Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–IV • EXAMINATION – SUMMER • 2015

Subject Code: 640008 **Date: 20-05-2015**

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)** Explain following term **07**

1) Aspect ratio
2) Viewport
3) Refresh rate
4) Horizontal retrace
5) Surface rendering
6) Homogeneous coordinate
7) Depth cueing

(b) Explain operation of refresh Cathode-Ray Tube. Also show basic design of CRT. **07**

Q.2 **(a)** Differentiate between random scan display and raster scan display. Which is better explaining with reason? **07**

(b) Describe Cohen- Sutherland line clipping with example. **07**

OR

(b) Explain Sutherland-Hodgman polygon clipping with example. **07**

Q.3 **(a)** Write a short note on **08**

1) Inside-Outside tests
2) Polygon table

(b) State Midpoint Circle Algorithm and explain in brief. **06**

OR

(a) Write Short note on following **08**

1) General two-dimensional pivot ï point rotation
2) Reflection
3) Three ï dimensional scaling
4) Shear Transformation.

(b) Explain bresenhamôs line generating algorithm. What are its advantages over DDA? Illustrate the bresenhamôs algorithm by digitizing the line segment having end points (30, 20) and (40, 28). **06**

Q.4 **(a)** Explain antialiasing and explain supersampling straight-line segment and subpixel weighting masks in detail. **07**

(b) A triangle with vertices (15,5), (5,5), (5,10) is rotated about (5,5) by 45 degree and then translated by the factor (2,1). Calculate the vertices of the transformed figure and also draw the initial and final position of the triangle. **07**

OR

Q.4 **(a)** Write the Boundary ï fill algorithm and flood fill algorithm. Explain both the approaches 4-connected and 8-connected used for boundary filling method. **07**

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	(b)	A rectangle ABCD having diagonals A(0,0), D(25,25),rotated by 45 degree counter clock wise about the origin and then sheared by 0.5 units in x direction. Derive 3x3 homogeneous coordinate. Obtain new coordinates of rectangle after applying this transformation.	**07**
Q.5	**(a)**	Explain in brief 1) Perspective projection 2) Cavalier projection 3) Virtual reality 4) Visualization	**08**
	(b)	Describe beam-penetration and shadow-mask method.	**06**
		OR	
	(b)	Explain about data gloves and mouse device.	**06**

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