Name Answer Key
Honors Physics
Period _____

A

Date _____
Energy WS #4H
Mrs. Nadworny

Energy

Directions: Read online textbook pages 172 – 179. Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

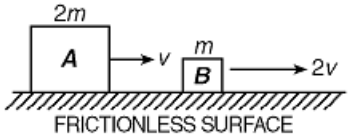
1. As the speed of a bicycle moving along a level horizontal surface changes from 2 meters per second to 4 meters per second, the magnitude of the bicycle's gravitational potential energy

   (A) decreases (B) increases (C) remains the same

2. If the speed of a car is doubled, the kinetic energy of the car is

   (A) quartered (B) quadrupled (C) doubled (D) halved

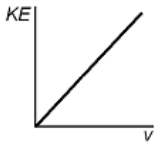
3. The diagram below shows block A, having mass 2m and speed v, and block B, having mass m and speed 2v.

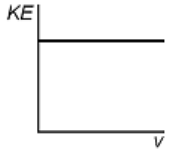


   Compared to the kinetic energy of block A, the kinetic energy of block B is

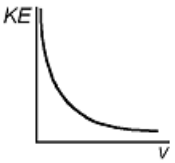
   (A) four times as great (B) the same (C) one-half as great (D) twice as great

4. Which graph best represents the kinetic energy of an object as a function of its speed?

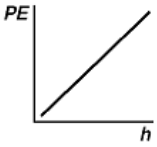
   (A) 

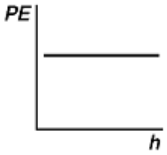
   (C) 

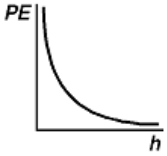
   (B) 

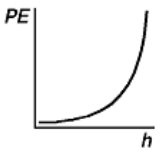
   (D) 

5. Which graph best represents the gravitational potential energy of an object as a function of its height?

   (A) 

   (C) 

   (B) 

   (D) 

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6. A 60.0 kilogram runner has 2170 joules of kinetic energy. Calculate the speed of the runner.

$$v = \sqrt{\frac{2KE}{m}} = \sqrt{\frac{2(2170J)}{60.0kg}} = 8.50\,\frac{m}{s}$$

7. Carole Singers, whose mass is 74.1 kg, is standing on a hill at a point that is 2.50 meters from level ground. If she walks to a point that is 13.6 meters above level ground, what is her change in potential energy?

$$\Delta PE = mg\Delta h = (74.1kg)(9.81\,\frac{m}{s^2})(11.1m) = 8070J$$

8. A 2900 kg car is driving at 20.8 m/s.

   a. What is its kinetic energy?

$$KE = \tfrac{1}{2}mv^2 = \tfrac{1}{2}(2900kg)(20.8\,\tfrac{m}{s})^2 = 6.3\times10^5\,J$$

   b. If the car speeds up to 29.2 m/s, what is its CHANGE in kinetic energy?

$$KE_{new} = \tfrac{1}{2}mv^2 = \tfrac{1}{2}(2900kg)(29.2\,\tfrac{m}{s})^2 = 1.2\times10^6\,J$$

$$\Delta KE = KE_{new} - KE_{old} = 1.2\times10^6\,J - 6.3\times10^5\,J = 6\times10^5\,J$$

9. A person who weighs 645 newtons rides an elevator upward at a constant speed of 3.0 meters per second for 5.0 second. Calculate the change in the person's gravitational potential energy.

$$h = vt = (3.0\,\tfrac{m}{s})(5.0s) = 15m$$
$$PE = mgh = (645N)(15m) = 9700J$$

Answers in size order: 8.50, 8070, 9700, 6 x 10^5, 6.3 x 10^5