Problem set #1

Momentum and Impulse introduction

1. Velocity is how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object is traveling and in what direction.

2. Velocity is a vector because it has both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. The fundamental SI unit for velocity is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. The measurement of how much matter is in an object is the object’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and

the fundamental SI unit is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. When an object moves with a velocity and it has mass, it has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. An object’s momentum is a product of the object’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. The SI unit for momentum is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. If an object is not moving, its momentum is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ no matter how much mass the object has.

9. To change an object’s momentum, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is applied over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

This is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10. The fundamental SI unit for impulse is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Practice problems:

11. A 2000 kg elephant is moving at 5.0 m/s. What is the elephant’s momentum?

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| Formula: | Plug in numbers: | Answer: |

12. If a 0.1kg mouse is moving at the same speed of the elephant, what is the mouse’s momentum?

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| Formula: | Plug in numbers: | Answer: |

13. What is the mass of a runner that has a momentum of 360 kgm/s and is moving with a velocity of 6m/s?

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| Formula: | Plug in numbers: | Answer: |

14. A baseball bat hits a baseball and applies a 20 N force for 0.50 seconds. What is the impulse on the ball?

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| Formula: | Plug in numbers: | Answer: |

15. When hit with a bat, 17,500 Ns of impulse acts on a baseball. If the impulse acts on the baseball for 0.53 seconds, what is the magnitude of force acting on the baseball?

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| Formula: | Plug in numbers: | Answer: |