

CIE A-Level Physics

3 - Kinematics

Flashcards

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Define speed, the equation used to calculate speed, and the respective SI units.



Define speed, the equation used to calculate speed, and the respective SI units.

Speed is defined as the rate of change of distance.

The equation used is $\text{speed} = \text{distance} / \text{time}$ and the SI units are m s^{-1}



Define displacement.



Define displacement.

The displacement of an object is the distance it has travelled in a given direction, so it is a vector with both magnitude and direction.



Define velocity, the equation used to calculate velocity, and the respective SI units.



Define velocity, the equation used to calculate velocity, and the respective SI units.

The velocity of an object is defined as the rate of change of displacement, or speed in a given direction, making velocity a vector.

The equation used is $\text{velocity} = \frac{\text{change in displacement}}{\text{time}}$ and the SI units are ms^{-1}



Define acceleration, the equation used to calculate acceleration, and the respective SI units.



Define acceleration, the equation used to calculate acceleration, and the respective SI units.

Acceleration is defined as the rate of change of velocity, making it a vector.

The equation used is $\text{acceleration} = \frac{\text{change in velocity}}{\text{time}}$ and the SI units are ms^{-2} .



What does a straight, horizontal line represent on a displacement-time graph?



What does a straight, horizontal line represent on a displacement-time graph?

A stationary object.



What does a line with a constant, non-zero gradient represent on a displacement-time graph?



What does a line with a constant, non-zero gradient represent on a displacement-time graph?

An object moving with constant velocity.



What does a curved line represent on a displacement-time graph?



What does a curved line represent on a displacement-time graph?

Acceleration (if gradient is increasing) or deceleration (if gradient is decreasing).



What does a straight, horizontal line represent on a velocity-time graph?



What does a straight, horizontal line represent on a velocity-time graph?

An object moving with constant velocity.



What does a line with a constant, non-zero gradient represent on a velocity-time graph?



What does a line with a constant, non-zero gradient represent on a velocity-time graph?

An object that is accelerating (positive gradient) or decelerating (negative gradient).



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



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

Displacement.



What does the area under an
acceleration-time graph represent?



What does the area under an acceleration-time graph represent?

Velocity.



Describe how the velocity of an object can be determined using light gates.



Describe how the velocity of an object can be determined using light gates.

Set up the light gates vertically and measure the distance between them. Connect them to a data logger and then release an object from rest above them, measuring the time it takes for the object to travel between the two gates. Using the time and the known distance, you can calculate the velocity of the falling object.



A ball is projected off a castle at 6m s^{-1} .
How does its horizontal velocity change
from its launch until it hits the ground?



A ball is projected from a castle at 6 m s^{-1} . How does its horizontal velocity change from its launch until it hits the ground?

The horizontal velocity remains the same as there is no acceleration in the horizontal direction.



In projectile motion, what is the vertical acceleration?



In projectile motion, what is the vertical acceleration?

The vertical acceleration is equal to
gravitational field strength (g)
downwards.



State the 5 SUVAT equations.



State the 5 SUVAT equations.

$$s = ut + \frac{1}{2}at^2$$

$$v = u + at$$

$$v^2 = u^2 + 2as$$

$$s = vt - \frac{1}{2}at^2$$

$$s = \frac{1}{2}(u+v)t$$

s is displacement

v is final velocity

u is initial velocity

a is acceleration

t is time taken

