Edexcel GCSE Physics

Topics 2.20-2.33P - Forces, Motion and Safety

Flashcards

When can an object travelling at a constant speed not have a constant velocity? (Higher)

When can an object travelling at a constant speed not have a constant velocity? (Higher)

When the object is changing direction; for example, moving in a circle.

Why does an object travelling at a constant speed in a circle not have a constant velocity? (Higher)

Why does an object travelling at a constant speed in a circle not have a constant velocity? (Higher)

- Speed is a scalar quantity
- Velocity is a vector quantity which means it can only be constant if the direction is constant
- In circular motion, the direction is continuously changing
- Velocity is constantly changing

What is the resultant force that acts on an object moving in a circle called, and in which direction does it act? (Higher)

What is the resultant force that acts on an object moving in a circle called, and in which direction does it act? (Higher)

It is called the centripetal force and acts towards the centre of the circle.

What is inertial mass? (Higher)

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- A measure of how difficult it is to change a given object's velocity
- The ratio of force over acceleration

State Newton’s Third Law. (Higher)

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Whenever two objects interact, the forces that they exert on each other are always equal and opposite.

State the equation used to calculate an object's momentum. (Higher)

State the equation used to calculate an object's momentum. (Higher)

Momentum = Mass x Velocity

What is the unit used for momentum?

(Higher)

What is the unit used for momentum? (Higher)

kgm/s

kilogram metres per seconds

In a closed system, what can be said about the momentum before and after a collision? (Higher)

In a closed system, what can be said about the momentum before and after a collision? (Higher)

The total momentum before and after are equal.

State an equation linking change in momentum, force and time. (Higher)

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Force x Time = Change in Momentum

$$F \Delta t = m \Delta v$$

How can you measure human reaction times?

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- Using the ruler drop test
- Person A and B hold each end of a ruler with the 0 cm mark at the bottom
- Person A drops the ruler without telling person B
- Person B catches it
- The distance travelled corresponds to their reaction time

Why is it important that the 0cm mark is at the bottom?

Why is it important that the 0cm mark is at the bottom?

So you can obtain the distance directly without having to calculate it; otherwise, a zero error would need to be accounted for.

What is the stopping distance of a vehicle equal to?

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The sum of thinking distance and braking distance.

For a given braking distance, if the vehicle’s speed is increased, what can be said about its stopping distance?

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The stopping distance is increased with an increase in speed.

Give a typical range of values for human reaction time.

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0.2 seconds - 0.9 seconds

Give three factors which can affect a driver’s reaction time.

Give three factors which can affect a driver's reaction time.

1. Tiredness
2. Drugs
3. Alcohol

Give two factors which may affect braking distance.

Give two factors which may affect braking distance.

1. Adverse (wet/icy) road conditions
2. Poor tyre/brake conditions

Describe the energy transfers that take place when a car applies its brakes.

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- Work is done by the friction force between the brakes and wheel
- Kinetic energy of the wheel is converted to heat and is dissipated to the surroundings through the brake discs

To stop a car in a given distance, if its velocity is increased, what must happen to the braking force applied?

To stop a car in a given distance, if its velocity is increased, what must happen to the braking force applied?

The braking force must also be increased.

State two consequences of a vehicle undergoing very large decelerations.

State two consequences of a vehicle undergoing very large decelerations.

1. Kinetic energy converted to heat is very high causing brakes to overheat
2. Loss of control of the vehicle