

Extra Practice Problems for Chapter 10

1. A spring has a force constant of 54.1 N/m . If an object is hung from it and causes it to stretch down 11.7 cm , what is the mass of the object?
2. A 15.0-g mass is hung on a spring and causes it to stretch down 3.8 cm . What is the spring's force constant?
3. A spring is hung vertically, and then a 199-g mass is hung from it. The spring stretches 1.92 cm as a result. Then, someone pulls the mass down an additional 2.50 cm and releases it. What is the period of its motion?
4. A mass/spring system has a period of 3.12 s . If the mass is 15.0 kg , what is the force constant of the spring?
5. A mass/spring system has a period of 5.0 s . If the spring has a force constant of 89 N/m , what is the mass?
6. A 2.84-kg mass is sliding on a frictionless surface with a speed of 45.1 m/s . It slams into an unstretched spring that has a force constant of 156 N/m . How far will the spring be compressed when the mass stops? Assume no energy is lost to friction.
7. A mass/spring system is set in periodic motion. The mass is 6.12 kg , the spring's force constant is 65.2 N/m , and the amplitude is 14.3 cm . What is the maximum speed of the mass?
8. For the mass/spring system above, how fast will the mass be moving when it is 6.00 cm from its equilibrium position?
9. A 56.4-cm pendulum is displaced by a small angle and released. What is its period?
10. The pendulum given above is put in an environment with artificial gravity. If its period is 0.45 seconds , what is the acceleration due to this artificial gravity?