

WebAssign

CH02-HW01-SP12 (Homework)

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 PHYS 172-SPRING 2012, Spring 2012
 Instructor: Virendra Saxena

Current Score : 18 / 18 **Due :** Thursday, January 19 2012 11:59 PM EST

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

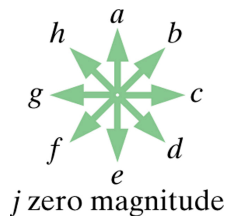
[View Key](#)

1. 1/1 points | [Previous Answers](#)

MI3 2.2.X.028

A ball moves in the direction of the arrow labeled **e** in the figure. The ball is struck by a stick which briefly exerts a force on the ball in the direction of the arrow labeled **g** in the figure. Which arrow best describes the direction of $\Delta \vec{p}$, the change in the ball's momentum?

g ✓



- [Read the eBook](#)
- [Section 2.2](#)

2. 3/3 points | [Previous Answers](#)

MI3 2.3.X.044

You are lifting a heavy box. We'll consider this process for different choices of system and surroundings.

(1) Choose the box as the system of interest. What objects in the surroundings exert significant forces on this system? Check all that apply.

☒ You

☐ The floor

☐ The box

☐ None

☒ The Earth

✓

(2) Choose you and the box as the system of interest. What objects in the surroundings exert

significant forces on this system? Check all that apply.

- ☐ You
- ☐ None
- ☐ The box
- ☒ The floor
- ☒ The Earth



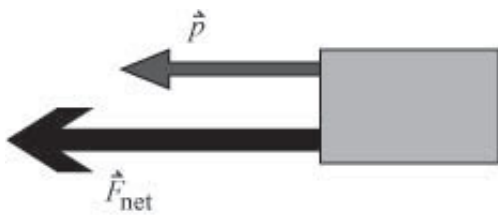
(3) Choose you, the box, and the Earth as the system of interest. What objects in the surroundings exert significant forces on this system? Check all that apply.

- ☐ The floor
- ☐ The Earth
- ☒ None
- ☐ You
- ☐ The box



- *Read the eBook*
- [Section 2.3](#)

3. 1/1 points | [Previous Answers](#)



The diagram shows the momentum of an object and the net force acting on it at some instant in time.

After a short amount of time, which of the following statements is true about the magnitude of the momentum?

- ☐ The magnitude of the momentum will stay the same.
- ☒ The magnitude of the momentum will increase.
- ☐ The magnitude of the momentum will decrease.



After a short amount of time, which of the following statements is true about the direction of the momentum?

- ☐ The momentum will be in the opposite direction.
- ☒ The direction of the momentum will be the same.
- ☐ The momentum will be in a different direction that is not parallel to the original direction.



4. 1/1 points | [Previous Answers](#)



The diagram shows the momentum of an object and the net force acting on it at some instant in time.

After a short amount of time, which of the following statements is true about the magnitude of the momentum? (You may assume that *if* there is any change in momentum in this situation, the time interval is short enough such that the magnitude of that change in momentum is small compared to the original momentum.)

- ☒ The magnitude of the momentum will decrease.
- ☐ The magnitude of the momentum will stay the same.
- ☐ The magnitude of the momentum will increase.

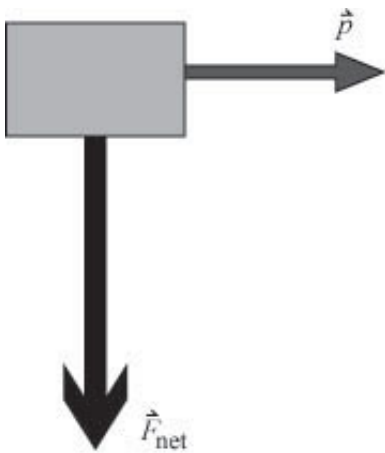


After a short amount of time, which of the following statements is true about the direction of the momentum?

- ☐ The momentum will be in the opposite direction.
- ☒ The direction of the momentum will be the same.
- ☐ The momentum will be in a different direction that is not parallel to the original direction.



5. 1/1 points | [Previous Answers](#)



The diagram shows the momentum of an object and the net force acting on it at some instant in time. (You may assume the force is constant.)

Some measurable amount of time elapses. After this time, which of the following statements is true about the magnitude of the momentum?

- ☐ The magnitude of the momentum will decrease.
- ☐ The magnitude of the momentum will stay the same.
- ☒ The magnitude of the momentum will increase.



After this short amount of time, which of the following statements is true about the direction of the momentum?

- ☒ The momentum will be in a different direction that is not parallel to the original direction.
- ☐ The momentum will be in the opposite direction.
- ☐ The direction of the momentum will be the same.



6. 1/1 points | [Previous Answers](#)

MI3 2.2.X.031

You observe three carts moving to the **left**.

Cart A moves to the **left** at nearly constant speed.

Cart B moves to the **left**, gradually speeding up.

Cart C moves to the **left**, gradually slowing down.

Which cart or carts, if any, experience a net force to the **left**?

- ☐ Cart A
☒ Cart B
☐ Cart C



- [Read the eBook](#)
- [Section 2.2](#)

7. 1/1 points | [Previous Answers](#)

MI3 2.3.X.006

A hockey puck is sliding along the ice with nearly constant momentum $\langle 6, 0, 5 \rangle \text{ kg} \cdot \text{m/s}$ when it is suddenly struck by a hockey stick with a force $\langle 0, 0, 2450 \rangle \text{ N}$ that lasts for only 4 milliseconds (4×10^{-3}) s. What is the new momentum of the puck?

$\vec{p}_f =$ $\text{ kg} \cdot \text{m/s}$

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8. 6/6 points | [Previous Answers](#)

MI3 2.3.X.007

You were driving a car with velocity $\langle 32, 0, 16 \rangle \text{ m/s}$. You quickly turned and braked, and your velocity became $\langle 25, 0, 20 \rangle \text{ m/s}$. The mass of the car was 1100 kg.

(a) What was the (vector) change in momentum $\Delta \vec{p}$ during this maneuver? Pay attention to signs.

$\Delta \vec{p} =$ $\text{ kg} \cdot \text{m/s}$

(b) What was the (vector) impulse applied to the car by the ground?

(vector) impulse: $\text{ N} \cdot \text{s}$

(c) If the maneuver took 4 seconds, what was the the average (vector) force exerted on the car? (The net force is due to the ground and the Earth; the y components of these forces cancel.)

$\vec{F}_{\text{net}} =$ N

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9. 1/1 points | [Previous Answers](#)

MI3 2.2.X.034

At $t = 16.0$ seconds an object with mass 3 kg was observed to have a velocity of $\langle 10, 28, -9 \rangle$ m/s. At $t = 16.3$ seconds its velocity was $\langle 20, 20, 23 \rangle$ m/s. What was the average (vector) net force acting on the object?

$$\vec{F}_{\text{net}} = \checkmark \text{ N}$$

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10.2/2 points | [Previous Answers](#)

MI3 2.2.X.035

A proton has mass 1.7×10^{-27} kg. What is the magnitude of the impulse required to increase its speed from $0.995c$ to $0.998c$?

$$\text{magnitude of impulse} = \boxed{2.9733\text{e-}18} \checkmark \text{ N} \cdot \text{s}$$

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