

(3 Hours)

Total Marks 80

- N.B:** 1) Question number 1 is compulsory.
 2) Attempt any three out of the remaining.
 3) Assume suitable data if necessary and justify the assumptions.
 4) Figures to the right indicate full marks.

- Q1 a)** What are homogeneous coordinates? Write a homogenous transformation matrix for translation, scaling, and rotation. [05]
- b)** Explain the working of the Raster scan system with a neat diagram, [05]
- c)** Explain any 5 principles of animation. [05]
- d)** Scale a triangle A(4,4), B(12,4) and C(8,10) with scaling factor $S_x = 2$ and $S_y = 1$. [05]
- Q2a)** Write a midpoint circle drawing algorithm. Apply this algorithm to find pixel coordinates of the circular boundary only for the first quadrant, whose radius is 8 units. [10]
- b)** Rotate a line segment with endpoint A (3,3) to B(10,10) in a clockwise direction by an angle 45 degrees by keeping A (3,3) as fixed point. Find new transformed coordinates of a line. [10]
- Q3a)** Explain Flood fill and boundary fill algorithm with a suitable example. Write merits and demerits of the same. [10]
- b)** Derive transformation matrix for 2D rotation about a fixed point. [10]
- Q4 a)** Explain the z-buffer algorithm for hidden surface removal with a suitable example. [10]
- b)** Explain Sutherland-Hodgeman polygon clipping algorithm with a suitable example. [10]
- Q5 a)** What is Bezier curve? Write important properties of the Bezier curve. [10]
- b)** What do you mean by line clipping? Explain Cohen-Sutherland line clipping algorithm with a suitable example. [10]
- Q6 a)** Write a note on 3D projections. [05]
- b)** What is animation? Explain key frame animation. [05]
- c)** What are the properties of fractals? Explain how the Koch curve is constructed. Calculate the dimensions of Koch curve. [05]
- d)** What do you mean by aliasing? Explain any two Anti-aliasing techniques. [05]
