



GCSE MARKING SCHEME

SUMMER 2025

**GCSE
CHEMISTRY – UNIT 2**

3410U20-1 AND 3410UB0-1

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

GCSE CHEMISTRY UNIT 2
CHEMICAL BONDING, APPLICATION OF CHEMICAL REACTIONS AND ORGANIC CHEMISTRY
SUMMER 2025 MARK SCHEME

GENERAL INSTRUCTIONS

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statements.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao	=	correct answer only
ecf	=	error carried forward
bod	=	benefit of doubt

FOUNDATION TIER ONLY QUESTIONS

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)		beaker tripod <u>Bunsen burner</u> stirrer	1			1		1
		(ii)		<div> <div>the copper(II) oxide turns blue</div> <div>black solid remains on the bottom of the beaker</div> <div>no black solid remains on the bottom of the beaker</div> </div> <div> ☐ ☒ ☐ </div>	1			1		1
	(b)			filter funnel (1) accept filter / funnel water (1)	2			2		2
	(c)			9.5		1		1	1	
	(d)			98 (2) if incorrect award (1) for clear indication of the number of each atom present e.g. $(2 \times 1) + 32 + (4 \times 16)$ 2 H + 1 S + 4 O		2		2	2	
				Question 1 total	4	3	0	7	3	4

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		award (2) for all three bars correct award (1) for any two correct – tolerance $\pm\frac{1}{2}$ small square ignore column widths		2		2	2	
		(ii)		award (1) for correct order calcium / Ca magnesium / Mg zinc / Zn iron / Fe no ecf possible from incorrect graph			1	1		1
		(iii)		change the glass beaker to a copper can ☐ repeat the experiment for each metal three times ☐ wrap insulating material around the glass beaker ☒			1	1		1
		(iv)		carbon dioxide nitrogen oxygen <u>hydrogen</u>	1			1		1
	(b)			9660 (2) if incorrect award (1) for $50 \times 4.2 \times 46$		2		2	2	

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)			<div>silver and copper(II) sulfate solution ☐</div> <div>copper and silver nitrate solution ☒</div> <div>silver nitrate solution and copper(II) sulfate solution ☐</div>			1	1		1
				Question 2 total	1	4	3	8	4	4

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)		award (2) for all five points plotted correctly award (1) for any three points plotted correctly – tolerance $\pm\frac{1}{2}$ small square award (1) for straight line through the points accept if line is unlabelled but in correct position		3		3	3	
		(ii)		award (1) for straight line from (0,0) to (5,2.0) accept if line is unlabelled but in correct position			1	1	1	
	(b)	(i)		CuCl CuCl² <u>CuCl₂</u> Cu₂Cl		1		1		
		(ii)		award (1) for each correct answer copper / <u>copper(II) chloride solution</u> / iron <u>copper</u> / iron / chlorine <u>increases</u> / decreases / stays the same	3			3		3
				Question 3 total	3	4	1	8	4	3

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			award (1) for each correct answer brittle / <u>hard</u> / soft pencils / <u>electrodes in batteries</u> / electrical wires	2			2		
	(b)			polymer gel (1) accept hydrogel thermochromic pigment (1)	2			2		
	(c)			award (1) for each correct answer sticky / absorbent / <u>antibacterial</u> white / greasy / <u>transparent</u>	2			2		
				Question 4 total	6	0	0	6	0	0

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons \boxed{2} \text{NH}_3(\text{g})$		1		1		
		(ii)		award (1) for any of following <ul style="list-style-type: none"> • speeds up the reaction • makes the reaction go quicker • increases the rate of the reaction • gives an alternative reaction pathway • lowers the activation energy 	1			1		
		(iii)		nitrogen, hydrogen and ammonia are all gases ☐ the $\rightleftharpoons$ symbol is used in the equation ☒ ammonia gas condenses on cooling to form liquid ammonia ☐ unreacted nitrogen and hydrogen are recycled ☐		1		1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)		red / <u>blue</u> / green	1			1		1
		(ii)		ammonium nitrate ☒ ammonium sulfate ☐ ammonium chloride ☐	1			1		1
				Question 5 total	3	2	0	5	0	2

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)	I	award (1) for any of following <ul style="list-style-type: none"> its melting point is below 1900°C it melts below 1900°C 1540°C is below 1900°C its melting point is below the furnace temperature 1900°C is higher than its melting point neutral answer – its melting point is 1540°C			1	1		
			II	iron and slag have the same density ☐ iron is more dense than slag ☒ slag is more dense than iron ☐			1	1		
		(ii)		carbon is reduced ☐ iron is reduced ☐ iron(III) oxide is reduced ☒ carbon monoxide is reduced ☐			1	1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			<p>Indicative content</p> <p>to make water pipes</p> <ul style="list-style-type: none"> important properties are that copper is malleable and unreactive copper can be bent into shape to make pipes and those pipes can be bent around corners as necessary copper does not corrode / react when (hot) water runs through the pipes <p>to make saucepan bases</p> <ul style="list-style-type: none"> important properties are that copper is a (good) heat conductor and has a high melting point copper transfers heat to the contents of the saucepan copper does not melt on heating (below 1000°C) <p>copper being unreactive and therefore not reacting with the food being cooked is relevant but should not be credited if this property has been referred to in respect of water pipes</p>		3	3	6		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				<p>5-6 marks Appropriate properties chosen; good description of their importance for both uses <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 Some appropriate properties chosen; partial description of their importance <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 One appropriate property chosen; attempt at stating the importance of that property <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 marks <i>No attempt made or no response worthy of credit.</i></p>						

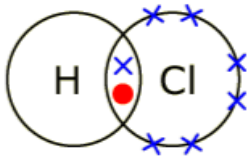
Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		peony <u>roman candle</u> chrysanthemum flying fish			1	1		
		(ii)		bursting charge ☐ star ☒ fuse ☐			1	1		
		(iii)		calcium chloride and barium chloride ☐ strontium carbonate and barium chloride ☒ strontium carbonate and calcium chloride ☐ barium chloride and copper(II) chloride ☐			1	1		1
				Question 6 total	0	3	9	12	0	1

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)			indicator / solution changes colour ignore any specific colours given	1			1		1
	(b)			10.5 (2) if incorrect award (1) for either of following 10.2 + 10.7 + 10.6 31.5 ecf possible from arithmetic error		2		2	2	
	(c)			add the mean volume of acid needed to a new 20.0 cm ³ of alkali containing no indicator ☒ add the mean volume of acid needed to a new 20.0 cm ³ of alkali with fresh indicator ☐ add a new 20.0 cm ³ of acid to a new 20.0 cm ³ of alkali containing no indicator ☐	1			1		1
	(d)			award (1) for either of following <ul style="list-style-type: none"> crystals / they would be larger Jamal's would be smaller 			1	1		1
				Question 7 total	2	2	1	5	2	3

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)			C_2H_6 (1) $\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$ (1) all atoms and all bonds must be shown	2			2		
	(b)	(i)		C_8H_{18}		1		1		
		(ii)		C_3H_6		1		1		
	(c)			D		1		1		
	(d)	(i)		1494		1		1	1	
		(ii)		award (2) for $3220 + 1856$ if incorrect award (1) for any of following $4 \times 805 / 3220$ $4 \times 464 / 1856$		2		2	2	
		(iii)		exothermic	1			1		
				Question 8 total	3	6	0	9	3	0

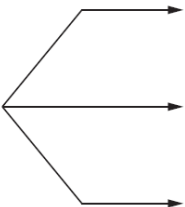
COMMON QUESTIONS

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
9/1	(a)	(i)		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> Li^+ (2) lithium ion </div> <div style="text-align: center;"> $\times \text{Cl}^-$ $(2,8,8)$ chloride ion </div> </div> <p>award (2) for all four structures and charges award (1) for any two structures and/or charges</p>		2		2		
		(ii)		<p>award (1) each for any two of following</p> <ul style="list-style-type: none"> high melting point / boiling point soluble in water conducts electricity when molten / dissolved – accept electrolyte brittle <p>neutral answers crystalline structure ions become mobile when molten / dissolved hard does not conduct when solid</p>	2			2		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			 <p>must have a total of 8 electrons for any credit</p> <p>shared pair – one dot and one cross (1)</p> <p>octet around chlorine (1)</p> <p>award (1) if diagram correct but using only dots or crosses</p>		2		2		
				Question 9/1 total	2	4	0	6	0	0

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
10/2	(a)	(i)		O^{2-}	1			1		
		(ii)		carbon dioxide / CO_2 accept carbon monoxide / CO	1			1		
		(iii)		$Al^{3+} - 3e^- \longrightarrow Al$ ☐ $Al^{3+} + 3e^- \longrightarrow 3Al$ ☐ $Al^{3+} - 3e^- \longrightarrow Al_3$ ☐ $Al^{3+} + 3e^- \longrightarrow Al$ ☒		1		1		
		(iv)		award (1) for any of following <ul style="list-style-type: none"> low density accept light ductile / can be drawn into wires corrosion resistant / does not corrode do not accept any of following <ul style="list-style-type: none"> non-toxic good thermal conductor malleable strong / durable high melting point neutral answers <ul style="list-style-type: none"> unreactive good electrical conductor does not rust 	1			1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			<div>near a port to import bauxite ☒</div> <div>nearby limestone quarries ☐</div> <div>near a direct supply of electricity ☒</div> <div>near a port to export bauxite ☐</div> <div>nearby recycling centre ☐</div> <div>nearby bauxite deposit ☐</div>			2	2		
	(c)			$2\text{Al} + \boxed{3} \text{Cl}_2 \longrightarrow 2\text{AlCl}_3$		1		1		
				Question 10/2 total	3	2	2	7	0	0

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
11/3	(a)	(i)		A ⇒ sulfur (1) B ⇒ air (1) neutral answer – oxygen	2			2		
		(ii)		vanadium(V) oxide / V_2O_5 accept vanadium oxide / vanadium pentoxide	1			1		
		(iii)		 award (2) for two correct molecules award (1) for one correct molecule award (1) max if any additional product(s) included		2		2		
		(iv)		$H_2S_2O_7 + H_2O$  <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> $H_4S_2O_8$ ☐ $2H_2SO_4$ ☒ $2H_2SO_3$ ☐ </div>	1			1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			<div>carbon, hydrogen and oxygen react to make sugar ☐</div> <div>sugar turns black and expands up the beaker ☐</div> <div>the reaction is exothermic ☐</div> <div>the elements hydrogen and oxygen are removed from the sugar ☒</div> <div>sugar splits up into carbon, hydrogen and oxygen ☐</div>	1			1		1
				Question 11/3 total	5	2	0	7	0	1

HIGHER TIER ONLY QUESTIONS

Question				Marking details	Marks available															
					AO1	AO2	AO3	Total	Maths	Prac										
4	(a)	(i)		award (1) for each correct letter <table><tr><td></td><td>Letter</td></tr><tr><td>a decomposition reaction</td><td>B</td></tr><tr><td>a reaction that is used to heat up the furnace</td><td>A</td></tr><tr><td>a reaction that forms a reducing agent</td><td>C</td></tr><tr><td>a neutralisation reaction</td><td>E</td></tr></table>		Letter	a decomposition reaction	B	a reaction that is used to heat up the furnace	A	a reaction that forms a reducing agent	C	a neutralisation reaction	E	4			4		
	Letter																			
a decomposition reaction	B																			
a reaction that is used to heat up the furnace	A																			
a reaction that forms a reducing agent	C																			
a neutralisation reaction	E																			
		(ii)		reduction involves loss of oxygen (1) award (1) for any of following <ul style="list-style-type: none">Fe₂O₃ / iron oxide loses oxygen (in this equation)Fe₂O₃ / iron oxide is reduced (in this equation)Fe₂O₃ forms Fe (in this equation)iron oxide forms iron (in this equation) neutral answer – Fe ₂ O ₃ loses oxide accept answer in terms of gain of electrons and appropriate explanation e.g. Fe ³⁺ gains electrons and forms Fe	2			2												
	(b)	(i)		silver ⇒ no colour change / solution remains green (1) iron ⇒ <u>blue</u> solution turns green (1)			2	2		2										

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
		(ii)		<div>2 Ag + Cu(NO₃)₂</div> <p>award (1) for product award (1) for balancing balancing mark can only be awarded if product is correct</p>		2		2		
				Question 4 total	6	2	2	10	0	2

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		shorter wavelengths of light are given off by blue and violet fireworks ☒						
				shorter wavelengths of light are given off by red and orange fireworks ☐						
				longer wavelengths of light are given off by blue and violet fireworks ☐			1	1		
				longer wavelengths of light are given off by green and yellow fireworks ☐						
		(ii)		as the energy increases the wavelength increases ☐						
				as the energy decreases the wavelength increases ☒						
				the wavelength changes with changes in energy ☐			1	1		
				as the energy decreases the wavelength decreases ☐						
		(iii)		iron, zinc and calcium chloride ☒						
				aluminium, magnesium and strontium carbonate ☐						
				barium chloride, phosphorus and calcium chloride ☐			1	1		
				iron, magnesium and zinc ☐						

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)		brown / red-brown	1			1		1
		(ii)		Fe(OH) ₂		1		1		
				Question 5 total	1	1	3	5	0	1

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)			the mass of both cathodes increases ☒	2			2		2
				Cu^{2+} ions enter the solution at both anodes ☐						
				Cu^{2+} ions gain electrons at both cathodes ☒						
				the blue colour of copper(II) sulfate solution turns paler in both beakers as Cu^{2+} ions are removed ☐						
				the blue colour of copper(II) sulfate solution remains the same in both beakers ☐						
	(b)	(i)		$2\text{H}^+ + \boxed{2} \text{e}^- \longrightarrow \text{H}_2$		1		1		
		(ii)		oxidation involves loss of electrons (1) award (1) for clearly stating what is oxidised in this reaction e.g. chloride / Cl^- ions are oxidised (to form chlorine) both marks can be awarded for one appropriate statement e.g. chloride / Cl^- ions lose electrons (to form chlorine) $2\text{Cl}^- - 2\text{e}^- \rightarrow \text{Cl}_2$	2			2		
		(iii)		B	1			1		1
Question 6 total					5	1	0	6	0	3

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)		$C_nH_{2n+1}OH$ accept $C_nH_{2n+2}O$	1			1		
		(ii)	I	award (2) for all three points correct award (1) for any point correct – tolerance $\pm\frac{1}{2}$ small square accept bar-line graph award (1) for curve through four points do not accept curve drawn from (0,20) do not accept straight lines drawn from point to point		2	1	3	3	
			II	37.8 accept values in the range 37.0-38.6 ecf possible from incorrectly drawn curve/straight line		1		1	1	

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			award (1) for improvement and (1) for reason e.g. reduce distance between can and flame / burner (1) less heat lost (to the surroundings) / more heat gets to the can) (1) put a draught excluder / shield (around the apparatus) (1) less heat lost (to the surroundings) / more heat gets to the can) (1) extend insulation further down the sides of the can (1) less heat lost (to the surroundings) (1)			2	2		2
	(c)	(i)		C		1		1		
		(ii)		propan-2-ol do not accept propanol		1		1		
				Question 7 total	1	5	3	9	4	2

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)			magnesium ethoxide magnesium ethane magnesium hydrogencarbonate <u>magnesium ethanoate</u>		1		1		
	(b)			$\text{NaCH}_3\text{COO} / \text{CH}_3\text{COONa} / \text{Na}^+(\text{CH}_3\text{COO})^- / \text{Na}^+ \text{CH}_3\text{COO}^-$ (1) accept ions in either order with or without charges/brackets H_2O (1) ignore any attempt at balancing		2		2		
	(c)			copper(II) carbonate / CuCO_3 accept copper carbonate			1	1		1
	(d)			turns red (1) it is a stronger acid / is more acidic / is a strong acid / is more dissociated (1) neutral answer – it has a lower pH / pH 1 or 2			2	2		2
				Question 8 total	0	3	3	6	0	2

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
9	(a)	(i)		<p>correct structure (1) brackets and balanced with subscript n (1) second mark can only be awarded if structure is correct accept end bonds that do not go beyond brackets</p>		2		2		
		(ii)		<p>C=C bond (in propene molecules) breaks (1)</p> <p>award (1) for any of following</p> <ul style="list-style-type: none"> monomers / propene molecules join together to form a long chain / polymer monomers / propene molecules join together monomers / propene molecules form a long chain / polymer 	2			2		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)		413 (2) accept –413 if incorrect award (1) for either of following $2648 - (2 \times 498) = 1652$ $\frac{1652}{4}$ ecf possible e.g. from incorrectly calculated value divided by 4		2		2	2	
		(ii)		805 (2) accept –805 if incorrect award (1) for either of following $3466 - (4 \times 464) = 1610$ $\frac{1610}{2}$ ecf possible e.g. from incorrectly calculated value divided by 2		2		2	2	
		(iii)		818 / –818		1		1	1	
				Question 9 total	2	7	0	9	5	0

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
10	(a)			$0.40 \times \frac{12.5}{1000} = 0.005 \text{ mol} \quad (2)$ if incorrect award (1) for either of following $\frac{12.5}{1000} / 0.0125$ $\frac{5}{5}$ no ecf possible from incorrectly rearranged equation		2		2	2	2
	(b)			$0.005 \times 84 = 0.42 \text{ g} \quad (2)$ if incorrect award (1) for mass/moles formula (any form) mass = number of moles $\times M_r$ number of moles = $\frac{\text{mass}}{M_r}$ ecf possible from part (i)		2		2	2	2
	(c)			award (1) for any answer where there is clear understanding that the volume made up is 10 times that used in the titration and implication that the mass is within the recommended dose e.g. yes – the glass has 200 cm ³ of water so 4.2 g of sodium hydrogencarbonate (⇒ this is within the range) ecf possible from part (ii)			1	1	1	1
				Question 10 total	0	4	1	5	5	5

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
11	(a)			Indicative content <ul style="list-style-type: none"> • reaction is reversible • the forward reaction makes ammonia • higher pressure gives higher yield • higher pressure increases rate • high pressure plants are expensive to build / maintain • lower temperature gives higher yield • but lower temperature decreases rate • catalyst used to increase the rate • unreacted nitrogen and hydrogen returned to the reaction vessel • conditions chosen are the optimum conditions • compromise of moderately high pressure and moderately low temperature gives the most economically favourable production 	6			6		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				<p>5-6 marks Clear understanding that temperature and pressure affect yield and rate; conditions chosen represent a compromise <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 Reference to temperature and pressure and how they affect yield and/or rate; effect of catalyst on rate <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 Simple reference to the effect of temperature or pressure on yield and/or rate <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 marks <i>No attempt made or no response worthy of credit.</i></p>						
	(b)	(i)		ammonia / NH ₃	1			1		1
		(ii)		<p>A ⇒ ammonium sulfate / (NH₄)₂SO₄</p> <p>B ⇒ potassium chloride / KCl</p> <p>award (2) for all four ions correct award (1) for any two ions correct</p>			2	2		2
		(iii)		$\text{P}_4\text{O}_{10} + \boxed{6} \text{H}_2\text{O} \longrightarrow \boxed{4} \text{H}_3\text{PO}_4$		1			1	
				Question 11 total	7	1	2	10	1	3

FOUNDATION TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

QUESTION	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	4	3	0	7	3	4
2	1	4	3	8	4	4
3	3	4	1	8	4	3
4	6	0	0	6	0	0
5	3	2	0	5	0	2
6	0	3	9	12	0	1
7	2	2	1	5	2	3
8	3	6	0	9	3	0
9	2	4	0	6	0	0
10	3	2	2	7	0	0
11	5	2	0	7	0	1
TOTAL	32	32	16	80	16	18

HIGHER TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

QUESTION	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	2	4	0	6	0	0
2	3	2	2	7	0	0
3	5	2	0	7	0	1
4	6	2	2	10	0	2
5	1	1	3	5	0	1
6	5	1	0	6	0	3
7	1	5	3	9	4	2
8	0	3	3	6	0	2
9	2	7	0	9	5	0
10	0	4	1	5	5	5
11	7	1	2	10	1	3
TOTAL	32	32	16	80	15	19