

Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 110514

Roll No. 

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B.Tech.

(SEM. V) THEORY EXAMINATION, 2015-16

COMPUTER GRAPHICS

[Time : 3 hours]

[Maximum Marks : 100]

Note : Attempt questions from all Sections as per directions.

Section-A

Attempt all parts of this section. Answer in brief.

(2×10=20)

- (a) Give window to viewport transformation matrix.
- (b) We require large refresh rate mainly due to short persistence of phosphor. Why not use a long persistence of phosphor instead to reduce the frame rate?
- (c) What is resolution?
- (d) Define computer graphics.
- (e) Define polygon.

- www.FirstRanker.com
- (f) What is transformation?
  - (g) What is translation?
  - (h) Define clipping.
  - (i) Define B-Spline curve
  - (j) What is a spline?

**Section-B**

Attempt *any five* questions from this section.

(10×5=50)

2. Rotate a triangle at A (0, 0), B (1, 1), C (5, 2) by 45° about: `
- (i) Origin (0, 0)
  - (ii) Point P (-1, -1). Find new coordinates of the rotated figure.

3. Write Liangle Barsky algorithm for line clipping. Use Liange Barsky line clipping algorithm to clip the line P1 (-15, -30); to P2 (30, 60) against the Window having diagonally opposite corners as (0, 0) and (15, 15).

4. What is the importance of hidden line and surface removal algorithm? Discuss the mechanism of Z-buffer surface removal algorithm and differentiate it with A-buffer surface removal algorithm.

5. Show that the uniform scaling and rotation make commutative pairs but in general scaling and rotation are not commutative.

6. Implement a back-face detection procedure using an orthographic parallel projection to view visible faces of a convex polyhedron. Assume that all parts of the object are in front of the view plane and provide a mapping onto a screen viewport for display.

7. Show that the composition of two rotations is additive by concatenating the matrix representations for  $R(\theta_1)$  and  $R(\theta_2)$  to obtain  $R(\theta_1) * R(\theta_2) =: R(\theta_1 + \theta_2)$

8. Explain with example - Warnock algorithm for hidden surface removal. Also draw the window tree structure for the same example.

9. Design a parallel version of Bresenham's algorithm for straight lines of any slope.

**Section-C**

Attempt *any two* questions from this section.

(15×2=30)

10. (a) Write and explain with example weiler and Atherton polygon clipping algorithm.  
(b) Explain the working of colour CRT by using delta shadow mask method.

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P.T.O.

11. Write short notes on any two of the following:

- (a) 3-D transformation
  - (b) 3-D projection
  - (c) 3-D clipping
12. Write an algorithm to draw Bezier curves.
- (a) Write an algorithm to draw Bezier curves.
  - (b) What are the various back face detection algorithms? Explain anyone of them.

—X—

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