

# GROUP 0 ELEMENTS 1

Q1. The table shows five noble gases and their boiling points.

Noble gas	Boiling point in °C
Helium	-269
Neon	-246
Argon	-186
Krypton	-152
Xenon	-107

Match properties, A, B, C and D, with the numbers 1– 4 in the sentences.

- A boiling point
- B colour
- C density
- D chemical reactivity

Argon is used in filament lamps because of its low ... 1 ...

In electric discharge tubes, used for advertisement signs, each noble gas glows with a different ... 2 ...

Helium is used in balloons because it has a low ... 3 ...

Xenon has the highest ... 4 ...

(4 marks)

**Q2.** The table shows the abundance in the Earth's atmosphere of each of four noble gases.

<b>Noble gas</b>	<b>Abundance (percentage in the atmosphere by volume)</b>
Argon	0.9300
Neon	0.0018
Helium	0.0005
Krypton	0.0001

Match properties, A, B, C and D, with the numbers 1– 4 in the sentences.

- A abundance
- B colour
- C density
- D reactivity

Argon is used in filament lamps because of its low chemical . . . 1 . . . .

Neon is used in electric discharge tubes for advertising signs because it produces a bright . . . 2 . . . .

Helium is used in balloons because it has a low . . . 3 . . . .

Krypton is the noble gas in the table with the lowest . . . 4 . . . .

(4 marks)

**Q3.** The atmosphere is made up of many different gases. The abundance, melting points, and the boiling points of the noble gases are given in the table.

<b>Noble gas</b>	<b>Abundance (percentage in the atmosphere by volume)</b>	<b>Melting point in °C</b>	<b>Boiling point in °C</b>
Helium	0.0005	-272	-269
Neon	0.0018	-248	-229
Argon	0.93	-189	-186
Krypton	0.0001	-157	-153
Xenon	0.000009	-112	-108

(a) Which of the following statements about the gases in the atmosphere is correct?

- 1 There is about 10 times as much argon as krypton.
- 2 There is about 20 times as much oxygen as argon.
- 3 There is about 4 times as much oxygen as nitrogen.
- 4 There is about 5 times as much nitrogen as oxygen.

(1 mark)

(b) Which noble gas is liquid over the largest temperature range?

- 1 neon
- 2 krypton
- 3 helium
- 4 argon

(1 mark)

(c) Which row in the table below correctly describes the properties of the noble gases?

	<b>Melting point/boiling point</b>	<b>Use</b>	<b>Position in the periodic table</b>
<b>1</b>	Melting point above room temperature (20 °C)	Provides a reactive atmosphere	In group 0
<b>2</b>	Melting point below room temperature (20 °C)	Provides an unreactive atmosphere	In group 7
<b>3</b>	Boiling point below room temperature	Provides a reactive atmosphere	In group 1
<b>4</b>	Boiling point is higher than the melting point	Provides an unreactive atmosphere	In group 0

(1 mark)

- (d) The average concentration of carbon dioxide in the atmosphere is about 390 parts per million (0.039 %). Which row in the table below shows the best way to measure this amount?

	Instrument reading to . . .	How readings are taken and used
1	10 parts per million	In several locations in a small area and take an average
2	2 parts per million	Average the highest and lowest values obtained
3	10 parts per million	Take values from industrialised areas and take an average
4	2 parts per million	Average the values taken over a large number of randomly selected locations

(1 mark)

- Q4. Look at the following table.

	Gas	Percentage (%) in the atmosphere	Melting point in °C	Boiling point in °C	Density in g per cm <sup>3</sup>
A	Argon	0.9	-189	-186	0.0037
B	Helium	0.0005	-272	-269	0.0002
C	Neon	0.002	-248	-246	0.0009
D	Xenon	0.000009	-112	-109	0.0059

Match gases, A, B, C and D, with the numbers 1– 4 in the sentences.

The noble gas with the highest density is . . . 1 . . . .

The most abundant noble gas is . . . 2 . . . .

The noble gas with the smallest temperature range between melting point and boiling point is . . . 3 . . . .

The noble gas with the lowest boiling point is . . . 4 . . . .

(4 marks)

- Q5. Why is neon in the same group of the periodic table as helium?

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(1 mark)

Total marks (17)