

GCSE Physics A (Gateway)

J249/04 Physics A P5-P8 and P9 (Higher Tier)

Question Set 14

1 (a) Some students try to measure the speed of sound, as shown in **Fig. 1.1**.

One student makes a loud sound by clapping her hands.

The sound of the clap reflects from the gym wall causing an echo.

Another student measures the time between hearing the clap and hearing the echo.

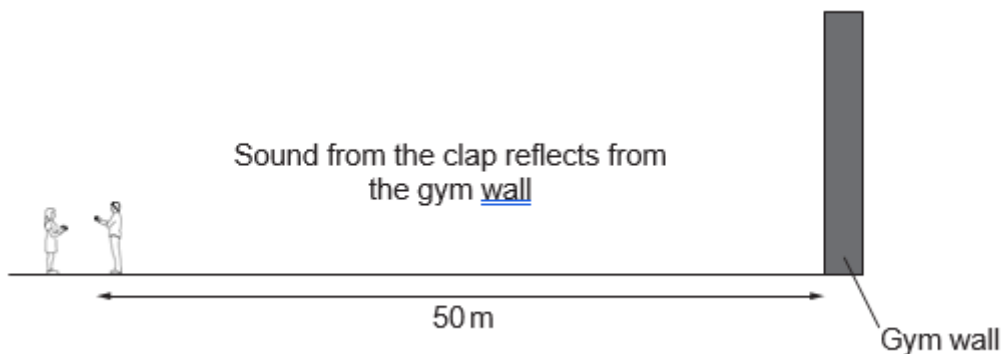


Fig. 1.1

They repeat the experiment three times and record their results in the table below.

Distance to wall (m)	Time 1 (s)	Time 2 (s)	Time 3 (s)	Mean time (s)
50	0.28	0.32	0.54	

(i) The student did not pay attention when recording **time 3**.

Calculate the **mean** time taken for the sound of the clap to return, using suitable values from the table.

Mean time taken = s

[1]

(ii) Calculate the speed of sound for the clap.

Use your answer to (a)(i) and the equation: distance travelled = speed × time

Give your answer to 3 significant figures.

Speed of sound = m/s

[4]

(iii) Describe two ways to improve and develop their method.

[2]

(b) Ultrasound wave pulses are used by vets to scan inner tissues inside animals.

The ultrasound pulses partially reflect from different layers of tissue. These reflected wave pulses (echoes) are collected by the detector as shown in Fig. 1.2.

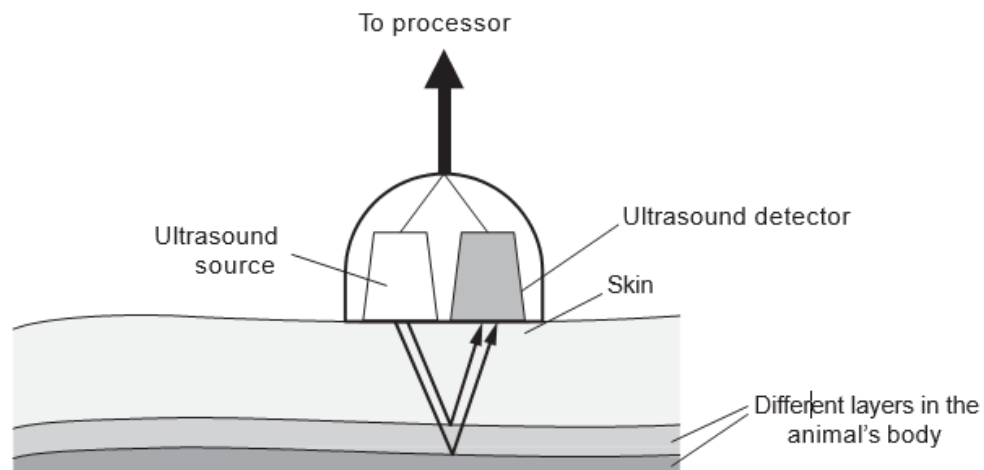


Fig. 1.2.

In a scan using ultrasound pulses, three layers of tissue are detected, with each layer having a different thickness.

Describe and explain how the results from the detector can show:

- that there are three layers
- that each layer has a different thickness.

[3]

Total Marks for Question Set 14: 10

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