Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2720910 **Date: 24/05/2016**

Subject Name: Advanced Mechanism Design

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)**	A four bar mechanism is to be designed by using three precision points to generate the function $y = x^{1.5}$ for a range $1 \leq x \leq 4$. Assuming the input and output link angles in the range of $30^0 \leq \theta \leq 120^0$ and $90^0 \leq \Phi \leq 180^0$ respectively. Determine the three precision potions and angles of the input and out links.	**07**
	(b)	Using the results of the Q.1 (a), determine the proportions of 4-bar mechanism by using three precision points. Take length of the fixed link as 25 mm.	**07**
Q.2	**(a)**	Give the classification of the synthesis problems with suitable example.	**07**
	(b)	Do the acceleration analyses of a four bar mechanism using analytical approach with suitable example.	**07**
		OR	
	(b)	Do the acceleration analyses of a slider crank mechanism using analytical approach with suitable example.	**07**
Q.3	**(a)**	Explain the point position reduction method of linkages.	**07**
	(b)	Explain center point and circle point circles.	**07**
		OR	
Q.3	**(a)**	Design a four bar linkages which will move a line on its coupler link such that a point P on that line will be first at P_1 and later at P_2 and will also rotate the line through an angle α_2 between those two precision positions. Find the lengths and angles of four links and coupler link dimensions. Further assume that all angular measurements are known.	**07**
	(b)	Explain the concept of fixed and moving centrodes along with their properties.	**07**
Q.4	**(a)**	Discuss the Hartmann construction.	**07**
	(b)	Derive the Euler-Savary equation.	**07**
		OR	
Q.4	**(a)**	Explain Hain method.	**07**
	(b)	Explain Robert-Calyley diagram.	**07**
Q.5	**(a)**	Discuss the graphical design procedure of a four bar Grashof crank rocker to give 45^0 of rocker rotation with equal time forward and backward from a constant speed motor input.	**07**
	(b)	Discuss the methodology of designing a 4-bar linkage to move output link from position 1 to position 2 by taking suitable positions.	**07**
		OR	
Q.5	**(a)**	Discuss D-H parameters with suitable example.	**07**
	(b)	Explain Euler angle representation in a frame.	**07**

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