Name _____Answer Key_____ Date _____

Honors Physics Momentum WS #5

Period _____ Mrs. Nadworny

A

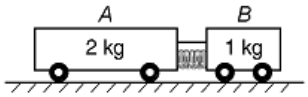
Explosions

Directions: Read online textbook pages 215 - 220. Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

1. A 0.050 kilogram bullet is fired from a 4.0 kilogram rifle that is initially at rest. If the bullet leaves the rifle with momentum having a magnitude of 20. kilogram • meters per second, what will be the magnitude of the momentum of the rifle's recoil?

   (A) 0.25 kg·m/s (B) 1600 kg·m/s (C) 80. kg·m/s (D) 20. kg·m/s

2. The diagram below shows a compressed spring between two carts initially at rest on a horizontal frictionless surface. Cart A has a mass of 2 kilograms and cart B has a mass of 1 kilogram. A string holds the carts together.



   After the string is cut and the two carts move apart, the magnitude of which quantity is the same for *both* carts?

   (A) inertia (B) momentum (C) kinetic energy (D) velocity

3. A bomb explodes into two pieces that travel in a straight line path away from each other. The mass of the first piece is 3.6 kg and is moving at 53 m/s to the right. The mass of the second piece is 1.8 kg. What is the velocity of the second piece?

Before	After
P_{before} =	P_{after}
0 kg • m/s =	$m_1v_1 + m_2v_2$
0 kg • m/s =	(3.6 kg)(+53 m/s) + (1.8 kg)(v_f)
110 m/s left =	v_f

4. A 7.8 kg rifle fires a 4.6 x 10^{-3} kg bullet at a velocity of 325 m/s north. What is the velocity of the rifle after the bullet is fired?

Before	After
P_{before} =	P_{after}
0 kg • m/s =	$m_1v_1 + m_2v_2$
0 kg • m/s =	(4.6E-3 kg)(+325 m/s) + (7.8 kg)(v_f)
0.19 m/s south =	v_f

5. Miners drill a hole into a large rock in order to blow it apart. A 98.7 kg portion of the rock moves to the left with a speed of 26.1 m/s. What is the velocity of the larger portion of the rock (133 kg) after the bomb explodes?

Before	After
P_{before} =	P_{after}
0 kg • m/s =	$m_1v_1 + m_2v_2$
0 kg • m/s =	(98.7 kg)(-26.1 m/s) + (133 kg)(v_f)
19.4 m/s right =	v_f

Answers in size order: 0.19, 19.4, 110