# OCR B Physics A Level

## 4.2.1 - Space, Time and Motion

Flashcards

# What is a scalar quantity?

# What is a scalar quantity?

A quantity that only has a magnitude.

# What is a vector quantity?

# What is a vector quantity?

A quantity that has both a magnitude and a direction.

# What is the difference between speed and velocity?

# What is the difference between speed and velocity?

Speed is a scalar quantity whereas velocity is a vector quantity.

# What is the difference between a distance and a displacement?

# What is the difference between a distance and a displacement?

Distance is a scalar quantity whereas displacement is a vector quantity.

# How can a vector quantity be drawn and what does it show?

How can a vector quantity be drawn and what does it show?

As an arrow - the length of the arrow represents the magnitude and the arrow points in the associated direction.

Is a force a vector or a scalar quantity?

# Is a force a vector or a scalar quantity?

- Vector.
- It has both a magnitude and an associated direction.

Give three examples of vector quantities.

# Give three examples of vector quantities.

1. Velocity
2. Displacement
3. Force

Give three examples of scalar quantities.

# Give three examples of scalar quantities.

1. Temperature
2. Time
3. Mass

(also speed, distance etc.)

If an object moves 3 metres to the left and then 3 metres back to its initial position, what is the object's total displacement?

If an object moves 3 metres to the left and then 3 metres back to its initial position, what is the object's total displacement?

- The object has zero displacement.
- Displacement is a vector quantity so it also involves direction.
- The object starts and ends at the same point.

What does the gradient of a distance-time graph represent?

What does the gradient of a distance-time graph represent?

Velocity

# What does the gradient of a velocity-time graph represent?

What does the gradient of a velocity-time graph represent?

Acceleration

# What does the area under a velocity-time graph represent?

What does the area under a velocity-time graph represent?

Displacement

What is the problem with using an iterative model to model an object's motion?

What is the problem with using an iterative model to model an object's motion?

Iterative models assume that no change occurs between the sampled time intervals.

How can the accuracy of an iterative model be improved?

# How can the accuracy of an iterative model be improved?

Decreasing the time interval will increase the accuracy.

# What is a vehicle's stopping distance equal to?

# What is a vehicle's stopping distance equal to?

The sum of its thinking and braking distances.

If the vehicle's speed is increased, what can be said about its stopping distance?

If the vehicle's speed is increased, what can be said about its stopping distance?

The stopping distance is also increased.

Give a typical range of values for human reaction time.

Give a typical range of values for human reaction time.

0.2 seconds - 0.9 seconds

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

Give three things 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 or brake conditions.

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

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

- 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.

# What is the law of the conservation of momentum?

# What is the law of the conservation of momentum?

The total momentum of a system before an event must always equal the total momentum after the event, given no external forces act.

# What is the equation for momentum?

# What is the equation for momentum?

*Momentum = Mass x Velocity*

# What unit is used for momentum?

# What unit is used for momentum?

$Kgms^{-1}$

# Is momentum a scalar or vector quantity?

# Is momentum a scalar or vector quantity?

Momentum is a vector quantity since it involves velocity and so has a magnitude and direction.