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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 142001 **Date: 06/06/2017**

Subject Name: Kinematics And Dynamics Of Machines

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)**	Define Grashof's law. How is it helpful in classifying the four-link mechanisms into different types?	**07**
	(b)	Sketch & explain various inversions of four bar chain mechanism.	**07**
Q.2	**(a)**	Explain different types of gear trains with suitable sketches.	**07**
	(b)	By using Klein's construction method, explain the procedure to determine velocity and acceleration of a slider crank mechanism.	**07**
		OR	
	(b)	Explain different types of followers with suitable sketches.	**07**
Q.3	**(a)**	What is velocity of rubbing? Explain it with suitable sketches for a four bar chain mechanism.	**07**
	(b)	Classify kinematic pairs. Explain each with suitable examples and sketches.	**07**
		OR	
Q.3	**(a)**	Explain different types of vibration with neat diagrams.	**07**
	(b)	Explain vibration isolation with schematic diagram.	**07**
Q.4	**(a)**	Derive the relation, $T_1/T_2 = e^{\mu\theta}$ for a flat belt drive with usual notations.	**07**
	(b)	Explain the effect of gyroscopic couple on Naval ship during steering, pitching and rolling.	**07**
		OR	
Q.4	**(a)**	Compare open belt drive and cross belt drive with neat schematic diagram.	**07**
	(b)	A shaft running at 200 rpm drives another shaft at 400 rpm, and transmits 7.5 KW through an open belt. The belt is 80 mm wide and 10 mm thick. The centre distance is 4m. The smaller pulley is of 500mm diameter, and the co efficient of friction between the belt and pulley is 0.30. Calculate the stress in the belt.	**07**
Q.5	**(a)**	Draw the profile of a cam that gives a lift of 40 mm to a knife edge follower. The axis of the follower passes through the axis of the cam. The least radius of cam is 50 mm. The follower is to be lifted for 90^0 of cam rotation and is to be dropped suddenly for 180^0 of cam rotation with simple harmonic motion. Determine the maximum velocity and acceleration during the lifting. The cam rotates at 60 rpm.	**07**
	(b)	Define the following gear terminologies with suitable sketch. (i) Pitch circle (ii) Module (iii) Addendum (iv) Pressure angle	**07**
		OR	
Q.5	**(a)**	Explain static balancing and dynamic balancing.	**07**
	(b)	A cam drives a flat reciprocating follower in the following manner:	**07**

During first 120^0 rotation of the cam, follower moves outwards through a distance of 20 mm with simple harmonic motion. The follower dwells during next 30^0 of cam rotation. During next 120^0 of cam rotation, the follower moves inwards with constant velocity. The follower dwells for the next 90^0 of cam rotation.
The minimum radius of the cam is 25 mm. Draw the profile of the cam.

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