

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

## Momentum

### PART A – MOMENTUM

- 1) A moving car has momentum. If it moves twice as fast, its momentum is \_\_\_\_\_ as much.
- 2) Two cars, one twice as heavy as the other, move down a hill at the same speed. Compared to the lighter car, the momentum of the heavier car is \_\_\_\_\_ as much.
- 3) A steel ball whose mass is 2.0 kg is rolling at a rate of 2.8 m/s. What is its momentum?

GIVEN	WORK
<b>ANSWER:</b>	

- 4) A marble is rolling at a velocity of 1.5 m/s with a momentum of 0.10 kg·m/s. What is its mass?

GIVEN	WORK
<b>ANSWER:</b>	

- 5) On April 15, 1912, the luxury cruise liner Titanic sank after running into an iceberg. What was the cruise liner's speed when it collided with the ice berg if it had a mass of  $4.23 \times 10^8$  kg ship and a momentum of  $4.9 \times 10^9$  kg·m/s?

GIVEN	WORK
<b>ANSWER:</b>	

**PART B – CONSERVATION OF MOMENTUM**

- 6) Suppose you are traveling in a bus at highway speed on a nice summer day and the momentum of an unlucky bug is suddenly changed as it splatters onto the front window.
- a) Compared to the force that acts on the bug, how much force acts on the bus.  
 (i) more            (ii) the same            (iii) less
  - b) Although the momentum of the bus is very large compared to the momentum of the bug, the **change** in momentum of the bus compared to the **change** in momentum of the bug is  
 (i) more            (ii) the same            (iii) less
  - c) Which experiences the greater acceleration (**HINT:** think of Newton's 2<sup>nd</sup> Law)?  
 (i) bus            (ii) both the same            (iii) bug
  - d) Which, therefore, suffers the greater damage?  
 (i) bus            (ii) both the same            (iii) bug
  - e)
- 7) A 4.5-kg ham is thrown into a stationary 15-kg shopping cart. At what speed will the cart travel if the ham had an initial speed of 2.2 m/s?

BEFORE	AFTER
<b>ANSWER:</b>	

- 8) Make two event chains showing what happens when a rolling ball (Ball 1) hits a resting ball (Ball 2). Use the phrases: *gains momentum, hits Ball 2, is hit by Ball 1, loses momentum, rests, rolls, slows down, starts rolling.*

