Name_____ Date_____ Period_____

Unit 7

Impulse and Momentum Practice Test

Form P

1. An air track glider is moving along at a steady speed of 3.60 m/s when a force of 1.20 N is applied in the direction opposite to the motion of the glider for a time of 2.40 s. The force then steadily decreases at a rate of 0.60 N/s for the next 3.00 seconds.
    a. Find the total impulse

    b. And the final speed of the 250-g glider.

2. A boy jumps straight up with an initial speed of 5.00 m/s. The boy's mass is 60.0 kg and the mass of the earth is about 6.00×10^{24} kg.
    a. What is the initial recoil speed of the earth?

    b. How much time does it take for the two to reach their maximum separation?, i.e., how long until the boy starts down?

    c. How far did the boy move in this time?

    d. How far did the earth move in this time?

3. A 250-g air track glider moving at 0.420 m/s collides head-on with a 750-g glider moving towards it at 0.200 m/s.
    a. What is the final speed if the two collide inelastically and stick together?

    b. What will be the final speeds and directions of the gliders if the collision is perfectly elastic?

4. A steel ball with a mass of 6.00 g is moving along the x-axis with a steady speed of 4.80 m/s when it collides elastically with an identical steel ball which was originally at rest. The first ball is deflected at an angle of 30° to its original direction of travel.
    a. At what angle is the second ball traveling after the collision? How do you know?

    b. What are the speeds of the two balls after the collision?

5. A car (mass = 1500 kg) and a small truck (mass = 2000 kg) collide at an icy intersection. The car was traveling west at 20.0 m/s and the truck was traveling south at 20.0 m/s when the collision took place. What is the speed of the combined wreck, assuming a completely inelastic collision?

6. What is the orbital angular momentum of an electron in orbit around a proton in an atom of hydrogen? Assume the electron is in the lowest Bohr orbit, so r = 53 pm.