Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2018

Subject Code:2160109 **Date:27/11/2018**

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.**

			MARKS
Q.1	**(a)**	Define Vibration? What are the main causes of Vibration?	**03**
	(b)	State role of Spring, Mass and Damper in any vibrating system.	**04**
	(c)	Derive the equation to calculate natural frequency of Simple pendulum.	**07**
Q.2	**(a)**	Explain simple harmonic motion with an example.	**03**
	(b)	Using Energy method derive equation to find frequency of spring-mass system.	**04**
	(c)	Define: Natural Frequency, Damped natural frequency, Time period, Periodic motion, Amplitude, Degree of freedom, Resonance.	**07**
		OR	
	(c)	Write a note on Beats phenomenon.	**07**
Q.3	**(a)**	Explain series and parallel connections of Spring.	**03**
	(b)	Write a note on Torsional Vibration of single rotor system.	**04**
	(c)	Define Damping. Explain Viscous damping and Structural damping.	**07**
		OR	
Q.3	**(a)**	A vertical spring mass system has a mass of 1 kg and initial deflection of 0.4 cm. Find the spring stiffness and the natural frequency of the system.	**03**
	(b)	Define Critical damping and damping ratio?	**04**
	(c)	With neat sketch explain behavior of Over damped, Under damped and Critically damped systems.	**07**
Q.4	**(a)**	Write a short note on Vibration Isolation.	**03**
	(b)	Explain Transmissibility.	**04**
	(c)	With neat sketch explain working of Vibration measuring instruments.	**07**
		OR	
Q.4	**(a)**	What is the difference between vibration isolator and absorber?	**03**
	(b)	With neat sketch explain the working of Vibration absorber.	**04**
	(c)	With neat sketch explain working of Frequency measuring instruments.	**07**
Q.5	**(a)**	What is Resonance? How it can be avoided?	**03**
	(b)	Explain Steady state and Transient vibration.	**04**
	(c)	Find the solution of equation of motion with harmonic force.	**07**
		OR	
Q.5	**(a)**	Explain Critical speed or Whirling speed of shaft.	**03**
	(b)	Define Free vibration & Forced vibration with examples.	**04**
	(c)	Derive an expression for frequency of torsional vibration of two rotor systems.	**07**

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