

Code No: P0501/R05

**Set No. 2**

**III B.Tech II Semester Supplementary Examinations, Nov/Dec 2009  
COMPUTER GRAPHICS  
(Computer Science & Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. (a) Consider a non interlaced raster monitor with a resolution of  $n$  by  $m$  ( $m$  scan lines and  $n$  pixels per scan line), a refresh rate of  $r$  frames per second, a horizontal retrace time of  $t_{horiz}$  and vertical retrace time of  $t_{vert}$ . What is the fraction of total refresh time per frame spent in retrace of the electron beam.  
(b) Explain the applications for large-screen displays. What graphical output devices support it? [12+4]
2. (a) Explain how the pixel screen positions are stored and retrieved from frame buffer.  
(b) What are the steps involved in mid point circle algorithm? [8+8]
3. (a) Describe the transformation which reflects an object about an arbitrary line  $L$ .  
(b) What is the relationship among rotation ( $R_\theta$ ), inverse rotation ( $R_{-\theta}$ ) and coordinate rotation ( $R_\theta^1$ ). [8+8]
4. Let  $R$  be a rectangular window whose lower left corner is at  $L(-3,1)$  and upper right-hand corner is at  $R(2,6)$ . If the line segment is defined with two end points  $A(-1,5)$  and  $B(3,8)$  determine
  - (a) The region codes of the two end points,
  - (b) Its clipping category and
  - (c) Stages in the clipping operations using Cohen-Sutherland algorithm. [16]
5. If the equation for a plane surface is expressed in the form  $Ax+By+Cz+D=0$ . Explain the procedure to calculate the parameters  $A$ ,  $B$ ,  $C$  and  $D$  using Cramer's rule if the three successive polygon vertices are given as input. [16]
6. Define tilting as a rotation about the  $x$ -axis followed by a rotation about the  $y$ -axis. If  $\theta_x$ ,  $\theta_y$  are the rotations about  $x$  and  $y$ -axis.
  - (a) Find the tilting matrix
  - (b) Does the order of performing the rotation matter. [16]
7. (a) If the camera viewing direction is  $V$  and the surface normal of plane is  $N$ , how to determine whether the surface visible with respect to viewing direction or not.

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- (b) Explain the depth-buffer method for elimination of hidden surfaces. [16]
8. (a) List and explain about the steps of animation.
- (b) What are the various types of interpolation used in animation. [8+8]

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