

Quiz #6: Work and Energy

Problem 1 (2 points)

Two objects, one of mass m and the other of mass $2m$, are dropped from the top of a building. Assuming air resistance is negligible, right before they hit the ground,

- a) both of them will have the same kinetic energy.
- b) the lighter one will have more kinetic energy than the heavier one
- c) the heavier one will have $\sqrt{2}$ times the kinetic energy of the lighter one.
- d) the heavier one will have twice the kinetic energy of the lighter one.
- e) the heavier one will have four times the kinetic energy of the lighter one.
- f) none of the above

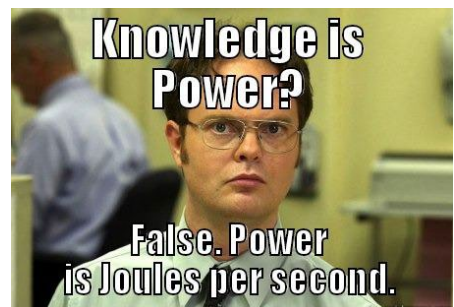
Problem 2 (2 points)

A 5.00-kg block of ice is sliding across a frozen pond at 2.00 m/s. A 7.60-N force is then applied to the block in the same direction as its motion. After the ice block slides 15.0 m, the force is removed. The work done by the applied force is

- a) -114 J
- b) -760 J
- c) +10.0 J
- d) +15.2 J
- e) +114 J
- f) +760 J
- g) none of the above

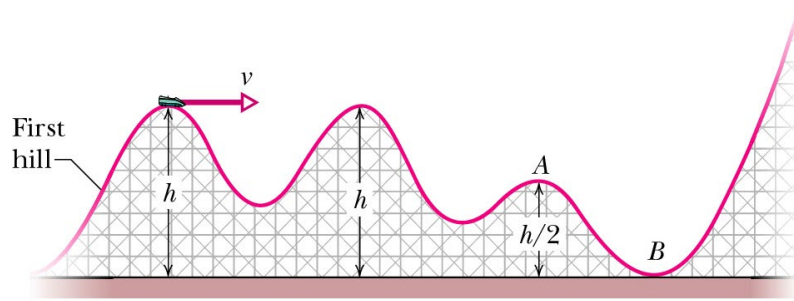
Problem 3 (2 points)

When an object's kinetic energy is increasing, must its potential energy be decreasing? If your answer is yes, briefly explain why. If your answer is no, give an example.



Problem 4 (4 points)

In the figure below, a frictionless roller coaster crosses the first hill of height $h = 62.5$ m with an initial speed of $v_i = 20.0$ m/s.



a) What is the speed of the coaster at point A?

b) How high will the coaster go on the next hill (beyond point B), which for some strange reason was built way too high for the coaster to cross?