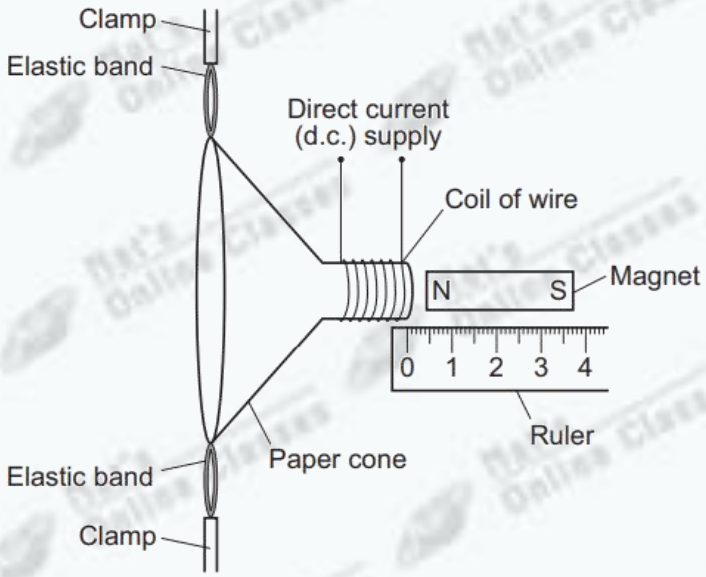
Sound Waves

Total Mark – 19

Question: 1

7 **Figure 13** shows a loudspeaker made by a student. When there is a current in the coil the paper cone moves.

Figure 13



The student investigates how changing the size of the current in the coil of wire affects the distance moved by the paper cone.

7 (a) State **two** variables the student should control.

[2 marks]

1 _____

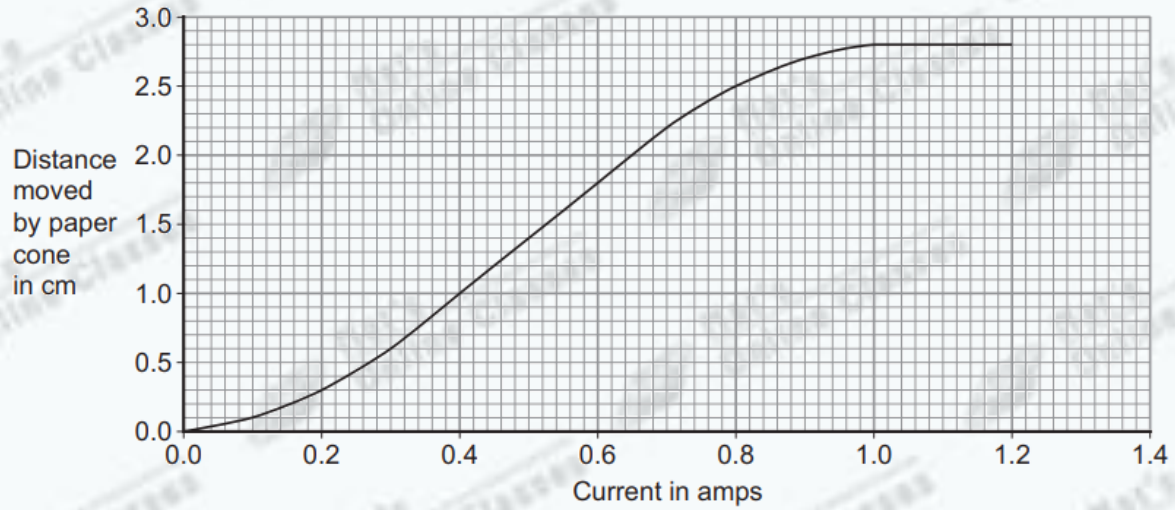
_____

2 _____

_____

7 (b) The results of the student's investigation are shown in **Figure 14**.

Figure 14



7 (b) (i) When the current increases from 0.5 A to 0.9 A, how much does the distance moved increase?

[2 marks]

Increase in distance moved = _____ cm

7 (b) (ii) State **two** conclusions that can be made from the graph.

[2 marks]

1 _____

_____

2 _____

_____

Question: 2

5 (a) Ultrasound is sound above the maximum frequency that humans can hear.

What is the maximum frequency that most humans can hear?

[1 mark]

Tick (✓) **one** box.

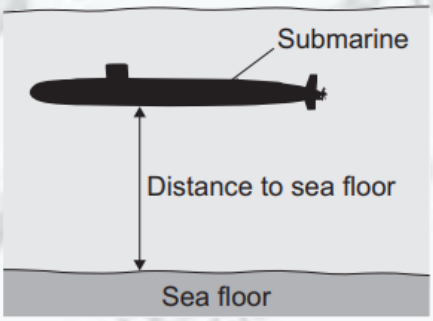
20 Hz ☐

2000 Hz ☐

20 000 Hz ☐

5 (b) **Figure 7** shows a submerged submarine.

Figure 7



Not to scale

The submarine sends a pulse of ultrasound to the sea floor.
The pulse takes 0.25 seconds to travel from the submarine to the sea floor.

The speed of sound in water is 1600 m/s.

Calculate the distance from the submarine to the sea floor.

Use the correct equation from the Physics Equations Sheet.

[2 marks]

Distance = _____ m

5 (c) The ultrasound is reflected from the sea floor back to the submarine.
Use the correct answer from the box to complete the sentence.

[1 mark]

half	the same as	twice

The total distance the ultrasound pulse travelled is _____ the distance to the sea floor.

5 (d) The submarine moves through the sea and every few seconds sends a pulse of ultrasound to check the distance to the sea floor.

Table 1 shows the time taken for five ultrasound pulses to travel from the submarine to the sea floor and back to the submarine.

Table 1

Pulse number	Time for pulse to return in seconds
1	0.50
2	0.45
3	0.38
4	0.40
5	0.48

Describe how the distance from the submarine to the sea floor changed over these five pulses.

[2 marks]

_____

_____

_____

_____

Question: 3

7 (a) What is ultrasound?

[1 mark]

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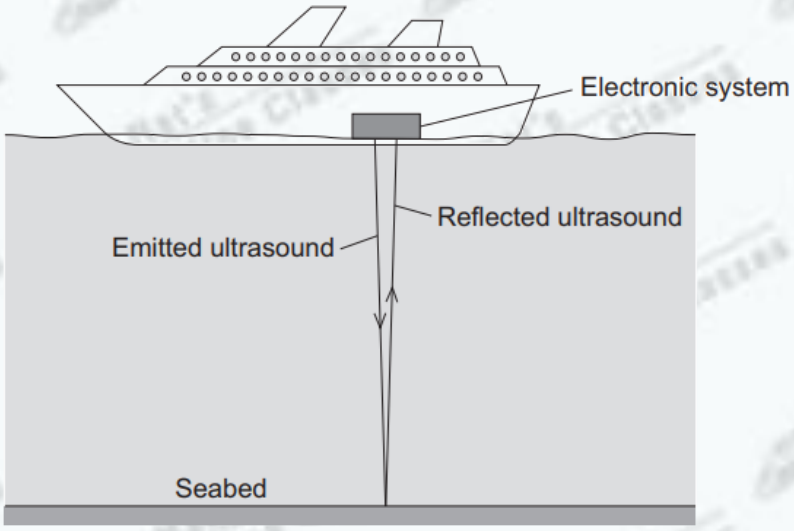
7 (b) **Figure 12** shows how ultrasound is used to measure the depth of water below a ship.

Figure 12



A pulse of ultrasound is sent out from an electronic system on-board the ship.

It takes 0.80 seconds for the emitted ultrasound to be received back at the ship.

Calculate the depth of the water.

Speed of ultrasound in water = 1600 m/s

Use the correct equation from the Physics Equations Sheet.

[3 marks]

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.....

.....

Depth of water = ... metres

7 (c) Ultrasound can be used in medicine for scanning.

State **one** medical use of ultrasound scanning.

[1 mark]

.....

7 (d) Images of the inside of the human body can be made using a Computerised Tomography (CT) scanner. The CT scanner in **Figure 13** uses X-rays to produce these images.

Figure 13

State **one** advantage and **one** disadvantage of using a CT scanner, compared with ultrasound scanning, for forming images of the inside of the human body.

[2 marks]

Advantage of CT scanning .....

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.....

Disadvantage of CT scanning .....

.....

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