Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2162006 **Date: 26/10/2016**

Subject Name: Computer Aided Design for Mechatronics

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)**	State the advantages and limitation of computer aided design.	**07**
	(b)	What is computer graphics? State general applications of computer graphics.	**07**
Q.2	**(a)**	Explain Bresenham's algorithm for generation of line and also write down advantage of Bresenham's algorithm.	**07**
	(b)	A line joining points P(20,10) and Q(25,14) is to be drawn using DDA algorithm. Find the coordinates of intermediate pixels starting from point P. also write down the limitation of DDA algorithm.	**07**
		OR	
	(b)	Explain the following two-dimensional geometric transformation: (1) Translation (2) Rotation (3) Scaling (4) Reflection	**07**
Q.3	**(a)**	A rectangle ABCD has vertices A(5,10), B(20,10), C(20,20) and D(5,20). This rectangle is to be reflected about a line P(25,20) and Q(10,30). Determine the vertices of transformed rectangle.	**07**
	(b)	Explain different type of geometric modeling methods. State their advantage and limitations.	**07**
		OR	
Q.3	**(a)**	Find the concatenated matrix for the following sequence of operations: a) Translation through 4 and 3 units along X and Y axis. b) Scaling by 4 in X axis and 3 in Y axis. c) Rotating about Z axis passing through the point (4,3) by 30º in anticlockwise direction.	**07**
	(b)	Explain the following entities used in surface modeling: (a) Plain surface (2) Tabulated surface (3) Ruled surface (4) Coons patch	**07**
Q.4	**(a)**	Explain the approaches of generation of synthetic curves.	**07**
	(b)	State and explain the continuity in synthetic curves.	**07**
		OR	
Q.4	**(a)**	A generalized parametric representation of Hermite Cubic spline is: $P(u) = (2u^3-3u^2+1)P_0 + (-2u^3+3u^2)P_1 + (u^3-2u^2+ u)P_0' + (u^3- u^2)P_1'$ Prove that the blending functions of the Hermite cubic spline curve are symmetric. What is the consequence of this symmetry?	**07**
	(b)	State advantage and limitation of solid modeling and surface modeling.	**07**
Q.5	**(a)**	Explain the lagrange multiplier method with suitable example.	**07**
	(b)	Explain with suitable example, the different type of equations used in optimization.	**07**
		OR	
Q.5	**(a)**	Explain the graphical representation of design constraints.	**07**
	(b)	Explain product data exchange using STEP (PDES).	**07**

****