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

Paper ID : 110514 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. V) THEORY EXAMINATION, 2015-16

COMPUTER GRAPHICS

[Time : 3 hours] **[MaximumMarks : 100]**

Note : Attempt questions from all Sections as per directions.

Section-A

1. 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.

(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 form 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.

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

(a) 3-D transformation

(b) 3-D projection

(c) 3-D clopping

12. (a) Write an algorithm to draw Bezier curves.

(b) What are the various back face detection algorithms? Explain anyone of them.

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