Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020

Subject Code: 2151603 Date: 03/02/2021

Subject Name: Computer Graphics

Time: 10:30 AM TO 12:30 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	What is Computer Graphics? List various applications of Computer Graphics.	**03**
	(b)	How much time is spent scanning across each row of pixels during screen refresh on a raster system with resolution of 1280 X 1024 and a refresh rate of 60 frames per second?	**04**
	(c)	Write the differences between random scan display and raster scan display.	**07**
Q.2	**(a)**	Explain Odd-Even rule.	**03**
	(b)	What are the differences between flood-fill and boundary fill algorithms?	**04**
	(c)	Write circle generation algorithm and explain it with example.	**07**
Q.3	**(a)**	Explain Translation transformation.	**03**
	(b)	Apply the shearing transformation to square with A(0,0), B(1,0), C(1,1) and D(0,1) as given below: 1) Shear parameter value of 0.5 relative to line Yref = -1 2) Shear parameter value of 0.5 relative to line Xref = -1	**04**
	(c)	Derive 2D reflection matrix about arbitrary line.	**07**
Q.4	**(a)**	Explain Scaling transformation.	**03**
	(b)	Derive 2D transformation matrix for rotation about arbitrary point.	**04**
	(c)	Obtain the mirror reflection of the triangle ABC about the line passing through the points (4, 6) and (10,15) where A,B,C have coordinate values (0,10),(0,50) and (-20,30) respectively.	**07**
Q.5	**(a)**	Write difference(s) between parallel projection and perspective projection.	**03**
	(b)	Let $r(t)=(t,t^2)$ for $0<=t<=1$ & Let $n(t)=(2t+1,t^3+4t+1)$ for $0<=t<=1$. Notice that $r(1)=(1,1)=n(0)$ for r and n join with C^0 continuity:- 1] Do n(t) and r(t) meet with C^1 continuity at the join point? 2] Do n(t) and r(t) meet with G^1 continuity at the join	**04**

point?

	(c)	Derive 3D transformation matrix for rotation about line which is parallel to any one of the co-ordinate axis.	**07**
Q.6	**(a)**	Define following terms: 1) Parametric Continuity 2) Geometric Continuity	**03**
	(b)	What is projection? List out types of projection with diagram.	**04**
	(c)	Explain the Cohen Sutherland line clipping algorithm.	**07**
Q.7	**(a)**	Discuss two approaches used to determine hidden surfaces.	**03**
	(b)	Briefly explain Back Face Detection algorithm.	**04**
	(c)	What is window and view-port? Retrieve equations for the scaling factors to map the window to view-port in 2D viewing system.	**07**
Q.8	**(a)**	What is depth buffer method?	**03**
	(b)	List out properties of Bezier Curve.	**04**
	(c)	Explain RGB Color model in detail.	**07**

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