

**UNIT 5: (Double Award) CHEMISTRY 2
FOUNDATION TIER****MARK SCHEME****GENERAL INSTRUCTIONS**Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

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

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)		A and D – both needed, either order (1) Both contain a double bond / both unsaturated (1)	2			2		
		(ii)		D	1			1		
		(iii)		Butane	1			1		
	(b)			$ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} $	1			1		
	(c)			$ \begin{array}{c} \left[\begin{array}{cc} \text{F} & \text{F} \\ & \\ \text{---C} & \text{---C---} \\ & \\ \text{F} & \text{F} \end{array} \right] \end{array} $ ignore 'n' (1)						
				$ \begin{array}{c} \text{H} \quad \text{Cl} \\ \diagdown \quad / \\ \text{C}=\text{C} \\ / \quad \diagdown \\ \text{H} \quad \text{H} \end{array} $ (1)		2		2		
				Question 1 total	5	2	0	7	0	0

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)		All three correct (2) Any one correct (1) iron ore — source of iron limestone — acts as a fuel coke — removes impurities	2			2		
	(b)		$C + O_2 \rightarrow CO_2$		1		1		
	(c)		A (1) Oxygen removed / iron(III) oxide loses oxygen (1) Do not accept oxide lost	1	1		2		
	(d)		93 (2) Accept any number of decimal places but rounding up must be correct If answer is incorrect award (1) for $0.65/0.7 \times 100$		2		2	2	
			Question 2 total	3	4	0	7	2	0

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
3	(a)		Copper(II) oxide / black solid remains	1			1		1
	(b)		Filtration / filtering (1) Removes excess / unreacted copper(II) oxide (1)	2			2		2
	(c)		CuSO ₄ (1) H ₂ O (1) Ignore any attempt at balancing	1	1		2	1	
	(d)		Copper(II) chloride (1) CuCl ₂ (1)		2		2	1	
			Question 3 total	4	3	0	7	2	3

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4	(a)		Any one of following Less litter Less waste to landfill Saves resources / crude oil New products formed more cheaply	1			1		
	(b)	(i)	Paper Metal Glass Plastic All correct (2) Any two correct (1)			2	2	2	
		(ii)	None recycled prior to 1980 (1) Gradual increase since 1980 (1)			2	2	2	
	(c)	(i)	Any one of following A lot more plastic bottles sold than recycled Number of plastic bottles sold has increased at a faster rate			1	1		
		(ii)	48 billion (2) If answer incorrect award (1) for 60 – 12		2		2	2	
			Question 4 total	1	2	5	8	6	0

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)	Oxide ion has a charge of 2– Calcium ion has the electronic structure 2,8,8 Both needed	1			1		
		(ii)	CaO Accept $\text{Ca}^{2+}\text{O}^{2-}$		1		1		
	(b)		Substance Z (1) Because it has a high melting point and does not conduct electricity when molten (1) Do not award second mark if 1600 °C given without reference to this being a high temperature			2	2		
	(c)		$ \begin{array}{c} \text{H} \\ \cdot \\ \times \\ \text{H} \times \text{C} \times \text{H} \\ \cdot \\ \times \\ \text{H} \end{array} $	1			1		
			Question 5 total	2	1	2	5	0	0

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)	1370 (2) If answer is incorrect award (1) for indication that two H—H bonds and one O=O bond are broken		2		2	2	
		(ii)	1856 (2) If answer is incorrect award (1) for indication that four O—H bonds are broken		2		2	2	
	(b)		−486 (1) Accept 486		1		1	1	
			Question 6 total	0	5	0	5	5	0

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
7	<p>Indicative content</p> <p>Observations Magnesium disappears; solution turns paler/goes colourless; brown solid forms; mass stays constant</p> <p>Explanation Magnesium displaces copper ions from solution; magnesium more reactive than copper; mass conserved as no atoms leave or enter the beaker</p> <p>Equation</p> <p>5–6 marks At least three observations with good explanation in terms of reactivity; understanding of conservation of mass; symbol equation <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 At least two observations with attempt at explanation in terms of reactivity; word equation and/or use of some chemical formulae <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 Any correct observation; any product named <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>	4	2		6		6
	Question 7 total	4	2	0	6	0	6

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Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
8	(a)	(i)	cathode / negative electrode (1) Al ³⁺ ions attracted to opposite charge / negative charge (1) Do not accept Al for Al ³⁺ Opposites attract gains no credit	2			2		
		(ii)	2Al ₂ O ₃ → 4Al + 3O ₂ (3) If equation not correct award (1) for each of following Al ₂ O ₃ on reactant side Al and O ₂ on product side		3		3	2	
	(iii)	Either of following Carbon electrodes used up (1) linked to carbon dioxide emission (1) Burning coal/gas to form electricity (1) linked to carbon dioxide emission (1) No credit for carbon dioxide emission alone	2			2			
	(b)	Any of following properties and uses for (1) Low density ... overhead power cables Good heat conductor saucepans Non-toxic ... drinks can Corrosion resistant window frames No credit for use relating to aluminium as a good electrical conductor	1			1			
Question 8 total				5	3	0	8	2	0

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
9	(a)		12600 (2) If answer is incorrect award (1) for $100 \times 4.2 \times 30$		2		2	2	2
	(b)		Any two of following for (1) each Same distance between beaker/can and flame Same beaker/can used Beaker/can bottom is cleaned after each alcohol is burned Same spirit burner/ size flame/ size wick			2	2		2
	(c)	(i)	Similarity: same rank order (1) Difference: theoretical values > experimental values (1)			2	2		2
		(ii)	Heat loss to surroundings			1	1		1
			Question 9 total	0	2	5	7	2	7

FOUNDATION TIER**SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES**

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	5	2	0	7	0	0
2	3	4	0	7	2	0
3	4	3	0	7	2	3
4	1	2	5	8	6	0
5	2	1	2	5	0	0
6	0	5	0	5	5	0
7	4	2	0	6	0	6
8	5	3	0	8	2	0
9	0	2	5	7	2	7
TOTAL	24	24	12	60	19	16