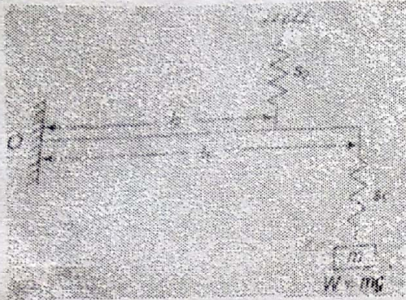


Government College Of Engineering, Amravati
Mechanical Engineering Department.

Class Test –I-MEU502 Dynamics of M/C- Max . Marks-15 -1 Hr duration

All Questions carry equal marks.

1. Determine the natural frequency of a vibrating system shown below in figure



2. A shaft simply supported at both the ends, has a mass of 120kg placed 250mm from one end. Determine the frequency of the natural transverse vibrations if the length of the shaft is 700 mm and its diameter is 40mm, $E=200\text{GN/m}^2$.
3. Each wheel of rear engine loaded car has a moment of inertia of 2.4 kg.m^2 . The gear ratio of engine to the back wheel is 3 to 1. The engine axis is parallel to the rear axle and the crank shaft rotates in the same sense as the road wheels. The mass of vehicle is 2200 kg and the centre of the mass is 500mm above the road level. The track width of the vehicle is 1.5m. Determine the limiting speed of the vehicle around a curve with 80m radius so that all the four wheels maintain the contact with the road surface.
4. The turbine rotor of a ship has a mass of 2.00 tonnes and rotates at 2000 rpm clockwise when viewed from the stern side. The radius of gyration of the rotor is 300 mm . determine the gyroscopic couple and its effect , when it pitches upward with bow rising at annular velocity of 0.8rad/sec; and when it turns right at a radius of 250m with speed of 30 kmph.
5. Show that $fn = 1/2\pi\sqrt{q/I}$, where the terms have usual meanings for the shaft of uniform length l , rigidly fixed at its upper end and carrying disc of moment of inertia I at its lower end and it is set to free torsional vibration