1T01873 - S.E. Computer Science & Engineering (Artificial Intelligence & Machine Learning) (R-2019)(C-Scheme) SEMESTER - III / 49375 - Computer Graphics
QP CODE: 10027037 DATE: 05/06/2023

(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 Sx= 2 and Sy=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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