Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2024

Subject Code:3150712 Date:28-11-2024

Subject Name:Computer Graphics

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	List the application of computer graphics.	**03**
	(b)	Explain Horizontal retrace and vertical retrace	**04**
	(c)	Explain the function of CRT display with neat and clean Diagram.	**07**
Q.2	**(a)**	What are the characteristics of line drawing algorithm? Discuss the disadvantage of DDA line drawing algorithm.	**03**
	(b)	Explain odd-even, winding number and inside outside test.	**04**
	(c)	Apply Mid-Point Circle Algorithm to find the coordinates of a circle with radius r=10 and center (0,0) for single octant.	**07**
		OR	
	(c)	Given end-point P1(1,3) and P2(8,9) find the pixels illuminated using Bresenham Line Drawing algorithm.	**07**
Q.3	**(a)**	What is the difference between Window and ViewPort?	**03**
	(b)	Explain Cohen-Sutherland Line Clipping algorithm.	**04**
	(c)	Consider square with left-bottom corner at (2, 2) and right-top corner at (6, 6). Find out the transformation matrix which makes its size half such that its center remains same.	**07**
		OR	
Q.3	**(a)**	Differentiate flood fill and Boundary fill algorithm for polygon.	**03**
	(b)	Derive for Liang-Barskey line clipping algorithm.	**04**
	(c)	Consider a triangle with vertices A(1,1), B(3,2) and C(2,4). Find out the transformation matrix which rotates given triangle about point A(1,1) by an angle 45 clockwise.	**07**
Q.4	**(a)**	Consider a raster system with resolution of 1024 by 768. What size of frame buffer is needed for given system to store 12bits per pixel? How much should be the buffer size if 24bits per pixel is needed.	**03**
	(b)	Prove that two 2D scaling transformation commute, that is S1S2=S2S1.	**04**
	(c)	Clip the following polygon using Weiler Atherton polygon clipping algorithm where P1P2P3P4P5P6P7P8P9 is the subjective polygon to be clipped with respect to dotted rectangular boundaries [refer figure 1].	**07**

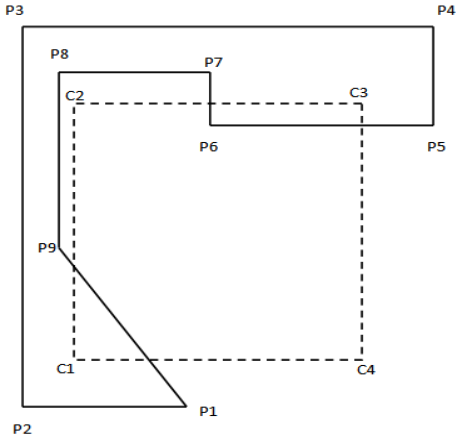

Figure 1

OR

Q.4	**(a)**	List and explain various character generation techniques.	**03**
	(b)	Prove that two 2D rotation about the origin is commute, that is R1R2=R2RS1.	**04**
	(c)	Explain Depth Buffer Method with its algorithm.	**07**
Q.5	**(a)**	What are the important properties of Bezier Curve?	**03**
	(b)	Explain YIQ and CMY color Model.	**04**
	(c)	Briefly explain Z-buffer method Visible surface detection algorithm.	**07**

OR

Q.5	**(a)**	Explain B-Spline Curve.	**03**
	(b)	Explain the term hue and saturation.	**04**
	(c)	Briefly explain types of projection.	**07**

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