

(Regents) Booklet # 79

Momentum Quiz (Open book)

Note: No Computer (Solve all problems by hand).

Unit #5: Momentum || March 10

Name:

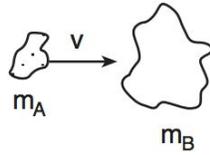
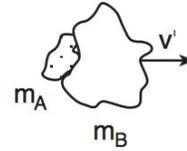
1	A 5 kg object traveling at 5m/s east collides with 2 kg object traveling at 2 m/s east. After the collisions, 2 kg object is moving at 4 m/s. What is the velocity of 5 kg object?

2	A spring exerts a force of 50 N on a cart located on a frictionless plane. The cart has a mass of 2 kg and force acts for .20 second.

3	A 5.00-kilogram block slides along a horizontal, frictionless surface at 10.0 meters per second for 4.00 seconds. The magnitude of the block's momentum is
	<p>(1) 200. kg•m/s (3) 20.0 kg•m/s (2) 50.0 kg•m/s (4) 12.5 kg•m/s</p> <p>Show work:</p>

4

The diagram below represents two masses before and after they collide. Before the collision, mass m_A is moving to the right with speed v , and mass m_B is at rest. Upon collision, the two masses stick together.

Before Collision**After Collision**

Which expression represents the speed, v' , of the masses after the collision? [Assume no outside forces acting on m_A or m_B .]

(1) $\frac{m_A + m_B v}{m_A}$

(3) $\frac{m_B v}{m_A + m_B}$

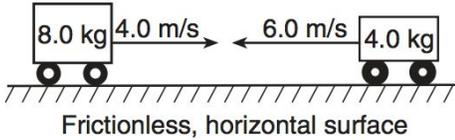
(2) $\frac{m_A + m_B}{m_A v}$

(4) $\frac{m_A v}{m_A + m_B}$

Show work here:

5	A 3.0-kilogram object is acted upon by an impulse having a magnitude of 15 newton•seconds. What is the magnitude of the object's change in momentum due to this impulse?	
	(1) 5.0 kg•m/s (3) 3.0 kg•m/s (2) 15 kg•m/s (4) 45 kg•m/s	Show work

6	A 3.0-kilogram object is acted upon by an impulse having a magnitude of 15 newton•seconds. What is the magnitude of the object's change in momentum due to this impulse?	
	(1) 5.0 kg•m/s (3) 3.0 kg•m/s (2) 15 kg•m/s (4) 45 kg•m/s	Work

7	<p>The diagram below shows an 8.0-kilogram cart moving to the right at 4.0 meters per second about to make a head-on collision with a 4.0-kilogram cart moving to the left at 6.0 meters per second. After the collision, the 4.0-kilogram cart moves to the right at 3.0 meters per second. What is the velocity of the 8.0-kilogram cart after the collision?</p>	
	 <p>Frictionless, horizontal surface</p> <p>(1) 0.50 m/s left (3) 5.5 m/s left (2) 0.50 m/s right (4) 5.5 m/s right</p>	<p>Work</p>

8	<p>3.1-kilogram gun initially at rest is free to move. When a 0.015-kilogram bullet leaves the gun with a speed of 500. meters per second, what is the speed of the gun?</p>	
	<p>(1) 0.0 m/s (3) 7.5 m/s (2) 2.4 m/s (4) 500. m/s</p>	<p>work</p>

9	When a 1.0-kilogram cart moving with a speed of 0.50 meter per second on a horizontal surface collides with a second 1.0-kilogram cart initially at rest, the carts lock together. What is the speed of the combined carts after the collision? [Neglect friction.]	
	<p>(1) 1.0 m/s (3) 0.25 m/s (2) 0.50 m/s (4) 0 m/s</p>	Work

10	A 0.149-kilogram baseball, initially moving at 15 meters per second, is brought to rest in 0.040 second by a baseball glove on a catcher's hand. The magnitude of the average force exerted on the ball by the glove is	
	<p>(1) 2.2 N (3) 17 N (2) 2.9 N (4) 56 N</p>	work

11. Car A (5 kg) moves to right at speed of 6 m/s, while Car B (2 kg) moves to right at speed 4 m/s

Use the formula to solve the problem. Write your answer on the box below.

Before collision				After collision	
M (Car 1) =	V (car 1) =	M (Car 2) =	V (car 2) =	M =	v=
P1 =		P 2 =		P =	
P (total) =				P (total) =	

Show your work:

12 A 2 kg toy car moves to the right at a velocity of 4 m/s, while the 3 kg car moves to the left at a speed of -2 m/s. What is the speed after the collision?

Before collision				After collision	
M (Car 1) =	V (car 1) =	M (Car 2) =	V (car 2) =	M =	v=
P1 =		P 2 =		P =	
P (total) =				P (total) =	

Show your work

13a	A mass of 100 kg man is riding at 20 m/s in his red sports car when he must suddenly slam on the brakes to avoid hitting a boy crossing the road. He strikes the air bag, that brings his body to a stop in 0.600 s. What average force does the seat belt exert on him?
13b	If he been wearing his seatbelt and not had an airbag, then the windshield would have stopped his head in 0.001 s. What average force would the windshield have exerted on him?

	<p>(time permit) Students will watch following video: https://www.youtube.com/watch?v=o5lRyIBgDiM</p> <p>Part # 2: https://www.youtube.com/watch?v=Wp9BqnnigkM</p>
--	--