

Phys 220

Exam 2

Name: _____

1. If a big truck hits a small car, which exerts the larger force on the other?
 - a. The big truck exerts the larger force on the car
 - b. The small car exerts the larger force on the truck
 - c. Neither, they exert equal force on each other.
2. If a big truck hits a small car, which experiences a larger impulse?
 - a. The big truck
 - b. The small car
 - c. Both experience an equal impulse
3. In perfectly elastic collisions
 - a. only momentum is conserved.
 - b. only kinetic energy is conserved.
 - c. both momentum and kinetic energy are conserved.
4. In perfectly inelastic collisions
 - a. only momentum is conserved.
 - b. only kinetic energy is conserved.
 - c. both momentum and kinetic energy are conserved.
5. A ball is thrown up with an initial velocity of 7.67 m/s. Use the conservation of energy to find the maximum height that it reaches.
6. A rope is used to lower a 2.55 kilogram bucket into a well with an acceleration of 3.92 m/s².
 - a. Draw a free body diagram
 - b. Find the tension in the rope
7. Two vehicles collide head on. Initially the first vehicle is traveling at 10.0 m/s due North and the second vehicle, which is *three times* the mass of the first, is traveling due South at 30.0 m/s. After the collision, the bumpers are locked.
 - a. What is the final velocity of the two vehicles?
 - b. What is the impulse delivered to each vehicle?
8. A 5.0 kg sled slides 3.0 meters down an incline that makes an angle of 25° with the horizontal. The coefficient of friction between the sled and the incline is 0.15.
 - a. Use Newton's Laws to solve for the final velocity of the block.
 - b. Use the concepts of work and energy to solve for the final velocity in the previous question.

$$\vec{p} = m\vec{v}$$

$$W = F \Delta x$$

$$\Sigma \vec{F} = m\vec{a}$$

$$\vec{I} = \vec{F} t = \Delta \vec{p}$$

$$KE = \frac{1}{2} m v^2$$

$$F_g = mg$$

$$PE = mgh$$

$$f = \mu n$$

$$P = W/\Delta t = F v$$

$$g = 9.8 \text{ m/s}^2$$

$$\sin \theta = \text{opp/hyp}$$

$$x = x_o + v_o t + \frac{1}{2} a t^2$$

$$\cos \theta = \text{adj/hyp}$$

$$v = v_o + at$$

$$\tan \theta = \text{opp/adj}$$

$$v^2 = v_o^2 + 2a(x-x_o)$$