

TCS-501

1347

Odd Semester Examination, 2017-18

B.TECH. (SEMESTER-V)

COMPUTER GRAPHICS

Time: 03:00 Hours

Max Marks : 100

Note : Attempt all questions.

1. Attempt any four questions : (5x4=20)
- (a) Consider the line coordinates (0,0) and (8,4). Rasterize the line segment using Bresenham's algorithm.
 - (b) Explain scanline fill algorithm with an example showing necessary vertex list, edge list, active edge list etc.?
 - (c) Justify the approach of using integer arithmetic in Bresenham line drawing algorithm. Explain how rasterization accuracy is preserved despite using integer arithmetic?
 - (d) Draw the flow chart for midpoint circle generation algorithm.?
 - (e) Explain the basic concept of midpoint ellipse drawing algorithm. Derive the decision parameter for the algorithm ?
2. Attempt any four questions: (5x4=20)
- (a) Explain difference between polygon relative and polygon absolute algorithm of entering polygons?
 - (b) Explain about the painter's algorithm. Explain the situation where the painter's algorithm does not work properly.
 - (c) What is segment? How is segment useful to draw and redraw a part of image and how is segment table created?
 - (d) Derive the window to view port transformations equations by first scaling the window to the size of the viewport and then translating the scaled window to the view port position.

TCS-501/1600

(1)

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(e) Write Short notes on :

- (i) Double Buffering
- (ii) Diffuse reflection
- (iii) Dot Matrix Method

3. Attempt **any two** questions :

(10x2=20)

- (a) Compare the orthographic and oblique types of parallel projections and also explain the various clipping parameters in 3D clipping?
- (b) Using homogeneous coordinate transformation matrix, apply the following sequence of transformation to a unit square centered at origin:
 - (i) Translation by factor (1/2, 1)
 - (ii) Rotate by an angle $\Theta = 90^\circ$
- (c) Explain the Cohen Sutherland Line Clipping Algorithm ? also Use this algorithm to find the visible portion of the line P(40, 80) Q(120, 30) inside the window, the window is defined as ABCD : A(20,20), B(60, 20), C(60, 40) AND D(20, 40).

(10x2=20)

4. Attempt **any two** questions :

- (a) (i) Derive the 2*2 transformation matrix for each of the following rotation about the origin, counterclockwise by π and clockwise by $\pi/2$.
- (ii) Consider a graphics system which allows the user to have more than one segment such a system. What would be its advantages and disadvantages?
- (b) Obtain a two point perspective transformation of a unit cube situated at the origin with center of projection at $x = -2$ and $y = -2$ projected onto the $z = 0$ plane.
- (c) Explain :
 - (i) Plain Projection and its Types
 - (ii) Oblique Projections
 - (iii) Z-Buffer Method and its disadvantages

(10x2=20)

5. Attempt **any two** questions :

- (a) Write Short Notes on Open GL API and Sierpinski Gasket?
- (b) List the properties of Animating Interactive Programs? Describe 3-D projection clipping procedure in detail?
