

Sonar is an example of a use of ultrasound.

- (a) State **one** other example of a use of ultrasound.

(1)

- (b) State an example of a use of infrasound.

(1)

- (c) Figure 1 shows the depth of the sea, measured using sonar, at different distances from the shore.

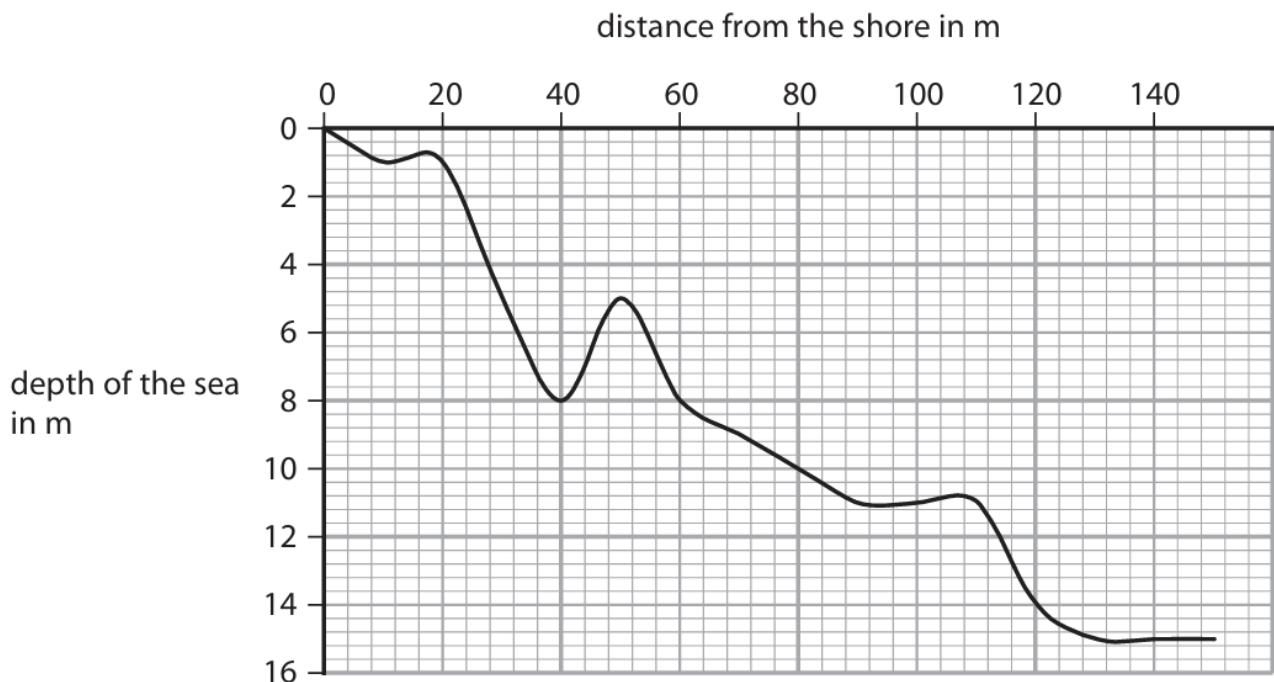


Figure 1

A technician on a boat uses sonar pulses to measure the depth of the sea when the boat is 120 m from the shore.

Calculate the **total** time of travel for the sonar pulse used to make this measurement.

The speed of the sonar pulse in seawater is 1600 m/s.

(4)

time of travel = s

(Total for Question 1 = 6 marks)

WWW	EBI...	DIRT Task
You can state an example of a use of ultrasound.	... you could state an example of a use of ultrasound.	Define ultrasound. Memorise the definition. List different uses of ultrasound.
You can state an example of a use of infrasound.	... you could state an example of a use of infrasound.	Define infrasound. Memorise the definition. List different uses of infrasound.
You can calculate the total time of travel for the sonar pulse.	... you could calculate the total time of travel for the sonar pulse.	What information are you given? Draw a diagram to show how the sonar pulses travel. Describe the total distance travelled by one sonar pulse. Write the formula to calculate time. Calculate the total distance travelled by the sonar pulse. Use the formula to calculate the total time of travel.
	Extension:	<i>Describe how a pregnancy scan works and explain the role of ultrasound in the process.</i>

Question Number	Answer	Additional Guidance	Mark
1(a)	foetal scanning (1)	ignore sonar ACCEPT echo location accept other examples e.g. dog whistle cat scarer bat detector kidney stones cleaning jewellery baby scanner pregnancy scanner faults in structures	(1) AO 1 1

Question Number	Answer	Additional Guidance	Mark
1(b)	studying the Earth's structure (1)	accept other examples e.g. detect meteor(ites) seismic activity named animals communicating e.g. elephants giraffes whales	(1) AO 1 1

Question Number	Answer	Additional guidance	Mark
1(c)	<p>recall (1) $v = \frac{x}{t}$</p> <p>rearrangement (1) $t = \frac{x}{v}$</p> <p>substitution (1) $\frac{14 \times 2}{1600}$</p> <p>evaluation (1) 0.018 (s)</p>	<p>substitution and rearrangement in either order</p> <p>max 3 marks if 14 used as distance</p> <p>accept numbers that round to 0.018 e.g. 0.0175 (s)</p> <p>award full marks for the correct answer with no working</p>	(4) AO 1 1 AO 2 1