

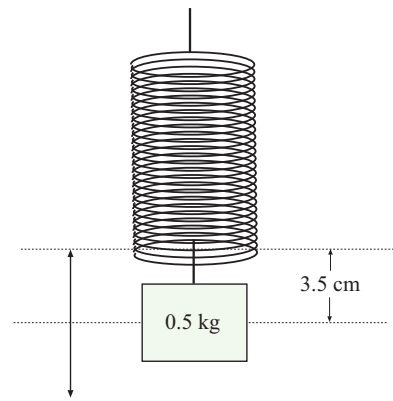
Name_____

Phys 2010 (NSCC), Fall 2005
Problem Set #13

1. The frequency of vibration of an object–spring system is 5.00 Hz when a 4.00-g mass is attached to the spring. What is the force constant of the spring?

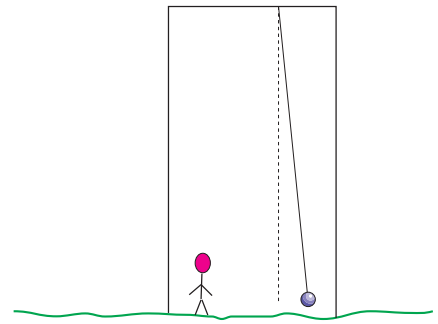
2. A spring stretches 3.9 cm when a 10-g object is hung from it. The object is replaced with a block of mass 25 g that oscillates in simple harmonic motion. (a) What is the force constant of the spring? (b) Calculate the period of motion for the oscillating mass.

3. An object–spring system oscillates with an amplitude of 3.5 cm. If the spring constant is 250 N/m and the object has a mass of 0.50 kg, determine: the mechanical energy of the system.

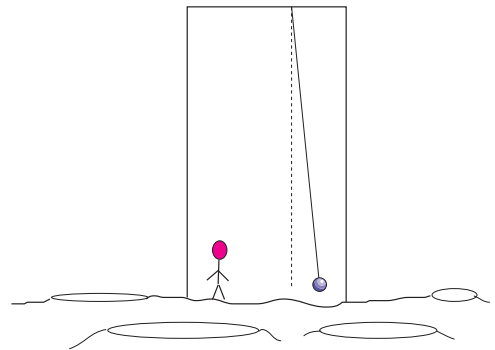


4. For the oscillating mass-spring system in Problem 3, find:
(a) The maximum speed of the object. (b) The maximum acceleration of the object.

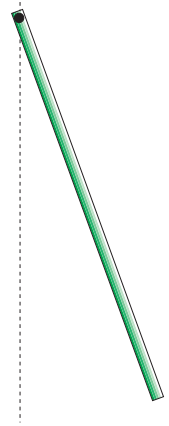
5. A man enters a tall tower, needing to know its height. He notes that a long pendulum extends from the ceiling almost to the floor and that its period is 15.5 s. How tall is the tower?



6. Suppose the pendulum in Problem 4 is taken to the moon where the acceleration of gravity is $1.67 \frac{\text{m}}{\text{s}^2}$. What is the period of the pendulum there?



7. A pendulum (*not* a simple one) is made from a uniform rod pivoted at one end, making small oscillations with the vertical. The rod has length 2.0 m. What is the period of oscillation for this pendulum? (I have not given the mass of the rod, but you don't need it.)



8. A harmonic wave travels along a rope; the distance between successive maxima is 0.65 m and any point on the rope make 6.0 oscillations every second.

What is the speed of this wave?

