

3 Hours

Marks: 80



N.B.: (1) Question No. 1 is compulsory.

(2) Attempt any **three** of remaining **five** questions.

(3) Assume any suitable **data** if necessary and justify the same.

1. (a) Describe the Open GL basic primitives. [05]
(b) Explain inside outside test used in filling algorithm. [05]
(c) What are the disadvantages of DDA algorithm? [05]
(d) Prove that two successive rotations are additive. [05]
2. (a) Explain the midpoint circle generation algorithm. [10]
(b) Explain Liang-Barsky line clipping algorithm. Apply the algorithm to the line with coordinates $p1(x1, y1) = (3, 3)$ and $p2(x2, y2) = (12, 9)$ against the window $(xwmin, ywmin) = (4, 4)$ and $(xwmax, ywmax) = (9, 8)$ [10]
3. (a) Differentiate between parallel and perspective projections. [10]
(b) Rotate a triangle ABC by an angle 30° , where the triangle has the coordinates A(0, 0), B(10, 2), and C(7, 4). Calculate new coordinates of the triangle. [10]
4. (a) Explain Bezier curve with its properties and construct the Bezier curve of order three with four vertices of the control polygon P0(0,0), P1(1,2), P2(3,2) and P3(2,0). [10]
(b) Define window, viewport and derive window to viewport transformation. [10]
5. (a) Explain any one polygon clipping algorithm. [10]
(b) Explain Gouraud and Phong shading methods along with their advantages and disadvantages [10]
6. Write a short note on any **two** of the following [20]
 - (a) Bresenham's line drawing algorithm.
 - (b) Back Face removal algorithm
 - (c) 3-D object representation methods

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