Momentum Quiz 2

Score: _____/18

1. A football player of mass 82 kg is running due **north** at 7.5 m/s. He collides with another player of mass 65 kg who is running **south** at 8.1 m/s. After the collision, the players stick together. What is the final velocity of both players immediately after the collision (magnitude and direction)? (3 marks)

Please don't turn in this quiz until you have marked it (the solution key will be sent out on Wednesday)

2. A 52 gram ball is dropped, and hits the ground at 8.2 m/s. After impact, it rebounds upwards at 6.2 m/s. If the impact takes 0.15 s,

a) What is the impulse on the ball (magnitude and direction)? (2 marks)

b) What is the average force of impact (magnitude and direction)? (2 marks)

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3. A 1650 kg car traveling at 11.0 m/s collides with a wall as shown.

The car rebounds off of the wall with a velocity of 1.3 m/s. If the collision lasts for 0.30 s, what is the magnitude of the average force that the wall applies to the car? (2 marks)

4. What will the recoil velocity (**magnitude and direction**) be if a 2.4 kg rifle fires a 0.046 kg bullet with a velocity of 490 m/s due North? (3 marks)

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5. When suited up in his hockey gear, George weighs 85.0 kg. He is skating East with a velocity of 14.0 m/s. He collides with Jim who weighs 65 kg and was skating West with a velocity of 8.0 m/s. After the collision, George slides across the ice with a velocity of 4.0 m/s East. What is Jim's velocity after the collision (magnitude and direction)? (3 marks)

6. An arrow of mass 0.120 kg traveling at 105.0 m/s due west is shot into a target hanging from a rope. The target has a mass of .80 kg and the arrow sticks into the target. Calculate the velocity (**magnitude and direction**) of the target with the arrow immediately after the arrow strikes. (3 marks)