Ch2 HW1 (1395033)

Current Score: 0/15 **Due:** Fri Sep 3 2010 09:00 AM EDT

Question	1	2	3	4	5	6	7	8	9	Total
Points	0/1	0/1	0/1	0/1	0/1	0/1	0/6	0/1	0/2	0/15

Description

System and surroundings; the Momentum Principle; net force; impulse; computation

Instructions

Readings: Sections 2.1-2.3

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1. 0/1 points MI3 2.2.X.028. [1250533]

A ball moves in the direction of the arrow labeled c 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 e in the figure. Which arrow best describes the direction of $\Delta\vec{p}$, the change in the ball's momentum?

---Select--- e

j zero magnitude

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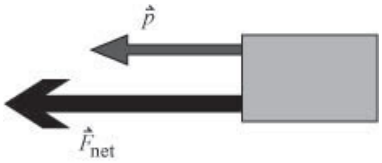
2. 0/1 points p_and_Fnet_parallel [1124113]



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

3. 0/1 points p_and_Fnet_antiparallel [1135962]

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

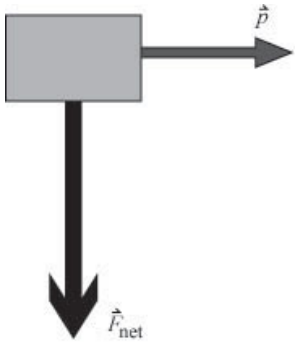
After a short amount of time, which of the following statements is true about the magnitude of the momentum? (You may assume that *if* there is any change in momentum in this situation, the time interval is short enough such that the magnitude of that change in momentum is small compared to the original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

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

4. 0/1 points p_and_Fnet_perpendicular [1135965]



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

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.

5. 0/1 points MI3 2.2.X.031. [1250505]

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 B
- Cart C
- Cart A

6. 0/1 points MI3 2.3.X.006. [1544795]

A hockey puck is sliding along the ice with nearly constant momentum < 5, 0, 4 > kg · m/s when it is suddenly struck by a hockey stick with a force < 0, 0, 1950 > N that lasts for only 6 milliseconds (6×10^{-3}) s. What is the new momentum of the puck?

$\vec{p}_f$ = [ ] $< 5.00, 0, 15.7 >$ kg · m/s

7. 0/6 points MI3 2.3.X.007. [1544823]

You were driving a car with velocity < 26, 0, 21 > m/s. You quickly turned and braked, and your velocity became < 18, 0, 24 > m/s. The mass of the car was 1400 kg.

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

$\Delta\vec{p}$ = [ ] $< -11200, 0, 4.20e+03 >$ kg · m/s

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

(vector) impulse: [ ] $< -11200, 0, 4.20e+03 >$ N · s

(c) If the maneuver took 7 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.)

$\vec{F}_{net}$ = [ ] $< -1.60e+03, 0, 600. >$ N

8. 0/1 points MI3 2.2.X.034. [1544858]

At t = 15.0 seconds an object with mass 5 kg was observed to have a velocity of < 11, 27, −8 > m/s. At t = 15.2 seconds its velocity was < 22, 18, 20 > m/s. What was the average (vector) net force acting on the object?

$\vec{F}_{net}$ = [ ] $< 275, -225, 7.00e+02 >$ N

9. 0/2 points MI3 2.2.X.035. [1250477]

A proton has mass 1.7×10^{-27} kg. What is the magnitude of the impulse required to increase its speed from 0.992*c* to 0.995*c*?

magnitude of impulse = [ ] 1.07e-18 N · s

Assignment Details