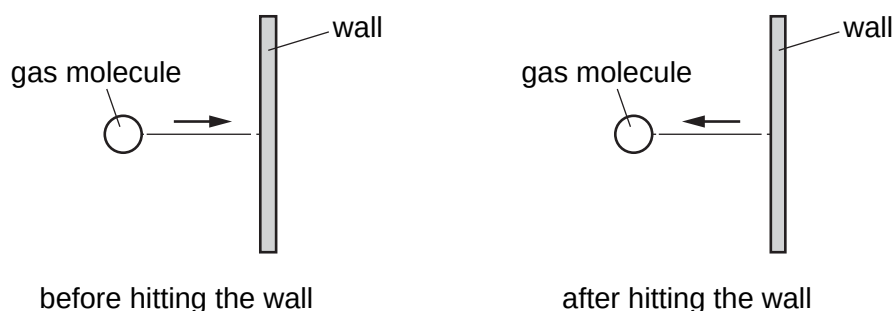


Question 1

A gas molecule strikes the wall of a container. The molecule rebounds with the same speed.



What happens to the kinetic energy and what happens to the momentum of the molecule?

	kinetic energy	momentum
A	changes	changes
B	changes	stays the same
C	stays the same	changes
D	stays the same	stays the same

Question 2

At time = 0, a cannonball is stationary inside a cannon. The cannonball is then fired from the cannon.

At time = t , the cannonball moves forwards and the cannon moves backwards.

What happens to the total kinetic energy and the total momentum of the cannon and the cannonball between time = 0 and time = t ?

	total kinetic energy of cannon and cannonball	total momentum of cannon and cannonball
A	changes	changes
B	changes	remains the same
C	remains the same	changes
D	remains the same	remains the same

Question 3

An object is moving at $+3.0\text{ m/s}$.

A force acts on the object.

After a time, the object is moving at -4.0 m/s .

The mass of the object is 5.0 kg .

What is the change in momentum of the body?

- A** -35 kg m/s **B** -5.0 kg m/s **C** $+5.0\text{ kg m/s}$ **D** $+35\text{ kg m/s}$

Question 4

A ball falls vertically to the floor and rebounds vertically upwards.

Just before it hits the floor, its speed is 4.0 m/s .

As it rebounds, its speed is 3.0 m/s .

The mass of the ball is 0.50 kg .

What is the change in momentum of the ball?

- A** 0.50 kg m/s downwards
B 0.50 kg m/s upwards
C 3.5 kg m/s downwards
D 3.5 kg m/s upwards

Question 5

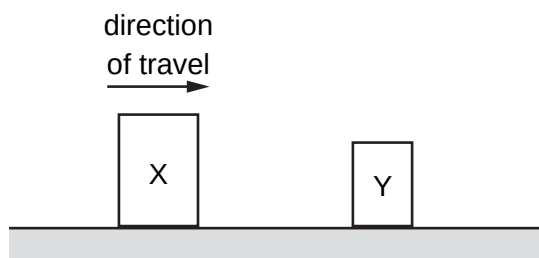
When a molecule rebounds from a wall, a force is exerted on the wall.

What causes this force?

- A** the kinetic energy gained by the molecule
B the kinetic energy lost by the molecule
C the change of momentum of the molecule
D the change of speed of the molecule

Question 6

Object X moves to the right along a frictionless surface towards a stationary object Y, as shown.



They make a noise as they collide and then both objects move to the right.

Which equation is correct?

- A** change in momentum of X = change in momentum of Y
- B** impulse of force acting on X = impulse of force acting on Y
- C** kinetic energy of X before collision = (kinetic energy of X + kinetic energy of Y) after collision
- D** momentum of X before collision = (momentum of X + momentum of Y) after collision

Question 7

Three situations are listed.

- 1 An object has a resultant force acting on it.
- 2 A moving object experiences an impulse.
- 3 An object is decelerating.

In which situations is the momentum of the object changing?

- A** 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

Question 8

A ball of mass m falls vertically and hits a hard surface.

Its speed on hitting the surface is v_1 .

It rebounds vertically upwards with speed v_2 .

What is the change in momentum of the ball?

- A** mv_1 **B** mv_2 **C** $m(v_1 + v_2)$ **D** $m(v_2 - v_1)$

Question 9

Which statement is **not** correct?

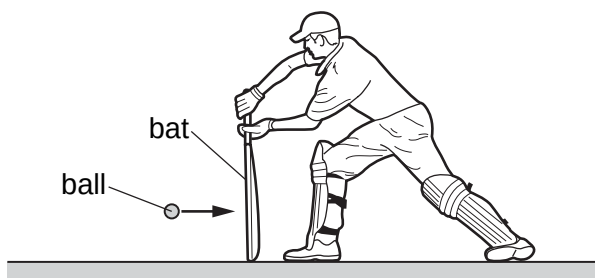
- A** the momentum of a system is conserved in all interactions
- B** impulse = change of momentum
- C** force acting = change of momentum $\times$ time
- D** momentum = mass $\times$ velocity

Question 10

A cricket ball of mass 0.15 kg is moving at a speed of 30 m / s.

The diagram shows a batsman holding a bat stationary as the ball hits the bat and bounces back at the same speed in the opposite direction.

The ball is in contact with the bat for 1.0×10^{-3} s.



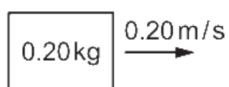
The table shows the change in momentum of the ball and the magnitude of the force applied to the ball.

Which row is correct?

	change of momentum kg m/s	force applied to ball / N
A	4.5	4500
B	4.5	9000
C	9.0	4500
D	9.0	9000

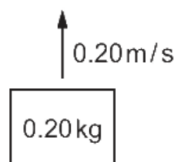
Question 11

An object with a mass of 0.20 kg moves at 0.20 m/s, as shown.



Which other object has a momentum that is identical to the momentum of this object?

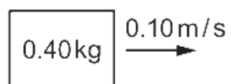
A



B



C



D

