**Newton’s 3rd Law** (p. 412 – 417)

**I. Action & Reaction Forces**

**1.** **State Newton’s Third Law Of Motion.**

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**2. What happens whenever one object exerts a force on a second object?**

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**3. The equal and opposite forces described by Newton’s Third Law are called**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forces.**

**4. Circle the letters that identify each sentence that is true about action-reaction forces.**

a. Newton’s Second Law describes action-reaction forces.

b. Forces always exist in pairs.

c. Action-reaction forces never cancel.

d. All action-reaction forces produce motion.

**5. List four examples illustrating Newton’s Third Law Of Motion.**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**II. Momentum**

**1.** **Define the term momentum.**

Momentum –

**2. Circle the letter of each factor that affects the momentum of a moving object.**

a. mass

b. volume

c. shape

d. velocity

**3. Write out the equation to determine momentum.**

Momentum = *p* =

**4. The unit for momentum is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**5. If two identical objects are moving at different velocities, the object that is moving faster**

**will have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ momentum.**

**6. Your in-line skates are sitting in a box on a shelf in the closet. What is their momentum?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**7. An object with a small mass can have a large momentum if the object is traveling at a**

**high speed.**

Circle One : True False

**8. Circle the letter of the object that has the greatest momentum.**

a. a 700-gram bird flying at a velocity of 2.5 m/s

b. a 1,000-kilogram car traveling at 5 m/s

c. a 40-kilogram shopping cart rolling along at 0.5 m/s

d. a 300-kilogram roller coaster car traveling at 25 m/s

**III. Impulse** *(Not in the book.)*

**1. Define the term impulse.**

Impulse –

**2.** **A large change in momentum occurs when there is a large change in impulse.**

Circle One : True False

**3. What are two ways that a large impulse can be generated?**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4. Using the term impulse, explain how a car airbag reduces injuries.**

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**IV. Conservation Of Momentum**

**1.** **Define the Law Of Conservation Of Momentum.**

Law Of Conservation Of Momentum –

**2. The momentum of an object does not change unless it’s mass, velocity, or both change.**

Circle One : True False

**3. Momentum cannot be transferred from one object to another.**

Circle One : True False