GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2710908 Subject Name: Vibration and Noise Time: 2:30 pm to 5:00 pm Instructions:

Date:06/01/2017

Total Marks: 70

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Derive the frequency equation of longitudinal vibrations for a free-free beam 07 with zero initial displacement.
 - (b) A force F(t) is suddenly applied to a mass *m* which is supported by a spring with a constant stiffness *k*. After a short period of time *T*, the force is suddenly removed. During the time the force is active, it is a constant, *F*. Determine the response of the system if t > T. The spring and the mass are initially at rest before the force F(t) is applied.
- Q.2 (a) Explain semi-definite torsional vibration system and determine the natural 07 frequencies.
 - (b) A spring mass system has a natural frequency f_1 . Calculate the value of k_2 07 another spring which when connected to k_1 in parallel increases the frequency by 30%.

OR

- (b) Explain Lagrange's method for deriving the differential equations for two 07 degree of freedom conservative system
- Q.3 (a) Explain matrix method for finding the natural frequencies with suitable 07 example.
 (b) Prove that the normal modes are orthogonal using orthogonality conditions. 07

OR

Q.3	(a)	Explain Dunkerley's method with suitable example.	07
-	(b)	Discuss torsional vibrations of two rotor system.	07
Q.4	(a)	Explain the working principle of Vibrometer.	07
	(b)	Discuss: force and displacement transmissibility.	07
		OR	
Q.4	(a)	Explain: Random variables and random processes.	07
	(b)	Explain the working principle of seismic instrument	07
Q.5	(a)	Explain the method for measuring the sound intensity.	
	(b)	Discuss active and passive vibration control.	07
	. /	OR	
0.5	(a)	Discuss the design principles for reducing the noise.	07

(b) Explain the dynamic and static coupling with suitable example. 07
