

Grade 11 advanced
Chapter 7 (Momentum and collisions)
Review

Chose the correct answer for each of the following question:

1- What is the direction of an object **momentum** moves with speed of $\vec{v}=3.0\hat{x}-2.0\hat{y}$?

- A. In the direction of +X axis
- B. In the direction of -y axis
- C. In the direction that makes an angle of 34° above the +X axis
- D. In the direction that makes an angle of 34° under the +X axis

2- Two objects are moving in the same direction, object 1 speed is triple the speed of object 2, and the mass of object 1 is half the mass of object 2, what is the ratio of object 2 momentum to object 1?

- A. 2/3
- B. 3/2
- C. 1/6
- D. 2/6

3- An object with mass of 20. kg has a momentum of 12 kg.m/s, what is the kinetic energy of this object?

- A. 0.3 J
- B. 1.8 J
- C. 3.6 J
- D. 7.2 J

4- A 65.0 kg object move with velocity ($\vec{v}=5.00\hat{x}+4.00\hat{y}$) m/s, what is the magnitude of the object momentum?

- A. 585 kg.m/s
- B. 416 kg.m/s
- C. 321 kg.m/s
- D. 297 kg.m/s

5- The change in momentum of 25 kg object is 112 kg.m/s, if the initial momentum of the object is 75 kg.m/s, what is the final speed of the object?

A. 7.5 m/s

B. 6.3 m/s

C. 4.1 m/s

D. 2.6 m/s

6- Which of the following objects has the largest momentum?

A. An object with mass of 120 kg

B. An object with mass of 0.12 kg

C. An object with mass of 15 kg

D. We can't determine.

7- Two objects have the same momentum, object speed is 5.4 m/s, object 1 mass is triple the mass of object 2, what is the speed of object 2?

A. 14 m/s

B. 15 m/s

C. 16 m/s

D. 17 m/s

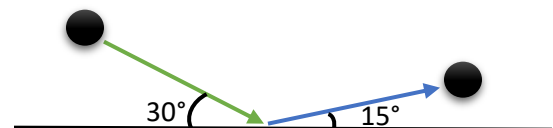
8- An 0.5 kg object is moving with velocity of 12 m/s hits the ground with an angle of 30° and bounce back with velocity of 9.0 m/s making an angle of 15° as shown in the figure, what is the magnitude of y-component of the change in the object's momentum?

A. 4.2 kg.m/s

B. 3.6 kg.m/s

C. 2.5 kg.m/s

D. 1.8 kg.m/s



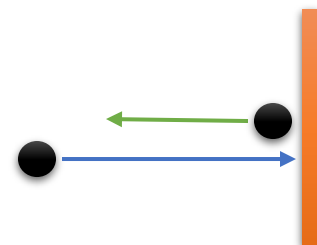
9- A 0.6 kg ball moves to the right with speed of 5.5 m/s hits a vertical wall and bounce back with speed of 3.5 m/s, what impulse is applied by the wall on the ball?

A. 5.4 N.s, to the left.

B. 5.4 N.s, to the right.

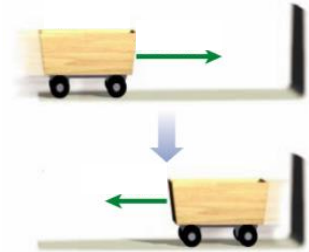
C. 1.2 N.s, to the left.

D. 1.2 N.s, to the right.



10- A 10 kg cart moves to the right with speed of 2.5 m/s collides with a vertical wall and bounce back with speed of 1.0 m/s, if the cart touch the wall for 0.06 s, what is the average force applied on the cart by the wall?

- A. 250 N, to the left.
- B. 340 N, to the right.
- C. 580 N, to the left.
- D. 630 N, to the left.



11- A force of 150 N to the right, is applied for 0.16 s on 12 kg object moving to the right with speed of 14 m/s, what is the new speed of the object?

- A. 19 m/s
- B. 18 m/s
- C. 17m/s
- D. 16 m/s

12- An egg falls down on a thick pillow from a height “h”, What is the reason why the egg remains intact without any fracture during the collision?

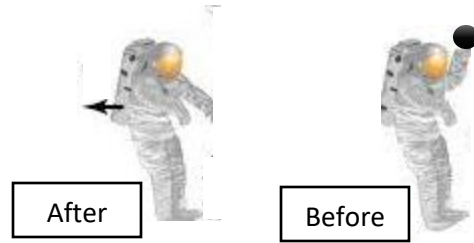
- A. The pillow reduces the impulse on the egg.
- B. The pillow reduces the collision time and thus reduces the acting force.
- C. The pillow increases the collision time and thus reduces the acting force.
- D. The pillow reduces the collision time and thus increases the acting force.

13- A ball of mass 1.2 kg, moving with speed of 12 m/s to the right, collides head on with another ball has a mass of 0.5 kg, moving with speed of 9.0 m/s, after collision, the 1.2 kg moves with speed of 5.0 m/s to the right, what is the velocity of the other ball?

- A. 7.8 m/s, to the right.
- B. 12.6 m/s, to the left.
- C. 16.1 m/s, to the left.
- D. 25.8 m/s, to the right.

14- An astronaut in the International Space Station has 60. kg mass at rest, throws a baseball of mass 0.15 kg at a speed of 25 m/s to the right. At what speed does the astronaut recoil?

- A. 4.2×10^{-2} m/s
- B. 5.1×10^{-2} m/s
- C. 6.3×10^{-2} m/s
- D. 7.8×10^{-2} m/s



15- Two identical objects, object 1 moves to the right with kinetic energy of 120 J, while object 2 is at rest, the two objects collide, stick to each other, and move to the right with speed of 4.4 m/s, what is the mass of the two objects?

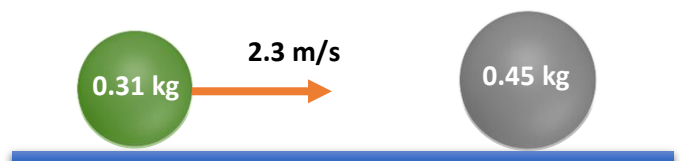
- A. 8.3 kg
- B. 5.6 kg
- C. 4.5 kg
- D. 3.1 kg

16- Two identical objects, object 1 moves to the right with speed of 12 m/s, while object 2 is at rest, the two objects collide, stick to each other, and move to the right, what is the speed of the two objects after collision?

- A. 6.0 m/s
- B. 5.2 m/s
- C. 4.1 m/s
- D. 2.0 m/s

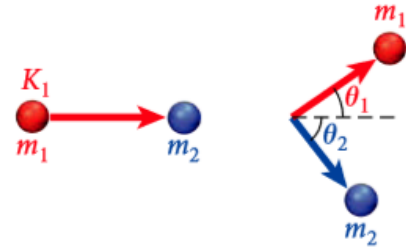
17- Two different balls, ball 1 with 0.31 kg mass is moving in a straight line with constant velocity of 2.3 m/s to the right directly forward ball 2 which is at rest and has 0.45 kg mass, ball 1 collide with ball 2 elastically, what is the speed of ball 2 after this collision.

- A. 3.4 m/s
- B. 2.3 m/s
- C. 1.9 m/s
- D. 1.1 m/s



18- A ball with mass $m = 0.5 \text{ kg}$ and kinetic energy $K_1 = 3.0 \text{ J}$ collides elastically with a second ball of the same mass that is initially at rest. After the collision, the first ball moves away at an angle of $\theta_1 = 30^\circ$ with respect to the horizontal, as shown in the figure. What is the speed of each ball after collision?

- A. $V_{f1}=3.0 \text{ m/s}$, $V_{f2}=1.7 \text{ m/s}$
- B. $V_{f1}=1.7 \text{ m/s}$, $V_{f2}=3.0 \text{ m/s}$
- C. $V_{f1}=2.1 \text{ m/s}$, $V_{f2}=2.8 \text{ m/s}$
- D. $V_{f1}=2.8 \text{ m/s}$, $V_{f2}=2.1 \text{ m/s}$



19- Two balls collide elastically, if ball 1 moves to right with speed of “ v ”, while ball 2 is at rest. After collision ball 1 stop and ball 2 moves to the right with the same speed of ball 1 before collision, what we can say about the mass of the two balls?

- A. $m_1=m_2$
- B. $m_1<m_2$
- C. $m_1>m_2$
- D. we can't determine

20- Two identical balls collide elastically, if ball 1 moves to right with speed of 5.0 m/s , while ball 2 moves to the left with speed of 8.0 m/s . The two balls collide head on, what is the velocity of ball 1 after collision?

- A. 6.2 m/s , to the right
- B. 7.4 m/s , to the left
- C. 8.0 m/s , to the left
- D. 9.3 m/s , to the right

Best regards ...