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

PAPER ID : 2167    Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

# B. Tech.

## (SEM. V) THEORY EXAMINATION 2011-12
## COMPUTER GRAPHICS

*Time : 2 Hours*                  *Total Marks : 50*

**Note :–** Attempt **all** questions. Attempt any **two** parts of each question.

1.   (a)   Write advantages of raster scan display over random scan display.

     (b)   Write Bresenham's algorithm of line and explain.

     (c)   Write mid-point circle algorithm and predict the pixels in any octant of circle for radius = 10 pixels with its centre at origin.            **(6×2=12)**

2.   (a)   Show that the uniform scaling and rotation make commutative pairs but in general scaling and rotation are not commutative.

     (b)   Reflect the polygon $(-1, 0), (0, -2), (1, 0)$ and $(0, 2)$ about the line $Y = 2$ by using transformation matrices.

     (c)   Write any one line clipping algorithm.       **(6×2=12)**

3. (a) Derive perspective projection transformation matrix.

   (b) Write rotation matrices about x-axis, y-axis and z-axis. Prove that for any rotation matrix (R) :

   $$R^{-1}(\theta) = R(-\theta) = R^T(\theta)$$

   (c) Write 3-D line clipping algorithm of Cohen-Sutherland region code method. **(6×2=12)**

4. (a) Write the properties of B-Spline Curves. Also write advantages of B-Spline Curves over Bezier Curves.

   (b) Set up the equation of Bezier Curve and roughly trace it for three control points (1,1) (2, 2) and (3, 1).

   (c) Explain specular reflection and phong model. **(7×2=14)**