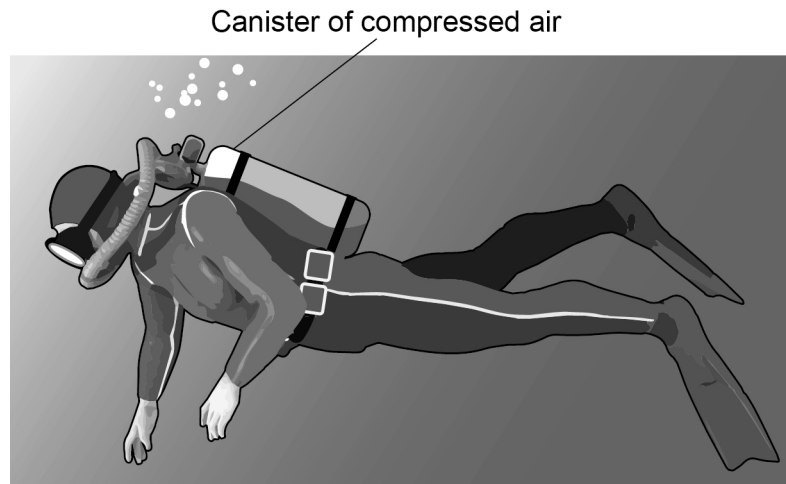


0 3

**Figure 5** shows a diver.

The diver is using a canister of compressed air so that he can breathe underwater.

**Figure 5**



0 3 . 1

Which **two** sentences describe the movement of the air particles in the canister?

[2 marks]

Tick **two** boxes.

They vibrate about a fixed position.

They move in random directions.

The motion of all the particles is predictable.

They move with a range of different speeds.

They move in circular paths.

0 3 . 2

The temperature of the air inside the canister increases.

What happens to the movement of the air particles?

[1 mark]

---

Turn over ►



0 3 . 3

It could be dangerous if the temperature of the air inside the canister increased by a large amount.

Explain why.

[2 marks]

---



---



---



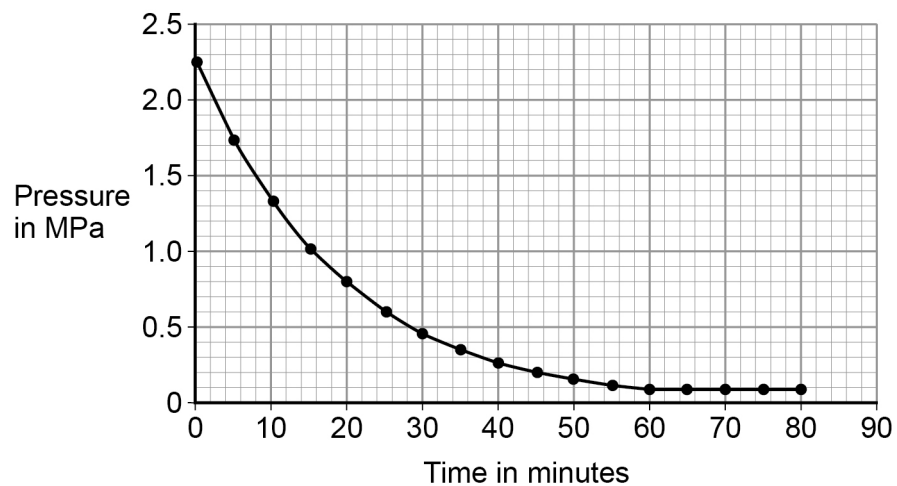
---

A canister of air was tested to find out how the pressure changed when it was used by a diver.

- Air was allowed to escape from the canister.
- The pressure of the air in the canister was recorded every 5 minutes for 80 minutes.

Figure 6 shows the results.

Figure 6



0 3 . 4

Estimate the atmospheric pressure.

Use Figure 6

[1 mark]

Atmospheric pressure = \_\_\_\_\_ MPa



**0 3 . 5** Divers can safely stay underwater until the pressure of the air in the canister has reduced to 25% of its original value.

Determine the maximum time the diver can safely stay underwater.

Use **Figure 6**

**[3 marks]**

---

---

Time = \_\_\_\_\_ minutes

**0 3 . 6** What happens to the volume of the air when it is released from the canister?

**[1 mark]**

---

**Turn over for the next question**

10

**Turn over ►**



Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>03.1</b>	they move in random directions		1	AO1 6.3.3.1
	they move with a range of different speeds		1	
<b>03.2</b>	the (mean) speed of the particles would increase	allow kinetic energy increases	1	AO1 6.3.3.1
<b>03.3</b>	(if the temperature increases) the pressure increases	allow an explanation in terms of large pressure difference	1	AO1 6.3.3.1
	so it could explode		1	AO2 6.3.3.1
<b>03.4</b>	p = 0.1 (MPa)		1	AO2 6.3.3.1
<b>03.5</b>	$p = 2.25 \times \left(\frac{25}{100}\right)$	an answer of 27 scores 3 marks allow any correct method of determining 25% of 2.25 allow use of 2.2–2.3	1	AO3 6.3.3.1
	p = 0.56	allow 0.55–0.575	1	
	t = 27 (minutes)	allow 26–28 minutes allow correct value of t using their calculated value of p	1	
<b>03.6</b>	(the volume of the air) increases		1	AO1 6.3.3.1
<b>Total</b>			<b>10</b>	