

Problem: 1

A 1.75-kg mass moves as a function of time as follows:

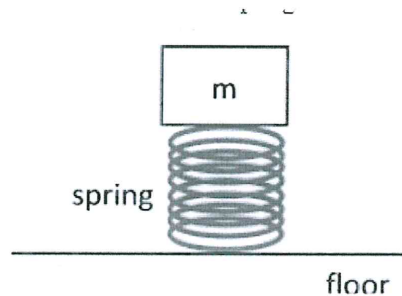
$$x = 4 \cos (1.33t + \pi/5)$$

Where distance is measured in meters and time in seconds,

- (a) What is the amplitude, frequency, angular frequency, and time period of this motion?
- (b) What is the equation of velocity of this mass.?
- (c) What is the equation of the acceleration of this mass?
- (d) What is the spring constant?

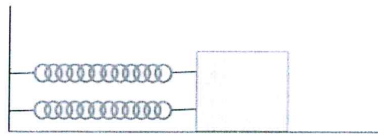
Problem: 2

A stiff spring $k = 400 \text{ N/m}$ has been attached to the floor vertically. A mass of 6.00 kg is placed on top of the spring as shown below and it finds a new equilibrium point. If the block is pressed downward and released it oscillates. If the compression is too big, however, the block will lose contact with the spring at the maximum vertical extension. Draw a free body diagram and find that extension at which the block loses contact with the spring

**Problem: 3**

A block of mass M is on a frictionless surface as shown below. It is attached to a wall by two springs with the same constant K . Initially the block is at rest and the springs unstretched. The block is pulled a distance A and then released.

- (a) What is the speed of the block as it passes through equilibrium?
- (b) What is the angular frequency ω of the motion?

**Problem: 4**