Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013

Subject code: 715002 **Date: 04-06-2013**

Subject Name: CAD/CAM Systems

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 the benefits of computer-aided design as compared to manual design.	**07**
	(b)	Explain the software configuration of a graphics system using a diagram.	**07**
Q.2	**(a)**	Attempt any two: 1. Discuss raster scan and frame buffer. 2. Explain 3D rotation about an arbitrary axis. 3. Homogenous coordinate system and its importance in CAD.	**07**
	(b)	The concatenated transformation of a graphics element consists of the following operations: (i) rotation through 120° about *z*-axis, (ii) translation through 10 and -20 units along *x*- and *y*-directions respectively, (iii) rotation through 30° about *x*-axis. Write the homogenous transformation matrix, if the operations are done in above sequence. Will the sequence of operations affect the end result?	**07**
		OR	
	(b)	Explain Bresenhamôs circle drawing algorithm.	**07**
Q.3	**(a)**	Write the mathematics behind displaying a circle parametrically with radius 2 and center located at (2, 2).	**07**
	(b)	What is the need of graphics standards? Write a short note on IGES.	**07**
		OR	
Q.3	**(a)**	Given P_0 [1 1], P_1 [2 3], P_2 [4 3] and P_3 [3 1] the vertices of a Bezier polygon, determine seven points on the Bezier curve and plot them. Show that for any given value of the parameter, the summation of the basis functions is precisely one.	**07**
	(b)	Explain in detail any two design-related tasks performed by a modern CAD system.	**07**
Q.4	**(a)**	Write a note on constructive solid geometry.	**07**
	(b)	Explain geometry and topology as applied to solid modeling.	**07**
		OR	
Q.4	**(a)**	Compare the merits and demerits of wire-frame modeling, surface modeling and solid modeling with regard to difficulty in usage and area of application.	**07**
	(b)	Explain the following entities used in surface modeling: (i) ruled surface, (ii) tabulated surface, (iii) offset surface, (iv) Bezier surface. Also group them in to analytic surface and synthetic surface.	**07**
Q.5	**(a)**	Explain, in detail, the procedure a part programmer would carry out when he is given a part drawing for NC code generation.	**07**
	(b)	Explain the principle of concurrent engineering.	**07**
		OR	
Q.5	**(a)**	Write about the scope of application of CNC technology in CAD/CAM systems.	**07**
	(b)	What do you mean by optimum design? How does CAD help optimize a design?	**07**

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