

1

Tom is doing a bungee jump from a bridge.



He is attached to one end of an elastic rope.  
 The other end of the rope is attached to the bridge.  
 Tom jumps from the bridge.

(a) (i) What force makes Tom fall towards the ground?

.....

1 mark

(ii) Tom does **not** hit the river below the bridge.  
 What makes Tom stop falling before he hits the river?

.....

1 mark

(b) The next person to do a bungee jump is Jill.

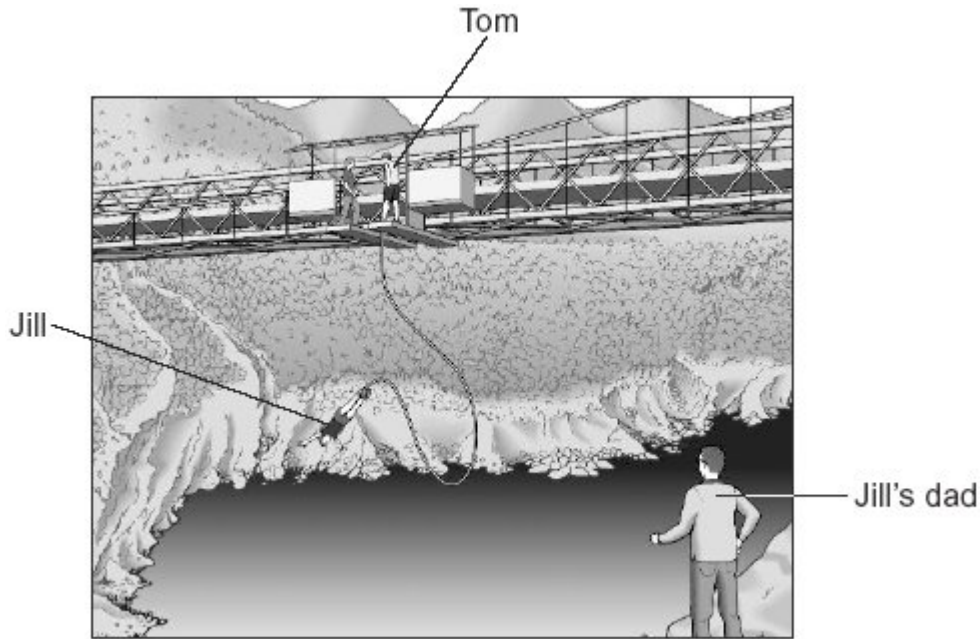
Jill weighs less than Tom.  
 Complete the sentence below using words from the box.

<b>more than</b>	<b>less than</b>	<b>the same as</b>
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When Jill jumps, the rope will stretch .....  
 it did when Tom jumped.

1 mark

- (c) Jill's dad watches her doing the bungee jump.  
 He is standing a long way from the bridge.  
 Jill shouts 'bungee' at the same time as she jumps off the bridge.  
 Jill's dad sees her jump before he hears her shout.



- (i) Why does Jill's dad **see** her jump before he **hears** her shout?

.....  
 .....

1 mark

- (ii) Tom is near Jill when she shouts. Her dad is far away.

Complete the sentence to describe how the shout will sound to Tom compared with Jill's dad. Use one word from the box.

<b>louder</b>	<b>higher</b>	<b>lower</b>	<b>quieter</b>
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The shout will sound ..... to Tom.

1 mark

- (iii) What part of Tom's ear vibrates when he hears Jill shout?

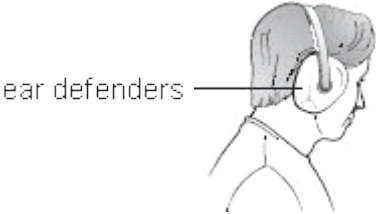
.....

1 mark  
 maximum 6 marks

2

Three pupils watched a firework display.

(a) A man lit the fireworks. He wore ear defenders.



Why should he wear ear defenders when he is close to loud fireworks?

.....

.....

1 mark

(b) A rocket exploded making a loud sound and a bright flash. Peter, Sabrina and Jan were standing at different distances from the rocket.



When the rocket exploded, Jan heard the quietest sound. Why did Jan hear the quietest sound?

.....

.....

1 mark

(c) Jan saw the flash before she heard the sound.

What does this tell you about the speed of light and the speed of sound?

.....  
.....

1 mark

(d) Complete the sentences below using words from the list.

**chemical    electrical    heat    light    sound**

(i) Jan, Sabrina and Peter could **see** the rocket explode because it gave out ..... energy.

1 mark

(ii) They could **hear** the rocket explode because it gave out ..... energy.

1 mark

(e) When the rocket stopped burning it fell to the ground. What force caused it to fall to the ground?

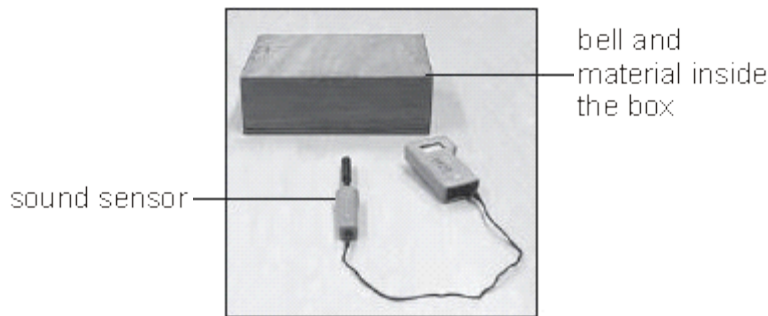
.....

1 mark

maximum 6 marks

**3**

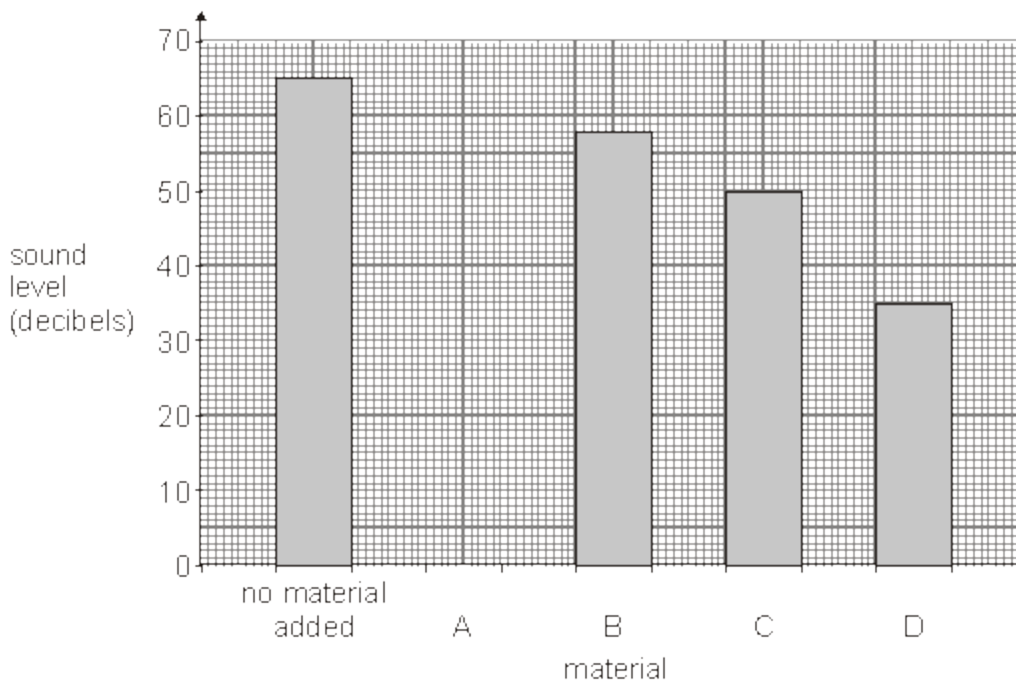
John investigated which material would be best for sound-proofing. He put a bell inside a box. He covered the bell with each material in turn. He put a sound sensor outside the box to record the sound level.



He tested different materials and got the following results.

material	sound level (decibels)
no material added	65
A	40
B	58
C	50
D	35

(a) On the chart below, draw the bar for **material A**.



1 mark

(b) How many types of material did John test?

.....

1 mark

(c) Which material was best at stopping the sound going through?  
Give the correct letter.

.....

1 mark

(d) Which **two** things should John have done to make his test fair?  
Tick the **two** correct boxes.

Use the same box each time.

Make sure a different person recorded the results each time.

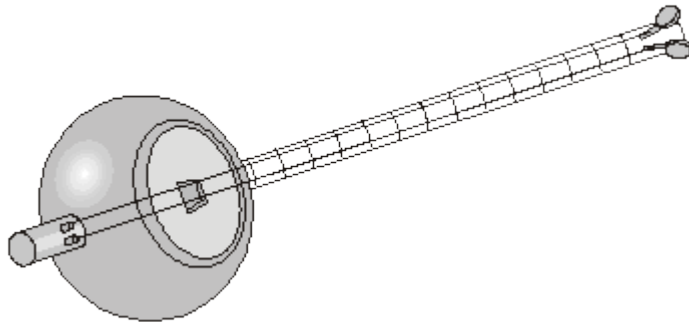
Use the same material each time.

Keep the distance between the sound sensor and the bell the same each time.

Test each material in a different room.

2 marks  
maximum 5 marks

**4** The dotar is a musical instrument with two strings.



(a) Aftal plays the dotar very quietly.

What must he do to the strings to make a louder sound?

.....

.....

1 mark

(b) Aftal makes the strings tighter so they vibrate more quickly.

How does this affect the sound produced by the strings?

Tick the correct box.

The sound has a lower pitch.

The sound is louder.

The sound has a higher pitch.

The sound is quieter.

1 mark

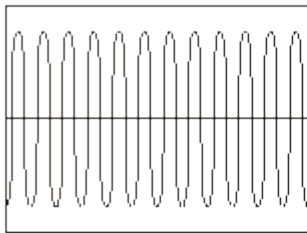
(c) One of the strings is thicker than the other, so it vibrates more slowly.

In what way is the sound made by the thicker string different from the sound made by the thinner string?

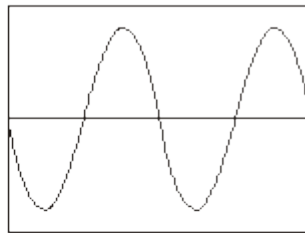
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1 mark

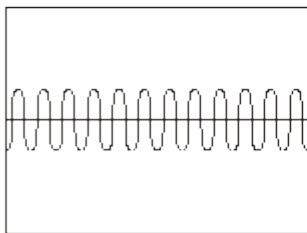
(d) Aftal played the dotar near a microphone connected to an oscilloscope. The diagrams below show the patterns made by four sounds.



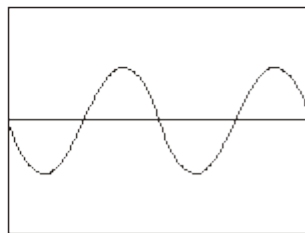
A



B



C



D

(i) How does the sound shown in trace A differ from the sound in trace B?

.....  
.....

1 mark

(ii) How does the sound shown in trace A differ from the sound in trace C?

.....  
.....

1 mark  
maximum 5 marks

5

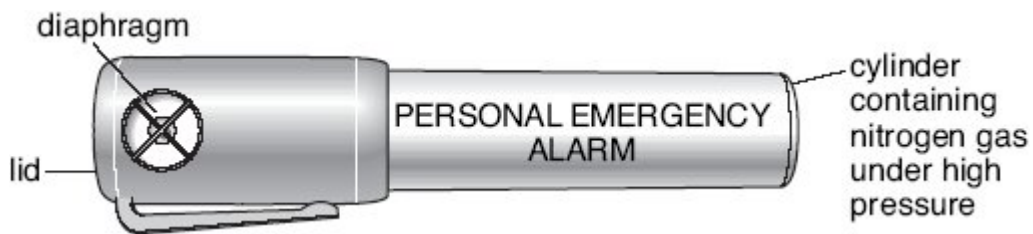
(a) (i) Air contains nitrogen.

In the box below draw **five** circles, ○, to show the arrangement of particles in nitrogen gas.



1 mark

(ii) Zeena carries a personal emergency alarm. It uses nitrogen gas to produce a very loud sound.



The nitrogen gas in the container is under much higher pressure than the nitrogen gas in the air.

How does the arrangement of nitrogen particles change when the gas is under higher pressure?

.....  
.....

1 mark

(b) Use words from the boxes below to complete the sentence.

**greater than**

**less than**

**the same as**

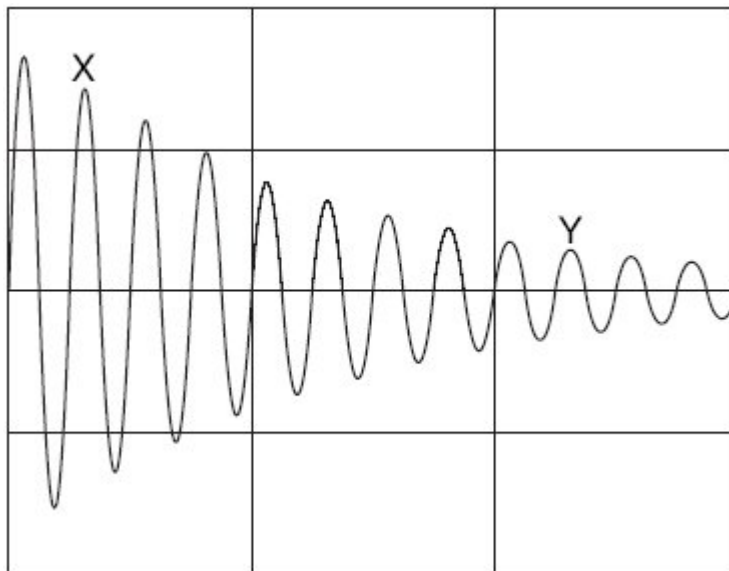
The rate at which the nitrogen particles hit the inside of the container is ..... the rate at which nitrogen particles hit the outside of the container.

1 mark



- (c) Zeena pushes the lid down and nitrogen gas escapes through the diaphragm. The diaphragm vibrates and produces a sound.

The pattern on the oscilloscope screen below represents the soundwave produced by the alarm.



- (i) The loudness of the sound produced by the alarm decreases between X and Y.

How can you tell this from the graph?

.....  
.....

1 mark

- (ii) The pitch of the sound produced by the alarm stays the same between X and Y.

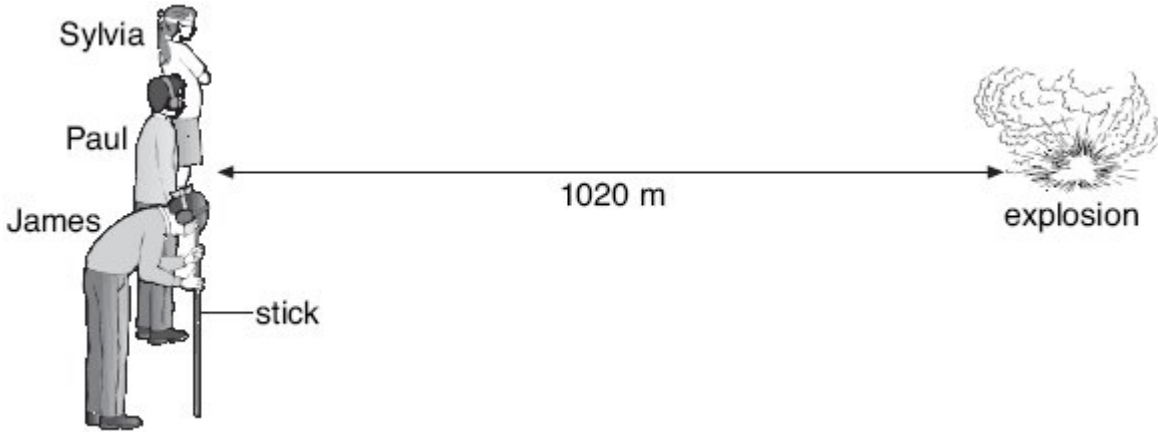
How can you tell this from the graph?

.....  
.....

1 mark  
maximum 5 marks

6

Three pupils took part in an investigation into the speed of sound. All three pupils stood 1020 m from an explosion.



- Sylvia wore a blindfold.
- Paul wore ear defenders.
- James wore a blindfold **and** ear defenders. He rested his head on a wooden stick pushed into the ground so that he could feel vibrations.

The explosion produced sound and light at the same time. The table shows the speed of sound in two different materials.

material	Speed of sound (m/s)
air	340
soil	3200

(a) Use all the information above to help you answer parts (i) and (ii) below.

(i) In which order would the pupils notice the explosion?

first .....

second .....

third .....

1 mark

(ii) From the information given, calculate the time it would take for the sound to travel through the air to Sylvia.

.....

..... **s**

1 mark

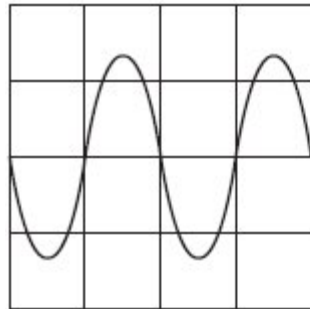
(b) Another pupil, Nasah, stood 2000 m away from the explosion.

- (i) The sound heard by Nasah was quieter than the sound heard by Sylvia.  
The further sound travels the quieter it becomes.  
Give the reason for this.

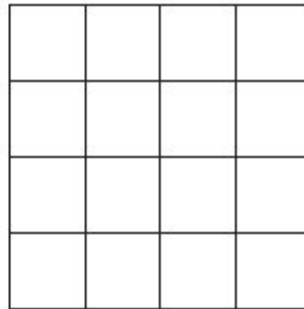
.....  
.....

1 mark

- (ii) The oscilloscope trace below represents the sound Sylvia heard.



Sylvia



Nasah

The sound Nasah heard was quieter but the pitch was the same.

On the right-hand grid, draw the trace to show the pattern of the sound Nasah heard.

2 marks  
maximum 5 marks