Physics Review

1. Which has a greater momentum: a heavy truck at rest or a moving skateboard?
   - The skateboard is moving so it has to have more momentum.
2. Distinguish between a force and an impulse.
   - Impulse is force x time, not simply force
3. What are the two ways in which you can increase impulse?
   -Can increase impulse by increasing force or increasing time of application.
4. Define the difference between elastic collision and inelastic collisions.
   - Elastic Collision "Bouncy Collision"- Theoretical collisions, no heat is given off and no damage done
   - Inelastic Collision "Sticky Collision- happens in daily life. Heat is given off and there is damage.
5. To impart the greatest momentum to an object, should you exert the largest possible force, extend that force for as long as possible or both? Explain your answer.
   - Both. Use both the longest force for the longest time.
6. Why is a force that is exerted over a shorter period of time more effecting in tae kwon do.
   - When the momentum of impact is quick, less time means more force.
7. What is the momentum of an 8-kg bowling ball rolling at 2 m/s?
   - p = mv = (8 kg)(2 m/s) = 16 kg.m/s.
8. What is the momentum of a 50-kg cart that slides at 4 m/s across an icy surface?
   - p = mv = (50 kg)(4 m/s) = 200 kg.m/s.
9. What impulse occurs when an average force of 10 N is exerted on a cart for 2.5 s?
   - I = (10 N)(2.5 s) = 25 N.s.
10. What impulse occurs when the same force of 10 N acts on the cart for twice the time?
    - I = (10 N)(5 s) = 50 N.s.
11. What is the impulse on an 8-kg ball rolling at 2 m/s when it bumps into a pillow and stops?
    - I = Δmv = (8 kg)(2 m/s) = 16 kg.m/s = 16 N.s.
12. How much impulse stops a 50- kg cart that is sliding at 4 m/s when it meets a rough surface?
    - I = Δmv = (50 kg)(4 m/s) = 200 kg.m/s = 200 N.s.
13. Jamie asks how much impulse is needed to stop a 10- kg bowling ball moving at 6 m/s. What is your answer?
    - I=(10 kg)(6 m/s) = 60 kg.m/s= 60 N.s
14. A football player runs at 8 m/s and plows into a 80 kg referee standing on the field causing the referee to fly forward at 5.0 m/s. If this were a perfectly elastic collision, what would the mass of football player be? $m_1v_1+m_2v_2=m_1v_{f_1}+m_2v_{f_2}$ $m_1(8\frac{m}{s})+80kg(0\frac{m}{s})=m_1(0\frac{m}{s})+80kg(5\frac{m}{s})$ $\Rightarrow m_1(8\frac{m}{s})=400\,kg\cdot\frac{m}{s}$ $m_1=50kg$
15. A 2 kg blob of putty moving at 4 m/s slams into a 6 kg blob of putty at rest. What is the speed of the two stuck-together blobs immediately after colliding?

$m_1v_1+m_2v_2=(m_1+m_2)v$

$2kg(4\frac{m}{s})+6kg(0)=(2+6)v$

$8\,kg\cdot\frac{m}{s}=(8kg)v$

$1\frac{m}{s}=v$