Edexcel GCSE Physics

Topics 4.13P-4.17 - Using Waves

Flashcards

How do sound waves travel through a solid? (Higher)

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The particles in the solid vibrate and transfer kinetic energy through the material.

How does the human ear work? (Higher)

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1. The outer ear collects the sound which travels into the ear
2. The sound waves cause the eardrum to vibrate at the same frequency
3. This is amplified by three ossicles (small bones)
4. This causes the hair in the cochlea to vibrate
5. The cochlea converts the vibrations into electrical signals
6. The signals are passed to brain through the auditory nerve
7. The brain converts the electrical signals into sound

What is the frequency range of human hearing? (Higher)

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20 Hz - 20kHz

(1kHz = 1000 Hz)

What is an ultrasound wave? (Higher)

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A sound wave with a frequency greater than 20,000 Hz.

What is sound of frequencies less than 20Hz called? (Higher)

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(Higher)

Infrasound.

What natural event causes seismic waves to be produced? What types are produced? (Higher)

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- Earthquakes
- They produce both P-waves and S-waves

Are P waves transverse or longitudinal? (Higher)

Are P waves transverse or longitudinal? (Higher)

Longitudinal

Are

Are S waves transverse or longitudinal?

(Higher)

Are S waves transverse or longitudinal? (Higher)

Longitudinal

State a difference between the mediums that P-waves and S-waves can travel through. (Higher)

State a difference between the mediums that P-waves and S-waves can travel through. (Higher)

- P-waves travel through both solids and liquids
- S-waves only travel through solids (**not** liquids)

What is the significance of P and S waves? (Higher)

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They provide evidence that the Earth has a liquid core; only P waves produced by an earthquake can be detected on the other side of the globe.

What technique is used to detect objects in deep water and measure water depth? (Higher)

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- Echo sounding
- High frequency sound waves are emitted, reflected and detected
- Time difference between emission and detection, alongside wave speed, are used to calculate distances

How does sonar work? (Higher)

How does sonar work? (Higher)

- When ultrasound waves are emitted they reflect off boundaries and their echoes are detected.
- The speed of the ultrasound is known and also the time it takes to detect the echoes.
- The equation distance=speed x time is used to find the distance travelled.
- The distance travelled is halved to give the distance between emitter and boundary (as the wave had to travel there and back.

How does foetal scanning work? (Higher)

How does foetal scanning work? (Higher)

- An ultrasound wave is sent into the patient's body. It passes through the body and reflects off the organs and tissue.
- The device then uses the reflected ultrasound waves to produce an image of the foetus.
- Ultrasound is safe and therefore does not damage cells.