

# Momentum

## Question Paper

Course	CIE IGCSE Physics
Section	1. Motion, Forces & Energy
Topic	Momentum
Difficulty	Hard

**Time Allowed**      10

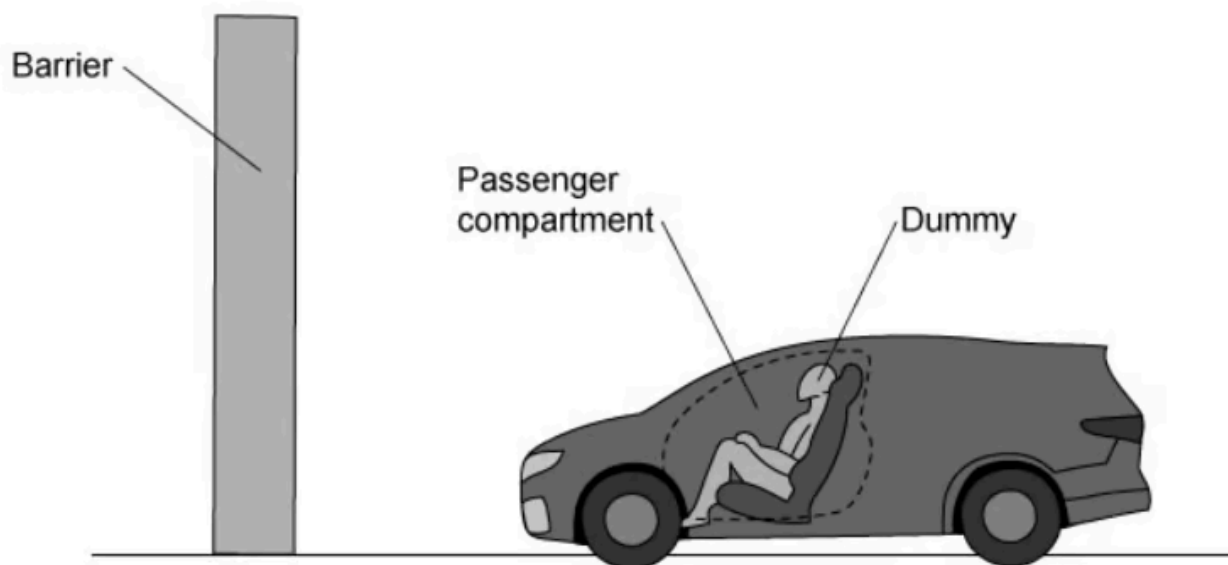
**Score**                /4

**Percentage**        /100

## Question 1

### Extended tier only

A dummy is used in a crash test to investigate the safety of a new car. The deceleration of the dummy and the passenger compartment is measured.



The deceleration of the dummy is less than the deceleration of the passenger compartment.

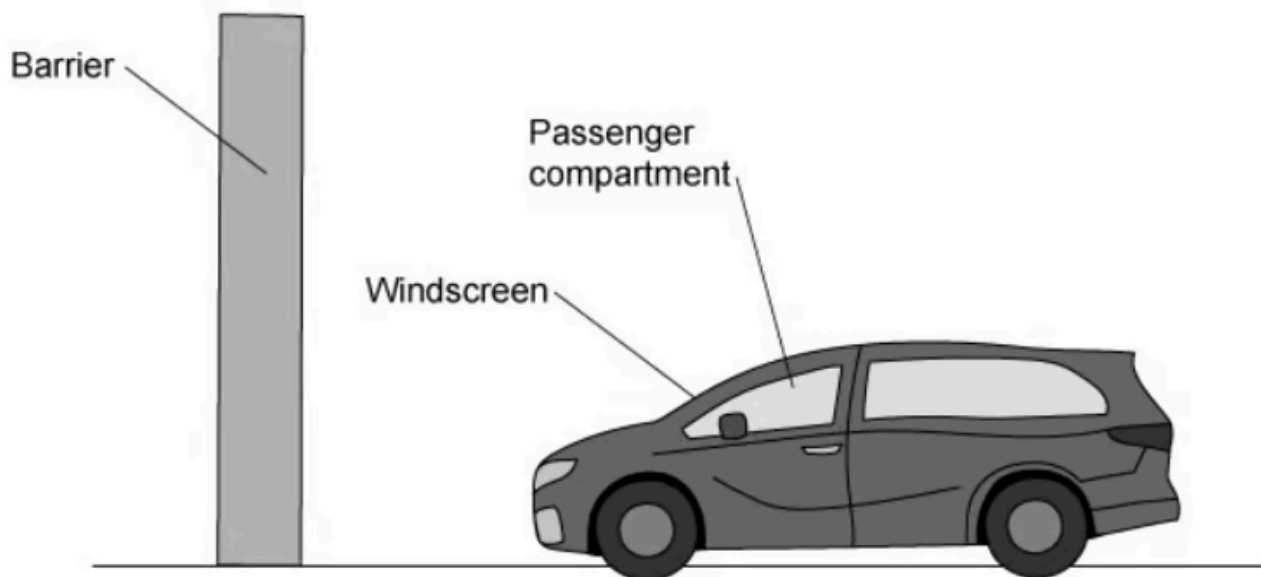
Why is this of benefit for the safety of the passenger?

- A. Seat belts, crumple zones and airbags all absorb energy from the crash
- B. The crash happens quickly so the passenger doesn't feel anything
- C. The force of impact on the passenger, and therefore harm, is reduced
- D. The time over which the collision happens is elongated for the passenger

[1 mark]

**Question 2****Extended tier only**

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

[1 mark]

**Question 3****Extended tier only**

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

[1 mark]

**Question 4****Extended tier only**

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.  $1.3 \times 10^3$  N
- B. 33 N
- C.  $1.3 \times 10^6$  N
- D.  $33 \times 10^3$  N

[1 mark]