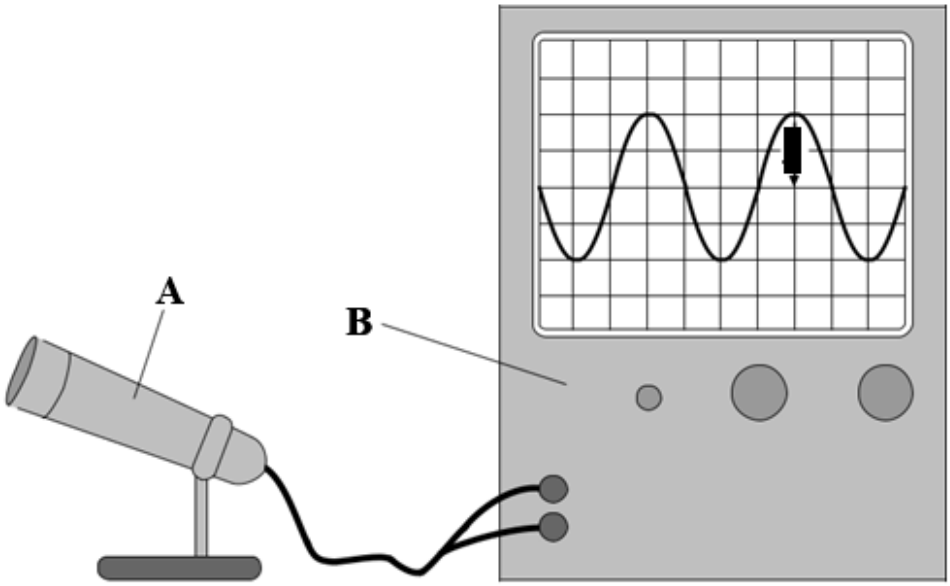
SOUND WAVES 2

Q1 (a) A student uses two pieces of equipment, A and B, to display a sound wave.



(a)(i) Use words from the box to complete the sentence.

a loudspeaker	a microphone	an oscilloscope	a screen

A is _____ and **B** is _____

(2 marks)

(a)(ii) Use words from the box to complete the sentence.

the amplitude	half the amplitude	the frequency	half the frequency

The distance x marked on the diagram measures _____ of the sound wave.

(1 mark)

(a) (iii) Complete the sentence.

The distance x becomes smaller. This is because the sound has become

_____

(1 mark)

(b) There is no air in space.

Astronauts in space cannot hear sounds from outside their spacesuits. Explain this.

_____

_____

_____

(2 mark)

Q2 (a) The diagrams show oscilloscope traces for the same musical note played on two different instruments. The oscilloscope settings are not changed.

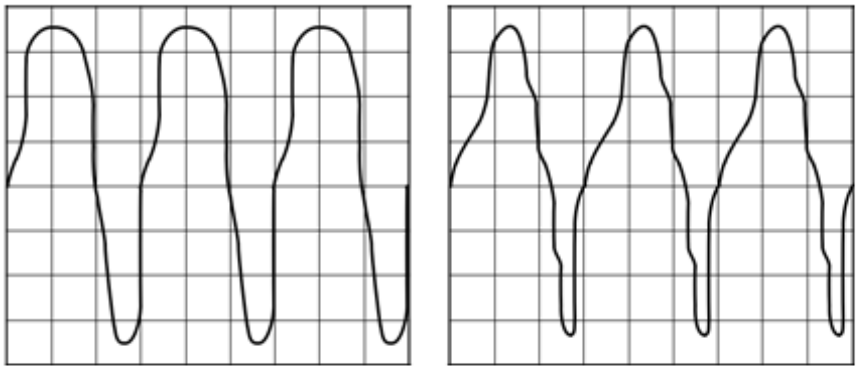


Diagram X **Diagram Y**

(a) (i) How can you tell, from the diagrams, that it is the same musical note?

_____

(1 mark)

(a) (ii) How can you tell, from the diagrams, that the musical note has been played on different instruments?

_____

(1 mark)

(b) This passage is from an electronics magazine.

> *Electronic systems can be used to produce ultrasound waves.*
>
> *These waves have a higher frequency than the upper limit for hearing in humans.*
>
> *Ultrasound waves are partially reflected when they meet a boundary between two different media.*

(b)(i) Approximately what is the highest frequency that humans can hear?

State the number and the unit.

_____

(1 mark)

(b) (ii) What does the word media mean when it is used in this passage?

_____

(1 mark)

(b) (iii) What happens to the ultrasound which reaches the boundary between two different media and is not reflected?

_____

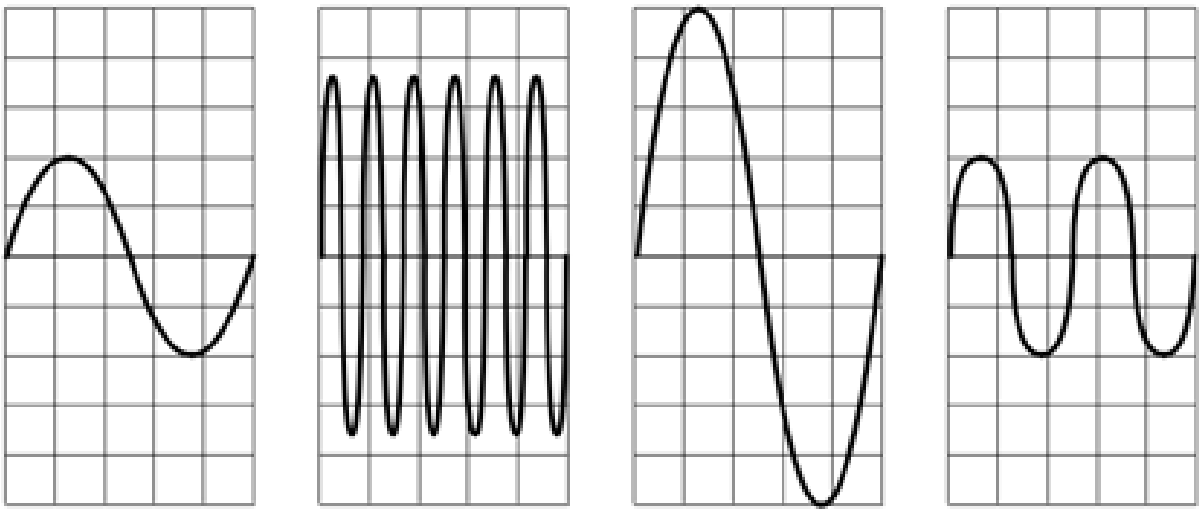
_____

_____

(2 marks)

Q3) a) (i) A sound wave can be represented as a wave on the screen of an oscilloscope.

The diagrams A, B, C and D show different screens for the same settings of an oscilloscope.



Which diagram represents the sound with the highest frequency?

Diagram

(a) (ii) Complete the sentences using the correct name from the box.

a loudspeaker	a microphone	an ultrasound transmitter

Information is transferred from a sound wave to an oscilloscope by

_____

(1 mark)

2 (b) Complete the sentences by drawing a ring around the correct word in the box.

2 (b) (i) The pitch of a note increases as the

amplitude frequency wavelength

increases.

(1 mark)

2 (b) (ii) The loudness of a note decreases as the

amplitude frequency wavelength

decreases.

(1 mark)

Q4. (a) Read this passage from a health leaflet.

> Most children can hear the full range of sounds which can be detected by the human ear. But as people get older, they cannot hear the higher frequencies.

(a) (i) Complete this statement.
Most children can detect sounds in the frequency range
_____ Hz to _____ Hz.
(1 mark)

(a) (ii) What word is used to describe sound with a frequency so high that it cannot be heard by humans?

_____

(1 mark)

(b) Read this cutting from a newspaper.

> A shopkeeper has fitted a special loudspeaker outside his store.
>
> "We used to have gangs of young people out there," he said, "but now, when I switch on the special loudspeaker, they hate the sound and go away." Older people are not bothered by the sound because the frequency is too high for them to hear it.

Some people support the use of the special loudspeaker but other people do not.

Give one reason against its use.

_____

_____

_____

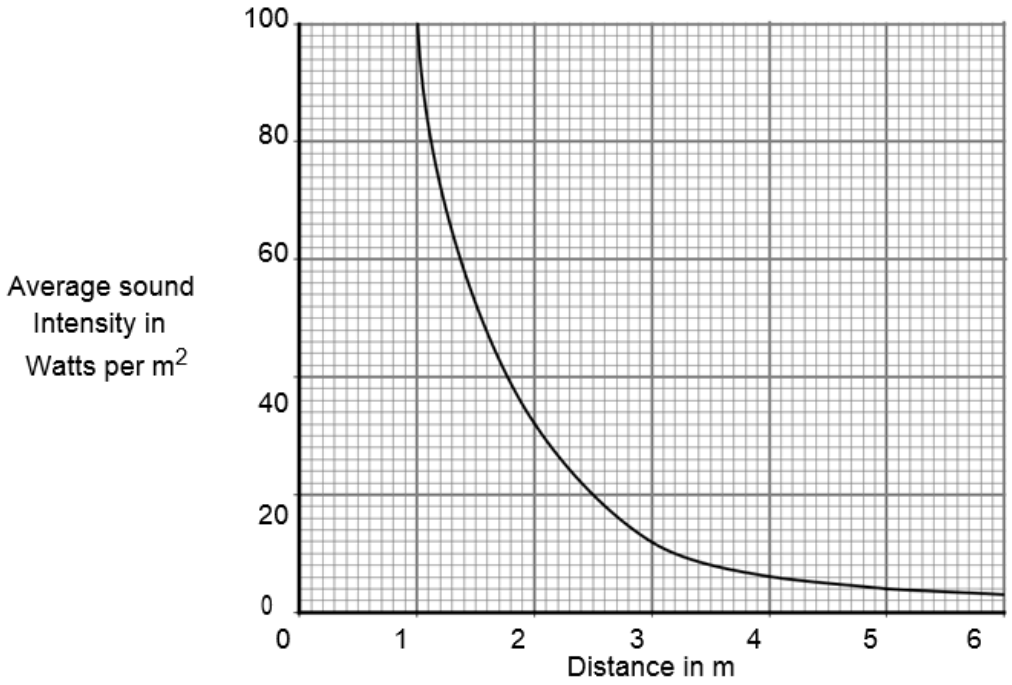
(1 mark)

(c) Machines are often very noisy. They transfer energy, and some of the energy is transformed into sound.

What is the cause of the sound?

(1 mark)

7 (d) Sound from a machine may damage the hearing of people who work close by. A safety officer measures the sound intensity at different distances from a noisy machine. The average results are shown on the graph.



(d) (i) Describe the pattern shown by the graph.

Use one or more examples from the graph to support your description.

(2 marks)

(d) (ii) Average results were plotted.

Explain why taking results several times and then calculating average values is more reliable than taking only a single result.

(2 marks)

Total: 18 marks