

Question 1

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 2

What is the relationship between the impulse acting on an object and the change in momentum of the object?

- A** impulse = change in momentum
B impulse = change in momentum $\times$ time
C impulse = $\frac{\text{change in momentum}}{\text{time}}$
D impulse = $\frac{\text{change in momentum}}{\text{mass}}$

Question 3

A rocket is launched upwards from the surface of the Moon.

Hot gases are ejected downwards over a very short period of time.

Which statement is **not** correct?

- A** The rocket experiences a downward force.
B The rocket experiences an upward force.
C The total momentum of the hot gases is equal to the momentum of the rocket.
D The total momentum of the hot gases and rocket when the hot gases have been ejected is zero.

Question 4

A resultant force F accelerates a car of mass m along a straight horizontal road from rest to a speed v in time t , giving it momentum p .

Which pair of relationships for this situation is correct?

- A $pt = mv$ and $F = pt$
- B $p = mv$ and $F = pt$
- C $p = mv$ and $Ft = p$
- D $p = mvt$ and $Ft = v$

Question 5

Which equation gives the momentum change of an object?

- A momentum change = $\frac{\text{force}}{\text{area}}$
- B momentum change = force $\times$ distance
- C momentum change = force $\times \frac{\text{distance}}{\text{time}}$
- D momentum change = force $\times$ time

Question 6

Which expression can be used to determine the impulse on a tennis ball?

- A force $\times$ time
- B $\frac{\text{momentum}}{\text{time}}$
- C mass $\times$ initial velocity
- D mass $\times$ acceleration

Question 7

The momentum of a car changes from $10\,000\text{ kg m/s}$ to $15\,000\text{ kg m/s}$ in a time of 8.0 s .

What is the resultant force acting on the car?

- A 630 N B 3100 N C $40\,000\text{ N}$ D $200\,000\text{ N}$

Question 8

- A** impulse = Ft
- B** impulse = $\frac{F}{t}$
- C** impulse = $(mv - mu)t$
- D** impulse = $\frac{(mv - mu)}{t}$

Question 9

A railway truck of mass 8000 kg moves with a velocity of 1.0 m/s to the right.

It collides with a railway truck of mass 12000 kg moving at 2.0 m/s to the left.

The two trucks become joined to each other when they collide and move off together.

What is the velocity of the two trucks after the collision?

- A** 1.6 m/s to the left
- B** 0.80 m/s to the left
- C** 0.80 m/s to the right
- D** 1.6m/s to the right

Question 10

A car of mass 1200 kg is travelling along a straight horizontal road.

Which impulse is needed to accelerate the car from 5.0 m/s to 10 m/s?

- A** SN0009 **B** 12000Ns **C** 15000Ns **D** 18000Ns

Question 11

An object has a mass of 20 kg.

Its velocity changes from 6 m/ s to 10m/ s.

Which impulse has acted on the object?

- A** 80 N s **B** 120 N s **C** 200 N s **D** 320 N s