**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?**

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 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