

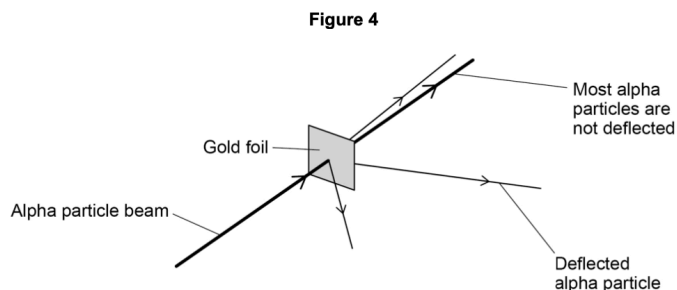
The nuclear model and the development of the atom

Q1. (2020)

In the alpha particle scattering experiment alpha particles are fired at gold foil.

Alpha particles are positively charged.

Figure 4 shows the results.



A)

0 3 . 1 Some alpha particles are deflected.

Complete the sentence.

Choose the answer from the box.

[1 mark]

negatively charged not charged positively charged

Some alpha particles are deflected because

the nucleus of the atom is _____.

B)

0 3 . 2 Why are most alpha particles **not** deflected?

[1 mark]

Tick (✓) **one** box.

The atom is a tiny sphere that cannot be divided.

☐

The atom is mainly empty space.

☐

The electrons orbit the nucleus at specific distances.

☐

C)

0 3 . 3 What was **one** conclusion from the alpha particle scattering experiment?

[1 mark]

Tick (✓) **one** box.

The mass is concentrated at the centre of the atom.

☐

The mass is concentrated at the edge of the atom.

☐

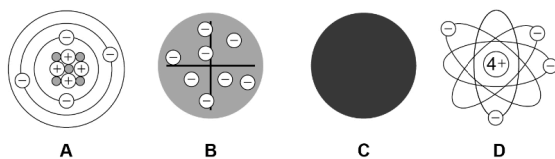
The mass is spread evenly throughout the atom.

☐

Q2. (2021)

Figure 12 represents different models of the atom.

Figure 12



A)

0 6 . 2 Which model represents the plum pudding model?

[1 mark]

Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐

B)

0 6 . 3 Which model resulted from Chadwick's experimental work?

[1 mark]

Tick (✓) **one** box.

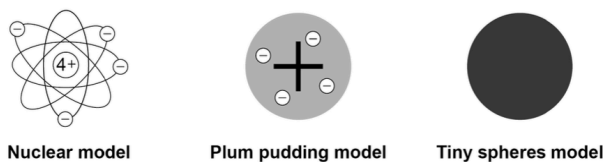
A ☐ B ☐ C ☐ D ☐

Q3. (2023)

Experimental evidence led to the scientific model of the atom changing over time.

0 1 . 6 Figure 4 shows three models for the atom.

Figure 4



What is the order for the development of the model of the atom?

[1 mark]

Tick (✓) **one** box.

	→		→		☐
	→		→		☐
	→		→		☐
	→		→		☐

Q4. (2023)

01.7

Complete the sentence.

Choose the answer from the box.

[1 mark]

Bohr	Chadwick	Mendeleev
------	----------	-----------

The existence of neutrons was discovered by _____.

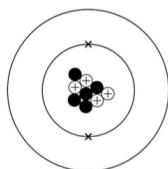
Relative electrical charges of subatomic particles

Q1. (2023)

0	1	2
---	---	---

 Figure 2 represents a beryllium ion.

Figure 2



What is the relative charge on a beryllium ion?

[1 mark]

Tick (✓) **one** box.

0

☐

+1

☐

+2

☐

Size and mass of atoms

Q1. (2018)

A)

02.6 How does the size of a chlorine atom compare with the size of a bromine atom?

Complete the sentence.

Choose the answer from the box.

[1 mark]

bigger than the same size as smaller than

A chlorine atom is _____ a bromine atom.

B)

02.7 Give a reason for your answer to question **02.6**

[1 mark]

Reason _____

Q2. (2021)

03.1 What is the approximate radius of a carbon atom?

[1 mark]

Tick (✓) **one** box.

0.1 m

☐

0.1 mm

☐

0.1 nm

☐

Q3. (2024)

01.2 A potassium atom is very small.

What is the radius of a potassium atom?

[1 mark]

Tick (✓) **one** box.

0.2 cm

☐

0.2 mm

☐

0.2 nm

☐

Relative atomic mass, isotopes, and abundance

Q1. (2021)

Potassium has different isotopes.

0 6 . 4 What is meant by 'isotopes'?

You should refer to subatomic particles.

[2 marks]

Q2. (2021)

0 6 . 5 **Table 2** shows the mass numbers and the percentage abundance of two isotopes of potassium.

Table 2

Mass number	Percentage abundance
39	93.1
41	6.9

Calculate the relative atomic mass (A_r) of potassium.

Give your answer to 1 decimal place.

[3 marks]

Q3. (2024)

0 1 . 7 Potassium has two isotopes.

Table 2 shows the percentage (%) abundance of the two isotopes.

Table 2

Isotope	Percentage (%) abundance
$^{39}_{19}\text{K}$	93
$^{41}_{19}\text{K}$	7

How is the relative atomic mass (A_r) of potassium calculated?

Tick (✓) **one** box.

[1 mark]

$$A_r = \frac{(39 \times 7) + (41 \times 93)}{100} \quad \boxed{}$$

$$A_r = \frac{(39 \times 93) + (41 \times 7)}{100} \quad \boxed{}$$

$$A_r = \frac{(39 \times 41) + (93 \times 7)}{100} \quad \boxed{}$$

The Periodic Table: development and modern layout

Q1. (2018)

0 4 . 1 **Figure 9** shows the positions of four elements, **A**, **B**, **C**, and **D**, in the periodic table.

Figure 9

	B															D
A												C				

Which element is in Group 2?

[1 mark]

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Q2. (2019)

What order did scientists use to arrange elements in early periodic tables?

[1 mark]

Tick (✓) **one** box.

Atomic weight of element

7

Number of neutrons in an atom of element

7

Size of atoms of element

7

Year element was discovered

7

Q3. (2019)

0 3 2 In early periodic tables some elements were placed in the wrong groups.

Mendeleev overcame some of these problems in his periodic table.

Complete the sentence.

[1 mark]

Mendeleev did this by leaving _____ for elements that had not been discovered.

Q4. (2020)

0 5 . 1 What property was used to arrange elements in early periodic tables?

[1 mark]

Tick (✓) **one** box.

Atomic number

7

Atomic weight

1

Mass number

9

Q5. (2020)

0 5 . 2 In early periodic tables, iodine (I) was placed before tellurium (Te).

Mendeleev placed iodine after tellurium.

Figure 7 shows part of Mendeleev's periodic table.

Figure 7

16 O	19 F
32 S	35.5 Cl
79 Se	80 Br
128 Te	127 I

Suggest **one** reason why Mendeleev placed iodine in the column shown in Figure 7.

[1 mark]

Q6. (2021)

0 6 . 1 Figure 11 shows part of Mendeleev's version of the periodic table.

Figure 11

H							
Li	Be	B	C	N	O	F	
Na	Mg	Al	Si	P	S	Cl	
K	Ca	Zn	Ti	V	Cr	Mn	Fe Co Ni
Rb	Sr	Y	Zr	Nb	Mo		Ru Rh Pd
Ag	Cd	In	Sn	Sb	Te	I	

Which group of elements had **not** been discovered when Mendeleev's version of the periodic table was published?

[1 mark]

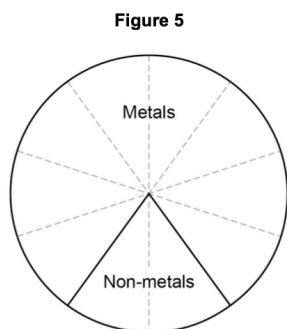
Metals and non-metals

Q1. (2019)

0 5 . 1 What is the state symbol of oxygen at room temperature?

[1 mark]

Q2. (2020)

0 4 . 1 **Figure 5** shows the proportion of elements in the periodic table that are metals and non-metals.Determine the percentage of the elements in **Figure 5** that are metals.

[2 marks]

Percentage = _____ %

Q3. (2020)

0 4 . 2 Give **two** physical properties of metals.

[2 marks]

1 _____

2 _____

Group 0 – Noble gases

Q1. (2019)

0 3 . 3 What is the name of the group that contains argon?

[1 mark]

Tick (✓) **one** box.

Alkali metals

☐

Halogens

☐

Noble gases

☐

Q2. (2019)

0 3 . 7 Why is argon unreactive?

[1 mark]

Q3. (2022)

0 4 . 4 Argon is a noble gas.

Explain why **no** product is formed when magnesium and argon are heated together.

[2 marks]

Q4. (2023)

0 3 Structure and bonding is used to explain properties of compounds.

Metal atoms react with non-metal atoms to form ions.

0 3 . 1 Which group of elements does **not** form ions?

[1 mark]

Tick (✓) **one** box.

Alkali metals

☐

Halogens

☐

Noble gases

☐

Q5. (2023)

0 5 . 4 Complete the sentence.

Choose the answer from the box.

[1 mark]

argon

chlorine

hydrogen

The gas used for the inert atmosphere is _____.

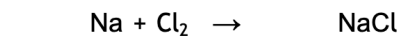
Group 1 – Alkali metals

Q1. (2019)

0 4 . 1 Sodium reacts with chlorine to produce sodium chloride.

Balance the equation for the reaction.

[1 mark]



Q2. (2020)

Table 3 shows the melting points of three Group 1 metals.

Table 3

Metal	Melting point in °C
Lithium	180
Sodium	98
Potassium	63

A)

0 5 . 3 What state is lithium at 100 °C?

Use Table 3.

Tick (✓) **one** box.

[1 mark]

Gas ☐ Liquid ☐ Solid ☐

B)

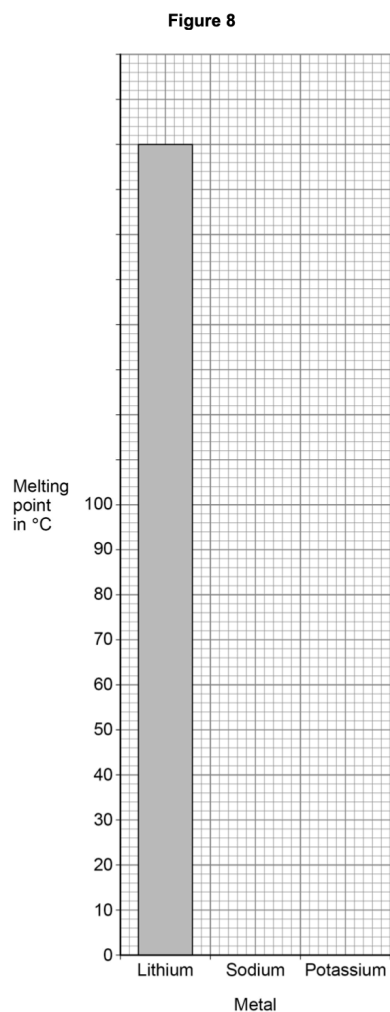
0 5 . 4 Complete the graph in Figure 8.

Use Table 3.

You should:

- complete the scale on the y-axis
- draw bars to show the melting points of sodium and potassium.

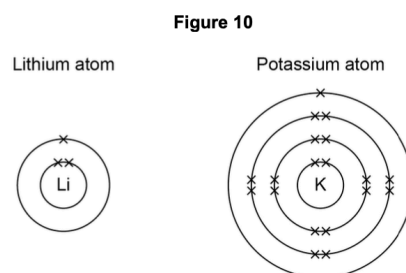
[3 marks]



Q3. (2020)

0 5 . 6 Lithium and potassium are in the same group of the periodic table.

Figure 10 represents the electronic structures of a lithium atom and of a potassium atom.



Give **two** reasons why potassium is more reactive than lithium.

[2 marks]

- 1 _____
- 2 _____

Q4. (2021)

0 4 Sodium and potassium are Group 1 elements.

0 4 . 1 What is the name of Group 1 elements?

[1 mark]

Tick (✓) **one** box.

Alkali metals ☐

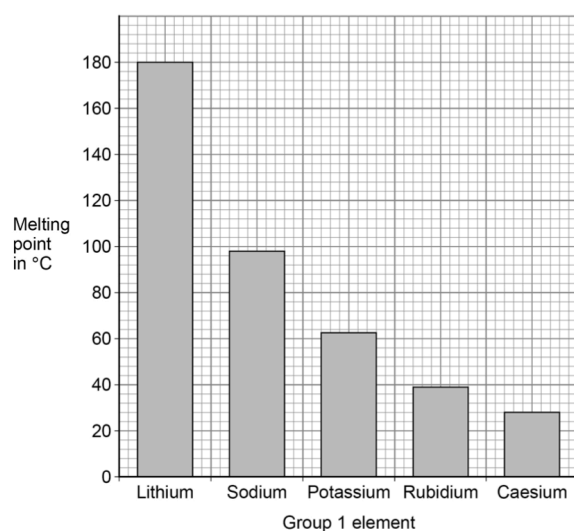
Halogens ☐

Noble gases ☐

Q5. (2021)

0 4 . 2 **Figure 5** represents the melting points of Group 1 elements.

Figure 5



What is the melting point of sodium?

[1 mark]

Melting point of sodium = _____ °C

Q6. (2022)

0 1 . 1 What are the Group 1 elements known as?

[1 mark]

Tick (✓) **one** box.

Alkali metals ☐

Halogens ☐

Noble gases ☐

Q7. (2022)

0 1 . 3 What is the relative charge on a lithium ion?

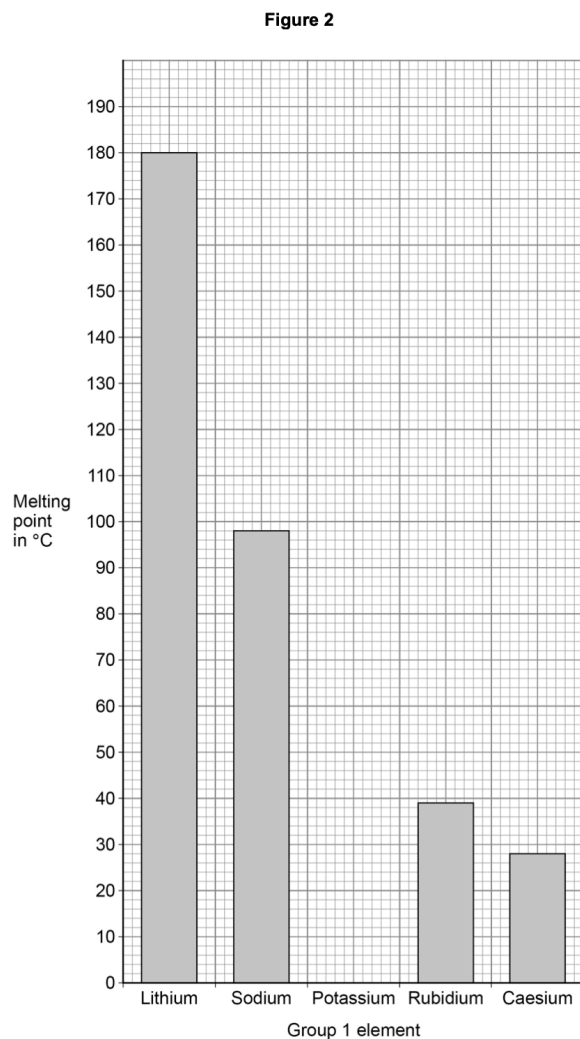
[1 mark]

Tick (✓) **one** box.

+1 ☐ 0 ☐ -1 ☐

Q8. (2022)

Figure 2 represents the melting points of some Group 1 elements.



A)

0 1 . 5

What is the melting point of caesium?

Use **Figure 2**.

[1 mark]

Melting point = _____ °C

B)

0 1 . 6

The melting point of potassium is 63 °C

Draw a bar for the melting point of potassium on **Figure 2**.

[1 mark]

C)

0 1 . 7

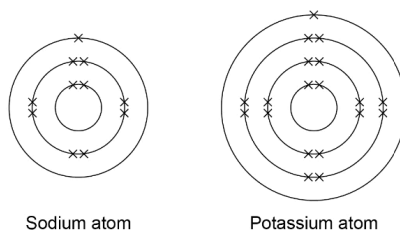
Describe the trend of the melting points of the Group 1 elements in **Figure 2**.

[3 marks]

Q9. (2022)

0 1 . 9 Figure 3 represents the electronic structure of a sodium atom and of a potassium atom.

Figure 3



Complete the sentence.

Choose the answer from the box.

[1 mark]

gains an electron

loses an electron

shares an electron

Potassium is more reactive than sodium because potassium more easily _____.

Q10. (2024)

0 1 . 1 What name is given to Group 1 elements?

[1 mark]

Tick (✓) **one** box.

Alkali metals

☐

Halogens

☐

Noble gases

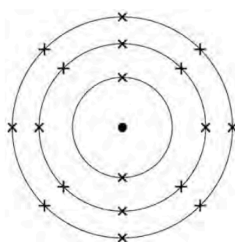
☐

Q11. (2024)

0 1 . 5 The electronic structure of a potassium atom is 2,8,8,1

Figure 1 represents the electronic structure of a potassium ion.

Figure 1



What is the charge on a potassium ion?

[1 mark]

Tick (✓) **one** box.

-1

☐

0

☐

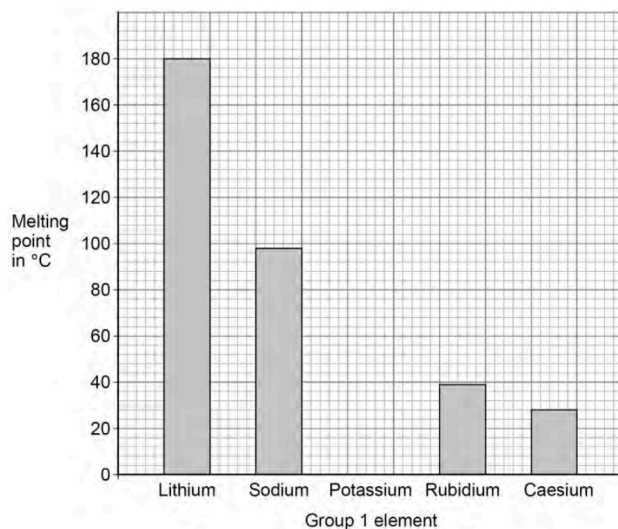
+1

☐

Q12. (2024)

0 1 . 6 Figure 2 shows the melting points of some Group 1 elements.

Figure 2



Predict the melting point of potassium.

[1 mark]

Melting point = _____ °C

Group 7 – Halogens

Q1. (2018)

0 2 . 1 Which group in the periodic table is known as the halogens?

[1 mark]

Tick **one** box.

Group 1

☐

Group 2

☐

Group 7

☐

Group 0

☐

Q2. (2018)

0 2 . 3 Chlorine reacts with potassium bromide solution.

[2 marks]

Complete the word equation.

chlorine + potassium bromide → _____ + _____

Q3. (2018)

0 2 . 4 What type of reaction happens when chlorine reacts with potassium bromide solution?

[1 mark]

Tick **one** box.

decomposition

☐

displacement

☐

neutralisation

☐

precipitation

☐

Q4. (2018)

0 2 . 5 Complete the sentence.

Choose the answer from the box.

[1 mark]

an atom

an electron

a neutron

a proton

Chlorine is more reactive than bromine.

This is because chlorine gains _____ more easily.

Q5. (2018)

0 2 . 6 How does the size of a chlorine atom compare with the size of a bromine atom?

Complete the sentence.

Choose the answer from the box.

[1 mark]

bigger than	the same size as	smaller than
-------------	------------------	--------------

A chlorine atom is _____ a bromine atom.

Q6. (2018)

0 2 . 7 Give a reason for your answer to question **02.6**

[1 mark]

Reason _____

Q7. (2018)

0 2 . 9 Explain why fluorine is a gas at room temperature.

Use the following words in your answer:

energy forces molecules weak

[3 marks]

Q8. (2020)

0 3 . 4 What are Group 7 elements known as?

[1 mark]

Tick (✓) **one** box.

Alkali metals ☐

Halogens ☐

Noble gases ☐

Q9. (2020)

0 3 . 5 Fluorine, chlorine and bromine react with gold.

Which element will be the most reactive with gold?

[1 mark]

Tick (✓) **one** box.

Fluorine ☐

Chlorine ☐

Bromine ☐