Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160109 Date:15-12-2022

Subject Name:Theory of Vibration

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	How many ways you can control the vibration?	**03**
	(b)	Explain Logarithmic decrement.	**04**
	(c)	Define: Natural Frequency, Damped natural frequency, Time period, Periodic motion, Amplitude, Degree of freedom, Resonance.	**07**
Q.2	**(a)**	Show the response of transient and steady state vibration.	**03**
	(b)	Explain the working of Vibration absorber with neat sketch.	**04**
	(c)	Derive the solution of equation of motion for forced vibration for spring mass damper system under the influence of harmonic force.	**07**
		OR	
	(c)	Define Damping. Explain Viscous damping and Structural damping.	**07**
Q.3	**(a)**	Explain series and parallel connections of Spring.	**03**
	(b)	Define: Overshooting. Why guns are designed based on critical damping?	**04**
	(c)	With neat sketch explain working of Vibration measuring instruments.	**07**
		OR	
Q.3	**(a)**	Explain different types of Damping.	**03**
	(b)	Explain Transmissibility.	**04**
	(c)	With neat sketch explain working of Frequency measuring instruments.	**07**
Q.4	**(a)**	Explain Continuous systems.	**03**
	(b)	Define Free vibration & Forced vibration with examples.	**04**
	(c)	Derive the equation to calculate natural frequency & time period of Simple pendulum.	**07**
		OR	
Q.4	**(a)**	With neat sketch explain the working of Vibration absorber.	**03**
	(b)	What is the difference between vibration isolator and absorber?	**04**
	(c)	Derive an expression for frequency of torsional vibration of two rotor systems.	**07**
Q.5	**(a)**	Explain Critical speed or Whirling speed of shaft.	**03**
	(b)	Derive an expression for natural frequency for undamped single degree of freedom spring mass system.	**04**
	(c)	Classify different types of vibration.	**07**
		OR	
Q.5	**(a)**	What is Resonance? How it can be avoided?	**03**
	(b)	Write a note on Co-ordinate Coupling.	**04**
	(c)	Find the solution of equation of motion with harmonic force.	**07**

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