

Code: ME6T6C

III B.Tech - II Semester – Regular Examinations – April 2016

**MECHANICAL VIBRATIONS
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1.

a) Give two examples each of the bad and the good effects of vibration. 6 M

b) What are the three elementary parts of a vibrating system?

4 M

c) Define the number of degrees of freedom of a vibrating system. 4 M

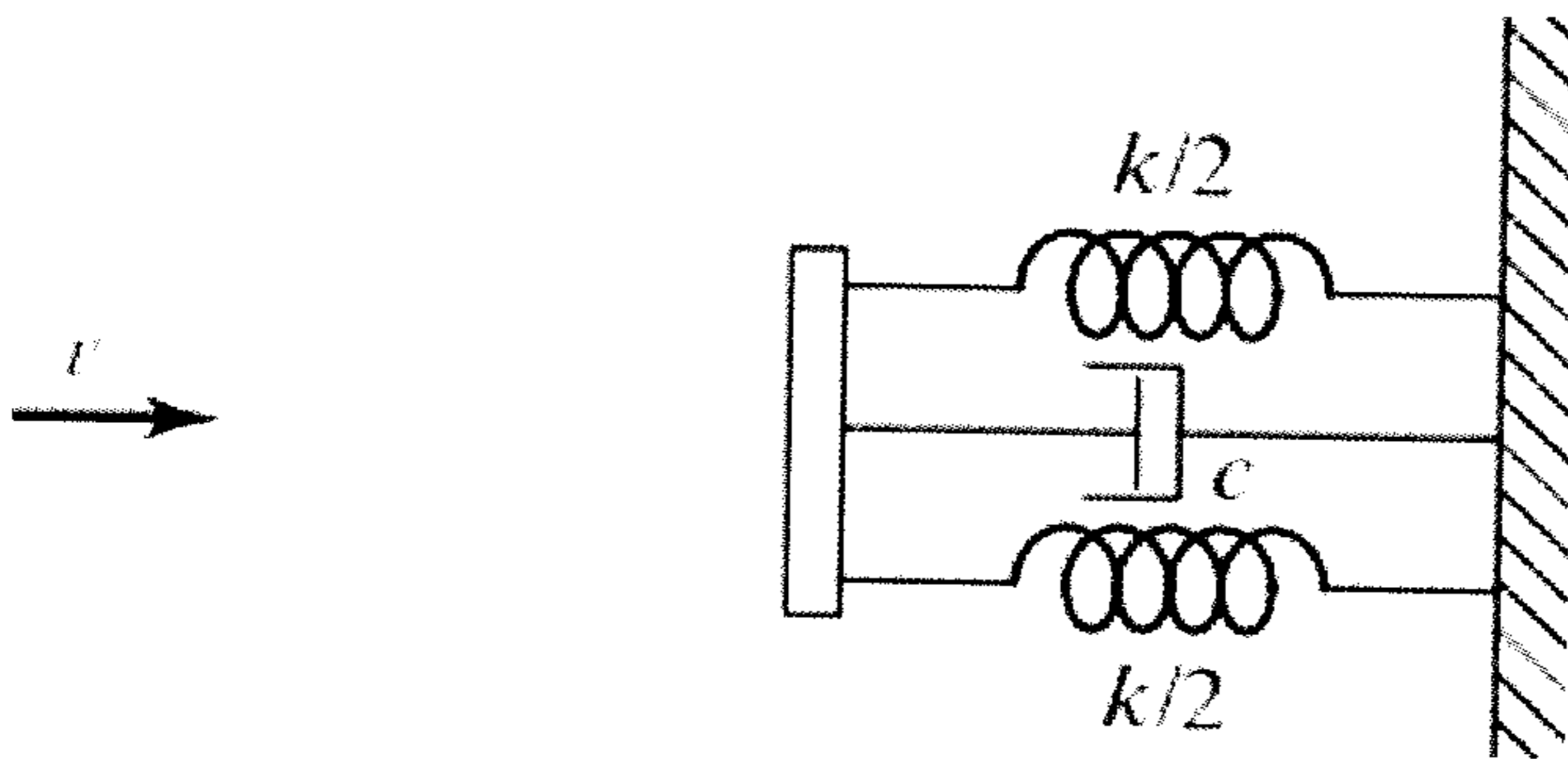
2.

a) An industrial press is mounted on a rubber pad to isolate it from its foundation. If rubber pad is compressed 5 mm by the self-weight of press, find the natural frequency of the system. 8 M

b) What assumptions are made in finding the natural frequency of a single degree of freedom system using the energy method? 6 M

3. A railroad car of mass 2000 kg traveling at a velocity $v = 10$ m/s is stopped at the end of track by a spring damper system as shown in below figure. If the stiffness of the spring is $k = 80$ N/mm and the damping constant is $c = 20$ N-s/mm. 14 M

Determine (a) the maximum displacement of the car after engaging the springs and damper and (b) the time taken to reach the maximum displacement.



4. Explain various Vibration measuring instruments in detail. 14 M
5. What are principle modes of vibration and explain them for a two degrees of freedom system. 14 M
6. Find natural frequencies for torsional vibration of a fixed- fixed shaft with central disc. 14 M

7.

a) Define Rayleigh's dissipation function. 5 M

b) Explain Dunkerley's method with an example. 9 M

8.

a) Describe the transverse vibration of a Beam? 8 M

b) Determine the velocity of wave propagation in a cable of mass $\rho = 5 \text{ kg/m}$ when stretched by a tension $P = 4000\text{N}$.

6 M