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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2151603 **Date: 01/05/2017**

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	List the applications of computer graphics.	
	2	List the input devices used in computer graphics.	
	3	Define persistence.	
	4	List the methods used for color display.	
	5	What does refreshing of the screen mean?	
	6	Define resolution.	
	7	Define Aspect ratio.	
	8	State True or False: Low persistence phosphor requires high refresh rate.	
	9	Which line drawing algorithm is implemented entirely with integer arithmetic?	
	10	Name the different methods used for generating thick primitives.	
	11	List different types of projections.	
	12	Define perspective foreshortening.	
	13	Define vanishing point.	
	14	What is the need of homogeneous coordinates?	
Q.2	**(a)**	Differentiate raster scan display and random scan display.	**03**
	(b)	Explain shadow mask method.	**04**
	(c)	Derive all formulas to scan convert a line using Mid Point line drawing algorithm. Write a function midline(x_1, y_1, x_2, y_2) which draws a dotted line between (x_1, y_1) and (x_2, y_2).	**07**
		OR	
	(c)	List different polygon clipping algorithms and explain any one of them.	**07**
Q.3	**(a)**	Explain DDA line drawing algorithm.	**03**
	(b)	Briefly explain Scan line polygon filling algorithm.	**04**
	(c)	Consider a rectangle with left bottom corner at (0,0) and right top corner at (8,4). Clip the line P_1P_2 with vertices P_1(-1,1) and P_2(9,3) against the given rectangle using Cyrus-Beck line clipping algorithm.	**07**
		OR	
Q.3	**(a)**	Explain boundary fill algorithm with merits and demerits.	**03**
	(b)	Explain ambient, diffuse and specular reflection.	**04**
	(c)	Explain NLN line clipping algorithm with proper example(s).	**07**

Q.4	**(a)**	Derive matrix for 2D rotation.	**03**
	(b)	What is called parallel projection? Briefly explain all types of parallel projection.	**04**
	(c)	Consider a square with left bottom corner at (2,2) and right top corner at (6,6). Do the transformation which makes its size half while its' center remain same. Find the new vertices.	**07**

OR

Q.4	**(a)**	Justify that two successive rotation is additive.	**03**
	(b)	Is simultaneous shearing same as shearing in one direction followed by shearing in another direction? Justify.	**04**
	(c)	Consider a triangle with vertices A(1,1), B(5,2), C(3,4). Find out the transformation matrix which rotates given triangle by angle 45° with reference to vertex C. Also find the new vertices.	**07**
Q.5	**(a)**	List the demerits of Cohen Sutherland line clipping algorithm.	**03**
	(b)	Derive the equations of Geometric continuities for Bezier Curve.	**04**
	(c)	Find the composite transformation matrix for mirror reflection of a 3D object with respect to the plane passing through the origin and having a normal vector whose direction is N = I + J + K	**07**

OR

Q.5	**(a)**	Explain RGB color model.	**03**
	(b)	Explain Hermite curve with necessary equations.	**04**
	(c)	Explain z-buffer visible surface determination algorithm.	**07**