UNIT 2: (Double Award) CHEMISTRY 1
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

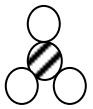
A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide 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)		Red, blue and yellow – all needed, any order			1	1		1
		(ii)		Orange Dye stays on start point / doesn't move Colour and reason must be correct			1	1		1
		(iii)		0.75 (2) If answer incorrect award (1) for: Distance moved by the substance = 6 or Distance moved by the solvent front = 8		2		2	2	
	(b)	(i)		Bunsen burner drawn (1) Accept heat arrow Heat / boil the solution / mixture (1) Accept evaporate the solution	2			2		2
		(ii)		Turn steam to water / condense the steam (1) By cooling (1)	2			2		2
				Question 1 total	**4**	**2**	**2**	**8**	**2**	**6**

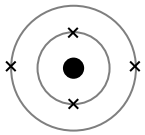
Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	*(a)*	(i)		**A** (1) Contains only one type of atom (1)	2			2		
		(ii)		Carbon dioxide / CO_2		1		1		
		(iii)		 Do not accept 		1		1		
	(b)	(i)		106.5 (2) If answer is incorrect award (1) for indication that formula includes one atom of Na, one atom of Cl and three atoms of O e.g. 23 + 35.5 + (3 × 16)		2		2	2	
		(ii)		22 (2) error carried forward from (i) Accept any number of decimal places but rounding must be correct If answer is incorrect award (1) for 23/106.5 × 100		2		2	2	
				Question 2 total	**2**	**6**	**0**	**8**	**4**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	*(a)*			Yes – results are repeatable (1) All runs have similar reaction times (for each concentration) (1) Accept all the results used to calculate the means			2	2		2
	(b)			All 5 points plotted correctly (2) [Credit (1) for 3 or 4 correct points] Smooth curve drawn (1)		2	1	3	3	3
	(c)			Increasing the concentration, decreases the reaction time ✓			1	1	1	1
	(d)			Temperature	1			1		1
				Question 3 total	**1**	**2**	**4**	**7**	**4**	**7**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	*(a)*			Fairly constant / stable then sharp increase (1) Fairly constant / stable **until 1920** then sharp increase (2)			2	2		
	(b)			Make and record observations ✓	1			1		
	(c)			Between 1659 and 2000 / today (1) Temperature measured / recorded from 1659 / temperatures before 1695 are estimates (1)	2			2	2	
	(d)			Arctic ice cap has reduced in size (1) During time period when temperature has increased sharply (1)			2	2		
				Question 4 total	**3**	**0**	**4**	**7**	**2**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	*(a)*			**A** oxygen / O_2 (1) do not accept 'O' / air **B** sodium chloride / NaCl (1)		2		2		
	(b)			**C** hydrogen / H_2 do not accept 'H'	1			1		1
	(c)			Formulae – NaOH and H_2 (1) both needed Balancing i.e. **2**NaOH (1) Both formulae must be correct to award balancing mark		2		2	1	
	(d)			Yellow / yellow-orange flame (1) Accept orange Sodium (ions) / Na^+ present (1)	2			2		2
	(e)			Less violent ✓ (1) Reactivity decreases up Group 1 / increases down Group 1 (1) Accept higher level answer explaining differences in reactivity e.g. lithium holds its outer electron more tightly than sodium	2			2		
				Question 5 total	**5**	**4**	**0**	**9**	**1**	**3**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
6				**Indicative content** Reference to water sources, sedimentation, filtration and chlorination together with the reasons for each stage • Sedimentation/settling tank – removal of large insoluble particles • Filtration/filter bed – removal of small insoluble particles, removal of bacteria/germs/micro-organisms • Chlorination/chlorine added – kills remaining bacteria, germs, micro-organisms **5–6 marks** At least one water source given, all three stages named with good description of purpose *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.* **3–4 marks** At least two stages named with basic description of purpose *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.* **1–2 marks** At least one stage named with attempt at description *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.* **0 marks** *No attempt made or no response worthy of credit.*	6			6		
				Question 6 total	**6**	**0**	**0**	**6**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
7	*(a)*	(i)		Number of protons 19 Number of neutrons 20 Number of electrons 19 All three correct (2) Any two correct (1)		2		2		
		(ii)	I	Beryllium / Be	1			1		
			II	Sulfur / S		1		1	1	
		(iii)				1		1		
	(b)	(i)		3		1		1		
		(ii)		K_2CO_3		1		1		
	(c)			Similarity – both have 5 protons (1) Difference – one has 5 neutrons, the other has 6 (1) Accept same number of protons and different number of neutrons for (1) Do not accept reference to electrons, atomic number or mass number	1	1		2	1	
				Question 7 total	**2**	**7**	**0**	**9**	**2**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
8	*(a)*			Both increase as temperature increases (1) NaCl very slightly and $CuSO_4$ significantly (1) Any two of following (1) Solubilities the same at 52°C NaCl more soluble than $CuSO_4$ below 52°C NaCl less soluble than $CuSO_4$ above 52°C		1	1 1	3	3	
	(b)			56 – 29 read from graph (1) Error carried forward $\frac{27}{2}$ = 13.5 (1) Award (2) for correct answer only		2		2	2	2
	(c)			Water freezes at 0°C and boils at 100°C – **both** needed Accept these are the freezing point and boiling point of water	1			1		1
				Question 8 total	**1**	**3**	**2**	**6**	**5**	**3**

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SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	4	2	2	8	2	6
2	2	6	0	8	4	0
3	1	2	4	7	4	7
4	3	0	4	7	2	0
5	5	4	0	9	1	3
6	6	0	0	6	0	0
7	2	7	0	9	2	0
8	1	3	2	6	5	3
TOTAL	24	24	12	60	20	19