Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– V (New) EXAMINATION – WINTER 2019

Subject Code: 2151603   **Date: 04/12/2019**
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.**

			MARKS
Q.1	**(a)**	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?	**03**
	(b)	Differentiate: Raster scan vs. Random scan display systems	**04**
	(c)	Write short note on Color CRT Monitors	**07**
Q.2	**(a)**	Discuss the incremental approach for line drawing.	**03**
	(b)	Draw a line from point (2, 2) to (10, 7) using DDA line drawing algorithm.	**04**
	(c)	State and derive all necessary formulas for decision parameters for mid-point circle drawing algorithm	**07**

<div align="center">OR</div>

	(c)	Explain inside outside test with suitable diagram.	**07**
Q.3	**(a)**	Derive transformation matrix for scaling with respect to origin	**03**
	(b)	Rotate a point A(3, 2) by 90^0 in anticlockwise direction with respect to some reference point B(1, 2).	**04**
	(c)	Prove following statement: (i). Successive rotations are additive (ii). Successive scaling are multiplicative	**07**

<div align="center">OR</div>

Q.3	**(a)**	Derive formula for window to viewport mapping.	**03**
	(b)	Discuss pointer to vertex list representation of polygon. State its advantages and limitations	**04**
	(c)	Clip the line using Liang Barsky algorithm against window with Bottom-Left and Top-Right corners at (0, 0) and (100, 50) respectively. Line end points are A(10, 10) and B(110, 40).	**07**
Q.4	**(a)**	State necessary conditions with explanation for geometric and parametric continuity.	**03**
	(b)	State the difference between (i). Hermite and Bezier curve and (ii). Bezier and B-spline curve	**04**
	(c)	Discuss the subdivision method to draw a bezier curve. Derive necessary matrices.	**07**

<div align="center">OR</div>

Q.4	**(a)**	Explain the cavalier projection with necessary conditions.	**03**
	(b)	Write a short note on 3D shearing.	**04**

	(c)	Derive 3D rotation matrix for rotation about arbitrary line.	**07**
Q.5	**(a)**	Derive a perspective projection of point P (x, y, z) on a view plane positioned at z = 0 and center of projection is on negative z-axis at distance d.	**03**
	(b)	Differentiate: Parallel projection vs. Perspective projection	**04**
	(c)	Write a short note on Z-Buffer algorithm.	**07**

OR

Q.5	**(a)**	Explain: Diffuse reflection and specular reflection	**03**
	(b)	Explain importance of coherence property in visible surface detection.	**04**
	(c)	Write a short note on following color models: (i). CMY Color Model (ii). YIQ Color Model	**07**

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