1. A 6.0×10^{-3}-kg insect is flying horizontally with a momentum of 4.8×10^{-2}-kg • m/s headwind. What is its resulting velocity relative to the ground?

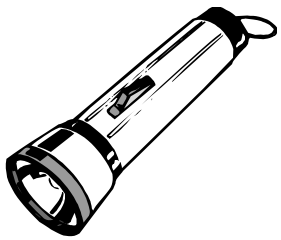
   A 8.0 m/s

   B 6.0 m/s

   C 0.80 m/s

   D 0.60 m/s

2. A 0.40-kg flashlight is constructed to withstand a specific force of impact that protects the bulb. A standard 0.10 second is used as time-of-impact in calculating a flashlight's specifications.



   What is the impact force on the 0.40-kg flashlight if it falls 2.5 meters and hits a concrete floor at 7.0 m/s, stopping in 0.10 seconds?

   A 1.0 N

   B 2.8 N

   C 28 N

   D 98 N

3. What impulse must be applied to a 25.0-kg cart to cause a velocity change of 12.0 m/s?

   A 0.480 N•s

   B 2.10 N•s

   C 13.0 N•s

   D 300. N•s

4. A ball is hit with a bat. A student determines that the momentum of the ball is 1.0 kilogram meter per second. What is the mass of the ball if it has a velocity of 2.0 meters per second?

   A 0 kg

   B 0.50 kg

   C 1.0 kg

   D 2.0 kg

5. A rubber ball bounces off a brick wall. If the ball strikes the wall with an initial horizontal velocity of 1.5 meters per second, what will the ***approximate*** magnitude of the horizontal component velocity of the ball be after the collision?

   A 0 m/s

   B 0.75 m/s

   C 1.5 m/s

   D 3.0 m/s

6. A 60.-kg student on ice skates stands at rest on a frictionless frozen pond holding a 10.-kg brick. He throws the brick east with a speed of 18 m/s. What is the resulting velocity of the student?

A 3.0 m/s west

B 3.0 m/s east

C 18 m/s west

D 18 m/s east

7. A 1,000-kg cannon fires a 10-kg projectile horizontally at a velocity of 300 m/s. What is the recoil velocity of the cannon?

A 0.3 m/s

B 3 m/s

C 30 m/s

D 300 m/s

8. A train car with a mass of 3.00×10^4 kg traveling north at 1.5 m/s collides and couples with a 3.20×10^4-kg train car going south at 0.80 m/s. What is the velocity of the coupled cars after the collision?

A 0.31 m/s north

B 0.31 m/s south

C 0.97 m/s north

D 0.97 m/s south

9. A student on roller skates throws a basketball forward. How does the momentum of the student on skates compare to the momentum of the basketball?

   A The velocity of the student is equal in magnitude but opposite in direction to the velocity of the basketball.

   B The velocity of the student is equal in magnitude and in the same direction as the velocity of the basketball.

   C The product of the mass times the velocity of the student is equal in magnitude and in the same direction as the product of the mass times the velocity of the basketball.

   D The product of the mass times the velocity of the student is equal in magnitude but opposite in direction to the product of the mass times the velocity of the basketball.

10. During batting practice, a 0.30-kg baseball is hit with a bat that exerts a force of 350 N on the ball. The ball left the bat at 80. m/s. If the incoming pitch was traveling at 60. m/s, how long did the ball stay in contact with the bat?

    A 0.12 s

    B 0.50 s

    C 0.85 s

    D 1.4 s

End of Goal 5 Sample Items

EOC Physics Goal 5
Sample Items Key Report

1 **Objective: 5.02**
Compare and contrast impulse and momentum.
Thinking Skill: Applying **Correct Answer:** B

2 **Objective: 5.03**
Analyze the factors required to produce a change in momentum.
Thinking Skill: Applying **Correct Answer:** C

3 **Objective: 5.03**
Analyze the factors required to produce a change in momentum.
Thinking Skill: Applying **Correct Answer:** D

4 **Objective: 5.04**
Analyze one-dimensional interactions between objects and recognize that the total momentum is conserved in both collision and recoil situations.
Thinking Skill: Applying **Correct Answer:** B

5 **Objective: 5.04**
Analyze one-dimensional interactions between objects and recognize that the total momentum is conserved in both collision and recoil situations.
Thinking Skill: Applying **Correct Answer:** C

6 **Objective: 5.04**
Analyze one-dimensional interactions between objects and recognize that the total momentum is conserved in both collision and recoil situations.
Thinking Skill: Applying **Correct Answer:** A

7 **Objective: 5.04**
Analyze one-dimensional interactions between objects and recognize that the total momentum is conserved in both collision and recoil situations.
Thinking Skill: Applying **Correct Answer:** B

8 **Objective: 5.05**
Assess real world applications of the impulse and momentum, including but not limited to, sports and transportation.
Thinking Skill: Applying **Correct Answer:** A

9 **Objective: 5.05**
Assess real world applications of the impulse and momentum, including but not limited to, sports and transportation.
Thinking Skill: Analyzing **Correct Answer:** D

10 **Objective: 5.05**

Assess real world applications of the impulse and momentum, including but not limited to, sports and transportation.

Thinking Skill: Applying **Correct Answer:** A