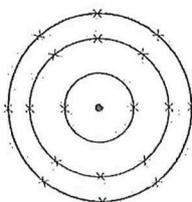


Question	Marking details	Marks Available				
		AO1	AO2	AO3	Total	Prac
8/2 (a)	E	1			1	
	D		1		1	
	C and E (1) both needed same number of protons (atomic number) but different number of neutrons (mass number) (1)	1	1		2	
(b) (i)			1		1	
(ii)	full outer shell (of electrons) accept both have 8 electrons in their outer shell	1			1	
	Question 8/2 total	3	3	0	6	0

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
(b)	<p>ClO_2 (3)</p> <p>if formula incorrect award credit for correct steps</p> <p>$Cl = \frac{0.71}{35.5} / 0.02$ and $O = \frac{0.64}{16} / 0.04$ (1)</p> <p>conversion of 0.02 and 0.04 to a 1:2 ratio (1)</p> <p>ecf possible</p> <p>award (1) max if A_r divided by mass leading to Cl_2O</p>		3		3	3	
(c)	<p>(i) $\text{Ag}^+(\text{aq}) + \text{Br}^-(\text{aq}) \rightarrow \text{AgBr}(\text{s})$</p> <p>correct formulae for both ions and product (1)</p> <p>state symbols for both ions and product (1)</p> <p>state symbols only credited if ions and product correct</p>	1	1		2		
	<p>(ii) $2\text{AgNO}_3 + \text{CaI}_2 \rightarrow 2\text{AgI} + \text{Ca}(\text{NO}_3)_2$</p> <p>correct reactants (1)</p> <p>correct products (1)</p> <p>balancing (1)</p> <p>balancing mark can only be awarded if both the reactants and products are correct</p>		3		3	1	
	Question 5 total	4	11	0	15	4	4

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths Prac	
7	<p>Indicative content</p> <p>Description</p> <ul style="list-style-type: none"> the metals get more reactive / react more violently as you go down the group lithium fizzes and moves slowly on water surface sodium fizzes, moves quickly on surface, forms a ball and melts potassium fizzes, moves quickly on surface, forms a ball, melts and ignites burning with a lilac flame <p>Explanation</p> <ul style="list-style-type: none"> the metals all have one electron in their outer electron shell they lose this outer electron when they react as you go down the group, the outer electron gets further away from the nucleus, meaning it is easier to lose the more easily the outer electron is lost, the more reactive the metal is 				6		3
	<p>5-6 marks Full description of the observations and explanation of trend in terms of ease of losing outer electron <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p>3-4 marks Good account of the observations, correct trend and reference to electronic structure <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p>1-2 marks Basic description of some observations and/or trend <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p>0 <i>No attempt made or answer worthy or any credit.</i></p>						
Question 7 total		6	0	0	6	0	3

Question	Marking details	Marks available									
		AO1	AO2	AO3	Total	Prac					
8/2	(a)		1		1	1					
	(ii)		2		2						
	(iii)			1	1						
	(b) (i)		1		1	1					
	(ii)		2		2	2					
	Question 8/2 total					0	6	1	7	4	0

	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)	<p>chlorine is more reactive than iodine (1) accept chlorine can gain an electron more easily than iodine</p> <p>award (1) for any of following</p> <ul style="list-style-type: none"> • chlorine displaces iodide ion • chlorine takes electron from iodide ion • chlorine oxidises iodide ion 	2			2		2
		(ii)	<p>$\text{Cl}_2 + 2\text{KI} \rightarrow 2\text{KCl} + \text{I}_2$</p> <p>award (1) for correct formulae for reactants and products</p> <p>award (1) for balancing only if correct formulae given</p>		2		2		
	(b)		<p>112 g of iron reacts with 213 g of chlorine (1) 1.32 g of iron reacts with $\frac{213}{112} \times 1.32$ g of chlorine (1) 2.51 g (1)</p> <p>ecf possible for incorrect relative mass values i.e. 112 or 213</p> <p>alternative method</p> <p>moles Fe = $\frac{1.32}{56} = 0.0236$ mol (1)</p> <p>moles Cl₂ = $\frac{3}{2} \times 0.0236 = 0.0353$ mol (1)</p> <p>mass Cl₂ = 0.0353 × 71 = 2.51 g (1)</p> <p>ecf possible for incorrect mole ratio</p>		3		3	3	

Question	Marking details	Marks available				
		AO1	AO2	AO3	Total	Prac
(c)	$\text{Cl}_2 + 3\text{Br}_2 \rightarrow 2\text{ClBr}_3$		1		1	
(ii)	77.46 / 77.5 / 77		1		1	1
	Question 7 total	2	7	0	9	4
						2

Common questions

8/1	Question	Marking details	Marks available						
			AO1	AO2	AO3	Total	Maths	Prac	
	(a)	(i)	award (1) for any of following to prevent it from reacting with air / oxygen / water (vapour) (in the air) because it reacts with air / oxygen / water (vapour) (in the air) to prevent oxidation / tarnishing	1			1		
		(ii)	it gets duller / tarnishes / loses its shine / turns white / turns grey neutral answers – changes colour / changes appearance	1			1		1
		(iii)	Na ₂ O		1		1		
	(b)	(i)	chlorine is toxic / poisonous	1			1		
		(ii)	2Na + Cl ₂ → 2NaCl award (2) for correct equation if incorrect award (1) for correct formula of product		2		2		2
	(c)	(i)	-25 °C <input type="checkbox"/> 25 °C <input type="checkbox"/> 100 °C <input type="checkbox"/> 150 °C <input checked="" type="checkbox"/>			1	1	1	
		(ii)	award (1) for any of following astatine will react very slowly / more slowly than iodine astatine will not react with hot iron astatine is less reactive than iodine / the least reactive neutral answers – quite slow / takes a long time to react reactivity decreases down the group (1)			2	2		
			Question 8/1 total	3	3	3	9	1	3

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
7	<p>(a)</p> <p>Si (1)</p> <p>award (1) for answer that identifies one property as metallic and another as non-metallic e.g. it has a high melting point but is brittle</p> <p>neutral answers it is a semiconductor it has metal and non-metal properties</p>		2		2		
	<p>(b)</p> <p>The density of metals and non-metals increases <input type="checkbox"/></p> <p>The boiling point of metals increases but the boiling point of non-metals shows no trend <input checked="" type="checkbox"/></p> <p>The density of metals shows no trend but the density of non-metals decreases <input type="checkbox"/></p> <p>The boiling point of metals and non-metals shows no trend <input type="checkbox"/></p> <p>The density of metals increases but the density of non-metals shows no trend <input checked="" type="checkbox"/></p> <p>The boiling point of metals shows no trend but the boiling point of non-metals decreases <input type="checkbox"/></p> <p>The density of metals decreases but the density of non-metals shows no trend <input type="checkbox"/></p>			2	2		

Question	Marking details	Marks available				
		AO1	AO2	AO3	Total	Maths Prac
(c)	<p>there is no trend in the melting points of the non-metals / the elements preceding chlorine</p> <p>accept description e.g. there is a decrease in melting point from Si to P, then an increase from P to S and then another decrease from S to Cl</p> <p>neutral answer – melting point is unpredictable</p>			1	1	
(d) (i)	<p>liquid (1)</p> <p>award (1) for any of following only if first mark is awarded</p> <ul style="list-style-type: none"> 60 °C is <u>between</u> its melting point and boiling point melting point is <u>below</u> 60 °C and boiling point is above 60 °C 60 °C is <u>between</u> 44 °C and 281 °C phosphorus has already melted at 60 °C but has not reached its boiling point <p>neutral answer – its melting point is 44 °C and its boiling point is 281 °C</p>			2	2	
(ii)	$3 \text{ Zn} + 2 \text{ H}_3\text{PO}_4 \longrightarrow \text{Zn}_3(\text{PO}_4)_2 + 3 \text{ H}_2$		1		1	1
	Question 7 total	0	3	5	8	1 0

Question	Marking details	Marks available							
		AO1	AO2	AO3	Total	Maths Prac			
8	(a)	(i)	(metals in Group 1) get more reactive (down the group) (1) award (1) for any of following due to a decrease in attraction between the nucleus and the outer shell electron easier to remove outer electron because there are more shells easier to remove outer electron because it is further from the nucleus	2			2		1
		(ii)	Group 1 metals are more reactive than Group 2 metals (1) award (1) for either of following <ul style="list-style-type: none"> because Group 1 metals only need to lose 1 electron (from the outer shell) whereas Group 2 metals need to lose 2 electrons because it is easier to lose 1 electron than 2 electrons 	2			2		
	(b)		257.6 / 258 (3) if answer incorrect credit each correct step in one of two possible methods (ecf possible throughout) method 1 $n(\text{H}_2) = \frac{11.2}{2} = 5.6$ (1) $n(\text{Na}) = 5.6 \times 2 = 11.2$ (1) mass Na = $11.2 \times 23 = 257.6$ (1) method 2 1 mol H_2 produced by 2 mol Na / 2 g H_2 produced by 46 g Na (1) 1 g H_2 produced by 23 g Na (1) 11.2 g H_2 produced by $23 \times 11.2 = 257.6$ g Na (1)					3	3

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
(c)	$\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$ award (2) for correct equation award (1) if $\text{Ca}(\text{OH})_2$ formula is correct		2		2		1
	Question 8 total	4	5	0	9	3	2

COMMON QUESTIONS

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
7/1	(a) A and B (1) both needed both contain two shells (of electrons) (1)	1	1		2		
	(b) D (1) has a full outer shell (of electrons) (1) accept all shells full neutral answers has 8 electrons in outer shell has full shell		2		2		
	(c) award (1) for either of following <ul style="list-style-type: none"> • number of electrons (in the shells) is equal to the number of protons (in the nucleus) • E has 11 electrons so it also has 11 protons award (1) for either of following <ul style="list-style-type: none"> • number of protons is equal to the atomic number • because it has 11 protons its atomic number is 11 number of electrons, number of protons and atomic number must all be linked to gain both marks	2			2		

Question	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
(d)	$4\text{K} + \text{O}_2 \rightarrow 2\text{K}_2\text{O}$ award (1) for K_2O award (1) for balancing only if formula correct		2		2		
	Question 7/1 total	3	5	0	8	0	0

Question	Marking details	Marks available								
		AO1	AO2	AO3	Total	Maths	Prac			
8	(a)	(i)	sodium bromide / NaBr (1) iodine / I ₂ (1)		2		2		2	
		(ii)	bromine is more reactive than <u>iodine</u> / elements get less reactive down <u>Group 7</u> (1) so bromine displaces iodine / takes electrons from iodide / oxidises iodide (1)		2		2		2	
		(b)	$2Fe + 3Br_2 \rightarrow 2FeBr_3$ award (1) for correct product award (1) for balancing only if all formulae are correct		2		2	1		
	(c)	(i)	yellow precipitate		1		1		1	
		(ii)	$Ag^+ + I^- \rightarrow AgI$ award (1) for reactants award (1) for product		2		2			
			Question 8 total		3	6	0	9	1	5