AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.1.2.6

Group 7

Past-paper questions

Tier	**Foundation**
Question groups	**6**
Available paper years	**2018–2023**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

5.1.2.6 Group 7

Question 01

June 2018 | 8464/C/1F | Original Q2

0 2 This question is about the halogens.

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 ☐

0 2 . 2 A fluorine atom has 7 electrons in the outer shell.

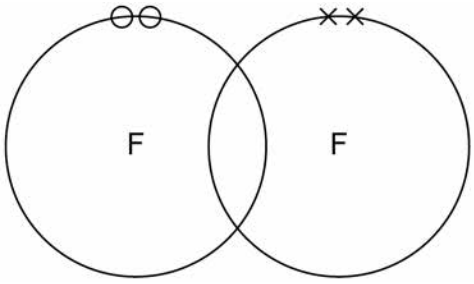
Figure 8 shows part of a dot and cross diagram to represent a molecule of fluorine (F_2).

Complete the dot and cross diagram.

You should show only the electrons in the outer shells.

[2 marks]

Figure 8



0 2 . 3 Chlorine reacts with potassium bromide solution.

Complete the word equation.

[2 marks]

chlorine + potassium bromide → _____ + _____

5.1.2.6 Group 7

Question 01 · continued

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

[1 mark]

Tick **one** box.

decomposition ☐

displacement ☐

neutralisation ☐

precipitation ☐

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.

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.

5.1.2.6 Group 7

Question 01 · continued

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

[1 mark]

Reason _____

_____

0 2 . 8 Fluorine reacts with chlorine to produce ClF_3

Balance the chemical equation for the reaction.

[1 mark]

$Cl_2 +$ _____ $F_2 \rightarrow 2\ ClF_3$

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]

13

5.1.2.6 Group 7

Question 02

June 2019 | 8464/C/1F | Original Q4

0 4 This question is about Group 1 elements.

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

Balance the equation for the reaction.

[1 mark]

$$____ Na + Cl_2 \rightarrow ____ NaCl$$

0 4 . 2 4.6 g of sodium reacts with chlorine to produce 11.7 g of sodium chloride.

What mass of chlorine reacted?

[1 mark]

Mass of chlorine = _____ g

0 4 . 3 A teacher puts hot sodium into a gas jar of chlorine.

The changes seen before, during and after this reaction were observed.

Complete the sentences.

Choose the answers from the box.

[4 marks]

colourless	**green**	**lilac**	**silver**	**white**	**yellow**

Sodium is a _____ solid.

Chlorine is a _____ gas.

The hot sodium burns with a _____ flame.

The product sodium chloride is a _____ solid.

5.1.2.6 Group 7

Question 02 · continued

0 4 . 4 Sodium chloride (NaCl) is an ionic compound.

Write the formulae of the ions in sodium chloride.

[2 marks]

Sodium ion _____

Chloride ion _____

0 4 . 5 Complete the sentence.

Choose the answer from the box.

[1 mark]

an atom	**an electron**	**a neutron**	**a proton**

Potassium is more reactive than sodium.

This is because potassium loses _____ more easily than sodium.

0 4 . 6 How does the size of a potassium atom compare with the size of a sodium atom?

Give a reason for your answer.

[2 marks]

_____

Reason _____

_____

_____

11

5.1.2.6 Group 7

Question 03

November 2020 | 8464/C/1F | Original Q3

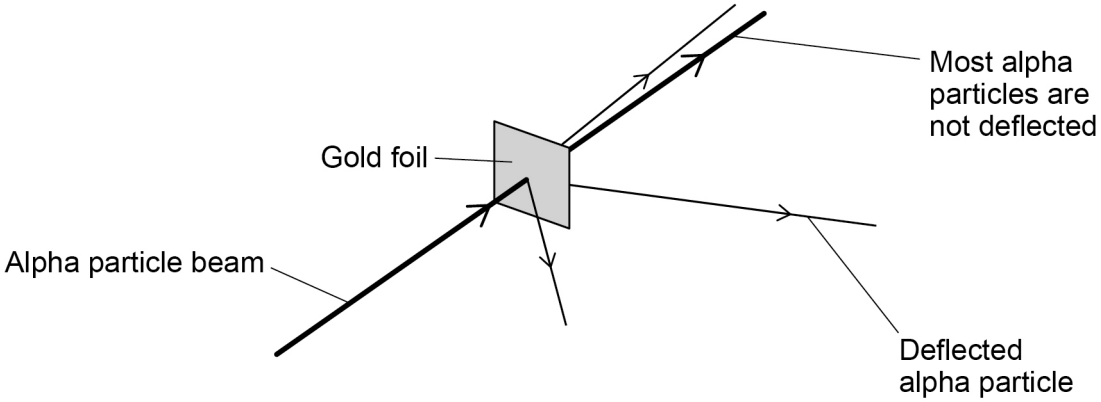
0 3 This question is about gold and compounds of gold.

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

Alpha particles are positively charged.

Figure 4 shows the results.

Figure 4



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 _____.

Question 03 · continued

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. ☐

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. ☐

Gold reacts with the elements in Group 7 of the periodic table.

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

[1 mark]

Tick (✓) **one** box.

- Alkali metals ☐
- Halogens ☐
- Noble gases ☐

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 ☐

0 3 . 6 3.94 g of gold reacts with chlorine to produce 6.07 g of gold chloride.

The word equation for the reaction is:

gold + chlorine → gold chloride

Calculate the mass of chlorine that reacts with 3.94 g of gold.

[1 mark]

Mass = _____ g

0 3 . 7 Calculate the relative formula mass (M_r) of gold chloride ($AuCl_3$).

Relative atomic masses (A_r): Cl = 35.5 Au = 197

[2 marks]

Relative formula mass (M_r) = _____

8

5.1.2.6 Group 7

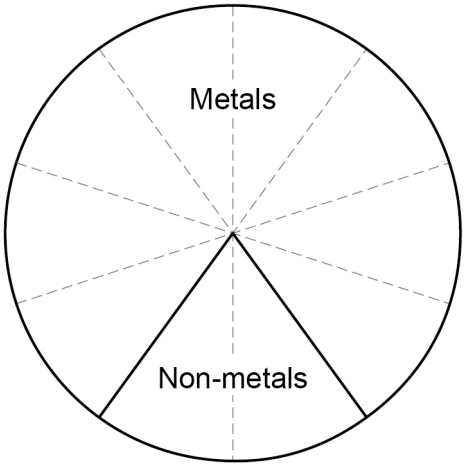
Question 04

November 2020 | 8464/C/1F | Original Q4

0 4 This question is about elements and compounds.

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

Figure 5



Determine the percentage of the elements in **Figure 5** that are metals.

[2 marks]

Percentage = _____ %

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

[2 marks]

1 _____

2 _____

0 4 . 3 Sodium reacts with chlorine to produce sodium chloride.

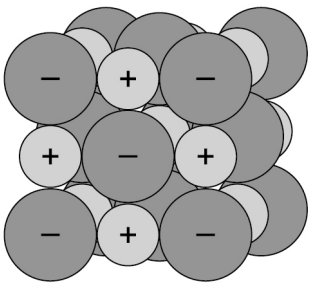
Balance the equation for the reaction.

[1 mark]

_____ $Na + Cl_2 \rightarrow$ _____ $NaCl$

Figure 6 shows part of the structure of sodium chloride (NaCl).

Figure 6



Sodium chloride

0 4 . 4 What holds the particles together in sodium chloride?

Use **Figure 6**.

[1 mark]

Tick (✓) **one** box.

Electrostatic attractions ☐

Intermolecular forces ☐

Metallic bonds ☐

0 4 . 5 Solid sodium chloride does not conduct electricity.

Give **two** ways in which sodium chloride can be made to conduct electricity.

[2 marks]

1 _____

_____

2 _____

_____

8

5.1.2.6 Group 7

Question 05

November 2020 | 8464/C/1F | Original Q5

0 5 This question is about elements in the periodic table.

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

[1 mark]

Tick (✓) **one** box.

Atomic number ☐

Atomic weight ☐

Mass number ☐

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]

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

Table 3

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

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

Use **Table 3**.

[1 mark]

Tick (✓) **one** box.

Gas ☐ Liquid ☐ Solid ☐

0 5 . 4 Complete the graph in **Figure 8**.

Use **Table 3**.

You should:

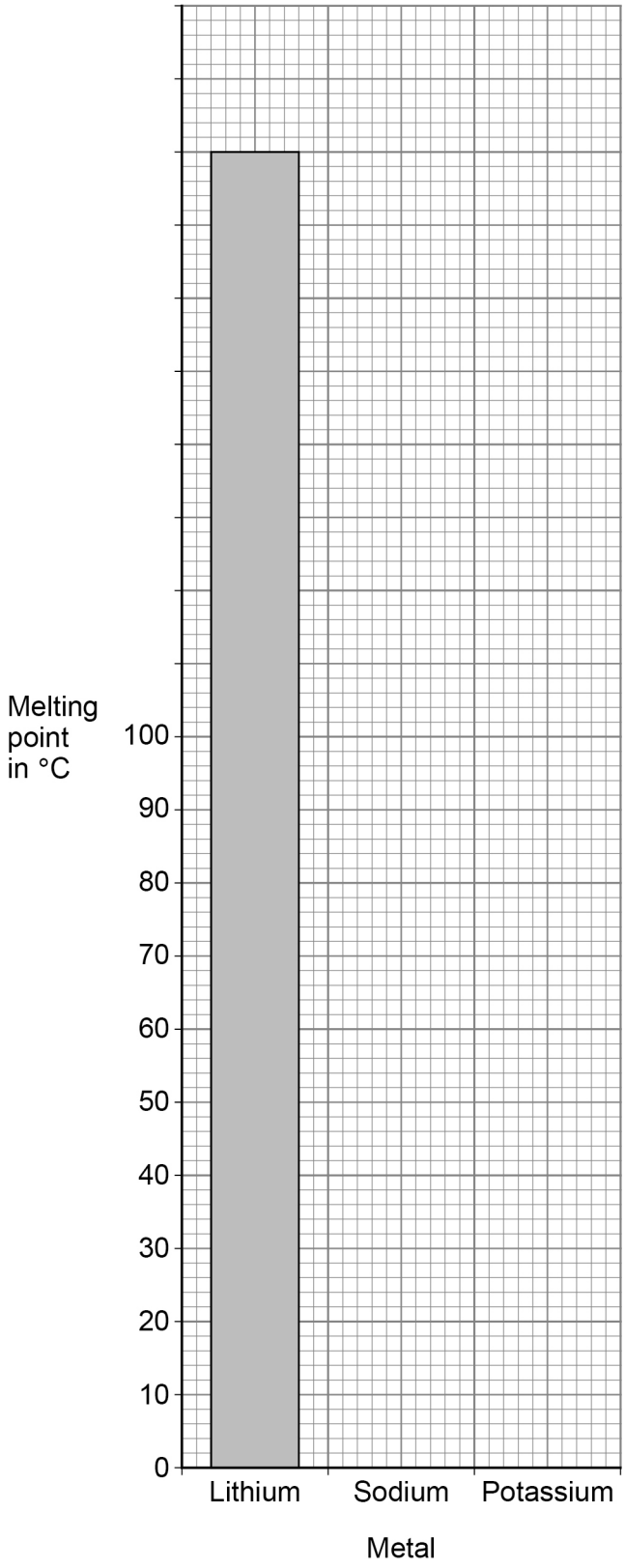
- complete the scale on the y-axis
- draw bars to show the melting points of sodium and potassium.

[3 marks]

5.1.2.6 Group 7

Question 05 · continued

Figure 8



5.1.2.6 Group 7

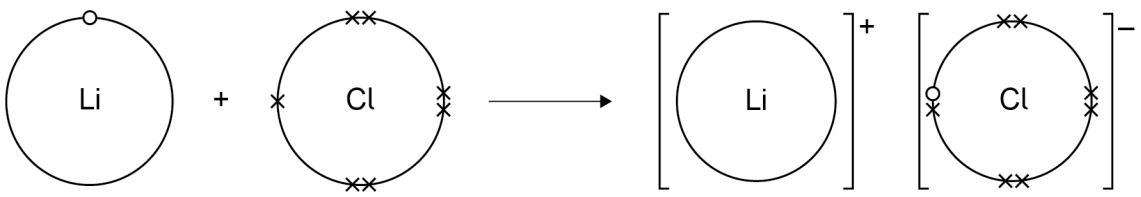
Question 05 · continued

0 5 . 5 Lithium reacts with chlorine to produce lithium chloride.

Figure 9 shows what happens to the electrons in the outer shells when a lithium atom reacts with a chlorine atom.

The dots (o) and crosses (x) represent electrons.

Figure 9



Describe what happens to a lithium atom and to a chlorine atom when they react.

Use **Figure 9** to answer in terms of electrons.

[3 marks]

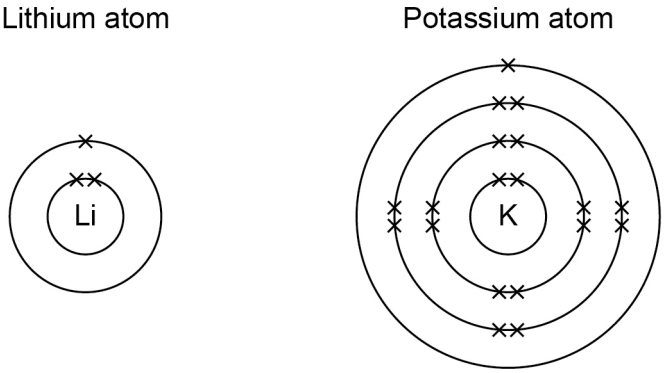
5.1.2.6 Group 7

Question 05 · continued

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.

Figure 10



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

[2 marks]

1 _____

_____

2 _____

_____

11

5.1.2.6 Group 7

Question 06

June 2023 | 8464/C/1F | Original Q3

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 ☐

Question 3 continues on the next page

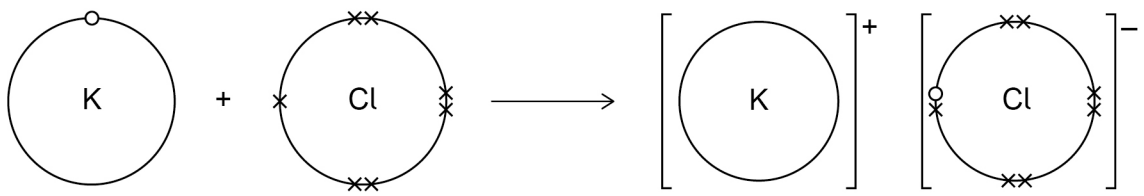
5.1.2.6 Group 7

0 3 . 2 Potassium reacts with chlorine to produce potassium chloride (KCl).

Figure 6 shows what happens to the electrons in the outer shells when a potassium atom reacts with a chlorine atom.

The dots (o) and crosses (×) represent electrons.

Figure 6



Describe what happens when a potassium atom reacts with a chlorine atom to produce potassium chloride.

Answer in terms of electrons.

[4 marks]

5.1.2.6 Group 7

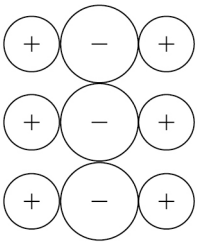
Question 06 · continued

0 3 . 3 In solid ionic compounds, oppositely charged ions attract to form a giant structure.

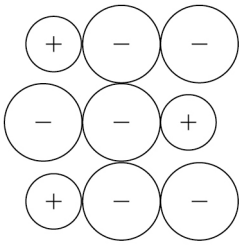
Which structure represents the arrangement of ions in solid potassium chloride?

[1 mark]

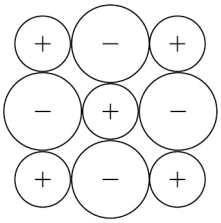
Tick (✓) **one** box.



☐



☐



☐

Question 3 continues on the next page

Non-metal atoms share electrons to form covalent bonds.

0 3 . 4 Water (H_2O) is a covalent molecule.

Table 2 shows the number of electrons in the outer shells of hydrogen atoms and of oxygen atoms.

Table 2

Element	Number of electrons in the outer shell of an atom
Hydrogen	1
Oxygen	6

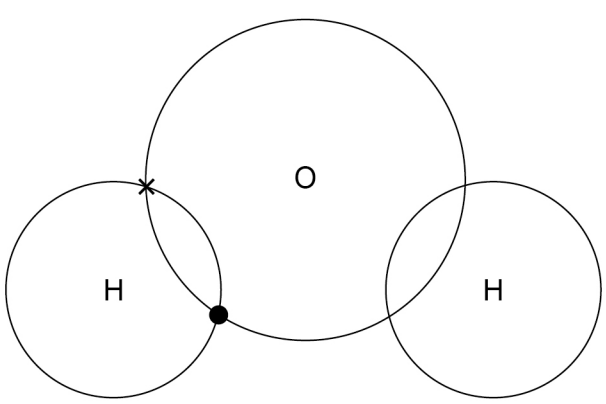
Figure 7 shows part of a dot and cross diagram for a molecule of water.

Complete the dot and cross diagram.

You should only show electrons in the outer shells.

[2 marks]

Figure 7



Question 06 · continued

0 3 . 5 Silica has a giant covalent structure.

Figure 8 represents the structure of silica.

Figure 8



Determine the ratio of silicon (Si) atoms to oxygen (O) atoms in silica.

Use **Figure 8**.

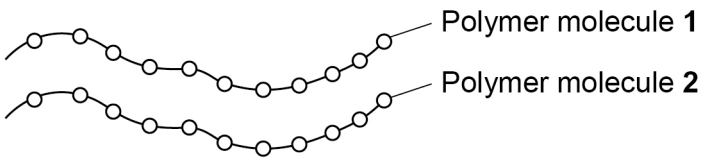
[1 mark]

_____ Si : _____ O

0 3 . 6 Polymers have very large molecules.

Figure 9 represents part of the structure of a polymer.

Figure 9



What holds polymer molecule **1** and polymer molecule **2** together in a polymer?

[1 mark]

Tick (✓) **one** box.

Covalent bonds ☐

Electrostatic attraction between ions ☐

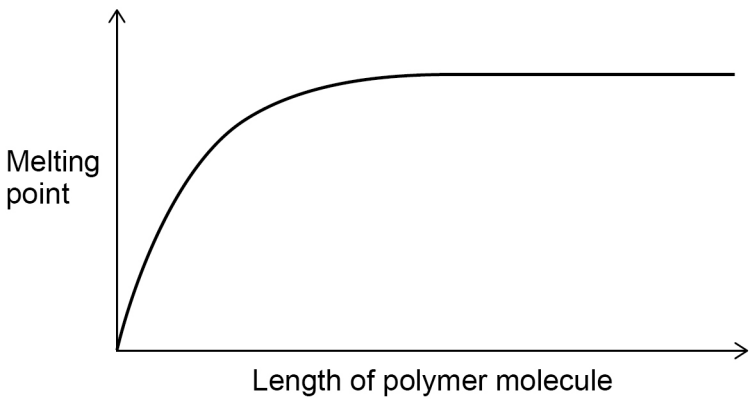
Weak intermolecular forces ☐

5.1.2.6 Group 7

Question 06 · continued

0 3 . 7 **Figure 10** shows the melting point of a polymer as the length of the polymer molecule increases.

Figure 10



Describe the trend shown in **Figure 10**.

[3 marks]

13