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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2160109 **Date:11/05/2016**

Subject Name: Theory of Vibration

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 • Natural Frequency • Degrees of Freedom • Free Vibration • Forced Vibration • Resonance • Stiffness • Critical Speed of Shaft	**07**
	(b)	With neat sketch explain the behavior of Over damped system, Under damped system and Critically damped system.	**07**
Q.2	**(a)**	Explain Beats with a neat and labeled sketch along with a detailed description.	**07**
	(b)	Explain and derive Torsional Vibrations for a single degree of freedom.	**07**
		OR	
	(b)	What do you mean by Vibration? Which are the causes of vibration? Discuss methods by which undesirable vibrations can be controlled?	**07**
Q.3	**(a)**	Using Lagrange's method, derive the Equation of motion of the system as shown in Figure 1.	**07**
	(b)	Find the natural frequency of the torsional oscillations for the system shown in Figure 2.	**07**
		OR	
Q.3	**(a)**	Derive the solution of equations of motion of Spring –mass–damper system with harmonic force.	**07**
	(b)	Explain response of a rotating unbalanced system with neat sketch.	**07**
Q.4	**(a)**	Write a short note on Vibration isolation and Transmissibility.	**07**
	(b)	Derive natural frequency of Simple Pendulum.	**07**
		OR	
Q.4	**(a)**	A body of 7 kg is supported on a spring of stiffness 280 N/m and has dashpot connected to it which produces a resistance of 0.002 N at a velocity of 0.1 mm/s. In what ratio will the amplitude of vibration be reduced after 5 cycles?	**07**
	(b)	Explain Logarithmic Decrement.	**07**
Q.5	**(a)**	With neat sketch explain the working of Vibration absorber. What is the difference between absorber and isolator?	**07**
	(b)	For free torsional vibrations of a two rotor system derive equation of Natural Frequency.	**07**
		OR	
Q.5	**(a)**	With neat sketch explain working of Accelerometer.	**07**
	(b)	With neat sketch explain working of Frequency measuring instruments.	**07**

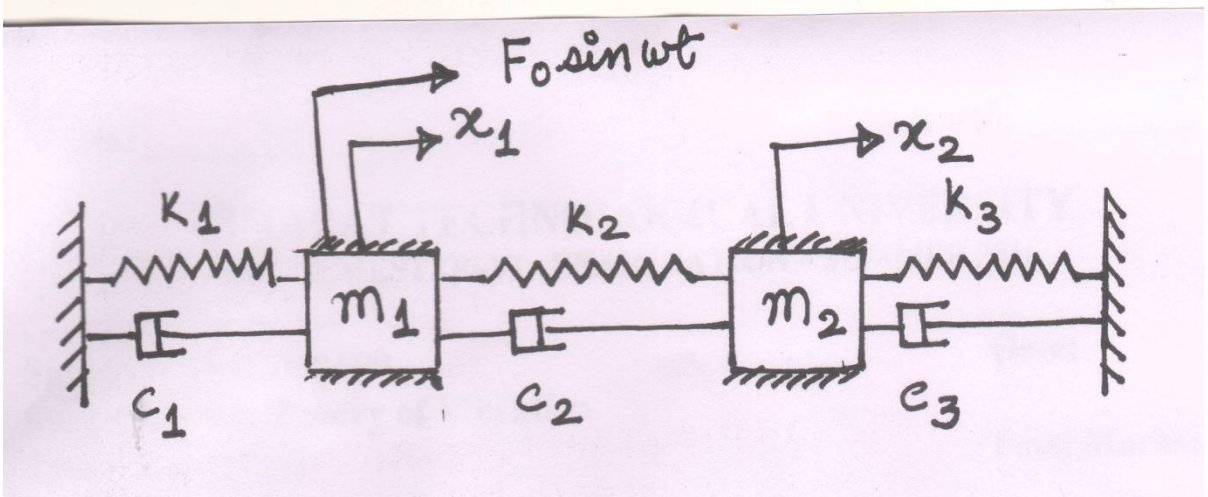

Figure 1

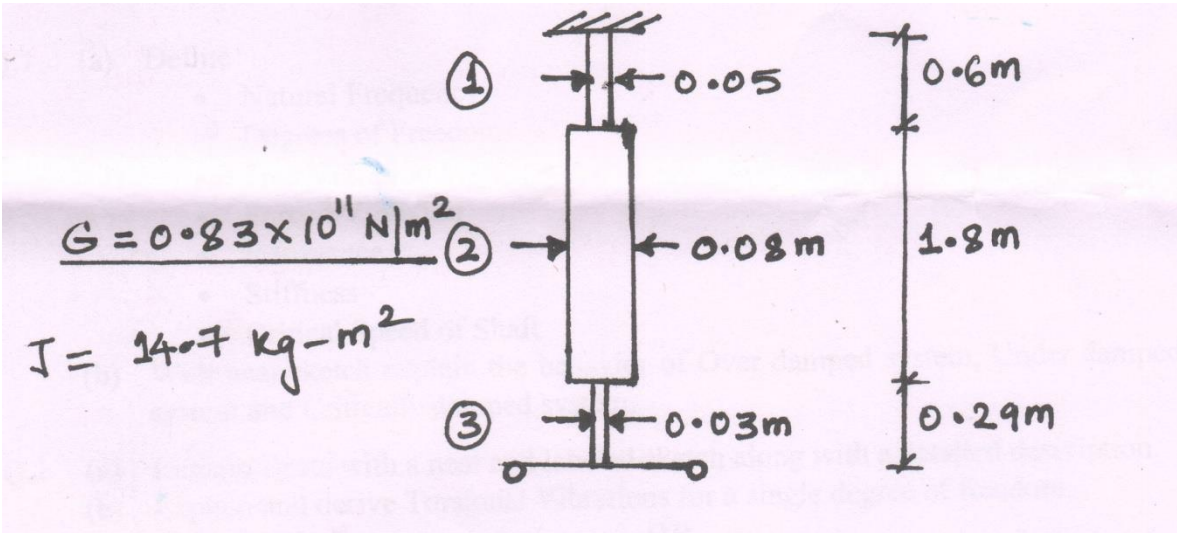

Figure 2