

SE sem III

Paper / Subject Code: 50925 / Computer Graphics

5/6/23

R-19

Computer

FH

2023

Q.P. code 27037

(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]

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