AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.1.2.6

Group 7

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**8**
Available paper years	**2018–2025**

Using this booklet

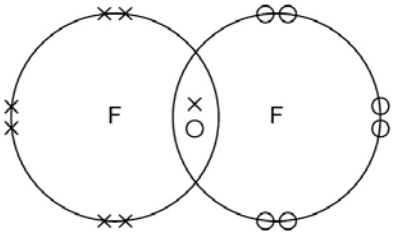
1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

5.1.2.6 Group 7

Answer 01 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	g	do **not** accept upper case (G) do **not** accept gas	1	AO1 5.1.2.6
04.2		one shared pair anywhere in overlap between two circles **or** on intersection 6 other electrons on each atom allow dots **or** crosses **or** mixture for all marks ignore any inner shell electrons	1 1	AO1 5.1.2.6 5.2.1.4 AO2 5.1.2.6 5.2.1.4
04.3	18		1	AO2 5.1.1.5 5.1.2.6
04.4	$AlBr_3$ **2** Al + **3** Br_2 (→ 2 $AlBr_3$)	ignore state symbols ignore charges ignore brackets as eg $Al(Br)_3$ allow **1** mark for balancing their equation with an incorrect product	 1 1	AO2 5.1.1.1 5.1.2.6

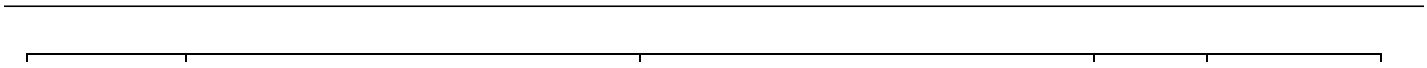
04.5		**max 2** if outer shell / level not mentioned 'it' refers to chlorine allow converse reasons for bromine being less reactive		
	chlorine is a smaller atom **or** has fewer energy levels **or** outer shell closer to nucleus	ignore chlorine has fewer electrons	1	AO1 5.1.2.6
	chlorine has less shielding **or** has the greater attraction between the nucleus and the outer shell **or** incoming electron		1	AO1 5.1.2.6
	therefore chlorine can gain an electron (into the outer shell) more easily		1	AO2 5.1.2.6
		if no other marks awarded allow **1** mark for correct trend in reactivity in Group 7 do **not** accept reference to incorrect particles eg chloride atom		

Total			**9**

5.1.2.6 Group 7

Answer 01 · Mark scheme

June 2018 | 8464/C/1H | Original Q4



5.1.2.6 Group 7

Answer 02 · Mark scheme

04.1	atomic weight	do **not** accept atomic mass or A_r	1	AO1 5.1.2.2
04.2	left gaps / spaces **or** changed the order based on atomic weights	 allow placed them in correct groups according to properties do **not** accept reference to atomic number	1	AO1 5.1.2.2
04.3	weak forces between the molecules **or** weak intermolecular forces (so) little energy required to overcome / break the forces between molecules **or** (so) little energy required to overcome / break the intermolecular forces	allow weak intermolecular bonds do **not** accept incorrect references to covalent bonds allow (so) little energy required to separate the molecules allow (so) little energy required to overcome / break the intermolecular bonds ignore less energy	1 1	AO1 AO3 5.1.2.6 5.2.2.4

04.4	(the) molecules get larger going down the group (so the) forces between the molecules increase **or** (so the) intermolecular forces increase (so the) boiling points increase going down the group **or** (so the) boiling points increase with increasing relative atomic mass	allow converse explanation in terms of boiling point allow (so) more energy is needed to separate the molecules	1 1 1	AO1 AO3 5.1.2.6 5.2.2.4

04.5	2,8 (so) stable arrangement of electrons **or** (so) full outer shell	allow diagram or description	1 1	AO1 5.1.2.4

04.6	$\frac{1}{40} \times 6.02 \times 10^{23}$ **or** $0.025 \times 6.02 \times 10^{23}$ 1.51×10^{22}	an answer of 1.51×10^{22} scores **2** marks allow 1.505×10^{22}	 1 1	AO2 5.3.2.1

Total			**11**

5.1.2.6 Group 7

Answer 02 · Mark scheme

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

Question	Answers	Extra information	Mark	AO / Spec. Ref.

5.1.2.6 Group 7

Answer 03 · Mark scheme

06.1	atoms have a positively charged nucleus. mass is concentrated in the nucleus in the centre of atoms.		1 1	AO1 5.1.1.3

06.2	$\frac{4 \times 10^{-7}}{2400}$ $= 1.66666 \times 10^{-10}$ $= 1.67 \times 10^{-10}$ (m)	 allow 0.000 000 000 167 (m) allow an answer correctly rounded to 3 significant figures from an incorrect calculation which uses the values in the question	1 1 1	AO2 5.1.1.5

06.3	(moles Au = $\frac{0.175}{197}$ =) 0.000888		1	AO2 5.3.1.1 5.3.2.2
	(moles Cl_2 = 0.000888 × $\frac{3}{2}$ =) 0.00133	allow a correct calculation using an incorrectly calculated value of moles of gold	1	
	(mass Cl_2 =) 0.00133 × 71	allow a correct calculation using an incorrectly calculated value of moles of chlorine	1	
	= 0.0946 (g)		1	
	= 94.6 (mg)	allow a correct conversion using an incorrectly calculated mass of chlorine	1	

	alternative approach: (from equation 2 moles of Au reacts with 3 moles of Cl_2) (so) 394 g Au reacts with 213 g Cl_2 (1) 1 g Au reacts with ($\frac{213}{394}$ =) 0.54 g Cl_2 (1) 0.175 g Au reacts with 0.54 × 0.175 g Cl_2 (1) = 0.0946 (g) (1) = 94.6 (mg) (1)	 allow a correct calculation using an incorrectly calculated value of mass of gold and / or chlorine allow a correct calculation using an incorrectly calculated value of mass of gold and / or chlorine allow a correct conversion using an incorrectly calculated mass of chlorine		

Total			**10**

5.1.2.6 Group 7

Answer 03 · Mark scheme

November 2020 | 8464/C/1H | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.

5.1.2.6 Group 7

Answer 04 · Mark scheme

November 2020 | 8464/C/1H | Original Q7

07.1		max **3** marks if reference to incorrect particles / bonding / structure		
	caesium atom loses one electron		1	AO1 5.1.2.5 5.2.1.2
	(and) oxygen atom gains two electrons		1	
	(so) two caesium atoms react with one oxygen atom	allow (to produce) Cs_2O	1	
	any **one** from: • (to form) Cs^+ and O^{2-} • (to form) caesium ion(s) and oxide ion(s) • (to form) ions with full outer shells / levels		1	

07.2		allow converse for sodium		
	(caesium has) more energy levels **or** (caesium has) more shells		1	AO2
	(so the) outer electron / shell is further from nucleus **or** outer electron / shell is more shielded		1	AO1
	(so) weaker attraction between nucleus and outer electron / shell		1	AO1
	(so) outer electron is more easily lost	allow (so) less energy needed to remove outer electron	1	AO1 5.1.2.3 5.1.2.5

07.3	early periodic tables were arranged with elements in order of their atomic weights	ignore atomic mass	1	AO1
	iodine has a lower atomic weight than tellurium	allow converse for tellurium	1	AO1
	(so) Mendeleev placed iodine with elements with same / similar properties **or** (so) Mendeleev placed tellurium with elements with same / similar properties	allow F / Cl / Br for elements allow O / S / Se for elements	1	AO2 5.1.2.2

Total			**11**

Answer 05 · Mark scheme

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	halogens		1	AO1 5.1.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	all have 7 electrons in <u>outer</u> shell **or** all have 7 <u>outer</u> electrons	allow energy level for shell allow same number of <u>outer</u> electrons allow one electron required to complete the <u>outer</u> shell	1	AO1 5.1.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	Cl_2O_7		1	AO2 5.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	*y*-axis scale correct from –100 to –250 °C bar correctly plotted at –220 °C	 allow a tolerance of ± ½ a small square	1 1	AO2 5.1.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5		allow converse explanation in terms of decreasing melting point		
	(the) molecules increase in size going down the group	allow atoms increase in size going down the group allow increase in number of electron shells going down group	1	AO3
	(so the) forces between the molecules increase **or** (so the) intermolecular forces increase		1	AO1
	(so the) melting points increase going down the group **or** (so the) melting points increase with increasing relative atomic mass	allow (so) more energy is needed to separate the molecules	1	AO1 5.1.2.6 5.2.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	(s)		1	AO3 5.1.2.6 5.2.2.1 5.2.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	condensation	allow condensing ignore evaporating and boiling	1	AO1 5.2.2.1

Total Question 4		10

5.1.2.6 Group 7

Answer 06 · Mark scheme

June 2023 | 8464/C/1H | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	electron → proton → neutron		1	AO1 5.1.1.3

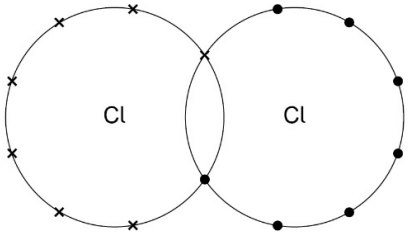
Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	(times heavier =) $\frac{1.673 \times 10^{-27}}{9.109 \times 10^{-31}}$ = 1837	 allow 1836.645076 correctly rounded to at least 3 significant figures	1 1	AO2 5.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	46		1	AO2 5.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	36		1	AO2 5.1.1.4 5.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	(A_r =) $\frac{(35 \times 75.77) + (37 \times 24.23)}{100}$ = 35.4846 = 35.48	 allow an answer correctly calculated to 2 decimal places from an incorrect calculation which uses the values in the question	1 1 1	AO2 5.1.1.6

Answer 06 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6		allow any combination of circles, dots, crosses, $e^{(-)}$ for electrons		AO1 5.1.2.6 5.2.1.1
	one shared pair in overlap		1	5.2.1.4
	each chlorine atom with 6 non-bonded electrons (on outer shell)	ignore any inner shell electrons	1	
		the diagram below scores 2 marks 		

Total Question 4	10

5.1.2.6 Group 7

Answer 07 · Mark scheme

June 2024 | 8464/C/1H | Original Q7

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	each calcium atom loses two electrons	allow **1** mark for calcium atoms lose electrons **and** chlorine atoms gain electrons	1	AO2 5.1.2.6 5.2.1.1
	(and) each chlorine atom gains one electron		1	
	(so) one calcium atom reacts with two chlorine atoms		1	
	(to form) Ca^{2+} ions **and** Cl^- ions **or** (to form) calcium ion(s) **and** chloride ion(s)	allow (to form) ions with full outer shells allow energy level for shell	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.2		allow converse for bromine allow energy level for shell		AO1 5.1.2.3 5.1.2.6
	chlorine has fewer shells	allow chlorine is a smaller atom	1	
	(so the) outer shell is closer to the nucleus	allow (so the) outer electrons are closer to the nucleus allow (so there) is less shielding	1	
	(so) stronger attraction between nucleus and electron gained **or** (so) stronger attraction between nucleus and outer shell		1	
	(so) gains the electron more easily		1	

5.1.2.6 Group 7

Answer 07 · Mark scheme

June 2024 | 8464/C/1H | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	as the relative formula mass increases the boiling points (of the hydrogen halides) increase (but) HF has the highest boiling point **or** (but) HF does not follow the trend	 allow (but) HF is anomalous	1 1	AO3 5.1.2.6

Total Question 7	10

5.1.2.6 Group 7

Answer 08 · Mark scheme

June 2025 | 8464/C/1H | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	atoms have a charged nucleus the mass of an atom is concentrated in the nucleus		1 1	AO1 5.1.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	(particle **X**) has more electrons than protons	allow (particle **X**) has a different number of protons and electrons allow because atoms have the same number of protons and electrons do **not** accept (particle **X**) has a different number of neutrons	1	AO3 5.1.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	$^{79}_{35}Br^-$		1	AO2 5.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	(going down the group) molecules increase in size	allow (going down the group) atoms increase in size	1	AO1 5.1.2.6 5.2.2.4
	(so the) forces between the molecules increase **or** (so the) intermolecular forces increase		1	
	(so) more energy is needed to break the intermolecular forces	allow (so) more energy is needed to separate the molecules	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	covalent	ignore intermolecular forces	1	AO1 5.1.2.6 5.2.1.1

Question	Answers	Mark	AO / Spec. Ref.
03.6	chlorine + sodium bromide → bromine + sodium chloride allow Br_2 for bromine allow NaCl for sodium chloride	1	AO2 5.1.2.6

5.1.2.6 Group 7

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.7	(going down the group the) the outer shell / electrons become further from the nucleus	allow energy level for shell allow the atoms become larger allow the atoms have more shells	1	AO1 5.1.2.6
	(so) there is less (electrostatic) attraction between the nucleus and the outer electron(s)	allow (so) there is more shielding between the outer electron(s) and the nucleus	1	
	(so) gaining an electron is more difficult		1	

Total Question 3	12

5.1.2.6 Group 7

Answer 01 · Examiner comments

Question 4 (standard, standard / high & high demand)

04.1 Students did not answer this question as well as expected. They were either not aware that chlorine was a gas or were not familiar with state symbols, as answers other than (s), (l) (g) or (aq) were frequently seen. Some wrote the word 'gas' in the space. 36% of students answered correctly.

04.2 This question was very well answered with 64% of students achieving full marks. Students showed a good understanding of the number of electrons involved in this example of covalent bonding, by ensuring that they had two electrons in the overlap area and six other electrons in the energy level of each fluorine.

A common mistake was to include two electrons in the overlap, but still included the seven electrons each fluorine originally contained in the level outside the overlap.

04.3 48% of students selected the correct answer to this question. The question followed the diagram of a fluorine (F_2) molecule in question **04.2** and focussed on this species.

A significant number of students incorrectly selected '9' as their response, which is the number of electrons in one fluorine atom.

04.4 Students are expected to represent the electronic structures of the first 20 elements of the periodic table and to predict and explain reactions of elements from their position in the periodic table.

A small number of students were able to state the correct formula, $AlBr_3$, with AlBr and $AlBr_2$ being the most common incorrect formulae. But, students did show a good understanding of balancing equations, in this case based upon their wrong formula for aluminium bromide. 68% of students achieved a single mark.

04.5 This question was not answered well, with 8% of students achieving three marks for the explanation that included:

- comparative size of atoms
- comparative difference in attraction
- the ease of which an electron was gained.

This last point was the one that was seen the least and the word 'outer' (shell or level) was omitted in a lot of answers.

Often students would repeat the question stem in terms of chlorine and bromine's reactivity without relating it to the whole of Group 7 and in many instances referring to the reactivity series (of metals).

5.1.2.6 Group 7

Answer 02 · Examiner comments

Question 4

Most of this question was at standard/high demand.

04.1 Scientists' use of atomic weight to arrange elements in early periodic tables was not well known. Far too many students did not fully appreciate the historical nature of the question and provided concepts that were not known at the time, such as atomic number and electrons.

04.2 Over half the entry gave a correct reason. Large numbers of students appreciated that Mendeleev left gaps or grouped elements with similar properties. Changing the order based upon atomic weights was correct but less common.

04.3 Only the higher-attaining students were able to explain that halogens have low boiling points because of weak intermolecular forces. It is these forces that are overcome when a 'little energy' is applied; less energy did not gain this mark, as less does not necessarily equate to little. Many students answered this question incorrectly in terms of the covalent bonds within the halogens. A lot of students linked the listed values to reactivity within group 7.

5.1.2.6 Group 7

Answer 02 · Examiner comments June 2019 | 8464/C/1H | Original Q4

04.4 The concept of intermolecular forces and the fact that the intermolecular forces increase because the molecules got larger was rarely seen in explanations. Many students gained a mark for stating that the boiling points increased down the group; down the table or periodic table did not gain this mark. Students commonly tried to explain a trend in reactivity down the group and attempted to link that to boiling points. Some struggled with negative temperatures.

04.5 Most students were able to state that neon's outer shell was full. Many did not gain the second mark by not giving the electronic structure of neon.

04.6 A third of students calculated the correct answer for 2 marks. Many were confused by standard form, with only a few students making slight calculation errors.
Most wrong answers came from either dividing the Avogadro number by 0.025 (the number of moles) or from multiplying by 40; they did not appreciate that 1g of argon is less than 1 mole of argon so the answer to this question must be less than 6×10^{23}

Answer 05 · Examiner comments June 2022 | 8464/C/1H | Original Q4

Question 4 (Standard, standard/high and high demand)

04.1 Approximately 70% of students could correctly identify Group 7 elements as the halogens.

04.2 Just over half of students stated that Group 7 elements react in similar ways because they all have 7 electrons in their outer shell. Many omitted the word outer which was a requirement for the mark.

04.3 Just under a third of students were able to deduce the molecular formula of Cl_2O_7 from the diagram of a molecule of a chlorine oxide. Students need to ensure that subscript numbers can be distinguished as such.

04.4 Nearly 70% students of students were able to gain both marks for completing the scale of the *y*-axis and drawing a bar at –220 °C for the melting point of fluorine. A significant minority failed to score the first marking point as the scale was not completed to minus 250 °C.

04.5 Very few students gained 3 marks. More than 60% gained 1 mark, usually for stating that the melting points increase going down Group 7. However students were unable to explain that this is because the molecules increase in size going down the group and the intermolecular forces increase, with only a small number of students gaining any further marks.

04.6 Just over 40% of the students deduced that bromine is a solid at –220 °C. Liquid proved to be a popular distractor.

04.7 Just under 40% of students knew that condensation happens at the surface of bromine at its boiling point.

5.1.2.6 Group 7

Answer 06 · Examiner comments

Question 4 (standard and standard/high demand)

04.1 Nearly half of the students correctly selected the order of discovery of the electron, proton and neutron. A third of students thought that the proton was discovered before the electron and chose the fourth option.

04.2 Just over a third of students calculated the number of times a proton is heavier than an electron. Most students were able to correctly round their answers to 3 significant figures although those who gained 1 mark invariably evaluated the ratio correctly but then incorrectly rounded the answer (1836.645076) usually by 'truncating' this to 1836. The most common error here was to invert the mathematical expression.

04.3 More than three-quarters of students deduced the number of neutrons in the bromine $^{81}_{35}Br$ atom.

04.4 Only 20% of students deduced the number of electrons in the bromide $^{81}_{35}Br^-$ ion. The majority gain the number of electrons in a bromine atom.

04.5 This question was a good discriminator. Just under a third of students gained all 3 marks with a few students gaining 2 of the 3 marks for not giving their answer to 2 decimal places.

04.6 More than three-quarters of students correctly drew a dot and cross diagram for chlorine. When only one mark was gained this was usually for the two shared electrons in the overlap between the atoms. Some failed to show that there are six unshared electrons on each chlorine atom.

Answer 07 · Examiner comments

June 2024 | 8464/C/1H | Original Q7

Question 7 (standard/high & high demand)

07.1 This question was a good differentiator between students. Electron transfer from a metal to a non-metal to form an ionic compound is frequently asked.

Most students understood the processes involved in this question, but their weak use of chemical language meant they often did not achieve the marks. Students often referred to calcium and chlorine, rather than calcium atoms and chlorine atoms. There were many incorrect terms such as 'atoms sharing electrons to form ionic bonds', 'metal ions losing electrons' and 'non-metal ions gaining electrons'. Formation of Ca^{+} was a common misconception, rather than recognising that two electrons are lost by one calcium atom and two chlorine atoms each gain one electron. To achieve the final mark students had to use the word 'ion', and this was often missing. A common error was for students to write chlorine ion instead of chloride ion.

0 7 . 1 Calcium reacts with chlorine to produce calcium chloride.

Explain what happens to calcium atoms and to chlorine atoms when calcium reacts with chlorine to produce calcium chloride.

[4 marks]

When calcium reacts with chlorine to produce calcium chloride, the atoms share electrons. Calcium is in group 2 meaning it has 2 electrons on it outer shell and chlorine is in group 7 meaning it has 7 electrons on its outer shell. Two chlorine atoms will be present shared with one calcium atom so that each chlorine atom gets 1 electron to complete its ourer shell.

A number of students did not appreciate that ionic bonding occurs when a metal reacts with a non-metal. The sharing of electrons described here contradicts the transfer of electrons from the metal to the non-metal for the first two marking points. This response gains 1 mark for the correct ratio between calcium atoms and chlorine atoms but does not say that ions are formed.

07.2 This question was also a good differentiator between students. Nearly half of students were able to gain some credit but few gained all 4 marks. Those students who gained 1 or 2 marks invariably described chlorine as having fewer shells, that the outer shell is closer to the nucleus or that chlorine atoms gain an electron more easily (or the converse for bromine). A stronger attraction between the nucleus and the electron gained was rarely seen.

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5.1.2.6 Group 7

Answer 07 · Examiner comments June 2024 | 8464/C/1H | Original Q7

07.3 Students were given the boiling points of four hydrogen halides and were asked to describe how the boiling points change as the relative formula mass changes. Many students found it challenging to interpret the negative numbers and deduced an incorrect trend whilst others referred to the halogens and not the hydrogen halides. Few gained 2 marks by correctly stating that the boiling points increase as the formula mass increases and that HF was anomalous and does not follow the trend.

Answer 08 · Examiner comments June 2025 | 8464/C/1H | Original Q3

Question 3 (Standard and Standard/High demand)

03.1 Just under half of students gave the two correct conclusions of the alpha particle scattering experiment as atoms have a charged nucleus and the mass of an atom is concentrated in the nucleus. The most popular incorrect distractor was electrons orbit the nucleus at specific distances.

03.2 Overall this question was well attempted with very few failing to offer an answer. The two most common incorrect responses were 'number of protons not equal to the number of electrons so X is an isotope' and 'protons should be the same as neutrons'.

03.3 Just than half of students used the number of subatomic particles to correctly deduce that particle X was $^{79}_{35}Br^{-}$. The most popular incorrect distractor was $^{79}_{35}Se^{-}$

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5.1.2.6 Group 7

Answer 08 · Examiner comments June 2025 | 8464/C/1H | Original Q3

03.4 Students found this question difficult with very few achieving 3 marks, and many failing to score. The most commonly awarded mark was MP1 which was related to the size of the atom. A large number of students answered in terms of reactivity rather than the physical property of boiling point, so references relating to the distance from the nucleus to the outer shell or outer electrons were common which were incorrect in this context. Linking boiling point to the ease of gaining electrons was another common response, together with incorrect references to electrostatic forces of attraction between the nucleus and electrons, again confusing reactivity and boiling points. There was also a significant number of students who used 'forces' and 'bonds' inconsistently and therefore could not be awarded marks as it was not clear what they meant.

0 3 . 4 **Table 2** shows the boiling points of some Group 7 elements.

Table 2

Element	Boiling point in °C
Fluorine	−188
Chlorine	−35
Bromine	59
Iodine	184

Explain the increase in the boiling points of the Group 7 elements going down the group.

[3 marks]

As you go down group 7 the boiling point increases
this is because ~~it is~~ the Molecules get larger and
the intermolecular forces get stronger which requires more
energy to break.

This response gained 3 marks. Size, force and energy are all correctly described.

03.5 More than three quarters of students deduced that the bonding in the compound ClF_3 was covalent as two non-metals had combined. Ionic and metallic were common incorrect responses.

03.6 The majority of students added sodium chloride and bromine to complete the word equation. The most common error was the mixing up of bromine with bromide and chlorine with chloride.

03.7 Students found this question difficult with very few achieving 3 marks, and many failing to score. Common errors for MP1 were students stating that the 'elements' have more shells or 'more outer shells'. A common error for MP2 was not mentioning the 'outer shell electrons' or referenced attraction between the nucleus and the 'outer shell' which was insufficient for the mark. The most commonly awarded mark was MP3 which related to the difficulty of gaining of an electron. References to attracting electrons were common but this was not creditworthy as it does not necessarily suggest electrons being gained. There were many students who were very close to 3 marks but scored 0 due to these incorrect or incomplete statements.

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5.1.2.6 Group 7

Answer 08 · Examiner comments June 2025 | 8464/C/1H | Original Q3

0 3 . 7 Explain why Group 7 elements become less reactive going down the group.

[3 marks]

Group 7 elements become less reactive because as you go down a group, the number of shells increases so ~~they~~ the strength of the attraction between the positive nucleus and negative electrons is weaker as the distance is greater, this means the nucleus is less likely to be able to attract another electron for its outer ~~ten~~ layer.

This response gained 0 marks. MP1 was not awarded as 'atoms' (have more shells) is missing. MP2 was not awarded as 'outer' (electrons) is omitted. MP3 is not gained as attracting electrons does not necessarily suggest an electron is gained. This is an example of answers that were very close to each of the 3 marks but scored 0 due to incomplete statements for each one.

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