

Edexcel Physics GCSE

Practical 2: Waves

Practical Flashcards

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Part 1: Waves in a Liquid



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.



Outline the basic steps of the practical.



Outline the basic steps of the practical.

1. Set up the ripple tank with a lamp above it and white card/paper below it
 2. Switch on the motor attached to the wooden rod
3. Measure the wavelength of the waves being cast onto the card using a ruler
4. Count the number of waves passing a point in 10 seconds and calculate the frequency
5. Calculate the wave speed



What type of waves are the waves on the surface of the water?



What type of waves are the waves on the surface of the water?

Transverse Waves



What is a transverse wave?



What is a transverse wave?

A wave where the oscillations are perpendicular (at right angles) to the movement of the wave. Transverse waves have peaks and troughs.



Approximately how much water should you put into the ripple tank? What would the consequence of too much be?



Approximately how much water should you put into the ripple tank? What would the consequence of too much be?

The water should be poured to a depth of around 5 mm. If there is too much water the rod won't produce clear waves and they will be less clearly projected onto the card below.



How should the wooden rod be set up in the ripple tank?



How should the wooden rod be set up in the ripple tank?

The wooden rod should be placed into the tank so that it just touches the surface of the water.



How should you measure the
wavelengths of the waves on the card?



How should you measure the wavelengths of the waves on the card?

1. Adjust the lamp position so that the waves are clearly projected onto the card
2. Using a metre rule, measure across as many waves as you can
3. Divide the distance by the number of waves measured across



Why should you measure across more than one wave?



Why should you measure across more than one wave?

To reduce the uncertainty in the measurement and improve the accuracy of the value.



Suggest a way to make measuring the wavelength of the waves easier.



Suggest a way to make measuring the wavelength of the waves easier.

Take a photograph of the waves with the ruler in the picture so that the distances can be measured without the waves moving.



What unit should be used for the wavelength measurements?



What unit should be used for the wavelength measurements?

Metres, so that when the speed is calculated it is in m/s.



How do you measure the frequency of the waves on the card?



How do you measure the frequency of the waves on the card?

1. Count the number of waves passing a chosen point in 10 seconds
2. Divide the number by 10, to produce a frequency in Hz



What equation is used to calculate wave speed?



What equation is used to calculate wave speed?

Wave Speed = Frequency x Wavelength



When the frequency is in Hertz and the wavelength is in metres, what is the unit for wave speed?



When the frequency is in Hertz and the wavelength is in metres, what is the unit for wave speed?

m/s

Metres per Second



Describe another way of measuring the wave speed.



Describe another way of measuring the wave speed.

Mark two points on the paper that are a fixed distance apart and use a stopwatch to time the time it takes for a wave to travel between them. Calculate speed by dividing the distance by the time taken.



If both values for wave speed from the two methods are similar, what does this suggest?



If both values for wave speed from the two methods are similar, what does this suggest?

The equipment and set-up is suitable and the value is accurate.



Part 2: Waves in a Solid



Outline the basic steps of the practical.



Outline the basic steps of the practical.

1. Measure the length of all the rods being tested
2. Suspend one of the rods from two clamp stands using rubber bands
3. Strike the rod and measure the peak frequency
4. Calculate the velocity of the waves in the rod
5. Repeat for rods of different lengths and materials



What type of wave is a sound wave?



What type of wave is a sound wave?

A longitudinal wave.



What is a longitudinal wave?



What is a longitudinal wave?

In a longitudinal wave the oscillations are parallel to the motion of the wave.

Longitudinal waves have compressions and rarefactions.



What piece of equipment is used to determine the frequency of the sound?



What piece of equipment is used to determine the frequency of the sound?

A frequency detector, such as that of a music tuner or a phone app.



How does the length of the rod relate to its wavelength?



How does the length of the rod relate to its wavelength?

The wavelength of the wave at peak frequency will be equal to twice the rod's length.

$$\lambda = 2L$$



What equation is used to calculate wave speed?



What equation is used to calculate wave speed?

Wave Speed = Frequency x Wavelength

