Review and Reinforcement - Momentum

Key Concepts:

- Momentum depends on the mass of the object and the velocity with which it is traveling.

- The total momentum of any group of objects remains the same unless outside forces act on the objects. This is known as the Law of Conservation of Momentum.

I. True/False. Decide whether each of the following statements is true or false.

T F 1. Momentum is equal to the mass of an object divided by its velocity.

T F 2. The momentum of an individual object can change.

T F 3. Two objects with the same mass will always have the same momentum.

T F 4. All moving objects have momentum.

T F 5. When an object speeds up, it gains momentum.

T F 6. When an object accelerates, it always gains momentum.

T F 7. Momentum cannot be transferred from one object to another.

T F 8. A tiny bullet can have more momentum than a huge truck.

T F 9. Objects with different masses can have the same momentum.

Momentum Problems

Solve the following problems in the space provided. Show all work!! Be sure to include the correct units with each answer. Draw pictures to help if needed!!!

1. A steel ball whose mass if 100 g is rolling at a rate of 2.8 m/sec. What is its momentum?

2. A marble is rolling at a rate of 100 cm/sec with a momentum of 10,000 g-cm/sec. What is its mass?

3. An object whose mass is 3 kg is fired from a cannon, giving it a forward momentum of 1050 kg-m/sec. What is its speed?

4. A firecracker is sitting on the sidewalk. Suddenly, it explodes!!! (Luckily, no one was nearby) Two pieces go flying off in opposite directions. One piece has a mass of 10 grams and is traveling at 100 m/sec. If the mass of the other piece is 4 grams, how fast is it going? (Hint: momentum is conserved, it has to be the same before and after the explosion.)