**Collision: Conservation of Momentum Problems 2**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_Period: \_\_\_\_\_\_\_\_\_

 

I. Answer the following. Show all your work to get full credit.

1) A 30.0 kg object moving to the right at a velocity of 1.00 m/s collides with a 20.0 kg object moving to the left with a velocity of 5.00 m/s. If the 20.0 kg object continues to move to the left at a velocity of 1.25 m/s, what is the velocity of the 30.0 kg object? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) A 4.50 x 103 kg railway car is moving east at a velocity of 5.0 m/s on a level frictionless track when it collides with a stationary 6.50 x 103 kg caboose. If the two cars lock together upon impact, how fast are they moving after collision? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) A 925 kg car moving at a velocity of 18.0 m/s right collides with a stationary truck of unknown mass. The two vehicles lock together and move off at a velocity of 6.50 m/s. What is the mass of the truck? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) A 50.0 g bullet strikes a 7.00 kg wooden block. If the bullet becomes imbedded in the block and they both move off at a velocity of 5.00 m/s, what was the initial speed of the bullet? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. A 40.0 g hot dog moving with a velocity of 9.00 m/s to the right collides with a 55.0 g hot dog bun with a velocity of 6.00 m/s to the left. If the two objects stick together upon collision, what is the velocity of the combined masses?

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6. A 76 kg student, standing at rest on a frictionless surface throws a 0.20 kg cream pie horizontally at 22 m/s at Mr. Trask who is standing to the student’s left. What was the velocity of the student after they throw the pie?

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7. A 25 kg turkey is fired from a 1.1 x 103  kg turkeylauncher. If the horizontal velocity of the turkey is 325 m/s east, what is the recoil of the launcher? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. A rail vehicle with a rocket engine is being tested on a smooth track. Starting from rest the engine is fired for a short period of time, releasing 4.5 x 102 kg of gases. It is estimated that the average velocity of the gases is 1.4 x 103 m/s to the right, and that the maximum velocity of the vehicle is 45 m/s left. What is the mass of the vehicle?

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