B. Tech.

(SEM. VI) EXAMINATION, 2006-07

COMPUTER GRAPHICS

Time : 3 Hours] [Total Marks : 100

1 Attempt any two : 2×5=10
   (a) Distinguish between Raster and Vector graphics methods. When do we prefer ? What?
   (b) Describe briefly Bresenham’s circle drawing algorithm. Why do we prefer incremental algorithm over DDA ?
   (c) How do we represent polygon using polygon table, edge table and vertex table explain with an example.

2 Attempt any two : 2×5=10
   (a) Distinguish between window port and viewport. In 2D clipping how are lines grouped into visible, invisible and partially visible categories?
   (b) Give a 3x3 homogeneous matrix to rotate the image clockwise by 90°. Then shift the image to the right by 10 units. Finally scale the image by twice as large. All these transformations are to be done one after another in sequence.

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(c) What is a segment table. How do we create it? Why do we need segments? Explain in detail.

3 Attempt any two: 2x5=10

(a) A cube is placed at the origin of 3D system. Such that all its vertices have positive coordinate values and sides are parallel to the three principal axes. Indicate a convenient position of a viewer at which he can see a 2-point perspective projection. Verify that such a view is generated.

(b) Define vanishing points. Is the location of vanishing point directly related to the viewing point? Explain how?

(c) What are the various logical graphic input primitives. What are the various input modes in which they work?

4 Attempt any two: 2x5=10

(a) What is ray tracing algorithm for hidden surface removal? Explain mathematically how do we find which planes are visible using ray tracing algorithm.

(b) What are the two spaces in which hidden surface algorithms work? How does sorting and coherence speed up calculation in such algorithms?

(c) Given control points (10,100), (50,100), (70,120) and (100,150). Calculate coordinates of any four points lying on the corresponding Bezier curve.
Attempt any two:

(a) Derive simple illumination model. Include the contribution of Diffuse, ambient and specular reflection.

(b) How are periodic B-spline curves different from non-periodic B-spline curves?

(c) Which clipping algorithm is best suited for hardware implementation? Give how this algorithm works.