OCR (A) Physics GCSE

PAG 04 - Using a ripple tank to measure the speed, wavelength and frequency of waves.

Flashcards

Define wavelength.

Define wavelength.

The shortest distance between the same point on two consecutive waves (e.g. the distance between two consecutive peaks/troughs/compressions/rarefactions)

Define displacement.

Define displacement.

The distance from equilibrium position.

When displacement is at a maximum (peaks/troughs), this is the **amplitude**.

Define frequency.

Define frequency.

The number of complete waves passing a point per second (or the number of waves produced by the source per second).

Define period.

Define period.

The time taken for a whole wave to pass through a single point.

State the wave equation.

State the wave equation.

$$v = \lambda \times f$$

- v = velocity (m/s)
- λ = wavelength (m)
- f = frequency (Hz)

What is a ripple tank?

What is a ripple tank?

A shallow glass tank with an oscillating paddle/needle that creates waves. It is illuminated from above so the waves can be seen on the surface below the tank.

How can frequency be measured using a ripple tank?

How can frequency be measured using a ripple tank?

- Choose a point; draw it on a piece of paper placed beneath the ripple tank if necessary
- Count the number of complete waves passing this point in 10 seconds
- Divide by 10 for the frequency in Hz

How can wavelength be worked out using a ripple tank?

How can wavelength be worked out using a ripple tank?

Measure the length of 5 waves using a ruler and divide by 5 for the wavelength of 1 wave.

Describe how to measure the speed of water waves using a ripple tank.

Describe how to measure the speed of water waves using a ripple tank.

- Set up ripple tank with a motor, power supply, meter ruler and approx. 5cm deep water
- Adjust the frequency of the motor so low frequency waves can be observed
- Measure the length of 5 waves using a ruler (the more waves measured the better) and divide by the number of waves to work out the wavelength of one wave
- Count the number of waves passing a point in 10 seconds and divide by 10 to get the frequency
- Use $v=\lambda f$ to calculate speed

Where should a ripple tank be set up?

Where should a ripple tank be set up?

In a darkened room, so no other light interferes with the lamp.

What is refraction?

What is refraction?

Refraction is the change in **speed** of a wave as it reaches a boundary between two media, usually resulting in a change in direction (if it enters at an angle).

How can ripple tanks be used to show refraction?

How can ripple tanks be used to show refraction?

By placing a thick glass sheet in the ripple tank, covering part of the floor.

How does placing a glass sheet in a ripple tank cause refraction?

How does placing a glass sheet in a ripple tank cause refraction?

- The depth decreases over the tank
- Speed depends on depth, so the wave speed slows down
- This causes the same effect as refraction

How do ripple tanks show reflection?

How do ripple tanks show reflection?

Waves bouncing off the walls of the tank.