UNIT 5 TEST REVIEW

***Instructions**: Show all of your work completely in your journal, including the equations used in variable form. Pay attention to sig figs and units; use complete sentences if applicable.*

1. In your own words, define the following terms. Include the conceptual definition, equation(s) and unit(s):
    a. Momentum
    b. Impulse
    c. Conservation of Momentum
    d. Kinetic Energy
    e. Potential Energy
    f. Mechanical Energy
    g. Conservation of Energy
    h. Work
    i. Work-Energy Theorem
    j. Power

2. Compare and contrast elastic and inelastic collisions. Make sure that you discuss what quantities are conserved in these types of collisions!

3. What are the relationships between the following quantities (i.e. – inverse, directly proportional, etc.)?
    a. Momentum and Velocity
    b. Impulse and Time
    c. Force and Time
    d. Impulse and Δ Momentum
    e. Kinetic and Potential Energy
    f. Kinetic Energy and Velocity
    g. Potential Energy and Height
    h. Work and Force
    i. Work and Δ Kinetic Energy
    j. Power and Work
    k. Power and Time

4. If you fire a bullet from a pistol and a revolver with a longer barrel, which will have greater velocity when it leaves the barrel? Why?

5. You are having a water balloon fight with your friends. Why are your water balloons more likely to break if you hit a friend who is not prepared versus letting them catch it?

6. Which is more damaging: running into a solid wall or colliding head on (with the same speed from the wall) with an identical car moving at the same speed? Why?

7. Two skiers are moving toward each other and collide. If the come to rest at the point of impact, what do we know about their motion before the collision?

8. When we talk about work, we are looking at a force causing motion. What forces are doing work in the following situations?
    a. A box is pushed 5 meters across the floor
    b. A sky-diver falls 100 meters towards the Earth
    c. An elevator is lifted 20 meters upward

Continued on the back →

9. Why is it important for work to depend on displacement versus distance? What do we know about work as a result?

10. Two boats of unequal mass travel across the bay at the same speed and in the same direction. If the water exerts the same frictional force on the boats, how will their stopping distances compare?

11. Basketball A and B each have a mass of 3.0 kg and are moving at 4.0 $^{m}/_{s}$.
    a. What is Basketball A's momentum? Basketball B?
    b. If A and B are moving in the same direction, what is the momentum of the system? What if they move in opposite directions?

12. A roller coaster cart starts at the bottom of a hill with some speed. At some point while moving up the hill, the cart has a potential energy of 80.0 J and a kinetic energy of 20.0 J.
    a. When the cart is at the top of a hill and at rest, what is its potential energy?
    b. What was the initial speed of the cart at the bottom of the hill if the cart has a mass of 85.0 kg?

13. An ice skater is at rest on the ice when she catches a prop that her partner threw to her. If the skater has a mass of 55 kg, the prop is 7.0 kg, and it was initially moving towards her at 18 $^{m}/_{s}$, how fast will the skater with the prop be moving after she catches the prop?

14. What is the work done by a 35 N force exerted at an angle of 25° to push a box of tools 15 meters?

15. What is the power supplied by a constant 75 N force if the object has an average speed of 12 $^{m}/_{s}$?