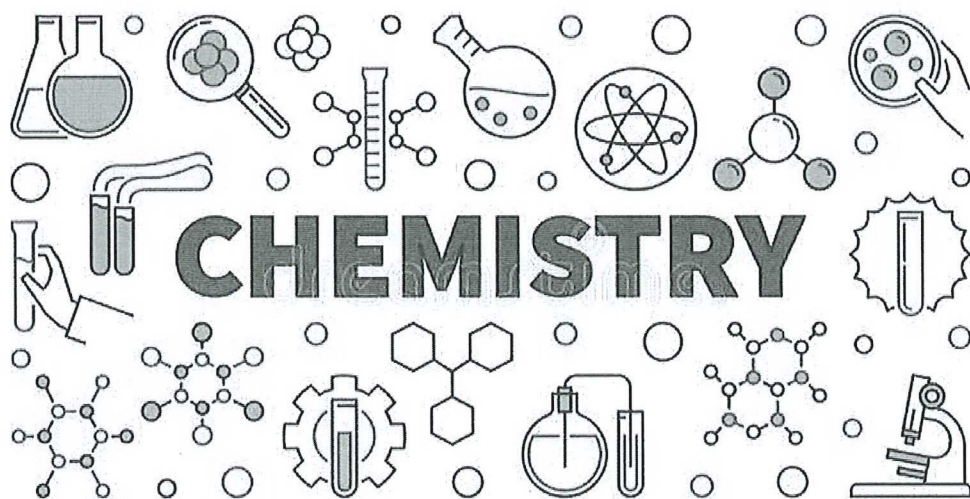
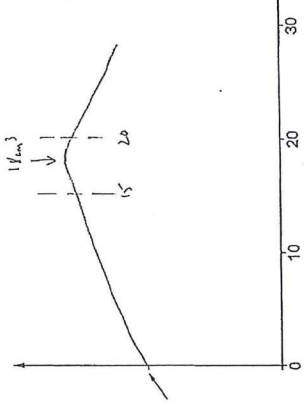




WJEC Chemistry 2
Option – Higher Tier
2.2 Mark Scheme

Common questions

Question		Marking details	Marks available				
			AO1	AO2	AO3	Total	Prac
7/1	(a)	$\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ reactants (1) products (1) ignore any attempt at balancing		2		2	
	(b)	pipette any of following - identify the end point - identify when neutralisation has taken place - identify when all the alkali has been used up	1			1	1
	(iii)	18.0 accept 18 / 17.9		1		1	
	(iv)	 award (1) for shape rising from starting temperature line and falling award (1) for peak maximum in range 15-20			2	2	2
	(v)	36.0 accept 36 ecf possible from part (iii)			1	1	
		Question 7/1 total	2	3	3	8	4

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
9	(a)	0.0152 (2) if incorrect award (1) for $\frac{15.2}{1000}$		2		2	2	
	(b)	0.0076 ecf possible		1		1	1	
	(c)	760 (3) if incorrect award (1) for any of following $M_r = 100$ $0.0076 \times 100 / 0.76$ ecf possible throughout		3		3	3	
	(d)	tablet also contains magnesium carbonate / another carbonate (which also reacts with the acid) neutral answer – 'tablet contains other substances' do not accept a list of two or more other ingredients			1	1		
		Question 9 total	0	6	1	7	6	0

Common questions

Question			Marking details	Marks available				
				AO1	AO2	AO3	Total	Prac
8/1	(a)	(i)	6.5		1		1	1
		(ii)	1365 (2) if answer incorrect award (1) for $50 \times 4.2 \times 6.5$ ECF possible from incorrect temperature rise		2		2	2
		(iii)	21.5 - it has returned to initial / room temperature both needed			1	1	
	(b)		all points plotted correctly (1) tolerance $\pm \frac{1}{2}$ small square smooth line passing through the points (1)		1			
	(c)		hydrochloric acid - greater temperature rise both needed			1	1	1
	(d)	(i)	award (1) for either of following • heat still lost (to the surroundings) • wouldn't stop heat being lost (to the surroundings) neutral answer - no lid used			1	1	1
		(ii)	award (1) for any of following • lid • stacked polystyrene cups • lag the polystyrene cup			1	1	1
			Question 8/1 total	0	4	5	9	8

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
9/2	(a)	(i)	award (1) for either of following magnesium oxide magnesium hydroxide accept MgO / Mg(OH) ₂ do not accept magnesium / magnesium carbonate		1		1		1
		(ii)	B copper(II) chloride / copper chloride (1) accept CuCl ₂ C carbon dioxide (1) accept CO ₂		2		2		2
	(b)		Zn + 2HCl → ZnCl ₂ + H ₂ award (1) for products award (1) for balancing only if all reactants and products correct		2		2		
	(c)		award (1) for any difference • bubbles / gas formed faster • magnesium disappears faster award (1) for sensible explanation • magnesium more reactive (than zinc) • magnesium above zinc in reactivity series neutral answer - gets hotter	2			2		2
			Question 9/2 total	2	5	0	7	0	5

Question		Marking details	Marks available				
			AO1	AO2	AO3	Total	Maths Prac
9	(a)	A iron(II) sulfate / FeSO_4 B ammonium carbonate / $(\text{NH}_4)_2\text{CO}_3$ C barium bromide / BaBr_2 award (3) for all correct award (2) for any four ions correct award (1) for any two ions correct			3	3	3
	(b)	0.0625 (2) if answer incorrect award (1) for $\frac{0.25 \times 250}{1000}$		2		2	2
	(ii)	20.6875 (2) if answer incorrect award (1) for 331 as $M_r(\text{Pb}(\text{NO}_3)_2)$ ECF possible from part (i)		2		2	2
	(iii)	20.69 ECF possible from part (ii)		1		1	1
		Question 9 total	0	5	3	8	5
							8

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
10	(a)	(i)	moles = $\frac{conc \times volume}{1000} = \frac{1.5 \times 12}{1000} = 0.018$ (2) accept 0.02 if working correct if answer incorrect award (1) for either of following 0.012 18 no ecf possible if formula is rearranged incorrectly		2		2	2	2
		(ii)	0.036 ecf possible from part (i)		1		1	1	1
		(iii)	3.6 (2) ecf possible from parts (i) and (ii) if answer incorrect award (1) for $\frac{0.036}{10}$		2		2	2	2
	(b)	(i)	award (1) for either of following any positive temperature change of less than 19°C temperature change will be less than 19°C / lower award (1) for reason e.g. (ethanoic acid) is a weaker acid / has a higher pH (ethanoic acid) is less dissociated / has fewer H ⁺ ions accept ethanoic acid / it is a weak acid			2	2		2

Question			Marking details		Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(ii)	I	copper(II) ethanoate	accept copper ethanoate	1			1		
		II	$\text{Cu}(\text{CH}_3\text{COO})_2$				1	1		
			Question 10 total		1	5	3	9	5	7

COMMON QUESTIONS

Question			Marking details					Marks available				
			AO1	AO2	AO3	Total	Maths	Prac				
7/1	(a)	(i)	award (1) for any of following • leave to crystallise / evaporate / dry naturally • leave to dry for a few days / until next lesson • leave to dry in a warm place / on window sill / on radiator must have a 'process' and the idea that it happens over a period of time OR in a warm place neutral answer – leave to dry	1							1	
		(ii)										2
		(iii)										2

Question			Marking details	Marks available								
				AO1	AO2	AO3	Total	Maths	Prac			
8	(a)	(i)	as pH increases, citric acid content decreases and sugar content increases	✓								
			as acidity decreases, ascorbic acid content decreases and water content decreases									
			tomatoes are a good source of vitamin C and citric acid				2	2	2			
			citrus fruits contain ascorbic acid and a natural preservative	✓								
		(ii)	award (1) for any of following - the values for ascorbic acid are bigger but the unit is 1000 times smaller - mg/100g is a smaller unit than % - citric acid is measured in % but ascorbic acid is measured in mg/100g - there is much more citric acid (than ascorbic acid) present					1	1	1		
	(b)	(i)	$\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$ formulae (1) state symbols (1)		2				2			

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(ii)	I	$0.35 \times 0.021 = 0.00735$		1		1	1	1
		II	$0.588 / 0.59$ (2) if answer incorrect credit each correct step in method $0.00735 \times 2 = 0.0147$ (1) $\frac{0.0147}{0.025} = 0.588 / 0.59$ (1) ecf possible from part (i)		2		2	2	2
	(iii)		1.2×10^{22} (2) accept $12 \times 10^{21} / 0.12 \times 10^{23}$ if answer incorrect credit each correct step in method but do not award any marks for multiplying mass 0.36 by N_A $\frac{0.36}{18} = 0.020$ (1) $0.020 \times 6.0 \times 10^{23} = 1.2 \times 10^{22}$ (1)		2		2	2	
			Question 8 total	2	5	3	10	8	3