PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

CHEMISTRY



MARK SCHEME

TOPIC 1: KEY CONCEPTS IN CHEMISTRY: THE PERIODIC TABLE (PAPER 1)

SCORE	PERCENTAGE
/83	%

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Mark Scheme

Q1.

	Answer	Acceptable answers	Mark
	A description to include • 2.8 (in 1st and 2nd shell)(1)	suitable diagram in place of 2.8(1).5(1)	**(2)**

	• 5 (in outer shell)(1)	electrons in {shells / orbits / rings}(1)	

(**Q20 1SC0/1CF, June 2013**)

Q2.

	Answer	**Acceptable answers**	**Mark**
	A description to include • 2.8 (in 1st and 2nd shell)(1) • 5 (in outer shell)(1)	suitable diagram in place of 2.8(1).5(1) electrons in {shells / orbits / rings}(1)	**(2)**

(**Q16 1SC0/2CF, June 2013**)

Q3.

Question number	**Answer**	**Additional guidance**	**Mark**
(i)	any one of the following • shiny • high {melting / boiling} point • good conductor of {electricity / heat} • malleable / ductile • grey coloured	 allow reflective surface allow easily shaped / can be drawn into wires allow silver **coloured** ignore density / sonorous / solid ignore strength / strong / hard	**AO1-1 (1)**

Question number	**Answer**	**Mark**
(ii)	**D** strontium is the only correct answer **A**, **B** and **C** are incorrect because they are all in a different group to magnesium.	**AO1-1 (1)**

(**Q04a 1SC0/1CF, June 2023**)

Q4.

Question number	Answer	Mark
(i)	2.8.2	AO1-1 (1)

Question number	Answer	Additional guidance	Mark
(ii)	an explanation linking any two of • (chlorine has) 3 shells / 3 numbers in electronic configuration (1) • (so) (chlorine is in) period 3 (1) • number of shells is the period number (1)	reject '3 outer shells' allow electron configuration diagram for 1st mark	AO1-1 (2)

(**Q04b 1SC0/1CF, June 2023**)

Q5.

Question number	Answer	Additional guidance	Mark
(i)	proton: +1 (1); 1 neutron: 0; 1 (1) electron: -1 (1); negligible	allow 1(+) / +, reject -1 reject +1, -1 allow (1)-, reject +1 / 1	(3) AO1-1

Question number	Answer	Additional guidance	Mark
(ii)	A description including • 10 protons (1) • 10 electrons (1)	allow {'how many'/ 'number of'} protons allow {'how many'/ 'number of'} electrons / (electronic configuration) 2.8 allow 'number of protons and (number of) electrons' (2) ignore any reference to location of subatomic particles ignore neutrons	**(2)** **AO1-1**

Question number	Answer	Additional guidance	Mark
(iii)	An explanation linking • same number of protons and electrons (1) • (so) the (+ and -) charges cancel (1)	ignore reference to neutrons allow charge (on neon atom) = 0 +10 plus -10 = 0 (2)	**(2)** **AO2-1**

(**QU05a 1SC0/1CF, June 2025**)

Q6.

Question number	Answer	Additional guidance	Mark
(i)	proton: +1 (1) | 1 neutron: 0 | 1 (1) electron: -1 (1) | negligible	allow 1(+) / +, reject -1 reject +1, -1 allow (1)-, reject +1 / 1	**(3)** **AO1-1**

Question number	Answer	Additional guidance	Mark
(ii)	A description including • 10 protons (1) • 10 electrons (1)	allow {'how many'/ 'number of'} protons allow {'how many'/ 'number of'} electrons / (electronic configuration) 2.8 allow 'number of protons and (number of) electrons' (2) ignore any reference to location of subatomic particles ignore neutrons	(2) AO1-1

Question number	Answer	Additional guidance	Mark
(iii)	An explanation linking • same number of protons and electrons (1) • (so) the (+ and -) charges cancel (1)	ignore reference to neutrons allow charge (on neon atom) = 0 +10 plus -10 = 0 (2)	(2) AO2-1

(**QU01a 1SC0/1CH, June 2025**)

Q7.

Question number	Answer	Additional guidance	Mark
(i)	sulfur	ignore S	(1) AO2 1

Question number	Answer	Mark
(ii)	28	(1) AO2 1

Question number	Answer	Additional guidance	Mark
(iii)	• metal: sodium / Na (1) • non-metal: argon / Ar (1)	if elements swapped score max 1 do not penalise case of letters if symbols used	(2) AO3 1

(**QU01a 1SC0/2CF, June 2024**)

Q8.

Question Number	Answer	Mark
	C magnesium **1. The only correct answer is C** ***A*** *is not correct because this element is in period 4* ***B*** *is not correct because this element is in period 4* ***D*** *is not correct because this element is in period 5*	**(1)** AO 3 2b

(**Q02 1SC0/1CF, June 2018**)

Q9.

	Answer	Acceptable answers	Mark
(i)	number of protons (in nucleus of atom)	ignore number of electrons eg number of protons and electrons worth (1)	**(1)**
(ii)	An explanation including • (atoms of) both contain 5 /same number of protons/same atomic number (1) • boron-10 atoms contain 5 neutrons but boron-11 atoms contain 6 neutrons / different numbers of neutrons/ different mass number (1)	ignore electrons boron-11 atoms contain 1 more neutron / boron-10 atoms contain 1 less neutron	**(2)**

(**Q24 1SC0/1CH, June 2013**)

Q10.

	Answer	Acceptable answers	Mark
(i)	number of protons (in nucleus of atom)	ignore number of electrons eg number of protons and electrons worth (1)	**(1)**
(ii)	An explanation including • (atoms of) both contain 5 /same number of protons/same atomic number (1) • boron-10 atoms contain 5 neutrons but boron-11 atoms contain 6 neutrons / different numbers of neutrons/ different mass number (1)	ignore electrons boron-11 atoms contain 1 more neutron / boron-10 atoms contain 1 less neutron	**(2)**

(**Q15 1SC0/2CH, June 2013**)

Q11.

	Answer	Acceptable answers	Mark
(a)	C smaller than the mass of a proton		**(1)**
(b)	An description linking • 8 protons (1) • (and) {17-8/9} neutrons (1)	ignore references to electrons in shells / charges on particles if electrons in nucleus max 1 protons and neutrons with incorrect numbers (1)	**(2)**
(c)	Explanation linking • (both have) same number (of electrons) in outer shell(1) • 6 (electrons in outer shell) (consequent on first point) (1)	correct electronic configurations or diagrams alone max 1 'they both have 6 in the outer shell' scores both marks allow 'both need 2 (more) (electrons) to fill outer shell' for both marks	**(2)**
(d)	A description to include	suitable diagram in place of	**(2)**

	• 2.8 (in 1st and 2nd shell)(1) • 5 (in outer shell)(1)	2.8(1).5(1) electrons in {shells / orbits / rings}(1)	
(e)(i)	A description to include • electron(s) shared (1) • {**pair(s) of / two**} (electrons) (1)	can be shown in a diagram of a covalent bond any mention of ions scores zero	**(2)**
(e)(ii)	P_2O_5	Reject P2O5 / P^2O^5	**(1)**

(**Q46 1SC0/1CH, June 2013**)

Q12.

	Answer	**Acceptable answers**	**Mark**
(a)(i)	C T		**(1)**
(a)(ii)	C Q and S		**(1)**
(b)(i)	number of protons (in nucleus of atom)	ignore number of electrons eg number of protons and electrons worth (1)	**(1)**
(b)(ii)	An explanation including • (atoms of) both contain 5 /same number of protons/same atomic number (1) • boron-10 atoms contain 5 neutrons but boron-11 atoms contain 6 neutrons / different numbers of neutrons/ different mass number (1)	ignore electrons boron-11 atoms contain 1 more neutron / boron-10 atoms contain 1 less neutron	**(2)**
(c)(i)	An explanation including the following • M1 {average/mean} mass (of atoms of an element) (1) • M2 compared to {1/12 mass carbon-12 (atom)/ (mass of) carbon-12 (atom) taken as 12} (1)	For M1 reject weight reject if mass of molecule reject if mass of neutrons and protons any reference to carbon-12 scores mark	**(2)**
(c)(ii)	[19.7 × 10] (1) +[80.3 × 11] (1) /100	If no working shown 10.8(03) worth 3	**(3)**

	(1) (=10.8) [0.197 ×10] (1) + [0.803 ×11] (1) = [1.97 + 8.83] (1) (=10.8)	marks	

(**Q14 1SC0/1CH, June 2013**)

Q13.

	Answer	Acceptable answers	Mark
(a)	C smaller than the mass of a proton		**(1)**
(b)	An description linking • 8 protons (1) • (and) {17-8/9} neutrons (1)	ignore references to electrons in shells / charges on particles if electrons in nucleus max 1 protons and neutrons with incorrect numbers (1)	**(2)**
(c)	Explanation linking • (both have) same number (of electrons) in outer shell(1) • 6 (electrons in outer shell) (consequent on first point) (1)	correct electronic configurations or diagrams alone max 1 'they both have 6 in the outer shell' scores both marks allow 'both need 2 (more) (electrons) to fill outer shell' for both marks	**(2)**
(d)	A description to include • 2.8 (in 1st and 2nd shell)(1) • 5 (in outer shell)(1)	suitable diagram in place of 2.8(1).5(1) electrons in {shells / orbits / rings}(1)	**(2)**
(e)(i)	A description to include • electron(s) shared (1) • {**pair(s) of / two**} (electrons) (1)	can be shown in a diagram of a covalent bond any mention of ions scores zero	**(2)**
(e)(ii)	P_2O_5	Reject P2O5 / P^2O^5	**(1)**

(**Q43 1SC0/2CH, June 2013**)

Q14.

	Answer	Acceptable answers	Mark

(a)(i)	C T		**(1)**
(a)(ii)	C Q and S		**(1)**
(b)(i)	number of protons (in nucleus of atom)	ignore number of electrons eg number of protons and electrons worth (1)	**(1)**
(b)(ii)	An explanation including • (atoms of) both contain 5 /same number of protons/same atomic number (1) • boron-10 atoms contain 5 neutrons but boron-11 atoms contain 6 neutrons / different numbers of neutrons/ different mass number (1)	ignore electrons boron-11 atoms contain 1 more neutron / boron-10 atoms contain 1 less neutron	**(2)**
(c)(i)	An explanation including the following • M1 {average/mean} mass (of atoms of an element) (1) • M2 compared to {1/12 mass carbon-12 (atom)/ (mass of) carbon-12 (atom) taken as 12} (1)	For M1 reject weight reject if mass of molecule reject if mass of neutrons and protons any reference to carbon-12 scores mark	**(2)**
(c)(ii)	[19.7 × 10] (1) +[80.3 × 11] (1) /100 (1) (=10.8) [0.197 ×10] (1) + [0.803 ×11] (1) = [1.97 + 8.83] (1) (=10.8)	If no working shown 10.8(03) worth 3 marks	**(3)**

(**Q04 1SC0/2CH, June 2013**)

Q15.

Question Number	Answer	Acceptable answers	Mark
(a)	<table><tr><th>particle</th><th>relative mass</th></tr><tr><td>proton</td><td>1</td></tr><tr><td>neutron</td><td>**1** (1)</td></tr><tr><td>electron</td><td>1/1837 / negligible / very small **(1)**</td></tr></table>	if any minus sign(s) MAX 1 anything less than 1/1500 or 0.00067/(almost) 0	**(2)**

Question Number	Answer	Acceptable answers	Mark
(b)	**B** the same number of electrons and protons		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)	3 protons **(1)** {4/7-3} neutrons **(1)** maximum 1 mark if electrons mentioned	if numbers incorrect but state both protons and neutrons (and not electrons) allow (1) but can score both marks if clearly stated electrons not in nucleus eg in shells	**(2)**

(**Q22 1SC0/1CF, June 2015**)

Q16.

Question Number	Answer	Acceptable answers	Mark
(a)	<table><tr><th>particle</th><th>relative mass</th></tr><tr><td>proton</td><td>1</td></tr><tr><td>neutron</td><td>**1** (1)</td></tr><tr><td>electron</td><td>1/1837 / negligible / very small **(1)**</td></tr></table>	if any minus sign(s) MAX 1 anything less than 1/1500 or 0.00067/(almost) 0	**(2)**

Question Number	Answer	Acceptable answers	Mark
(b)	**B** the same number of electrons and protons		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)	3 protons **(1)** {4/7-3} neutrons **(1)** maximum 1 mark if electrons mentioned	 if numbers incorrect but state both protons and neutrons (and not electrons) allow (1) but can score both marks if clearly stated electrons not in nucleus eg in shells	**(2)**

(**Q10 1SC0/2CF, June 2015**)

Q17.

	Answer	**Acceptable answers**	**Mark**
	An description linking • 8 protons (1) • (and) {17-8/9} neutrons (1)	 ignore references to electrons in shells / charges on particles if electrons in nucleus max 1 protons and neutrons with incorrect numbers (1)	**(2)**

(**Q18 1SC0/1CF, June 2013**)

Q18.

	Answer	**Acceptable answers**	**Mark**
	An description linking • 8 protons (1) • (and) {17-8/9} neutrons (1)	 ignore references to electrons in shells / charges on particles if electrons in nucleus max 1 protons and neutrons with incorrect numbers (1)	**(2)**

(**Q14 1SC0/2CF, June 2013**)

Q19.

Question number	Answer	Additional guidance	Mark
(i)	A description to include • use of **glowing** splint (1) • (glowing splint) relights (1)	 2nd mark dependent on correct test	**(2)** **AO1**

Question number	Answer	Additional guidance	Mark
(ii)	potassium ion: 2.8.8 (1) oxide ion: 2.8 (1)	Allow other separators between the numbers including spaces	**(2)** **AO1**

(**Q03c 1SC0/2CH, Nov 2021**)

Q20.

Question number	Answer	Additional guidance	Mark
	A description to include any two from : • left gaps / incomplete (1) • fewer elements / not all elements discovered (1) • elements ordered by atomic mass (1) • no group 0 (/8/18)) / fewer groups (1) • no atomic numbers (1) • some elements in different positions (1) • names of **some** elements were different (1)	 allow reverse arguments for modern periodic table for all these points, except: modern periodic table ordered by atomic number allow gaps left for undiscovered elements (on Mendeleev's table) (2)	**(2)** **AO 1-1**

Q21.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	A metal		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	Any one of Li B C N O F Ne Ignore numbers with the symbols eg $^{7}_{3}Li$		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)(i)	4 (protons) (1) 4 (electrons) (1) 5 (neutrons) (1)		**(3)**

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	C -1		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)	An explanation linking 5 electrons (1) (in the) {outer/last/final/end} {shell/energy level} (1)	 it has 5 {outer/valence} electrons fully correct diagram showing electronic configuration **and** electron(s) labelled the group (number) is the number of electrons in the outer shell orbit/ring for shell fully correct diagram showing electronic configuration without labelled electron **OR** 5 in the {outer/last} {shell / energy level} do not allow just '5 at the end' do not award the first mark if proton/neutron/atom (in the outer shell)	 **(2)**

(Total for Question 2 = marks)

(**Q02 1SC0/1CF, June 2014**)

Q22.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	A metal		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	Any one of Li B C N O F Ne Ignore numbers with the symbols eg $^{7}_{3}Li$		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)(i)	4 (protons) (1) 4 (electrons) (1) 5 (neutrons) (1)		**(3)**

Question Number	Answer	Acceptable answers	Mark
(b)(ii)	C -1		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)	An explanation linking 5 electrons (1) (in the) {outer/last/final/end} {shell/energy level} (1)	 it has 5 {outer/valence} electrons fully correct diagram showing electronic configuration **and** electron(s) labelled the group (number) is the number of electrons in the outer shell orbit/ring for shell fully correct diagram showing electronic configuration without labelled electron **OR** 5 in the {outer/last} {shell / energy level} do not allow just '5 at the end' do not award the first mark if proton/neutron/atom (in the outer shell)	**(2)**

(Total for Question 2 = marks)

(**Q02 1SC0/2CF, June 2014**)

Q23.

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. Read whole answer and ignore all incorrect material/ discard any contradictory material. Ignore irrelevant material **not linked to electrons** e.g metals on left, non-metals on right; change in reactivity down a group; periodic table arranged in order of atomic number; groups based on similar chemical properties Allow row for period, allow column for group. **AO1 (6 marks)** • number of electrons increases • from left to right / Li to Ne • down the group / Li to Na / symbols for elements in other groups • {first 2 elements / H & He} electrons in 1st shell • {elements 3-10 / Li to Ne} added electron in 2nd shell • {next 2 elements / Na & Mg} outer electrons in 3rd shell • more electrons need more electron shells • so no of shells = period number • no of electrons in outer shell = group no • examples of electronic configurations of elements	**(6)**

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) • Presents an explanation with some structure and coherence. (AO1)
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) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Demonstrates accurate and relevant chemical understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

Level	Mark	Descriptor	Additional Guidance
	0	No rewardable material.	
Level 1	1–2	Additional Guidance Describes some information about the periodic table	Possible candidate response • the atomic number gives the number of electrons (1) • the electronic configuration of magnesium is 2.8.2 (1) • the group number gives the number of electrons in the outer shell (1) • the period number gives then number of shells of electrons (1) • sodium is in group 1 because it has 1 electron in its outer shell (2) • all group 1 elements have 1 outer electron (1)
Level 2	3–4	Additional Guidance A full explanation linking group to outer electron with example **AND** attempt to link period to number of shells **OR** A full explanation linking period to number of shells with example **AND** attempt to link group to number of electrons in outer shell	Possible candidate response • The number of electrons in the outer shell is the group, so group 1 elements such as have 1 electron in their outer shell (3) • The number of electrons in the outer shell is the group, so lithium has 1 electron in their outer shell (3) • The number of electrons in the outer shell is the group, so group 1 elements such as have 1 electron in their outer shell and the period number is the number of shells (4) • The number of shells of electrons is the period number for example lithium is period 2 because it has 2 shells (3) • The number of shells of electrons is the period number for example period 3 elements have 3 shells (3) • The number of shells of electrons is the period number for example period 3 elements have 3 shells and the number of outer electrons gives the group number. (4)
Level 3	5–6	Additional Guidance A full explanation linking group to outer electron with example **AND** a full explanation linking period to number of shells with example **AND** example of an electronic configuration	Possible candidate response • The number of electrons in the outer shell is the group, so group 1 elements such as have 1 electron in their outer shell. The number of shells of electrons is the period number for example period 3 elements have 3 shells and the number of outer electrons (5) • The number of electrons in the outer shell is the group, so group 1 elements such as have 1 electron in their outer shell. The number of shells of electrons is the period number for example period 3 elements have 3 shells and the number of outer electrons gives the group number so the electronic configuration of potassium is 2.8.1 (6)

(**QU05b 1SC0/1CF, June 2025**)

Q24.

Question number	Answer	Mark
	An explanation linking • number of electrons on outer shell gives the group number / 1 electron on outer shell so group 1 (1) • number of electron shells gives the period number / 4 electron shells so period 4 (1)	**(2)** **AO1**

(**Q03b 1SC0/2CH, Nov 2021**)

Q25.

Question number	Answer	Additional guidance	Mark
	An explanation linking • period 2 (1) • (because) 2 (electron) shells (1)	 accept 'row', horizontal line allow electron configurations for each element ignore same number of shells reject 2 outer shells if no other mark awarded period = number of electron shells (1)	**(2)** **AO1.1**

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

Q26.

Question number	Answer	Additional guidance	Mark
(i)	**A 20 20 is the only correct answer** **B, C** and **D** are incorrect because calcium does not have 40 protons; calcium does not have 60 neutrons; calcium does not have 60 protons		**(1)**

Question number	Answer	Additional guidance	Mark
(ii)	an explanation linking • period 4 (1) • four shells of electrons (1)	reject four outer shells	**(2)**

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

Q27.

Question number	Answer	Additional guidance	Mark
	An explanation linking • 1 electron (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**

(**QU02a 1SC0/2CH, June 2023**)

Q28.

Question number	Answer	Additional guidance	Mark
	An explanation linking • outer (electron) shell (1) • (both have) {same number / 1} electron(s) (1)	allow both lose 1 electron (to form ion / to form noble gas configuration) reject same number of outer shells / same number of electrons MP2 depends on MP1	(2)

(**Q05b 1SC0/2CF, Nov 2020**)

Q29.

	Answer	**Acceptable answers**	**Mark**
(a)(i)	fractional distillation		**(1)**
(a)(ii)	to make it liquid	liquefy/condense to remove water (vapour) to remove carbon dioxide	**(1)**
(b)	D weak forces of attraction between the oxygen molecules		**(1)**
(c)(i)	An description including • shared (electrons) (1) • pair(s) of electrons (between atoms) (1)	Ignore reference to complete/full shells Ignore reference to between two metals Ignore reference to between metal and non-metal Ignore reference to between molecules Any reference to between ions scores 0	**(2)**
(c)(ii)	2.4		**(1)**
(c)(iii)	diagram showing • any shared pair of electrons between a carbon and oxygen atom in CO_2 molecule (1)	Must have O C O arrangement If any atom labelled must be correct	**(2)**

	• rest of molecule correct (1)	Ignore inner electrons even if wrong electrons can be on/in ring or no ring Ignore intersecting circles Accept all permutations of dots and crosses	

(**Q12 1SC0/1CH, June 2013**)

Q30.

	Answer	**Acceptable answers**	**Mark**
(a)(i)	fractional distillation		**(1)**
(a)(ii)	to make it liquid	liquefy/condense to remove water (vapour) to remove carbon dioxide	**(1)**
(b)	D weak forces of attraction between the oxygen molecules		**(1)**
(c)(i)	An description including • shared (electrons) (1) • pair(s) of electrons (between atoms) (1)	Ignore reference to complete/full shells Ignore reference to between two metals Ignore reference to between metal and non-metal Ignore reference to between molecules Any reference to between ions scores 0	**(2)**
(c)(ii)	2.4		**(1)**
(c)(iii)	diagram showing • any shared pair of electrons between a carbon and oxygen atom in CO_2 molecule (1) • rest of molecule correct (1)	Must have O C O arrangement If any atom labelled must be correct Ignore inner electrons even if wrong electrons can be on/in ring or no ring Ignore intersecting circles Accept all permutations of dots and crosses	**(2)**

(**Q02 1SC0/2CH, June 2013**)

Q31.

Question number	Answer	Additional guidance	Mark
(i)	2.8.8.1	allow any separator including gaps *e.g.* 2 8 8 1 send to review any diagrams	(1)

Question number	Answer	Mark
(ii)	**B** 19 (protons) 20 (neutrons) This is the only correct answer. **A** is incorrect because there are 20 neutrons in the ion **C** is incorrect because there are 19 protons and 20 neutrons **D** is incorrect because there are 19 protons in the ion	(1)

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

Q32.

Question number	Answer	Additional guidance	Mark
(i)	**2.8.8.1**	allow any separator including gaps *e.g.* 2 8 8 1 send to review any diagrams	(1)

Question number	Answer	Mark
(ii)	**B** 19 (protons) 20 (neutrons) is the only correct answer. **A** is incorrect because there are 20 neutrons in the ion **C** is incorrect because there are 19 protons and 20 neutrons **D** is incorrect because there are 19 protons in the ion	(1)

(**Q01a 1SC0/2CH, Nov 2020**)

Q33.

Question Number	Answer	Additional guidance	Mark
(i)	any two from **E, G** and **X**	allow mark if all three given for E allow B / boron for G allow O / O_2 / oxygen for X allow Ar / argon allow use of lower case letters reject answers with any other letters / element names	**(1)**

Question Number	Answer	Additional guidance	Mark
(ii)	any two from **A, E** and **G**	allow mark if all three given for A allow Li / lithium for E allow B / boron for G allow O / O_2 / oxygen allow use of lower case letters reject answers with any other letters / element names	**(1)**

Question Number	Answer	Additional guidance	Mark
(iii)	**A / J**	allow mark if both given for A allow Li / lithium for J allow Na / sodium allow use of lower case letters reject answers with any other letters / element names reject answers with + or – charges	**(1)**

(**Q05a 1SC0/1CF, June 2019**)

Q34.

Question number	Answer	Additional guidance	Mark
(i)	any two from **E, G** and **X**	allow mark if all three given for E allow B / boron for G allow O / O_2 / oxygen for X allow Ar / argon allow use of lower case letters reject answers with any other letters / element names	(1)

Question number	Answer	Additional guidance	Mark
(ii)	any two from **A, E** and **G**	allow mark if all three given for A allow Li / lithium for E allow B / boron for G allow O / O_2 / oxygen allow use of lower case letters reject answers with any other letters / element names	(1)

Question number	Answer	Additional guidance	Mark
(iii)	**A** / **J**	allow mark if both given for A allow Li / lithium for J allow Na / sodium allow use of lower case letters reject answers with any other letters / element names reject answers with + or – charges	(1)

(**Q01a 1SC0/1CH, June 2019**)

Q35.

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**)

Q36.

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**

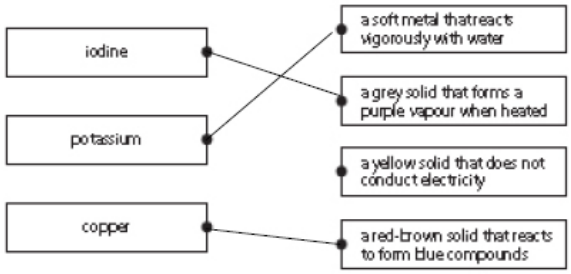
Question number	Answer	Mark
(ii)	3 / three	**(1) AO2 1**

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**)

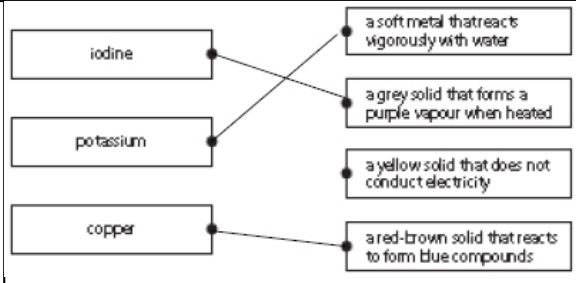
Q37.

	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)		if two answer lines from one element,	**(2)**

	 all 3 correct – 2 marks any two correct – 1 mark one correct – 0 marks	then ignore	

(**Q07 1SC0/1CF, June 2013**)

Q38.

	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)		if two answer lines from one element, then ignore	**(2)**

	all 3 correct – 2 marks any two correct – 1 mark one correct – 0 marks		

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

Q39.

Question number	Answer	Mark
	D	(1)

(**Q04b 1SC0/1CH, SAM 2016**)

Q40.

Question Number	Answer	Mark
	B 2.8.8.2 (1)	(1)

(**Q04a 1SC0/1CH, SAM**)