WJEC A-Level Physics

3.1 Circular Motion

Flashcards

What is a period of rotation?

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The period of rotation is the time it takes for an object to complete one rotation or oscillation. For circular motion, this means it is the time it takes for the object to make one whole revolution.

What is frequency?

What is frequency?

The number of times an object completes a full rotation or oscillation in a unit time is the frequency.

What is a radian?

What is a radian?

The angle of a circle sector such that the radius is equal to the arc length.

Radians are usually written in terms of π

2π radians = 360 degrees

What kind of force is required to keep an object moving in a circle at constant speed?

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A force that is always applied towards the centre of a circular path. It is known as a centripetal force.

An object moving in a circle at a constant speed is accelerating. True or False?

An object moving in a circle at a constant speed is accelerating. True or False?

True

The direction is always changing hence the velocity always changing. Acceleration is defined as the change in velocity over time.

What equation(s) can you use to calculate the magnitude of angular speed (ω)?

What equation(s) can you use to calculate the magnitude of angular speed (ω)?

$\omega = v/r$ or $\omega = 2\pi f$

ω: s^{-1}

v: ms^{-1}

r: m

f: Hz

What is angular acceleration in terms of angular velocity?

What is angular acceleration in terms of angular velocity?

$$a = \omega^2 r$$

ω: s^{-1}

a: ms^{-2}

r: m

What is angular acceleration in terms of velocity?

What is angular acceleration in terms of velocity?

$$a = v^2/r$$

a: ms^{-2}

v: ms^{-1}

r: m

What are the equations for centripetal force?

What are the equations for centripetal force?

$$F = mv^2/r \quad \text{or} \quad F = m\omega^2 r$$

ω: s^{-1}

v: ms^{-1}

r: m

F: N

m: kg

What are the conditions for SHM?

What are the conditions for SHM?

- Acceleration must be proportional to its displacement from the equilibrium point.
- It must act towards the equilibrium point.
- $a \propto -x$

What is the constant of proportionality linking acceleration and x?

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ω^2 or - k/m

What is x as a trig function of t and ω?

What is x as a trig function of t and ω?

$$x = A\cos(\omega t) \text{ or } x = A\sin(\omega t)$$

ω: s^{-1}

A: m

x: m

t: s

How can you calculate the maximum speed using ω and A?

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$$\text{Max speed} = \omega A$$

ω: s^{-1}

A: m

How can you calculate the maximum acceleration using ω and A?

How can you calculate the maximum acceleration using ω and A?

$$\text{Max acceleration} = \omega^2 A$$

ω: s^{-1}

A: m