Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 160103 Date: 28-05-2013

Subject Name: Vibration and Noise Control

Time: 10.30 am - 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 the vibrations. What is phenomenon of vibrations? Explain in brief.	**07**
	(B)		What are the methods of reducing effects of undesirable vibrations? Explain any two of them with a neat sketch.	**07**
Q-2	**(A)**		What are the various types of vibrations? Distinguish between longitudinal, transverse and torsional vibration.	**07**
	(B)		Explain the concept of modeling of system with a one suitable example.	**07**
			OR	
	(B)		Draw a neat schematic diagram of Accelerometer and explain in brief working of it.	
Q-3	**(A)**	**(I)**	Find the natural frequency of oscillation of the simple pendulum When a mass is attached at the end of rod. Use equilibrium method considering mass of the rod.	**07**
		(II)	A U tube manometer having column length l, contains liquid and both ends of it open to atmosphere. Find the natural frequency of oscillations of liquid column. Use energy method.	
	(B)		A spring mass damper has mass of four Kg. A stiffness of spring is 300N/m and damping co-efficient of 35 N sec/m. Determine (I) Natural frequency of damped vibrations (II) Natural frequency of the system if viscous damping is removed.	**07**
			OR	
Q-3	**(A)**		Explain in brief two nodes vibration of three rotor system. How it is differentiated from single node vibration?	**07**
	(B)		A Single cylinder engine drives a centrifugal pump with a flywheel connected between them. The rotating mass of engine, flywheel and pump with the shaft is equivalent to a three rotor system with a diameter 60mm. The mass moment of inertia of the rotor A, B and C are 0.135 kg-m^2, 0.3 kg-m^2 and 0.09 kg-m^2 respectively. The modulus rigidity for the shaft material is 84×10^9 N/m^2. Determine (1) The natural frequency of torsional vibration and positions of Nodes of the systems. The distance of the rotor B and C from A are 1.5meter and 2.5 meter respectively.	**07**
Q-4	**(A)**		What is transient vibration and steady state vibration in case of force damped vibration? Explain the salient features of frequency response curves.	**07**

	(B)	In a forced vibratory system a body having 2kg mass vibrates in a viscous fluid. The harmonic exciting force of 20 N acting on the mass results in a resonance amplitude of 15mm with a period of 0.15sec.Determine the damping co-efficient of viscous fluid. If the system is excited by the same harmonic force but at a frequency of 5 cps. What will be the amplitude of forced vibration?	**07**
		OR	
Q-4	**(A)**	Draw a neat diagram of frequency ratio verses transmissibility and explain the three salient regions for the practical application.	**07**
	(B)	A machine of mass 60kg is placed on four springs. The mass of reciprocating parts is 3kg which moves through a stroke of 100mm. The speed of crank is 800rpm. The damping is introduced to reduce the amplitudes of successive vibrations by 20%. Find (I) The stiffness of each spring if damper is removed and the force transmitted to the foundation is $(1/10)^{th}$ of the impressed forced and(II) The forced transmitted to the foundation at 800rpm.	**07**
Q-5	**(A)**	What is continuous system? How problems are solved in the system?	**07**
	(b)	Write a short note on mechanical exciter and velocity pick-up.	**07**
		OR	
Q-5	**(A)**	Prepare a schematic diagram of spring mass dashpot system damped free vibration. Find the general solution of the differential equitation of critically damped system.	**07**
	(B)	What are the advantages and disadvantages of vibrations?	**07**

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