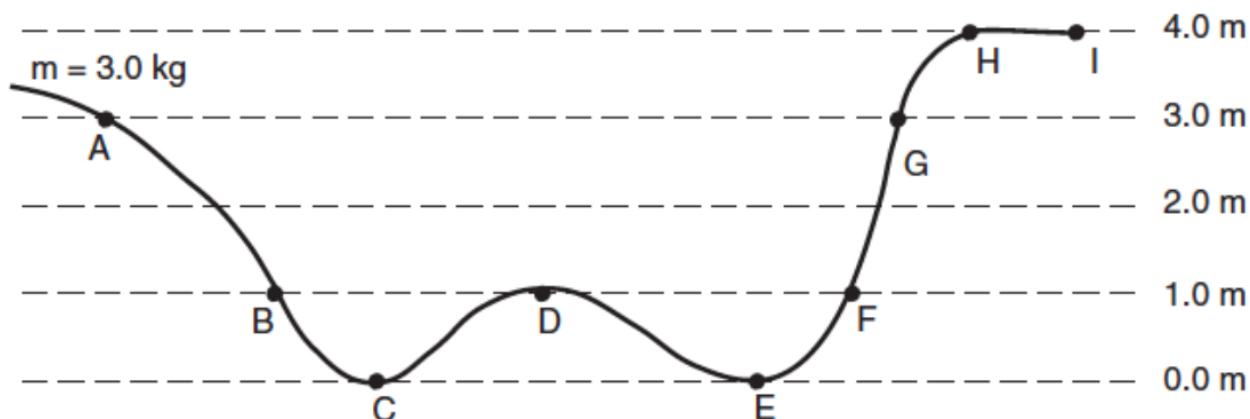
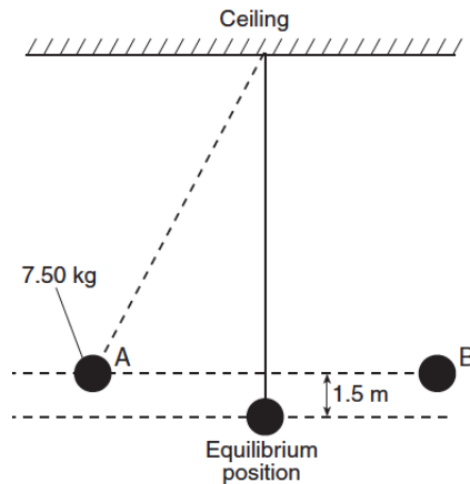


1. A 1.0 kg rock is dropped from a cliff 90. m high. After falling 20. m, what is the kinetic energy of the rock?
2. A 0.50 kg ball is thrown vertically upward with an initial kinetic energy of 25 J. How high will the ball rise?
3. A 1.00 kg ball is dropped from the top of a building. Just before striking the ground, the ball's speed is 12.0 m/s. What was the ball's gravitational potential energy, relative to the ground, at the instant it was dropped?
4. A 3.0 kg object is placed on a frictionless track at point A and released from rest. (Assume the gravitational potential energy of the system to be zero at point C.)



- a) Calculate the gravitational potential energy of the object at point A.
 - b) Calculate the speed of the object at point B.
 - c) Calculate the speed of the object at point C.
 - d) Which letter represents the farthest point on the track that the object will reach?
5. Tarzan has a mass of 85.0 kg and he runs at 6.00 m/s. He grabs onto a vine and swings up until he stops. How high can he swing?
 6. A 500. kg roller coaster is moving at 1.20 m/s at the top of a 30.0 m high hill. Assuming no friction, what will be the speed of the coaster when it zooms down the hill at is at height of
 - a) 25.0 m
 - b) 12.0 m
 - c) 0.00 m
 7. A water fountain shoots water straight up 5.20 m into the air. What is the speed of the water when it leaves the fountain?
 8. A 65 kg pole vaulter wishes to vault to a height of 5.5 m. Calculate the speed the vaulter must attain to have the necessary kinetic energy.

9. A 55 kg diver falls freely from a diving platform that is 3.00 m above the surface of the water in a pool. When she is 1.00 m above the water, what are her gravitational potential energy and kinetic energy with respect to the water's surface?
10. A child, starting from rest at the top of a playground slide, reaches a speed of 7.0 m/s at the bottom of the slide. What is the vertical height of the slide?
11. A pendulum is made from a 7.50-kilogram mass attached to a rope connected to the ceiling of a gymnasium. The mass is pushed to the side until it is at position A, 1.5 m higher than its equilibrium position. After it is released from rest at position A, the pendulum moves freely back and forth between positions A and B, as shown in the diagram below. What is the speed of the mass as it swings freely through its equilibrium position?



12. A skier is coasting up a 4.0 m high hill. If she is moving at a speed of 6.0 m/s when she is 2.0 m up the hill, will she make it to the top of the hill?
13. A book of mass m falls freely from rest to the floor from the top of a desk of height h . What is the speed of the book upon striking the floor?
14. A mass m is thrown horizontally at 5.00 m/s off of a 20.0 m high cliff. Find its speed at impact.
 - a) Solve using projectile analysis
 - b) Solve using energy