# Impulse and Momentum Puzzlers

1. Matt, who has a mass of 110 kg, was driving his truck at 30 m/s when he slams on his brakes to avoid hitting a dog. He strikes the air bag which brings his body to a stop in 0.35 seconds. What average force does the bag exert on him?

What impulse was imparted on Matt?

If Matt did not have an airbag, he would have struck the windshield and came to a stop in 0.001 seconds. What average force would the windshield have exerted on him?

2. A ball of mass 0.300 kg with speed 16.0 m/s collides with a wall and bounces back with a speed of 13.5 m/s. If the motion is in a straight line,
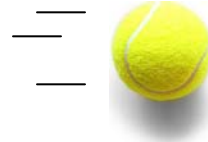
Calculate the initial momentum?

Calculate the final momentum?

Calculate the impulse.

If the wall exerted an average force of 1100 N on the ball, how long did the collision last?

3. A hockey player takes a slapshot and strikes a 0.25 kg puck with an average force of 200 N with a contact time of 0.15 seconds. Determine the impulse imparted on the puck.

4. A 0.18 Kg model rocket's engine is designed to deliver an impulse of 10.0 N*s. If the rocket engine burns for 0.75 s, what is the average force does the engine produce?

5. A bullet traveling at 5.0 × 10² meters per second is brought to rest by an impulse of 50. newton·seconds. What is the mass of the bullet?