

Which of these is the correct definition for momentum and its unit?

| | definition | unit |
|----------|------------------|-------|
| A | $p = m \div v$ | N/m |
| B | $v = p \times m$ | kgm/s |
| C | $v = p \div m$ | kgm/s |
| D | $p = m \times v$ | N/kg |

Complete the following sentence:

Impulse is equal to...

- A** Momentum
- B** Velocity multiplied by time
- C** A corresponding change in momentum
- D** Force multiplied by the distance it acts

A rollercoaster speeds along a track with considerable momentum.

If a different rollercoaster travels at four times the speed but has half as much mass, its momentum is would be:

- A** Zero
- B** Twice as much
- C** Four times as much
- D** Unchanged

Padded dashboards in cars are safer in an accident than non-padded ones because a passenger hitting the dashboard would experience

- A Lengthened time of contact
- B Shorter time of contact
- C Decreased impulse
- D Increased momentum

After a car crash the car driver's airbag inflates. The airbag then deflates when it is hit by the driver's head.

How does an airbag reduce the risk of injury?

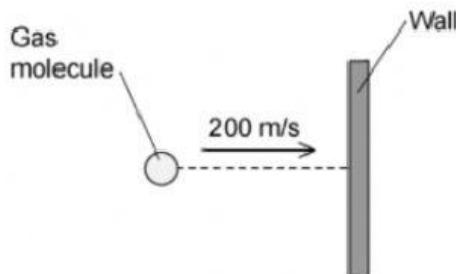
- A Collision time increases, which increases the rate of change of momentum.
- B Collision time increases, which reduces the rate of change of momentum.
- C Collision time decreases, which increases the rate of change of momentum.
- D Collision time decreases, which reduces the rate of change of momentum.

An object of mass 150 kg accelerates from a velocity of 5 m/s to a velocity of 10 m/s in the same direction.

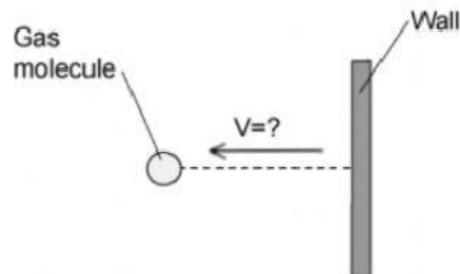
What is the impulse provided to cause this acceleration?

- A 750 Ns
- B 1500 Ns
- C 2250 Ns
- D 7500 Ns

A gas molecule strikes the wall of a container with a speed of 200m/s. It rebounds with the same kinetic energy as it had before striking the wall.



Before hitting the wall

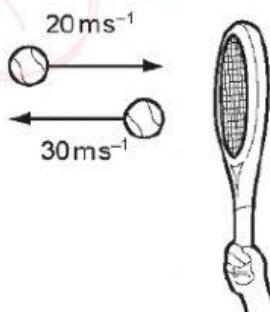


After hitting the wall

What is its final velocity?

- A 100 m/s
- B - 100 m/s
- C 200 m/s
- D - 200 m/s

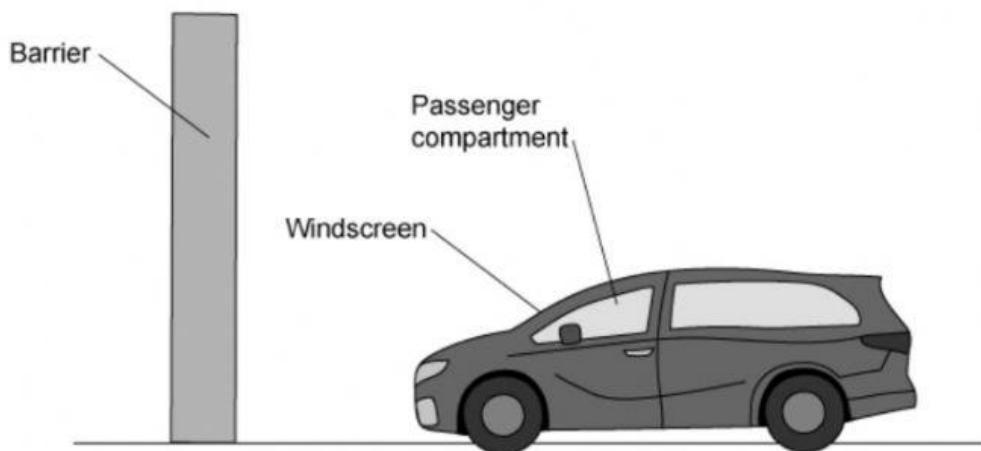
A tennis ball of mass 100 g is struck by a tennis racket. The velocity of the ball is changed as shown.



What is the magnitude of the change in momentum of the ball?

- A 1 kg m s^{-1}
- B 5 kg m s^{-1}
- C 1000 kg m s^{-1}
- D 5000 kg m s^{-1}

A passenger of mass 90 kg is involved in a minor car crash.



The car approaches a solid barrier at 32 m/s. It crashes into the barrier and stops in 0.2s.

Determine the impulse that must be applied to the car to bring it to rest.

- A 2.8 Ns
- B 14 Ns
- C 580 Ns
- D 2900 Ns

During a paintball fight, a paint pellet of mass 150g hits a stationary target with a speed of 220m/s. It takes 0.025s from the moment the pellet comes into contact with the wall until it flattens onto the wall.

What is the force exerted as a result of the paintball "splat"?

- A 1.3×10^3 N
- B 33 N
- C 1.3×10^6 N
- D 33×10^3 N