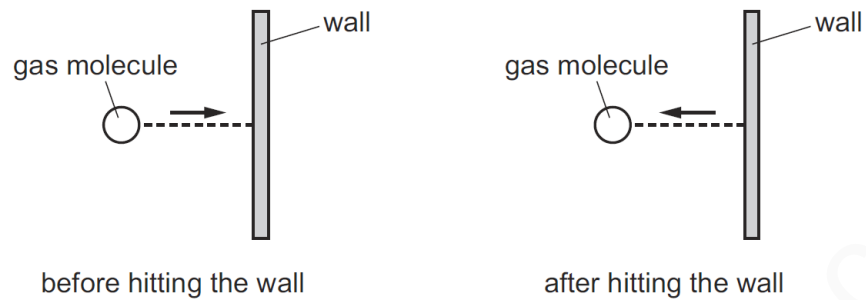


MOMENTUM-SET-1

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 |

2

Gas molecules striking a container wall cause a pressure to be exerted on the wall.

Which statement explains this?

- A** When a molecule rebounds there must be a change in its energy.
- B** When a molecule rebounds there must be a change in its momentum.
- C** When a molecule rebounds there must be a change in its speed.
- D** When a molecule rebounds there must be a change in its temperature.

3

A ball of mass 2.0 kg is travelling at a speed of 12 m/s. It moves towards an object of mass 3.0 kg which is at rest.



The ball hits the object and sticks to it.

Which row gives the total momentum, and the speed of both objects immediately after the collision?

| | <u>total momentum</u> kg m/s | <u>speed</u> m/s |
|----------|---------------------------------|---------------------|
| A | 0 | 4.8 |
| B | 0 | 8.0 |
| C | 24 | 4.8 |
| D | 24 | 8.0 |

4

Which expression gives the momentum of an object?

- A** mass \times acceleration
- B** mass \times gravitational field strength
- C** mass \times velocity
- D** $\frac{1}{2} \times$ mass \times (velocity)²

5

An object of mass 4.0 kg is moving with a velocity of 3.0 m/s in a straight line.

What is the momentum of the object?

- A** 0.75 kg m/s **B** 1.3 kg m/s **C** 12 kg m/s **D** 24 kg m/s

6

How is momentum p calculated in terms of the mass m of a body and its velocity v , and what type of quantity is p ?

| | equation | type of quantity |
|----------|-------------------|------------------|
| A | $p = m \times v$ | scalar |
| B | $p = m \times v$ | vector |
| C | $p = \frac{m}{v}$ | scalar |
| D | $p = \frac{m}{v}$ | vector |

7

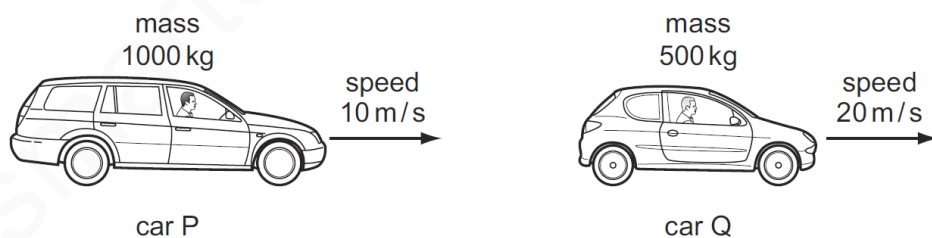
An object travels in a circular path at constant speed.

Which statement about the object is correct?

- A** It has changing kinetic energy.
- B** It has changing momentum.
- C** It has constant velocity.
- D** It is not accelerating.

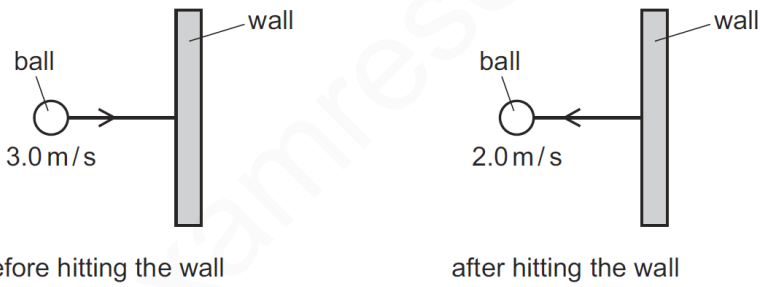
8

Two cars, P and Q, have different masses and different speeds as shown.



Which row correctly compares the momentum and the kinetic energy of P with the momentum and the kinetic energy of Q?

| | momentum | kinetic energy |
|----------|------------------|------------------|
| A | P greater than Q | P equal to Q |
| B | P equal to Q | P equal to Q |
| C | P equal to Q | P less than Q |
| D | P less than Q | P greater than Q |

| | |
|----|---|
| 9 | <p>A girl of mass 50 kg runs at 6.0 m/s.</p> <p>What is her momentum?</p> <p>A 300 J B 300 kg m/s C 900 J D 900 kg m/s</p> |
| 10 | <p>A vehicle of mass 900 kg is travelling with a velocity of 20 m/s.</p> <p>What is the momentum of the vehicle?</p> <p>A 45 kg m/s B 450 kg m/s C 18 000 kg m/s D 180 000 kg m/s</p> |
| 11 | <p>A ball has a mass of 0.30 kg. It moves horizontally with a speed of 3.0 m/s in the direction shown.</p> <p>The ball hits a wall.</p> <div style="text-align: center;">  <p>The diagram consists of two parts. The left part shows a ball moving to the right towards a vertical wall. An arrow points from the ball to the wall, labeled '3.0 m/s'. The right part shows the ball moving to the left away from the wall. An arrow points from the wall to the ball, labeled '2.0 m/s'. Both parts are labeled 'ball' and 'wall'.</p> </div> <p>before hitting the wall after hitting the wall</p> <p>The ball rebounds from the wall with a horizontal speed of 2.0 m/s.</p> <p>What is the change in momentum of the ball?</p> <p>A 0.30 kg m/s B 1.0 kg m/s C 1.5 kg m/s D 5.0 kg m/s</p> |