Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: 640008 **Date: 03-06-2014**

Subject Name: Computer Graphics (CG)

Time: 10:30 am - 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.**

Q.1 **(a)** Define following. **07**

1. Aspect ratio
2. Convex Polygon.
3. glutInitDisplayMode()
4. Rigid Body Transformation.
5. Aliasing.
6. Refresh buffer
7. Data Visualization.

(b) Explain DDA line drawing technique **03**

(c) Explain Applications of Computer Graphics **04**

Q.2 **(a)** 1. Describe OpenGL with basic syntax and header files and explain OpenGL Line functions. **04**

2. Write a note on Color CRT Monitor. **03**

(b) 1. How much storage is required for the frame buffer with a resolution of 1024 X 1024, a full color (24-bit per pixel) RGB system? How it can be reduced by using color lookup table. **03**

2. Explain LCD Display. **04**

OR

(b) 1. Explain Raster Scan Display. **03**

2. Discuss various methods of identifying interior areas of polygons. **04**

Q.3 **(a)** Explain MidPoint Ellipse generation algorithm. **07**

(b) Write decision parameters of Bresenham's line algorithm. Digitize the line with end points (20,10) and (35,22). **07**

OR

Q.3 **(a)** Explain Scan Line polygon fill algorithm. **07**

(b) Write decision parameters of Midpoint Circle algorithm. Determine positions along the circle octant in the first quadrant from x = 0 to x = y for radius r = 10 and center point is origin. **07**

Q.4 **(a)** What is composite transformation? What is advantage of it? **07**

Discuss

1) General Two Dimension Pivot Point Rotation.
2) General Two Dimensional Fixed Point Scaling.

(b) The vertices of a triangle ABC are A(2,0), B(12,0) and C(2,10) the triangle is scaled by factors Sx=2 and Sy=0.5 then triangle is rotated about by 60 degree and than translated tx = 3 and ty = 2. Calculate the vertices of transformed triangle.(cos(60) = 0.5, sin(60) = 0.86) **07**

OR

Q.4 **(a)** 1. What is Homogeneous coordinates? Explain advantages of it. Give Matrix for all type of transformations 2D. **04**

2. Discuss Two Dimensional viewing transformation pipeline. **03**

	(b)	Write Matrix concatenation property. Check and prove whether the multiplication of transformation matrices for each of the following sequences is commutative or not 1) Two successive translations 2) Two successive scaling 3) Individual translation and then rotation	**07**
Q.5	**(a)**	Explain Cohen-Sutherland Line Clipping Algorithm with example.	**07**
	(b)	Derive parallel projection transformation matrix.	**07**
		OR	
Q.5	**(a)**	Explain Sutherland-Hodgman Polygon Clipping Algorithm with example.	**07**
	(b)	Explain Parallel Projection and perspective Projection in detail.	**07**

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