Quiz 6  Name: Grace Johnston
Physics 2010
Adam Johnston  Score: ___ / 20
As always, show all your work and circle your final answer (both numerical and multiple choice). All values are good to 3 significant figures.

1. [3 points] Which of the following units measures the same kinds of quantities as a "Joule"? 

<table>
<thead>
<tr>
<th>A. Watt</th>
<th>B. Newton</th>
<th>C. Kilowatt-hour</th>
<th>D. Volt</th>
<th>E. Ampere</th>
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2. [3 points] A bowling ball pendulum swings downward, increasing speed as it approaches the bottom of its path. Its total energy is

| A. Constant       | B. increasing    | C. decreasing    | D. 42            | E. none of these |

3. [3 points] Considering kinetic energy and work, by what factor would your necessary stopping distance change if you increased your car’s velocity by a factor of 2.00?

| A. No change in stopping distance | B. 2.00 times the stopping distance | C. 1.41 times the stopping distance | D. 4.00 times the stopping distance | E. none of these |

4. [3 points] Dr. Inglefield pushes a crate of apples up a frictionless inclined plane at a slope of 30° so that it is now 2.00 m above the ground. Dr. Arnold pushes the same crate of apples up a frictionless inclined plane at a slope of 45° so that it is 2.00 m above the ground, just as Dr. Inglefield’s crate was. Which of the following quantities is the same for each of these two crates?

| A. The work done to each crate. | B. The change in potential energy of each crate. | C. The force exerted on each crate. | D. The distance traveled by each crate. | E. Two answers are correct. |

5. [3 points] An 80.0 kg cross country skier is skiing along a flat surface where all friction and air resistance add to a total of 60.0 N while the skier maintains a constant velocity of 4.00 m/s. What is the power output of the skier?

\[ P = F \cdot v = (60 \text{ N})(4 \text{ m/s}) \]

6. [5 points] A roller coaster starts at the top of a hill at a speed of 5.00 m/s, and then drops 25.0 m in height on an incline of 23.0 degrees. What is the speed of a roller coaster at the bottom of this height?

\[ E_i = E_f \]

\[ mgh + \frac{1}{2}mv_i^2 = \frac{1}{2}mv_f^2 \]

\[ v_f = \pm \sqrt{2gh + v_i^2} = \pm \sqrt{2\left(9.8 \frac{m}{s^2}\right)25 \text{ m} + (5 \text{ m/s})^2} \]

\[ v_f = 22.7 \frac{m}{s} \]