Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 160703 **Date: 27/04/2017**

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.**

Q.1	(a)	What makes Bresenham's algorithm more efficient than the basic DDA? Consider the line coordinates (5,5) and (13,9). Rasterize the line segment using Bresenham's algorithm.	07
	(b)	Describe the working principle of LCD displays. What are their advantages over CRT displays? What are their applications?	07
Q.2	(a)	Write basic principle of the midpoint circle drawing algorithm. Using the midpoint circle algorithm calculate first five pixels in one octant. The radius of the circle is 10	07
	(b)	Briefly explain different methods to generate thick lines	07
		OR	
	(b)	What is aliasing? Why aliasing occur in computer graphics? Briefly explain different anti-aliasing techniques	07
Q.3	(a)	Derive a matrix of rotation in a clockwise direction about origin. Find out the rotation of the triangle ABC where the coordinates of triangle ABC are A(2,3), B(7,5) and C(0.0) about A(2,3). Consider the angle of rotation 90.	07
	(b)	Derive the matrix for reflection of object about axis passing through origin and perpendicular to xy plane. Consider the line AB with coordinates of the line A(2,3) and B(4,5) in the coordinate plane . Reflect line about axis passing through P(4,5) and perpendicular to xy plane.	07
		OR	
Q.3	(a)	Derive the transformation matrix to magnify the triangle A (0, 0), B (1, 2), C (3, 2) to twice its size so that the point C (3, 2) remains fixed. Also find scaled triangle	07
	(b)	Briefly explain x direction and y direction shear transformation. Prove that a shear transformation can be expressed in terms of rotation and scaling operations.	07
Q.4	(a)	Consider a clipping window A (20, 20), B (90, 20), C (90, 70) and D (20, 70). Using the Cohen-Sutherland line clipping algorithm, clip the line with end points X (10, 30) to Y (80, 90).	07
	(b)	Briefly explain RGB, CMY and HSV color models	07
		OR	
Q.4	(a)	Using the Linag Barsky line clipping algorithm, find the clipping coordinates of the segment with end coordinates A(-40,30) and B(50,40) against a window with xmin=-30, ymin=10, xmax=20, ymax=60	07
	(b)	Briefly explain Flood fill algorithm with its limitations	07

Q.5	(a)	Briefly explain following 1. Perspective projection 2. Oblique parallel projection 3. Orthographic parallel projection	07
	(b)	Differentiate between Diffuse and Specular reflections	07

OR

Q.5	(a)	Mention advantages and disadvantages of Z-buffer visible surface algorithm. Briefly explain Z-buffer visible surface determination algorithm	07
	(b)	Define polygon mesh. Briefly explain different methods to represent 3D object using polygon mesh	07

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