

GCSE Physics B (Twenty First Century Science)
J259/04 Depth in physics (Higher Tier)

Question Set 14

1

Ultrasound is used in hospitals to image the inside of our bodies.

Fig. 5.1 shows an ultrasound wave travelling from air into the patient's skin.

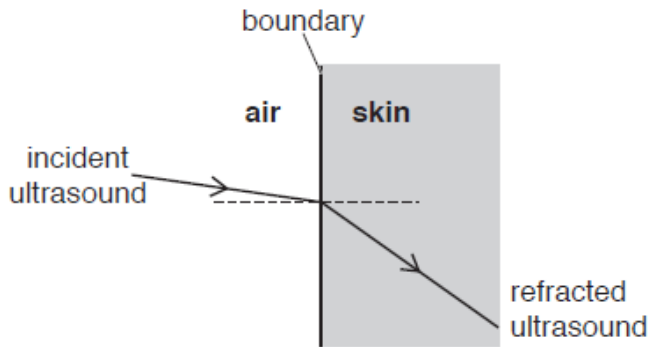


Fig. 5.1

The ultrasound wave is **refracted** at the air-skin boundary.

- (a) Describe what happens to the **speed**, **frequency** and **wavelength** of the ultrasound wave as it travels from air to skin. [3]
- (b) **Fig. 5.2** is a diagram of a human eye. Ultrasound can be used to determine the length of an eyeball.

Pulses of ultrasound are sent into the eye.

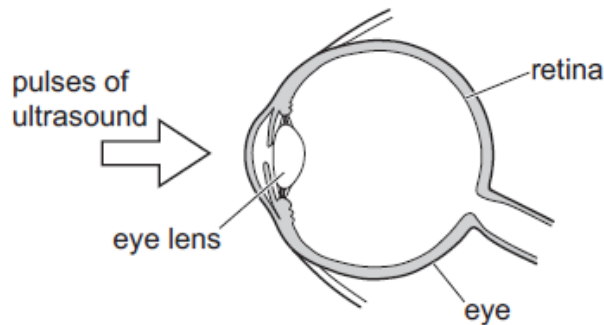


Fig. 5.2

The ultrasound pulse is reflected at the retina.

It takes 4.0×10^{-5} s for an ultrasound pulse to travel from the front of the eye, to the retina, and then back to the front of the eye.

The speed of the ultrasound pulse in the eye is 1100 m/s.
Calculate the length of the eyeball in metres.

Length of eyeball = m [4]

- (c) **Fig. 5.3** shows the ultrasound pulses that were sent into the eye, as described in part (b).

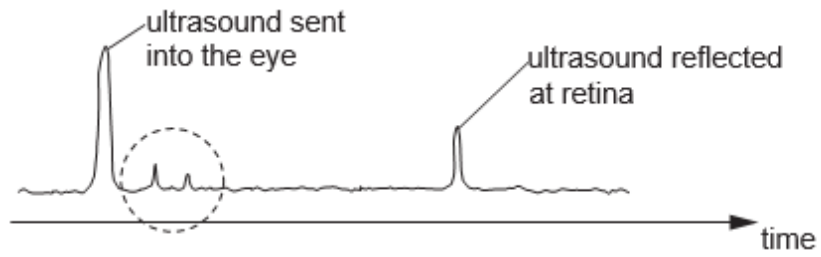


Fig. 5.3

Suggest an explanation for the other two pulses ringed in the diagram.

[2]

Total Marks for Question Set 14: 9

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