Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2710802 **Date:13/05/2015**

Subject Name: Computer Aided Design

Time: 10:30 am to 1:00 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)**	Draw a product life cycle diagram along with its various phases. Differentiate synthesis and analysis in context of product design with explanation of CAD tools used in each phase.	**07**
	(b)	What do you mean by scan conversion? Write down the algorithm to scan covert a circle using Bresenhamôs method. Write parametric equation of a circle at origin.	**07**
Q.2	**(a)**	Write the algorithm for generating a line using DDA algorithm. Calculate the coordinates of intermediate points for a straight line between points (17,25) and (32,31)	**07**
	(b)	Reflect a diamond shaped polygon whose vertices are A (-2, 0), B (0, 4),C (2, 0) and D (0, -4) about i) The horizontal line y = 4 ii) The vertical line x = 4 iii) The line y = x + 4	**07**
		OR	
	(b)	Define ñGeometric Transformationò. Derive the matrix representation of rotation of a point about any other point other than origin and hence obtain the new positions of vertices of triangle A(2,4), B(6,10), C(8,0) after a 30° rotation has been performed about a point (1,1).	**07**
Q.3	**(a)**	A three segment Hermite cubic spline is defined by four control points (P_0, P_1, P_2 and P_3) and tangent vectors at end points (P_0ó and P_3ô). Develop the matrix equation for the two intermediate tangent vectors in terms of control points and two end tangent vectors.	**07**
	(b)	Write general expression of ß-spline curve defined by n+1 control points. State the characteristics of ß-spline curve.	**07**
		OR	
Q.3	**(a)**	Derive the equation of Bezier curve with five control points. Explain various properties of Bezier curve.	**07**
	(b)	What do you mean by ñOrthoò in Orthographics projection? Derive expression of top view of an orthographic projection.	**07**
Q.4	**(a)**	Differentiate between parametric and synthetic curves. Explain various orders of continuity of curves used in engineering applications.	**07**
	(b)	Which are the type of surfaces? How are the explicit and implicit functions of surfaces represented? Give example of each representation.	**07**
		OR	
Q.4	**(a)**	Explain Hermite bi-cubic surface representation using a neat sketch.	**07**
	(b)	Differentiate between Constructive Solid Geometry (CSG) and boundary representation schemes of solid representation. Highlight the role of Boolean operations in CSG.	**07**

Q.5	**(a)**	Explain basics of feature entities, relations, and constraints used in Feature based modelling	**07**
	(b)	Formulate curve length as a geometric property between two end points.	**07**

OR

Q.5	**(a)**	What is role of data exchange formats? Highlight the special features incorporated in STEP. List at least three recently used exchange formats in modern computer software.	**07**
	(b)	What do you mean by mass property of an object? Derive the formulations for First Moments of Inertia.	**07**

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