[3 hours]   **Marks:100**

N.B (1) Question No1 is compulsory.
     (2) Attempt any four questions out of remaining six questions.
     (3) Assume any necessary data but justify the same.
     (4) Figures to the right indicate full marks.
     (5) Use of scientific calculator is allowed.

Q1. a) What is scaling transformation? Derive the matrix for two-dimensional fixed   (10)
        point scaling.

Q1. b) Use Liang Barsky's line clipping algorithm to clip the line XY X(-350, -450) ,   (10)
        Y(450, 400) with respect to the window with lower left corner : (-300, -300) ,
        Upper right corner (400, 250)

Q2. a) Write the Properties of Bspline Curve   (10)

Q2. b) What is Reflection? What are the different types of reflections   (10)

Q3. a) Derive the DDA line drawing algorithm, also compare it with Bresnham's line   (10)
        drawing algorithm

Q3 b) Explain the Phong's illumination model .   (10)

Q4. a) What is viewing? Explain the 2D viewing transformation   (10)

Q4. b) Write all the homogeneous matrices for 3D rotation . Rotate the 3D PYRAMID   (10)
        A(10,0,10),B(20,0,10), C(20,0,20),D(10,0,20),E(15,40,15) by 60 degrees about
        y axis and determine the new coordinates

Q5. a) Explain in detail the Halftoning and dithering techniques   (10)

Q5. b) Differentiate between Parallel and Perspective Projections.   (10)

Q6. a) Derive the midpoint circle drawing algorithm   (10)

Q6. b) Compare and contrast between flood fill and boundary filling techniques   (10)

Q7.   Write short notes on

    a) Fractal Dimension   (05)

    b) Ray Tracing   (05)

    c) Area-fill attributes and -fill styles   (05)

    d) Surface Rendering   (05)

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