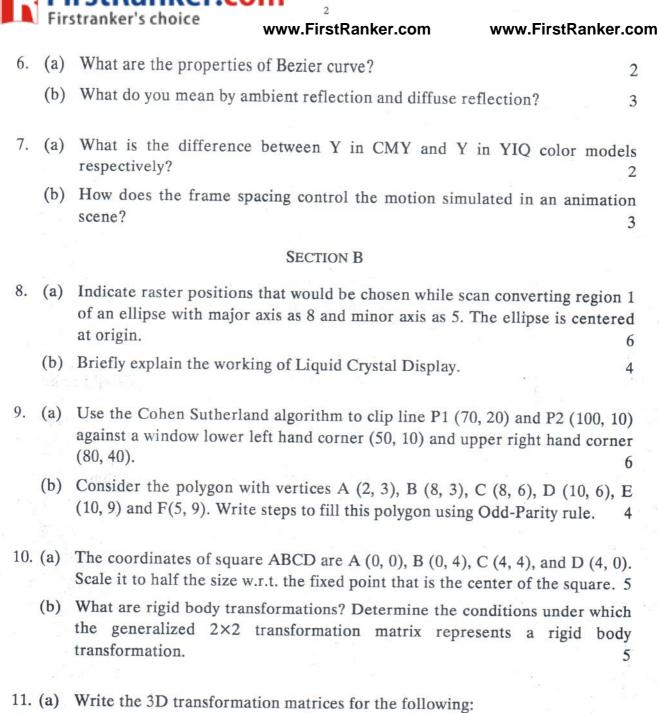
(b) Why is depth sort algorithm also known as Painter's algorithm?

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(i) Uniform scaling by a factor of 2 w.r.t. the fixed point (1, 1, 2, 1).

(iii) Rotate about X-axis by 30° followed by rotation about z-axis by 45°

(iv) Two-point perspective projection on z=0 plane with Centre

Projection (COP) lying on X-axix as 2.0 and COP lying along y-axis as

(ii) Translation right by 2 units and up by 4 units.

 $-1 \cdot 0$.

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12. (a)	Given a sequence of control points p0 $(0, 0, 0)$, p1 $(1, 2, 0)$, p3 $(3, 1, 0)$. Write a formula for the Bezier curve formed from above three points. Use the formula to calculate the point $t = 1/3$ and the tanget at that point.	
(b)	Define morphing. Specify the rules to equalize the set of edges in key frame K and $K+1$.	s 5
13. (a)	Differentiate between halftoning and dithering.	4
(b)	List the data structures used in Z-buffer algorithm for visible surface determination, along with the description of the values stored in them.	3
(c)	Briefly explain the Gourand shading model.	3