Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3150712 Date:27/01/2021

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)**	Define: 1) Aspect Ratio 2) Persistence 3) Frame Buffer.	**03**
	(b)	Consider a raster system with resolution of 1280 by 1024. What size of frame buffer is needed for given system to store 24bits per pixel? How many colors are possible in given system? What is the access time per pixel if refreshing rate is 60 frames per second?	**04**
	(c)	List differences between raster scan and random scan display.	**07**
Q.2	**(a)**	Write a short note on Light Emitting Diodes (LED)	**03**
	(b)	What is aliasing? Briefly explain various anti-aliasing techniques.	**04**
	(c)	Explain the property of circle and calculate the pixel position along circle path with radius r =10 centered on the origin using midpoint circle algorithm up to x=y.	**07**
Q.3	**(a)**	What is inside-outside test? List out the method for inside-outside test.	**03**
	(b)	Write short note on Boundary fill (8-connected) algorithm.	**04**
	(c)	Reflect the diamond-shaped polygon whose vertices are A(–1,0), B(0, –2),C(1,0) and D(0,2) about a line y=x+2.	**07**
Q.4	**(a)**	Write a short note on 2D Viewing Pipeline.	**03**
	(b)	Explain methods of character generation in brief.	**04**
	(c)	Prove that the multiplication of 2D transformation matrices for each of the following sequence of operations is commutative 1.Two successive rotations. 2. Two successive translations.	**07**
Q.5	**(a)**	State necessary conditions with explanation for geometric and parametric continuity.	**03**
	(b)	Write Short note on 1) 3D Rotation 2) 3D Translation 3) 3D Scaling.	**04**
	(c)	What is polygon clipping? Explain Sutherland-Hodgeman polygon clipping algorithm with the help of an example.	**07**
Q.6	**(a)**	Define Concave and Convex polygon with example. Also explain how to split concave polygon.	**03**
	(b)	What is projection? List out various types of projection.	**04**
	(c)	Clip the line PQ having coordinates P(4,1), and Q(6,4) against the clipping window having vertices A(3,2), B(7,2), C(7,6), and D(3,6) using Cohen Sutherland Line Clipping Algorithm.	**07**
Q.7	**(a)**	Write short note on RGB Color Model.	**03**
	(b)	Explain Bezier curve with necessary equations. List all properties of a Bezier curve.	**04**
	(c)	Explain z-buffer visible surface determination algorithm.	**07**
Q.8	**(a)**	Write short note on CMY Color Model.	**03**
	(b)	Discuss Specular refection and Phong Model.	**04**
	(c)	Give the classification of the visible surface detection algorithm. Explain any one with example.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2021

Subject Code:3150712 Date:01/01/2022

Subject Name:Computer Graphics

Time:02:30 PM TO 05:00 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)**	Explain Beam penetration method.	**03**
	(b)	Write the differences between Random Scan display Raster scan Display.	**04**
	(c)	Explain Scanline polygon fill algorithm in detail.	**07**
Q.2	**(a)**	Write short note on Flood fill algorithm for 8 connected region.	**03**
	(b)	What is inside-outside test? List out the method for inside-outside test	**04**
	(c)	Explain Sutherland-Hodgeman polygon clipping with example.	**07**
		OR	
	(c)	Write the Midpoint Ellipse generation algorithm.	**07**
Q.3	**(a)**	Explain DDA line drawing algorithm	**03**
	(b)	Explain 2D Rotation with example.	**04**
	(c)	Derive all necessary formulas for Bresenham line drawing algorithm. Bresenham line drawing algorithm is used to draw a line from (5, 5) to (13, 9). Determine all the pixels which will be on as the line is drawn.	**07**
		OR	
Q.3	**(a)**	Write short note on Antialiasing	**03**
	(b)	Rotate a point A(4, 3) by 45 degree in anticlockwise direction. Find the rotation matrix and resultant point.	**04**
	(c)	How Nicholl-Lee-Nicholl line clipping algorithm reduce the computation of unnecessary intersection point.	**07**
Q.4	**(a)**	Write short note on Polygon Meshes.	**03**
	(b)	Explain window to view port transformation	**04**
	(c)	What is Bezier curve? List all it important properties.	**07**
		OR	
Q.4	**(a)**	Differentiate the parallel and perspective transformation.	**03**
	(b)	Explain reflection and shear with example.	**04**
	(c)	Derive 3D Rotation matrix.	**07**
Q.5	**(a)**	Explain general 3D Viewing Pipeline.	**03**
	(b)	Explain the term hue and saturation.	**04**
	(c)	Explain how RGB to CMY color models with proper diagram.	**07**
		OR	
Q.5	**(a)**	Define cavalier and cabinet projection with example.	**03**
	(b)	What is the difference between Object-Space method and ImageSpace Method	**04**
	(c)	Write a short note on Z-Buffer algorithm.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2021

Subject Code:3150712 Date:09/09/2021

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 the function of CRT display with neat and clean diagram.	**04**
	(c)	Explain CMY and YIQ color Model.	**07**
Q.2	**(a)**	Compare Raster Scan system and Random Scan System.	**03**
	(b)	Explain DDA line drawing algorithm.	**04**
	(c)	Write a brief note Emissive displays.	**07**
		OR	
	(c)	Explain the Bresenham's circle drawing algorithm with all necessary derivations. Consider start position as (0, r) and move in clockwise direction.	**07**
Q.3	**(a)**	What is the difference between Window and ViewPort?	**03**
	(b)	Explain boundary fill algorithm for polygon filling.	**04**
	(c)	Explain three methods of character generation.	**07**
		OR	
Q.3	**(a)**	List and Explain various 2D transformation.	**03**
	(b)	Explain reflection and shear with example.	**04**
	(c)	What is aliasing? How to compensate the aliasing? Explain in detail.	**07**
Q.4	**(a)**	Justify that two successive rotation is additive.	**03**
	(b)	What is a need of homogeneous co-ordinates? Give homogeneous co-ordinates for translation, rotation and scaling.	**04**
	(c)	Explain and write Liang Bersky line clipping algorithm.	**07**
		OR	
Q.4	**(a)**	What is the difference between Closegraph( ) and Cleardevice( ) function in C graphics library?	**03**
	(b)	Write a short note on Viewing Pipeline.	**04**
	(c)	Briefly explain NLN line clipping algorithm. What are the advantages of NLN over Cohen Sutherland line clipping algorithm.	**07**
Q.5	**(a)**	What is the difference between Object-Space method and Image-Space Method?	**03**
	(b)	Explain back face detection in details.	**04**
	(c)	List advantages of B-spline over Bazier splines. Explain B-spline curves.	**07**
		OR	
Q.5	**(a)**	List the properties of Bezier curves	**03**
	(b)	Explain any two 3D display methods.	**04**
	(c)	Explain XYZ and CMY color models.	**07**

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(NEW) EXAMINATION – SUMMER 2022

Subject Code:3150712 Date:04/06/2022

Subject Name:Computer Graphics

Time:02:30 PM TO 05:00 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)**	Explain applications of Computer Graphics.	**03**
	(b)	Compare Raster scan system and Random scan system.	**04**
	(c)	Describe DDA line drawing algorithm.	**07**
Q.2	**(a)**	Explain 2D Reflection and Shearing transformation.	**03**
	(b)	Bresenham line Algorithm, Calculate between the starting coordinates (9, 18) and ending coordinates (14, 22).	**04**
	(c)	Find out the new coordinates. For a triangle with corner coordinates (0, 0), (1, 0) and (1, 1). Rotate the triangle by 90 degree anticlockwise direction.	**07**
		OR	
	(c)	Explain midpoint ellipse generation algorithm, Write pseudo code for midpoint ellipse generation algorithm.	**07**
Q.3	**(a)**	Explain 3D rotation.	**03**
	(b)	Describe beam penetration technique for color display.	**04**
	(c)	Explain scan line fill algorithm and with all data structures used in algorithm.	**07**
		OR	
Q.3	**(a)**	Explain window to view port transformation	**03**
	(b)	Describe scaling in 2D transformations.	**04**
	(c)	Explain types of projection.	**07**
Q.4	**(a)**	What are the characteristics of line drawing algorithm?	**03**
	(b)	What are inside – outside tests?	**04**
	(c)	What is aliasing? How to compensate the aliasing? Describe in detail.	**07**
		OR	
Q.4	**(a)**	Explain properties of Bezier curve.	**03**
	(b)	Explain following terms : 1) Aspect ratio 2) Cubic spline 3) Window port	**04**
	(c)	Describe NLN clipping algorithm.	**07**
Q.5	**(a)**	Explain RGB color model.	**03**
	(b)	Explain parallel and perspective transformation.	**04**
	(c)	Explain Depth Buffer method for visible surface detection.	**07**
		OR	
Q.5	**(a)**	Explain CMY color model.	**03**
	(b)	Explain following terms : (1) Dominant Frequency (2) Purity (3) Clipping (4) Frame buffer	**04**
	(c)	Describe Cohen Sutherland Line clipping algorithm with example.	**07**

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