WJEC A-Level Physics

2.4 The Nature of Waves

Flashcards

Define the term ‘progressive wave’.

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A wave which transfers energy from one place to another with a wave front which travels through the material (in contrast to stationary waves which don’t appear to move).

What is a longitudinal wave?

What is a longitudinal wave?

A wave in which the oscillation of the particles is parallel to the direction of energy transfer.

There are rarefactions (areas of low pressure) and compressions (areas of high pressure).

What is a transverse wave? Give examples.

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Waves where the particle oscillations are perpendicular to the direction of energy transfer.

For example, electromagnetic waves.

What does a polarising filter do?

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Polarising filters only allow oscillations in one plane to pass through.

How is polarisation used as evidence of the nature of transverse waves?

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Polarisation can only occur if a wave's oscillations are perpendicular to its direction of travel (as they are in transverse waves).

How is polarisation used in antennas?

How are polarisers used in antennas?

TV and radio signals are usually plane-polarised by the orientation of the rods on the transmitting aerial, so the receiving aerial must be aligned in the same plane of polarisation to receive the signal at full strength.

What is ‘phase’?

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The position of a certain point on a wave cycle (units are radians, degrees or fractions of a cycle).

Define frequency and give its units.

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The number of waves passing through a point per second.

Hertz, Hz

Define wavelength.

Define wavelength.

The distance between two adjacent peaks on a wave.

Define amplitude.

Define amplitude.

The maximum displacement of the wave from its equilibrium position.

How can you find out the time period of a wave using its frequency?

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$$T = 1/f$$

What is the speed of a wave with frequency 10GHz and wavelength 6cm?

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$$c = f\lambda$$

$$c = (10 \times 10^{9}) \times (6 \times 10^{-2})$$

$$c = 6 \times 10^{8} \text{ m/s}$$

What are wave fronts?

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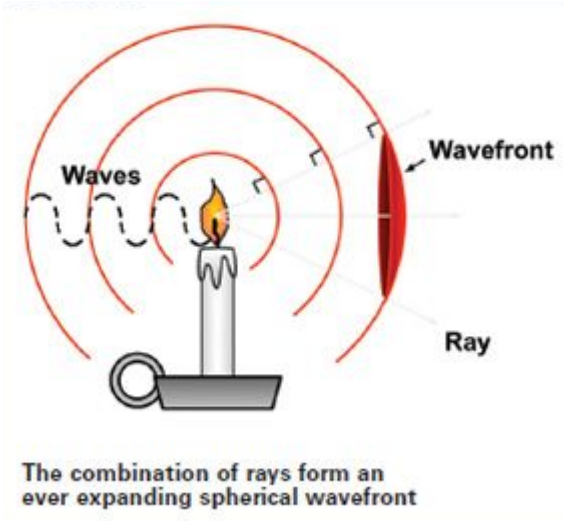

The combination of rays form an ever expanding spherical wavefront

Wave fronts are the lines of constant phase. All points on the wave fronts are in phase. The wave fronts travel radially from a source and therefore the direction of travel of the waves are along a radial direction (perpendicular to the wave fronts) as shown in the diagram.