Cluster Innovation Centre, University of Delhi, Delhi-110007

Examination : End Semester Examination – Nov-Dec 2022
Name of the Course : B. Tech (Information Technology and Mathematical Innovations)
Name of the Paper : Computer Graphics and Visualization
Paper Code : 32861502
Semester : V
Duration : 2 Hours
Maximum Marks : 40

Instructions:

- **Question 1 is Compulsory**
- **Attempt any 3 out of Q2-Q5**

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1. **(1x10=10 Marks)**

   a. What is Computer Graphics?
   b. What is Rasterization?
   c. Write the properties of video display devices?
   d. Write the essential applications of computer-graphics?
   e. What is an animation?
   f. Define refresh and frame buffer.
   g. What are the advantages and disadvantages of direct view storage tubes?
   h. What are Hidden lines and surfaces?
   i. What is the Drawback of Boundary Filling Color Method?
   j. What are Concave and Convex Polygons ?

2. Differentiate between the following: **(2.5x4=10 Marks)**

   a. DDA and Bresenham's line drawing algorithm.
   b. Parallel projection and Perspective projection.
   c. Vector and Raster graphics
   d. Window port and View port

3. **(2x5=10 Marks)**

   a. Explain Bresenham's line algorithm? Draw the line b/w **(5,5)** and **(13,9)** (calculate at least 4 coordinates).
   b. Derive Ellipse Drawing algorithm. Calculate the coordinates to draw an ellipse for $r_x=10, r_y=5$

(2x5=10 Marks)

4. a. Find the transformation matrix that transforms the square ABCD to half its size with the center still remaining at the same position A(1,1), B(3,1), C(3,3), D(1,3) and center at (2,2). Also find resultant coordinates of the square.

   b. Give a 3x3 homogeneous coordinate transformation matrix for each of the following translations:

      i. Shift the image to the right 3-units.

      ii. Move the image down ½ unit and left 1 unit.

(2x5=10 Marks)

5. a. Explain The Cohen-Sutherland Line-Clipping Algorithm.

   b. Determine the quadratic Bezier blending functions for three control points. Plot each function and label the maximum and minimum value.