

GCSE Combined Science: Trilogy

Worksheet: Group 7

TIME 30 min	TOTAL 30 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Group 7

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

The halogens are the elements in Group 7.

0 1 . 1

Which halogen is a liquid at room temperature?

Tick (✓) **one** box.

Chlorine

☐

Bromine

☐

Iodine

☐

Fluorine

☐

[1 mark]

0 1 . 2

Give the charge on a halide ion.

.....

.....

.....

.....

[1 mark]

0 2

Chlorine, bromine and iodine are Group 7 elements.

0 2 . 1

What name is given to the elements in Group 7?

.....

.....

.....

.....

[1 mark]

0 2 . 2

The molecules of Group 7 elements are made of pairs of atoms.
Give the formula of a bromine molecule.

.....

.....

.....

.....

[1 mark]

0 2 . 3

Which Group 7 element is a grey-black solid at room temperature?

Tick (✓) **one** box.

Bromine

☐

Chlorine

☐

Fluorine

☐

Iodine

☐

[1 mark]

0 2 . 4

Sodium reacts with chlorine.
Name the product of the reaction.

.....

.....

.....

.....

[1 mark]

0 2 . 5

How many electrons are in the outer shell of an atom of a Group 7 element?

.....

.....

.....

[1 mark]

0 3

A student added aqueous solutions of halogens to solutions of potassium halides.
Table 1 shows the results.

Table 1

	Potassium chloride	Potassium bromide	Potassium iodide
Chlorine water	not tested	solution turns orange	solution turns brown
Bromine water	no change	not tested	solution turns brown
Iodine solution	no change	no change	not tested

0 3 . 1

Explain why chlorine reacts with potassium bromide solution.

.....

.....

[1 mark]

0 3 . 2

Complete the word equation for the reaction of chlorine with potassium iodide.
chlorine + potassium iodide → +

.....

.....

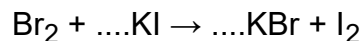
.....

.....

[2 marks]

0 3 . 3

Balance the equation for the reaction of bromine with potassium iodide.



.....

.....

[1 mark]

0 3 . 4

Use the results to put iodine, chlorine and bromine in order of reactivity. Start with the most reactive.

.....

.....

[1 mark]

0 3 . 5

Suggest why the student did not use fluorine in this investigation.

.....

.....

[1 mark]

0 4

Astatine, At, is below iodine in Group 7.

0 4 . 1

Predict whether astatine would react with sodium iodide solution.
Explain your answer.

.....

.....

.....

.....

[2 marks]

0 4 . 2

Iodine reacts with hydrogen to form hydrogen iodide, HI.
Write a balanced symbol equation for this reaction.

.....

.....

[1 mark]

0 4 . 3

Hydrogen iodide is a covalent compound. Sodium iodide is an ionic compound. Explain this difference in terms of the elements that react.

.....

.....

.....

.....

[2 marks]

0 4 . 4

Predict the formula of the compound formed when calcium reacts with astatine.

.....

.....

[1 mark]

0 5

The melting points and the reactivity of the halogens both change down Group 7.

0 5 . 1

Describe how the melting point and the reactivity of the halogens change down Group 7.

Explain the change in reactivity, in terms of electrons.

.....

.....

.....

.....

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.....

[4 marks]

0 6

Table 2 shows the melting points and boiling points of four halogens.

Table 2

Halogen	Melting point in °C	Boiling point in °C
Fluorine	-220	-188
Chlorine	-101	-34
Bromine	-7	59
Iodine	114	184

0 6 . 1

Describe the trend in boiling points down Group 7.

.....

.....

[1 mark]

0 6 . 2

Astatine is below iodine in Group 7.

Predict the state of astatine at room temperature. Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 6 . 3

Give the state of:
bromine at 0 °C
chlorine at -50 °C.

.....

.....

.....

.....

[2 marks]

0 6 . 4

Explain the trend in boiling points down Group 7.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Group 7 · 30 marks

Question 1 (2 marks)

01.1 [1 mark]

Correct: Bromine

01.2 [1 mark]

Answer: 1–

- 1– (1)

Notes: Allow –1. Do not accept 1+ or 1.

Question 2 (5 marks)

02.1 [1 mark]

Answer: the halogens

- halogens (1)
-

02.2 [1 mark]

Answer: Br₂

- Br₂ (1)

Notes: Do not accept Br.

02.3 [1 mark]

Correct: Iodine

02.4 [1 mark]

Answer: sodium chloride

- sodium chloride (1)

Notes: Allow NaCl. Do not accept sodium chlorine.

02.5 [1 mark]

Answer: 7

- 7 (1)
-

Question 3 (6 marks)

03.1 [1 mark]

Answer: Chlorine is more reactive than bromine, so it displaces bromine.

- chlorine is more reactive than bromine (so it displaces bromine) (1)
-

03.2 [2 marks]

Answer: potassium chloride + iodine

- potassium chloride (1)
- iodine (1)

Notes: Either order. Do not accept iodide for iodine.

03.3 [1 mark]

Answer: $\text{Br}_2 + 2\text{KI} \rightarrow 2\text{KBr} + \text{I}_2$

- $\text{Br}_2 + 2\text{KI} \rightarrow 2\text{KBr} + \text{I}_2$ (1)
-

03.4 [1 mark]

Answer: chlorine, bromine, iodine

- chlorine, bromine, iodine (1)
-

03.5 [1 mark]

Answer: Fluorine is too reactive / very toxic.

- fluorine is too reactive / (very) toxic / dangerous (1)

Notes: Ignore 'expensive'.

Question 4 (6 marks)

04.1 [2 marks]

Answer: No reaction, because astatine is less reactive than iodine.

- no (reaction) (1)
- astatine is less reactive than iodine (as it is lower in Group 7) (1)

Notes: The explanation mark depends on 'no reaction'.

04.2 [1 mark]

Answer: $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$

- $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$ (1)
-

04.3 [2 marks]

Answer: Hydrogen and iodine are both non-metals, so they share electrons; sodium is a metal, so it transfers an electron to iodine and ions form.

- hydrogen and iodine are both non-metals so they share (pairs of) electrons (1)
 - sodium is a metal so an electron is transferred (from sodium to iodine) / ions are formed (1)
-

04.4 [1 mark]

Answer: CaAt_2

- CaAt_2 (1)
-

Question 5 (4 marks)

05.1 [4 marks]

Answer: Melting point increases and reactivity decreases down the group. The outer shell is further from the nucleus, so there is a weaker attraction for the electron that the atom needs to gain.

Levels of response

- **Level 2 (3–4)** A clear, logically linked answer covering the key points accurately.
- **Level 1 (1–2)** One or two relevant points with little linking.
- **No marks (0)** Nothing relevant or worthy of credit.

Indicative content

- melting point increases down Group 7
 - reactivity decreases down Group 7
 - the outer shell is further from the nucleus / there are more shells down the group
 - so there is a weaker attraction for an electron to be gained, and the atom gains an electron less easily
-

Question 6 (7 marks)

06.1 [1 mark]

Answer: The boiling point increases down the group.

- increases (down the group) (1)
-

06.2 [2 marks]

Answer: Solid; melting points increase down the group and iodine is already a solid.

- solid (1)
 - melting points increase down the group and iodine is (already) a solid / has a melting point above room temperature (1)
-

06.3 [2 marks]

Answer: bromine: liquid; chlorine: liquid

- bromine: liquid (1)
 - chlorine: liquid (1)
-

06.4 [2 marks]

Answer: The molecules get larger (higher relative molecular mass), so the intermolecular forces are stronger and need more energy to overcome.

- molecules get larger / relative molecular mass increases (1)
- (so the) intermolecular forces are stronger / more energy is needed to overcome the forces between molecules (1)

Notes: Do not accept 'covalent bonds break' or 'bonds between atoms are stronger'.
