

### Momentum

## TRUE OR FALSE QUESTIONS Circle the correct answer.

T E

1. If the net external force acting on a system is zero, then the total momentum of the system is zero.



2. Impulses are smaller when bouncing takes place.



After a firecracker falling through the air explodes, the net momentum of its fragments decreases.



4. The padding on car dashboards lengthens the time of a passenger's impact during a collision.



5. If a net force acts on a system, the system's momentum will change.

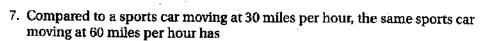
### **MULTIPLE CHOICE QUESTIONS**

Choose the best answer to each question and write the appropriate letter in the space provided.



6. Which has more momentum, a large truck moving at 30 miles per hour or a small truck moving at 30 miles per hour?

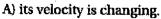
- A) The large truck
- B) The small truck
- C) Both have the same momentum.



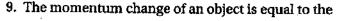
- A) the same momentum.
- B) twice as much momentum.
- C) four times as much momentum.



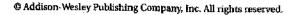
8. If the momentum of an object changes and its mass remains constant



- B) it is accelerating (or decelerating).
- C) there is a force acting on it.
- D) All of the above



- A) force acting on it.
- B) velocity change of the object.
- C) impulse acting on it.
- D) object's mass times the force acting on it.



<u>.</u> B	10. If Superman at rest in free space throws an asteroid that has more mass than Superman, then which moves faster?
	A) The asteroid. B) Superman. C) They both move at the same speed.
	<ol> <li>Skelly the skater traveling at high speed needs a certain amount of force to stop him. More stopping force will be needed if he has</li> </ol>
,	<ul><li>A) more mass.</li><li>B) more momentum.</li><li>C) less stopping distance.</li><li>D) all of these.</li></ul>
<u> </u>	<ol> <li>A Ping-Pong® ball launcher is fired. Compared to the impulse on the ball, the amount of impulse on the launcher is</li> </ol>
0	A) larger. B) smaller. C) the same.
	<ol> <li>The cannonball launched from a cannon with a long barrel will be faster because the cannonball receives a greater</li> </ol>
	<ul><li>A) force.</li><li>B) impulse.</li><li>C) both of these.</li><li>D) neither of these.</li></ul>
·	MATH PROBLEMS Solve the following problems in the space provided. Show all work.
	14. What is the average momentum of a 70-kg runner who covers 400 m in 50 s? V - 2 - 400 m - 505 - 505
	P=M.V=70Kg(8m)=560 kgm
	15. A 30-kg girl and a 25-kg boy face each other on friction-free roller skates. The girl pushes the boy, who moves away at a speed of 1.0 m/s. What is the girl's speed?  F = F (New ton's 3td Law)
	70 kg (X m/s) = 25 kg (1.0 m/s)
·	ESSAY QUESTION X= 0.93 m/g
	On a separate sheet of paper, answer the following question?  16. A failroad diesel engine coasting at 10 km/h and into a stationary flatcar. The diesel wighs 4 times as much as the flatcar. Assuming the cars couple together, how fast are they moving after the consists?

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	10)000	Name	



## **Momentum and Its Conservation**

	standing Concepts Part A				
Write the	letter of the choice that best completes th				
-17	The linear momentum of an object its	t can be calculated by multiplying the mass of the object by			
	a. acceleration	c. impulse			
A	b. velocity	d. time			
4	2. The greatest change in momentum will be produced by a				
	<ul> <li>a. large force acting over a long</li> </ul>	time			
	<b>b.</b> small force acting over a short	rt time			
8	c. large force acting over a shor	t time			
	3. Impulse can be represented by				
	$\mathbf{a}$ . $\Delta v/\Delta t$	G. mv			
A	<b>b.</b> $F\Delta t$	<b>d.</b> $m/v$			
<u> </u>	<ol> <li>When a golf club hits a golf ball, t momentum of the club.</li> </ol>	he change in momentum of the ball is the change in			
	<b>a.</b> equal to <b>b.</b> greater	than c. less than			
<u> </u>	5. A system is closed if				
	a. no net external force acts on	it			
	<b>b.</b> the momentum of each obje	ct in the system remains constant			
	c. the system does not gain or l	ose mass			
$\sim$	d. objects can enter, but not lea	ve, the system			
	6. An internal force the total i	momentum of a closed system.			
00	a. increases b. decreas	es <b>c.</b> does not change			
		les and is holding a heavy medicine ball. If he throws the right, what will be his resulting motion?			
	a. to the right	c. backward			
	<b>b.</b> to the left	d. no motion			
<del></del>		nove on paths that are 120° apart. The total mor entum of			
	the objects after the collision is	the total momentum before the collision			
	equal to h breate	an c less than			

# Chapter Assessment

### **Understanding Concepts Part B**

Answer the following questions, showing your calculations.

1. What is the momentum of a 145-g baseball traveling at +40.0 m/s?

2. What impulse is needed to stop a 45-g mass traveling at a velocity of -42 m/s?

Fat= May =0.045kg (42m/s) (=1.9N.5

3. A force with a magnitude of 540 N is used to stop an object with a mass of 65 kg moving at a velocity of +175 m/s. How long will it take to bring the object to a full stop?

Fat=MAY At = MAY

= M(V2-V1) = 65Kg(04/5-17)

4. In hitting a stationary hockey puck having a mass of 180 g, a hockey player gives the puck an impulse of 6.0 N·s. At what speed will the puck move toward the goal?

Fat=Man AV = Fat

12-0=DN=6.0NS = 6Kg m/s
.18Kg = 6Kg m/s