Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2710908 **Date:16/05/2015**

Subject Name: Vibration and Noise

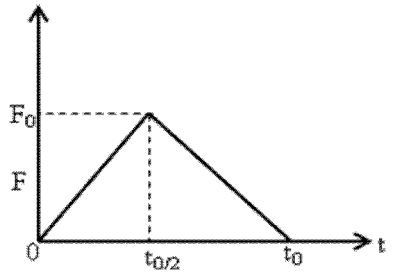
Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

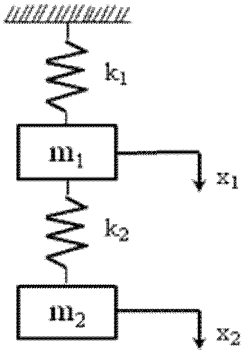
Q.1 **(a)** Explain phase plane method. **07**

(b) Determine the response of an undamped, single degree of freedom spring mass system subjected to triangular impulse as shown in figure. **07**



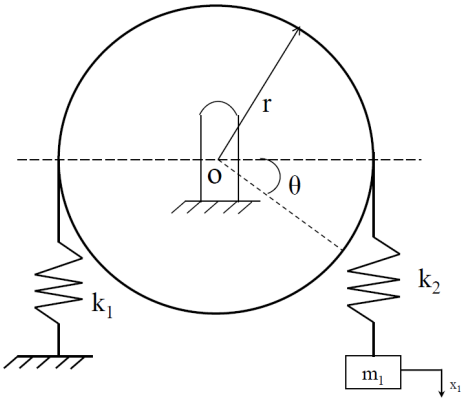
Q.2 **(a)** Explain: Semi-definite system with suitable example. **07**

(b) Figure shows a vibrating system having two degree of freedom. Determine the two natural frequencies of vibrations and the ratio of amplitudes of the motion of m_1 and m_2 for the two modes of vibration. **07**



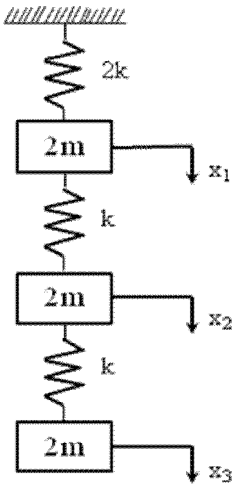
OR

(b) Find the natural frequencies of the system shown in figure. Assume that there is no slip between the cord and cylinder. **07**



Q.3 **(a)** Explain co-ordinate coupling concept with suitable example. **07**

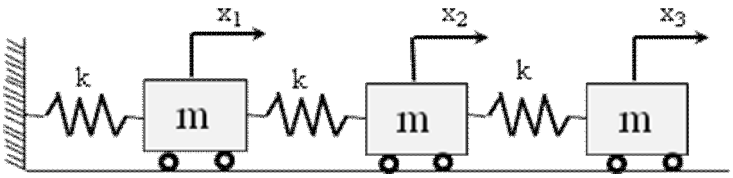
(b) Using matrix method, determine the natural frequencies of the system shown in figure. **07**



OR

Q.3 **(a)** Explain torsional vibration of geared system. **07**

(b) Three rail bogies are connected by two springs of stiffness 40×10^5 N/m each. The mass of each bogey is 20×10^3 kg. Determine the frequencies of vibration. Neglect friction between the wheels and rails. **07**



Q.4 **(a)** Derive the governing differential equation of longitudinal vibration of bars. **07**

(b) A bar of uniform cross-section having length l is fixed at both ends as shown in figure. The bar is subjected to longitudinal vibrations having a constant velocity V_0 at all points. Derive suitable mathematical expression of longitudinal vibration in the bar. **07**

OR

Q.4 **(a)** Derive the governing differential equation of longitudinal vibration of beams. **07**

Q.4 **(b)** Derive the frequency equation of longitudinal vibrations for a free-free beam with zero initial displacement. **07**

Q.5 **(a)** Derive the equation for the force transmissibility for vibration isolation system with rigid foundation. **07**

(b) Explain undamped dynamic vibration absorber. **07**

OR

Q.5 **(a)** Discuss the relation between vibration and noise. **07**

(b) Discuss noise radiation and transmission. **07**

****