

- 2 (a) Define momentum and state its unit.

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[2]

- (b) (i) A student describes a collision between two bodies:

"Momentum is conserved therefore the collision is elastic."

Discuss whether this statement is correct.

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[2]

- (ii) Two bodies collide.

State the types of collisions in which their relative speed of approach is equal to their relative speed of separation.

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[1]

- (c) State Newton's three laws of motion.

First law

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Second law

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Third law

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[3]





- (d) (i) A car driver is not using her seat belt. The car is travelling on a straight road at constant speed. The driver applies the brakes to rapidly bring the car to a stop.

Explain how Newton's three laws of motion describe the motion of the driver and car.

First law

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Second law

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Third law

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[4]

- (ii) A constant braking force is applied to a car of mass 1100 kg. The car comes to a stop from an initial speed of 27 m s^{-1} while travelling 60 m.

Calculate the braking force applied to the car.

$$\text{force} = \dots \text{ N} [3]$$

- (iii) An airbag is a safety device used in cars which inflates upon impact to reduce the force on the driver in a collision.

Explain how an airbag reduces the force on a driver in a collision.

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[1]

[Total: 16]

