PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

CHEMISTRY



MARK SCHEME

TOPIC 6: GROUPS IN THE PERIODIC TABLE: GROUP 1 (PAPER 2)

SCORE	PERCENTAGE
/122	%

STEMUP

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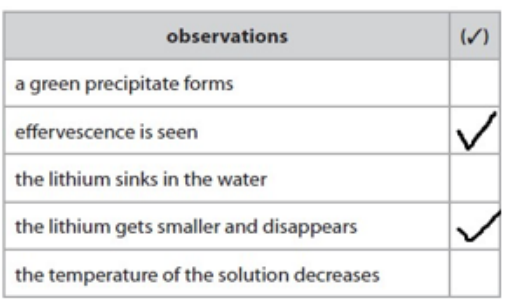
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Mark Scheme

Q1.

Question number	Answer	Additional guidance	Mark
(i)	from green to {purple / blue}	reject colours in reverse order allow named shades e.g. light green, dark blue reject any other colours given	AO2 2 (1)

Question number	Answer	Additional guidance	Mark
(ii)		if 1-2 ticks: 1 mark per correct tick if 3 ticks: 1 mark only if **both** correct ticks included if 4-5 ticks: 0 marks	AO1 2 (2)

Question number	Answer	Mark
(iii)	**C** hydrogen is the only correct answer **A**, **B** and **D** are incorrect because hydrogen is formed when sodium reacts with water	**AO1 1 (1)**

Question number	Answer	Additional guidance	Mark
(iv)	a description to include: • loses **electron**(s) (1) • **{one / an}** (electron) (1)	reject shares electron(s) for MP1 and MP2 ignore mention of any bonding type allow {transfers / donates / gives away} electron(s)	**AO1 1 (2)**

Question number	Answer	Additional guidance	Mark
(v)	4.166666...**correctly rounded** with or without working scores 3 7 + 16 + 1 = 24 (1) $\frac{1}{24}$ (= 0.0416666666) (1) 0.0417 x 100 = 4.2 (1)	4.16 scores 3 marks with or without working 24 seen scores 1 allow ECF from Mr calculated by adding at least two Ar with working allow ECF to MP3 using $\frac{1}{Mr}$ x 100 or $\frac{2}{Mr}$ x 100 only	**AO2 1 (3)**

(**QU04b 1SC0/2CF, June 2025**)

Q2.

Question number	Answer	Additional guidance	Mark
(i)	beaker	ignore any numbers before 'beaker' reject measuring beaker	(1) AO2 2

Question number	Answer	Additional guidance	Mark
(ii)	an explanation to include any three from: STEP 3 • collect the gas (in suitable apparatus) (1) • otherwise the gas will {disperse / escape} / hydrogen gas above the beaker is too dilute (1) OR • hold (the lighted splint) close to reaction mixture / in container (1) • that's where most of the gas will be (1) STEP 4 • dip the litmus paper into the reaction mixture (1) • so it is in contact with the (alkaline) solution / because above the beaker it does not touch the solution (1)	mark independently allow any reasonable pieces of apparatus eg test tube / boiling tube allow cover container (before applying splint) reject splint going into solution allow drop liquid onto litmus paper add to solution universal indicator / use a pH meter allow other named indicators reject blue litmus to see the change (in colour /pH)	(3) AO3 3

(**QU01b 1SC0/2CF, June 2024**)

Q3.

Question number	Answer	Additional guidance	Mark
(i)	an answer including any **two** from • metal melts / forms a ball (1) • effervescence / fizzing / bubbles (1) • metal floats (1) • metal moves (1) • metal ignites (1) • metal disappears (1) • metal explodes (1) • (lilac / purple) flame (1) • white smoke (1)	ignore (named) gas(es) allow metal dissolves allow spits allow 'coloured' flame reject incorrect colours ignore sparks ignore any temperature changes	**(2)** **AO1-2**

Question number	Answer	Additional guidance	Mark
(ii)	an explanation linking any three from • lithium has fewer (electron) shells (1) • (because) **outer** electron clos**er** to nucleus (1) • (because) (outer electron) more strongly attracted to nucleus / has greater electrostatic attraction to nucleus • (because) (outer) electron hard**er** to remove (1) • (because) less shielding in lithium (than K) (1)	allow reverse argument for potassium **correct** electronic configurations score MP1 for Li **and** K reject '**outer** shells' for mp1 allow outer shell is clos**er** to nucleus allow small**er** atom (for Li) allow 'attractive forces' in place of electrostatic attraction reject any incorrect forces or intermolecular forces for MP3&4	**(3)** **AO1-1**

	Answer	Additional guidance	Mark
(iii)	$2\ OH^- + CO_2 \rightarrow CO_3^{2-} + H_2O$ (2) both formulae of CO_2 **and** H_2O (1) balancing correct formulae only (1)	allow multiples reject equation if Na^+ in front of OH^-	**(2)** **AO2-1**

(**QU03b 1SC0/2CH, June 2025**)

Q4.

Question Number	Answer	Acceptable answers	Mark
(a)	$H_2 + Cl_2 \rightarrow 2HCl$ M1 correct formulae on LHS and RHS **(1)** M2 correctly balanced **(1)**	In M1 do not allow incorrect use of upper/lower case/subscripts but M2 can be awarded for correct balancing dependent on M1 being awarded (but note special case above) accept multiples	**(2)**

Question Number	Answer	Acceptable answers	Mark
(b)	M1 shared pair of electrons between one H and one Cl **(1)** M2 remaining outer electrons correct **(1)**	Accept all permutations of dots and crosses for electrons If any indication of ionic bonding including charges 0/2 symbols not required ignore incorrect symbols eg C/CL M2 dependent on M1 electrons do not need to be in pairs ignore inner shells electrons can be on/in ring or no ring	**(2)**

(**Q06 1SC0/2CF, June 2015**)

Q5.

Question number	Answer	Additional guidance	Mark
(i)	$H_2 + Cl_2 \rightarrow 2HCl$	allow multiples	**(1)** **AO2-1**

Question number	Answer	Additional guidance	Mark
(ii)	{dissolve in / add} water	allow {make aqueous / dissolve into a solution} allow bubble through water / mix with water ignore dilute / make it a liquid reject other substances	(1) AO1-1

(**QU04c 1SC0/2CF, June 2023**)

Q6.

Question number	Answer	Additional guidance	Mark
(i)	halogens Or halogen	reject halide	(1)

Question number	Answer	Additional guidance	Mark
(ii)	**noble** gases or **inert** gases or **rare** gases	Do not allow gases alone	(1)

(**Q02a 1SC0/2CF, June 2019**)

Q7.

Question number	Answer	Additional guidance	Mark
	An answer that combines the following points of understanding to provide a logical description: • (hydrogen produced as a gas so) there would be {effervescence/fizzing/ bubbles} (1) • calcium hydroxide produced as a solid so the water would {go cloudy/a white precipitate would form} (1)	Allow: • calcium would move (around) (1) • calcium would decrease in size/disappears/ dissolves (1)	**(2)**

(**Q05d 1SC0/2CF, SAM 2016**)

Q8.

Question number	Answer	Additional guidance	Mark
	An answer that combines the following points of understanding to provide a logical description: • (hydrogen produced as a gas so) there would be {effervescence/fizzing/ bubbles} (1) • and (calcium hydroxide produced as a solid so) the water would go {cloudy/a white precipitate would form} (1)	Allow: calcium moves (around) (1) calcium decreases in size/disappears/dissolves (1)	**(2)**

(**Q02a 1SC0/2CH, SAM 2016**)

Q9.

Question number	Indicative content	Mark
	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. • lithium, sodium, potassium float on water • metals move around on the water • bubbles form / fizz / effervescence • hydrogen / gas produced • metal hydroxide solution formed • metal + water → metal hydroxide + hydrogen • purple solution formed if universal indicator present in the water • lithium slowly disappears • sodium forms a ball / melts • sodium disappears quickly • potassium burns with a lilac flame • potassium disappears very quickly • rubidium much more reactive (than potassium) • rubidium burns with coloured flame • caesium explosive / more reactive than rubidium	**(6) AO1-1**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates elements of chemical understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. • The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question.
Level 2	3–4	• Demonstrates chemical understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. • The explanation is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question.
Level 3	5–6	• Demonstrates accurate and relevant chemical understanding throughout. Understanding of the scientific ideas is detailed and fully developed. • The explanation is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question.

Level	Mark	Descriptor	Additional Guidance
	0	No rewardable material.	Read whole answer and ignore all incorrect material/ discard any contradictory material then:
Level 1	1–2	Additional Guidance Correctly describes the trend in reactivity of group 1 metals down the group. Gives at least 1 observation for reaction of one alkali metal and water. Identifies at least 1 product formed when alkali metals react with water. Writes at least one correct word equation	Possible candidate response potassium is more reactive than sodium (1) the metals get more reactive down the group (1) water with universal indicator turns purple when lithium is added (1) when potassium is added to water it moves on the surface with a lilac flame (2) when lithium is added to water, bubbles of hydrogen are formed (2) sodium makes sodium hydroxide (1) sodium + water → sodium hydroxide + hydrogen (2)
Level 2	3–4	Additional Guidance Compares reactions of at least 2 alkali metals including at least 1 observation. Compares at least 2 alkali metals including identifying at least 1 product of reaction with water. Gives at least 1 observation about reaction of alkali metals and makes prediction for Rb / Cs.	Possible candidate response lithium and sodium both float on the water (3) lithium is the least reactive because it moves less than the others, with fewer bubbles (4) lithium is less reactive than sodium because it produces fewer bubbles of hydrogen (4) sodium makes sodium hydroxide, potassium makes potassium hydroxide (3) potassium burns with a flame, caesium would explode (3) rubidium would give off more bubbles than potassium, and would move faster in the water (4)
Level 3	5–6	Additional Guidance Compares reactions of at least 3 alkali metals including at least 2 observations for at least one metal AND identifies at least one product of reaction with water. Compares at least 3 alkali metals, including predictions for Cs / Rb AND identifies at least one product of reaction with water.	Possible candidate response potassium is more reactive than sodium, which is more reactive than lithium. When added to water they move around the surface and then disappear, with lithium moving the slowest. The metals react to form metal hydroxides and hydrogen (6) sodium + water → sodium hydroxide + hydrogen potassium + water → potassium hydroxide + hydrogen rubidium + water → rubidium hydroxide + hydrogen (5)

(**QU06e 1SC0/2CF, June 2023**)

Q10.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	D the transition metals		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	D malleable		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)(i)	non-flammable		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	has a low density		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)(i)	A description including (yellow-) green (1) gas (1)	 any shade of green do not allow just 'yellow' do not allow green in combination with other colours eg blue-green	 **(2)**

Question Number	Answer	Acceptable answers	Mark
(c)(ii)	hydrogen + chlorine → hydrogen chloride lhs (1) rhs (1) Ignore formulae in addition to all of the names	if formulae are used, do not allow h or CL or superscripts $H_2 + Cl_2$ on lhs 2HCl on rhs reactants in either order do not allow a mixture of words and formulae for both marks eg $H_2 + Cl_2$ → hydrogen chloride scores 1 mark for rhs do not allow hydrochloric acid /hydrochloride/hydrogen chlorine	 **(2)**

(Total for Question = 8 marks)

(**Q01 1SC0/2CF, June 2014**)

Q11.

Question Number	Answer	Additional guidance	Mark
	$2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$ 2Na (1) 2NaOH (1) s, l, aq, g (1)	 allow S, L, AQ, G ignore words	**(3)** AO 2 1

(Q26 1SC0/2CF, June 2018)

Q12.

Question Number	Answer	Additional guidance	Mark
	$2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$ 2 Na (1) 2 NaOH (1) s, l, aq, g (1)	 allow S, L, AQ, G ignore words	**(3)** AO 2 1

(Q09 1SC0/2CH, June 2018)

Q13.

Question Number	Answer	Mark
(i)	**C** is the most reactive **The only correct answer is C** ***A*** *is not correct because this is irrelevant* ***B*** *is not correct because this is irrelevant* ***D*** *is not correct because this is irrelevant*	**(1)** AO 2 1

Question Number	Indicative content	Mark
* (ii)	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlines in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **Aspect one: METHOD** • trough/large container of water • equal volumes of water for each experiment • remove metal from container with tongs • remove oil • cut small piece • add metal with tongs/tweezers etc. to water • teacher wears safety glasses • gloves • use of safety screen • class well back • class wear goggles ignore general safety ideas – hair tied back, lab coat etc. ignore equal sized pieces of metal **Aspect 2: ANALYSIS** • most vigorous effervescence of hydrogen with potassium and least with lithium • fastest movement with potassium and slowest with lithium • potassium is most reactive, then sodium, then lithium ignore copying of results from table e.g potassium bubbles very fast ignore writing up of results/ put in table etc	**(6)** AO 2 2 AO 3 1a AO 3 1b

Level	Descriptor
	No rewardable material.
Level 1	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. • Presents an explanation with some structure and coherence.
Level 2	• Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. • Presents an explanation that has a structure which is mostly clear, coherent and logical.
Level 3	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. • Presents an explanation that has a well-developed structure which is clear, coherent and logical.

(**Q27 1SC0/2CF, June 2018**)

Q14.

Question Number	Answer	Mark
	C is the most reactive **The only correct answer is C** ***A*** *is not correct because this is irrelevant* ***B*** *is not correct because this is irrelevant* ***D*** *is not correct because this is irrelevant*	**(1)** AO 2 1

(**Q10 1SC0/2CH, June 2018**)

Q15.

Question number	Answer	Additional guidance	Mark
	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • in calcium the outermost electron(s) {are further away from nucleus/experience(s) greater shielding} (from the nucleus) (as shown by the electronic configuration) (1) • therefore less attraction between nucleus and electron(s)/the electron(s) is/are easier to remove (1)	Allow answers in terms of why reactivity of magnesium is less than that of calcium.	**(2)**

(**Q05f 1SC0/2CF, SAM 2016**)

Q16.

Question number	Answer	Additional guidance	Mark
	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • In calcium the outermost electron(s) {are further away from nucleus /experience(s) greater shielding} (from the nucleus) (as shown by the electronic configuration) (1) • Therefore less attraction between nucleus and electron(s)/ the electron(s) is/are easier to remove (1)	Allow answers in terms of why reactivity of magnesium is less than that of calcium	**(2)**

(**Q02c 1SC0/2CH, SAM 2016**)

Q17.

Question number	Answer	Additional guidance	Mark
	An explanation linking • 1 <u>electron</u> (1) • in outer shell(s) (1)	 allow 1 is the last number of the electronic configuration (1) ignore electronic configurations written out reject incorrect number of electrons MP2 depends on MP1 for outer allow {highest energy / last} for shell allow ring, energy level, orbital allow: 1 outer electron (2) 1 valence electron (2) have to lose 1 electron to get full outer shell (2) same number of electrons in outer shell (1) forms a +1 ion by losing one electron (1)	**(2)** **AO1-1**

(**QU06a 1SC0/2CF, June 2023**)

Q18.

Question number	Indicative content	Mark
	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. • group 1 metals form positive ions • outer electron lost • further down the group outer electron more easily lost • due to electron shell further from nucleus OR greater electron shielding • so lower nuclear attraction • group 1 metal becomes more reactive • order of reactivity Li < K < Rb • group 7 elements form negative ions • gains electron to complete outer shell • further down the group electron is less easily gained • due to outer electron shell further from nucleus OR greater electron shielding • so lower nuclear attraction • group 7 element becomes less reactive • order of reactivity F > Br > I • most reactive pair likely to be potassium + fluorine with suitable justification (K low in group 1 and F is at the top of group 7) • allow rubidium +iodine with justification (Rb lower in group 1 than K and so more reactive)	**(6)** **AO1** **AO2**

Level	Mark	Additional Guidance	General additional guidance – the decision within levels Eg - At each level, as well as content, the scientific coherency of what is stated backed up by detail will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	Additional guidance States some simple facts about group 1 OR group 7 elements OR Correctly identifies most violent reaction(s) with simple reasoning	Possible candidate responses • Group 1 elements lose 1 electron from outer shell. • Group 7 elements are more reactive up the group. • The most violent reaction could be potassium with fluorine as fluorine is the most reactive group 7 element (2)
Level 2	3–4	Additional guidance Correctly identifies most violent reaction(s) with a simple justification OR A simple explanation of the reactivity of group 1 AND group 7 elements. OR A detailed explanation of the reactivity of group 1 OR group 7 elements.	Possible candidate responses • The most violent reaction could be rubidium with iodine as rubidium is the most reactive of the group 1 elements given. Rubidium is so reactive because it loses its outer electron easily. • Group 1 elements are more reactive down the group as the distance between the nucleus and the outer electron is further, so the force of attraction between them is weaker and the electron is more easily lost. • Fluorine is the most reactive halogen because its outer electron shell is closer to the nucleus. Group 1 elements are more reactive down the group as their outer shell gets further from the nucleus.

Level 3	5–6	Additional guidance Correctly identifies the most violent reaction with a detailed justification. OR A detailed explanation of the reactivity of group 1 AND group 7 elements.	Possible candidate responses • The most violent reaction is potassium and fluorine as fluorine is the most reactive element in group 7. Potassium loses its outer electron easily as there is a weak nuclear attraction, and fluorine gains this electron easily as it has a strong nuclear attraction. • Group 1 elements become more reactive down the group. They lose 1 electron to form cations and the larger the distance between the nucleus and the outer shell, the more easily the electron is lost. Group 7 elements gain 1 electron to form anions and the smaller elements gain this electron more easily. This is because the force between the nucleus and the outer shell is stronger.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates elements of chemical understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Lines of reasoning are unsupported or unclear. (AO2)
Level 2	3–4	• Demonstrates chemical understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Lines of reasoning mostly supported through the application of relevant evidence. (AO2)
Level 3	5–6	• Demonstrates accurate and relevant chemical understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Lines of reasoning are supported by sustained application of relevant evidence. (AO2)

(**Q05d 1SC0/2CH, Nov 2021**)

Q19.

	Answer	Acceptable answers	Mark
(i) 1	any value in range 1.45 to 2.99	any answer which, to 1 sf, is in the range	**(1)**
(i) 2	Kr	Reject KR, kr	**(1)**
(i) 3	no reaction		**(1)**

		'nothing'	
(ii)	An explanation linking any two of: • argon is {inert / unreactive} (1) • argon does not react with {metal/filament}/{metal/ filament} would react with air or oxygen / ORA (1) • atom has {eight electrons in outer shell / full (outer) shell} (1)	ignore noble gas doesn't react with anything argon does not corrode the metal ignore references to electrical conductivity	**(2)**

(**Q09 1SC0/2CF, June 2013**)

Q20.

Question number	Answer	Additional guidance	Mark
(i)	test tube / boiling tube	ignore just 'tube', testing tube	**(1)** **AO2 2**

Question number	Answer	Additional guidance	Mark
(ii)	An explanation to include any three from: **Step 2** • cut a smaller piece of sodium (1) • so less reaction / slower reaction (1) **Step 3** • use a larger {container / trough} (of water) (1) • there is more water so more heat is absorbed (1)	reject use powdered sodium for MP1 and MP2 MP2 is dependent on MP1 allow less sodium / smaller volume of sodium / 1(cm^3) x 1(cm^3) x 1(cm^3) cube / smaller mass of sodium ignore use less cubes allow smaller reaction / it is less reactive ignore so reaction is less vigorous MP4 is dependent on MP3 allow name of larger container: beaker/ flask ignore use larger test tube / boiling tube ignore change container ignore add more water ignore add a safety screen / observe from a distance	**(3)** **AO3** **3a**

(**QU01b 1SC0/2CF, June 2019**)

Q21.

Question number	Answer	Additional guidance	Mark
(i)	test tube / boiling tube	ignore just 'tube', testing tube	**(1)** **AO2 2**

Question number	Answer	Additional guidance	Mark
(ii)	An explanation to include any three from: **Step 2** • cut a smaller piece of sodium (1) • so less reaction / slower reaction (1) **Step 3** • use a larger {container / trough} (of water) (1) • there is more water so more heat is absorbed (1)	reject use powdered sodium for MP1 and MP2 MP2 is dependent on MP1 allow less sodium / smaller volume of sodium / 1(cm^3) x 1(cm^3) x 1(cm^3) cube / smaller mass of sodium ignore use less cubes allow smaller reaction / it is less reactive ignore so reaction is less vigorous MP4 is dependent on MP3 allow name of larger container: beaker/ flask ignore use larger test tube / boiling tube ignore change container ignore add more water ignore add a safety screen / observe from a distance	(3) AO3 3a

(**QU01b 1SC0/2CF, June 2022**)

Q22.

Question number	Answer	Additional guidance	Mark
(i)	Rb / Cs / Fr	symbols must have uppercase letter then lowercase letter reject answers with any other symbols ignore any names	(1) AO2 1

Question number	Answer	Mark
(ii)	3 / three	(1) AO2 1

Question number	Answer	Additional guidance	Mark
(iii)	A description including • (the melting points) decrease (1) • as the atomic number increases/ as you go down {the group / the alkali metals / group 1} (1)	allow (melting points) {go down / get smaller} ignore less heat needed to melt it MP2 depends on MP1 allow (going) down (the table / list) allow down the periodic table ignore references to boiling point higher the atomic number, lower the melting point (2) ORA higher in {group/ table} the higher the melting point (2) ORA	**(2) AO3 1**

(**QU01a 1SC0/2CF, June 2019**)

Q23.

Question number	Answer	Additional guidance	Mark
(i)	Rb / Cs / Fr	symbols must have uppercase letter then lowercase letter reject answers with any other symbols ignore any names	**(1) AO2 1**

Question number	Answer	Mark
(ii)	3 / three	**(1) AO2 1**

Question number	Answer	Additional guidance	Mark
(iii)	A description including • (the melting points) decrease (1) • as the atomic number increases/ as you go down {the group / the alkali metals / group 1} (1)	allow (melting points) {go down / get smaller} ignore less heat needed to melt it MP2 depends on MP1 allow (going) down (the table / list) allow down the periodic table ignore references to boiling point higher the atomic number, lower the melting point (2) ORA higher in {group/ table} the higher the melting point (2) ORA	**(2)** **AO3** **1**

(**QU01a 1SC0/2CF, June 2022**)

Q24.

	Answer	Acceptable answers	Mark
	D alkali metals		**(1)**

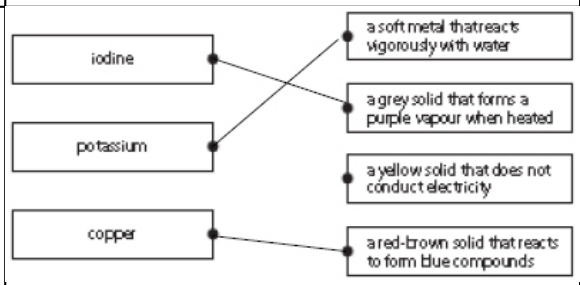
(**Q08 1SC0/2CF, June 2013**)

Q25.

Question number	Answer	Mark
	alkali metals	**(1)**

(**Q04a 1SC0/2CF/S2, SAM**)

Q26.

	Answer	Acceptable answers	Mark
(a)	B elements		**(1)**
(b)	D alkali metals		**(1)**
(c)(i) 1	any value in range 1.45 to 2.99	any answer which, to 1 sf, is in the range	**(1)**
(c)(i) 2	Kr	Reject KR, kr	**(1)**
(c)(i) 3	no reaction	'nothing'	**(1)**
(c)(ii)	An explanation linking any two of: • argon is {inert / unreactive} (1) • argon does not react with {metal/filament}/{metal/ filament} would react with air or oxygen / ORA (1) • atom has {eight electrons in outer shell / full (outer) shell} (1)	ignore noble gas doesn't react with anything argon does not corrode the metal ignore references to electrical conductivity	**(2)**
(d)	 all 3 correct – 2 marks any two correct – 1 mark one correct – 0 marks	if two answer lines from one element, then ignore	**(2)**

(**Q01 1SC0/2CF, June 2013**)

Q27.

Question number	Answer	Mark
	B halogens **A**, **C** and **D** are names for other groups in the periodic table	**(1)** **AO1-1**

(**QU04a 1SC0/2CF, June 2023**)

Q28.

Question number	Answer	Mark
	C soft enough to be cut by a knife / low melting point is the only correct answer **A** and **D** are incorrect because alkali metals do not have a high density **B** is incorrect because alkali metal compounds are not blue in colour	**(1)** **AO1-1**

(**QU06b 1SC0/2CF, June 2023**)

Q29.

Question number	Answer	Mark
	C soft enough to be cut by a knife / low melting point is the only correct answer **A** and **D** are incorrect because alkali metals do not have a high density **B** is incorrect because alkali metal compounds are not blue in colour	**(1)** **AO1-1**

(**QU02b 1SC0/2CH, June 2023**)

Q30.

Question number	Answer	Mark
	C soft, low is the only correct answer **A**, **B** and **D** are incorrect because alkali metals are soft with low melting points	**(1)** **AO1-1**

(**QU03a 1SC0/2CH, June 2025**)

Q31.

Question Number	Answer	Additional guidance	Mark
	An explanation linking • atoms become larger/ **outer** electron becomes further from the nucleus / ORA (1) • so **outer** electron more easily **lost** / less energy needed to **lose outer** electron / ORA (1)	allow atomic radius increases / increased shielding effect (by inner complete(electron) shells)/ more (inner) shells/ decreased force of attraction between outer shell electron and nucleus / correct electronic configuration**s** (at least two) reject 'more outer shells' / incorrect forces such as intermolecular	**(2)** AO 1 1

(**Q11 1SC0/2CH, June 2018**)

Q32.

Question number	Answer	Mark
(i)	any value between 30 (°C) and 63 (°C)	**(1)**

Question number	Answer	Mark
(ii)	potassium / rubidium / caesium / francium	**(1)**

Q33.

Question Number	Answer	Acceptable answers	Mark
(a)	B potassium and caesium, copper and iron		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)(i)	A description linking (regular arrangement of) positive ions /cations (1) (surrounded by) {delocalised/sea of} electrons (1)	Any reference to molecules/molecular/intermolecular/covalent scores 0 marks overall metal ions reject "negative and positive particles" / positive atoms / protons ignore descriptions of atoms in rows/ layers of particles etc cloud of electrons ignore free	**(2)**

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	An explanation linking M1 electrons (1) M2 move/flow (1) M2 dep on M1	 pass through / travel For M2: ignore free/delocalised (electrons) ignore electricity flows ignore (electrons) vibrate ignore carry/pass the current/charge	**(2)**

Question Number	Answer	Acceptable answers	Mark
(c)(i)	A description including any two from floats (1) moves (around) (1) effervescence / fizzing / bubbles (1) melts/changes to a ball shape (1) becomes smaller /disappears (1)	moves (around) on the surface (2) white smoke formed ignore gas/hydrogen given off dissolves / explodes Ignore: burns/catches fire/ignites/flame/sparks ignore addition of indicators	**(2)**

Question Number	Answer	Acceptable answers	Mark
(c)(ii)	$2Na + 2H_2O \rightarrow 2NaOH + H_2$ LHS (1) RHS (1) balancing of correct formulae(1)	NaHO ignore brackets around OH Use of lower case h, upper case A, lower case o, or use of superscripts or large numbers inside the formulae loses 1 mark only ignore state symbols	**(3)**

(**Q03 1SC0/2CH, June 2014**)

Q34.

Question number	Answer	Mark
	C hydrogen	**(1)**

(**Q04b 1SC0/2CF/S2, SAM**)

Q35.

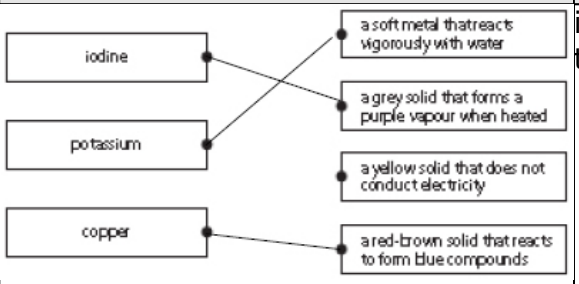
Question number	Answer		Mark
(i)	A description to include any three from • metal disappears **(1)** • metal moves around **(1)** • fizzing/ effervescence/ bubbling **(1)** • (any colour) flame **(1)** • explodes/reacts violently **(1)**	ignore floats/ sinks/ on surface of water allow dissolves/gets smaller ignore gas / smoke / steam / water vapour / hydrogen allow forms a ball / melts	**(3)**

Question number	Answer	Mark
(ii)	**C** rubidium atoms outer electrons are further from the nucleus than potassium atoms is the only correct answer. **A**, **B** and **D** are true but does not affect the reactivity	**(1)**

Question number	Answer	Additional guidance	Mark
(iii)	4.08 as final answer with or without working scores 4 • moles Rb = 8.5/85 (= 0.1 mol) **(1)** • moles RbOH = 0.1 mol **(1)** • mass RbOH = 0.1 x 102 (=10.2 g) **(1)** • conc = 10.2/2.5 (= 4.08 gdm^{-3}) **(1)** **OR** • 2Rb → 2 RbOH/ 1:1 ratio **(1)** • 85 (x2) (g) → 102 (x2) (g) **(1)** • 8.5 (g) → 10.2 (g) **(1)** • conc = 10.2/2.5 (= 4.08 gdm^{-3}) **(1)**	allow 8.5/ 2.5 (=3.4) to score MP4 working leading to 10.2 will score 3	**(4)**

(**Q05a 1SC0/2CH, Nov 2020**)

Q36.

	Answer	Acceptable answers	Mark
	 all 3 correct – 2 marks any two correct – 1 mark one correct – 0 marks	if two answer lines from one element, then ignore	**(2)**

(**Q10 1SC0/2CF, June 2013**)

Q37.

Question number	Answer	Mark
(i)	any value greater than 0 and less than 5 s	**(1)**

Question number	Answer	Additional guidance	Mark
(ii)	Any two from • effervesces (1) • melts (1) • catches fire (1) • explodes (1) • makes alkaline solution (1)	allow moves very quickly / moves about	**(2)**

(**Q04c 1SC0/2CF/S2, SAM**)

Q38.

Question number	Answer	Additional guidance	Mark
	safety screen / eye protection / gloves	Ignore 'tie long hair back'	**(1)**

(**Q04d 1SC0/2CF/S2, SAM**)

Q39.

Question number	Answer	Additional guidance	Mark
	An explanation to include three from : **HCl** • goes red (1) • (HCl) is an acid (1) **SO_2** • goes red (1) • (SO_2 solution) is an acid (1)	all MPs are marked independently allow pink for red reject other colours for MP1 reject references to test for chlorine/ bleaching for MP1 allow hydrogen chloride for HCl allow pink for red reject other colours for MP3 reject references to test for chlorine/ bleaching for MP3 both go red/ they go red (2) for MP1 and MP3 both are acids (2) for MP2 and MP4	**(3)** **AO1 1** **AO2 1**

(**QU03c 1SC0/2CF, June 2019**)

Q40.

Question number	Answer	Additional guidance	Mark
	An explanation to include three from : **HCl** • goes red (1) • (HCl) is an acid (1) **SO_2** • goes red (1) • (SO_2 solution) is an acid (1)	all MPs are marked independently allow pink for red reject other colours for MP1 reject references to test for chlorine/ bleaching for MP1 allow hydrogen chloride for HCl allow pink for red reject other colours for MP3 reject references to test for chlorine/ bleaching for MP3 both go red/ they go red (2) for MP1 and MP3 both are acids (2) for MP2 and MP4	**(3)** **AO1 1** **AO2 1**

(**QU03c 1SC0/2CF, June 2022**)