AQA GCSE Chemistry

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	metal		1	AO1 4.1.2.3
01.2	rubidium hydroxide and hydrogen		1	AO2 4.1.2.5
01.3	rubidium + oxygen → rubidium oxide		1	AO1 4.1.2.5
01.4	$2Na(s) + Br_2(l) \rightarrow 2NaBr(s)$	one mark for balancing one mark for state symbols	2	AO2 4.1.2.5
01.5	rubidium is more reactive that sodium/sodium less reactive because it is further down Group 1/it has more electron shells outer electron is further from the nucleus / the nucleus is more shielded so easier to transfer to bromine/easier to remove		1 1 1 1	AO1 4.1.2.5
02.1	gaps were left for elements that were predicted to exist, but had not yet been discovered in some places, the order of the elements were changed (based on atomic weights)		1 1	AO1 4.1.2.2
02.2	elements could be arranged in order of atomic/proton number so elements were grouped according to their chemical properties.		1 1	AO1 4.1.2.2

Question	Answers	Extra information	Mark	AO / Specification reference
02.3	elements in the same group of the Periodic Table have the same number of electrons in their highest energy level/outer shell number of electrons in the highest energy level/outer shell determine the chemical properties of an element		1 1	AO1 4.1.2.2
02.4	the existence of neutrons makes possible the existence of isotopes		1	AO2 4.1.2.2
03.1	Group 0: inert Group 1: react with water to make alkaline solutions Group 7: react with metals to make ionic compounds	one mark for each correct match	3	AO2 4.1.2.5
03.2	**Level 3:** Clearly links trend in reactivity for both groups to electron structure.		5-6	AO2 4.2.2.3
	Level 2: Clearly links trend in reactivity for one group to electron structure OR correctly states trends in reactivity for both groups.		3-4	
	Level 1: Correctly states trends in reactivity for one/both groups.		1-2	
	No relevant content		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content • Group 1 gets more reactive down the group • Group 1 loses outer electron to form full outer shell/nearest noble gas • electron is further from the nucleus, so becomes easier to remove • Group 7 gets less reactive down the group • Group 7 atoms gain electron to form full outer shell/nearest Noble Gas • less attraction felt by positive nucleus charge further away from nucleus.			
03.3	inert/unreactice because atoms already have a full outer electron shell	ignore references to heavier Noble Gases forming some compounds	1 1	AO1 4.1.2.4
04.1	outer electrons of xenon are far way from the nucleus weaker electrostatic force between outer electrons and positively charged nucleus strong attraction from the positively charged fluorine nucleus		1 1 1	AO3 4.1.2.4 4.1.2.6
04.2	Xe atom should have 8 black dots and 4 green dots. F atoms should have 8 black dots. each F atoms should share 2 black dots with the Xe atom		2	AO3 4.2.1.4
04.3	covalent		1	AO1 4.2.1.4

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05.1	Group 1		1	AO1 4.1.2.5
05.2	so that the big lump of sodium does not react with oxygen/water from the air		1	AO3
05.3	to avoid sodium reacting with water on fingers/to prevent injury to the hand		1	AO3
05.4	use filter paper to remove the oil from the surface of the sodium/scrape the surface of the sodium to expose the metal or remove some sodium oxide		1	AO3
05.5	hydrogen/H_2.	reject H	1	AO1 4.1.2.5
05.6	add universal indicator to the water colour change from green to blue/purple	allow other indicators provided correct colour change given	1 1	AO1 4.1.2.5
05.7	atoms of all Group 1 elements lose an electron in their reactions atoms get bigger down the group, so the outer electron is further from the nucleus/Na has an extra shell/Li has one fewer shell electrostatic force of attraction between positive nucleus and negatively charged electron decreases down the group so it is easier to lose electron/transfer electron	allow references to shielding one mark for each part of the explanation	3	AO1 4.1.2.5

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5.8	very vigorous reaction/caesium catches fire/very vigorous bubbling	allow any correct observations allow damage to glass trough answers only if they are related to the high reactivity of Cs	1	AO2 4.1.2.5
06	**Level 3:** Solutions X, Y and Z are correctly identified, and the justification is correct and explained coherently and logically.		5-6	AO3 4.1.2.6
	Level 2: Solutions X, Y and Z are correctly identified, and some aspects of the justification are correct. The explanation lacks coherence and logic.		3-4	
	Level 1: One or two solutions are correctly identified, and one or two points of explanation are made. The explanation lacks coherence and logic.		1-2	
	No relevant content		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content • X is potassium bromide, Y is potassium chloride, Z is potassium iodide • a Halogen displaces a less reactive Halogen from an aqueous solution of its salt • chlorine is more reactive than bromine, so chlorine displaces bromine from potassium bromide solution (solution X) and iodine from potassium iodide solution (solution Z) • bromine is more reactive than iodine, so bromine displaces iodine from potassium iodide solution (solution Z) • iodine is less reactive than both chlorine and bromine, so displaces neither of these compounds from solutions of their salts			
07	**Level 3:** The prediction is correct, and the explanation is clear, coherent and logical.		5-6	AO1 × 5 AO3 × 1 4.1.2.5 4.1.2.6
	Level 2: The prediction is correct, but the explanation lacks some clarity and coherence.		3-4	
	Level 1: The prediction is incorrect, but one or two aspects of the explanation are correct.		1-2	
	No relevant content		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content: • D – sodium and fluorine • fluorine is most reactive of the Halogens given and sodium is most reactive of the Alkali Metals given • in the reaction, each fluorine atom gains an electron and each sodium atom loses an electron. • fluorine atom attracts electrons to it more strongly than bromine because its atoms are smaller • so incoming electrons are attracted to the nucleus more strongly • sodium loses its electrons more easily than lithium because its atoms are bigger • so the outer shell/highest energy level electrons are less strongly attracted to the nucleus			
08.1	Noble Gases		1	AO1 4.1.2.4
08.2	A		1	AO2 4.1.2.4
08.3	A		1	AO2 4.1.2.4
08.4	Ne atom should have 2 rings with 2 dots on the first ring and 8 dots on the second ring		1	AO1 4.1.2.4

Question	Answers	Extra information	Mark	AO / Specification reference
08.5	their atoms have a full outer shell of electrons/highest energy level/stable electron arrangement		1	AO2 4.1.2.4
09.1	B		1	AO2 4.1.2.1
09.2	C because its outer electron shell/highest energy level is full/atoms have stable arrangement of electrons		1 1	AO2 4.1.2.4
09.3	A and D	both required for the mark	1	AO2 4.1.2.1
10.1	increases because, like Group 1, atoms of Group 2 elements react by losing electrons atoms get bigger down the group, so the outer electrons are further from the nucleus so the force of attraction between the nucleus and the outer electrons decreases.	no mark for 'increases' alone	1 1 1 1	AO2 × 2 AO3 × 2 4.1.2.5
10.2	giant (metallic) structures atoms arranged in regular pattern electrons of outer shells of atoms delocalised and free to move throughout the whole structure		1 1 1	AO1 4.2.1.5
10.3	less sodium reacts vigorously with cold water.		1 1	AO3 4.1.2.5

Question	Answers	Extra information	Mark	AO / Specification reference
10.4	$MgCl_2$		1	AO3 4.1.2.5
11.1	H atom should have 1 dot and 1 cross. F atom should have 7 crosses and 1 dot. H atom and F atom should be sharing one dot and one electron.		2	AO2 4.1.2.6 4.2.1.4
11.2	**Level 3:** The electronic structures are correctly stated or drawn, and the explanation is clear, coherent and logical.		5-6	AO2 4.1.2.6
	Level 2: The electronic structures are correctly stated or drawn, but the explanation lacks some clarity and coherence.		3-4	
	Level 1: One of the electronic structures are correctly stated or drawn, and one or two parts of an explanation are included.		1-2	
	No relevant content		0	
	Indicative content: • correctly stated or drawn electronic structures of fluorine (2,7) and chlorine (2,8,7) atoms • atoms of fluorine and chlorine gain an electron in their reactions. • chlorine is bigger than fluorine, so its outer electrons are further from nucleus • electrostatic force of attraction between positive nucleus and incoming negatively charged electron is greater for fluorine than chlorine			

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11.3	products of reaction three melts at higher temperature. product of reaction two has small molecules/simple molecules, so low melting point product of reaction three has (giant) ionic structure, so high melting point	one mark for correct suggestion, one mark for reason	1 1 1	AO2 × 2 AO3 × 1 4.1.2.6
12.1	Alkali Metals		1	AO1 4.1.2.6
12.2	they have the same number of electrons in the shell furthest from the nucleus		1	AO1 4.1.2.1
12.3	metals		1	AO1 4.1.2.3
12.4	caesium bromide		1	AO2 4.1.2.5 4.1.2.6
13.1	B		1	AO2 4.2.2.1
13.2	2,8,8		1	AO2 4.1.1.7

Question	Answers	Extra information	Mark	AO / Specification reference
13.3	one electron from potassium's outer shell is transferred to chlorine's outer shell to form +1 potassium ion and -1 chlorine ion electrostatic attraction occurs between oppositely charged ions		1 1 1 1	AO2 4.2.1.2
13.4	ions/charges are free to move		1	AO2 4.2.2.3
13.5	place solution in round-bottom flask and attach this round-bottom flask to condenser heat this round-bottom flask with a Bunsen burner water will evaporate and condense in the condenser this can be collected in a separate vessel. potassium chloride will remain in the round-bottom flask.		1 1 1 1 1 1	AO1 4.1.1.2
14.1	discovery of neutrons led to discovery of isotopes explained why atomic weight order was not correct		1	AO1 4.1.2.2
14.2	has one electron in the outermost shell. does not share properties with the rest of Group 1 elements	 accept a named property	1 1	AO3 4.1.2.5
14.3	number of protons		1	AO1 4.1.1.5

Question	Answers	Extra information	Mark	AO / Specification reference
14.5	$M_R = \frac{(92.2\times28)+(4.7\times65)+(3.1\times30)}{100}$ =28.109 =28.1		1 1 1	AO2 4.1.1.6