GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VI • EXAMINATION – SUMMER 2013

Subject Code: 160103Date: 28-05-2013Subject Name: Vibration and Noise ControlTime: 10.30 am - 01.00 pmTime: 10.30 am - 01.00 pmTotal Marks: 70Instructions:Total Marks: 70						
Q-1	(A) (B)		Define the vibrations. What is phenomenon of vibrations? Explain in brief. What are the methods of reducing effects of undesirable vibrations? Explain any two of them with a neat sketch.	07 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		
	(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	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		
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		

 Q-4 (A) Draw a neat diagram of frequency ratio verses transmissibility and explain the three salient regions for the practical application. (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. Q-5 (A) What is continuous system? How problems are solved in the system? (b) Write a short note on mechanical exciter and velocity pick-up. 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. (B) What are the advantages and disadvantages of vibrations? 		(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
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