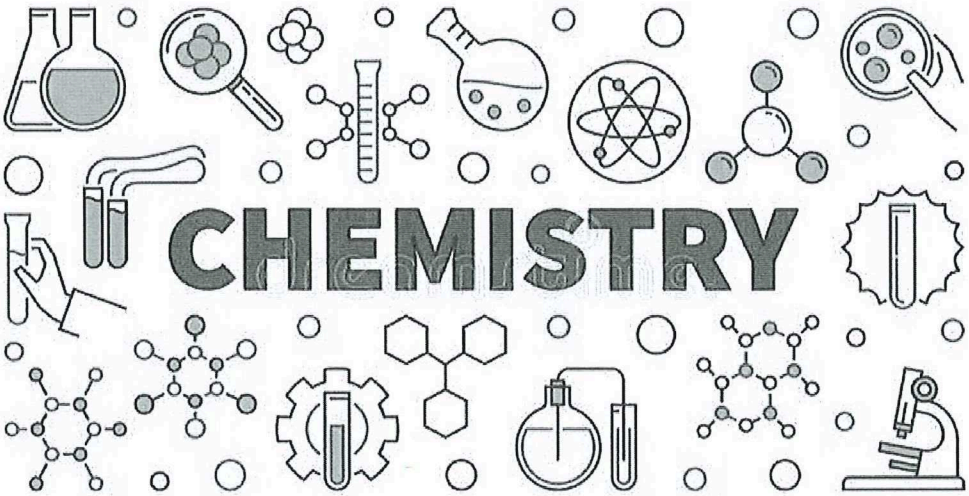


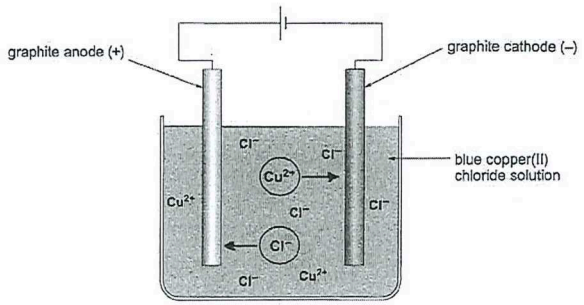
WJEC Chemistry 2

Option – Foundation Tier

2.3 Mark Scheme

Foundation Tier only questions

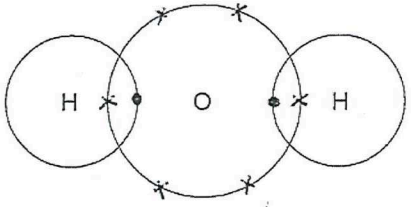
Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)		coke limestone iron ore **any** order all correct for (2) any one correct for (1) **B** slag **C** iron **both** needed for (1)	3			3		
		(ii)		oxygen		1		1		
	(b)			**F** **D** **E** award (2) for all three in correct order award (1) for any one in the correct box	2			2		2

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		electrolysis (1) electrodes (1)	2			2		
		(ii)		Cu^{2+} ion to cathode **AND** Cl^- ion to anode  ignore arrows on all ions other than those circled		1		1		
		(iii)	I	electron ✓	1			1		
			II	the solution turns paler ✓			1	1		1
		(iv)		chlorine ✓	1			1		1
				Question 1 total	**9**	**2**	**1**	**12**	**0**	**4**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8/2	(a)	(i)		either of following • (reaction) temperature above melting point of iron • melting point of iron below reaction temperature / 2500°C			1	1		1
		(ii)		Al_2O_3 (1) 2 Fe (1) product **must** be correct for balancing mark to be awarded		2		2	1	
		(iii)		aluminium is oxidised because it gains oxygen do not accept aluminium oxide is oxidised accept 'aluminium is oxidised because it loses electrons'	1			1		
		(iv)		magnesium aluminium iron **must** be in correct order			1	1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)		What are the positions of the four metals in the reactivity series? ✓			1	1		1
		(ii)		**D**		1		1		1
		(iii)		any of following for (1) • copper in copper(II) sulfate • tin in tin(II) sulfate • iron in iron(II) sulfate • zinc in zinc sulfate • metal in its own sulfate solution • metals in their own sulfate solutions metals do not displace themselves from solution / metals do not react with their own sulfate (1)	2			2		2
	(c)	(i)		any of following • silvery/grey solid formed • (brown) copper turns silvery/grey • (colourless) solution turns blue neutral answer – 'metal changes colour' or 'solution changes colour'	1			1		1
		(ii)		$Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$ products (1) balancing (1) reactants and products **must** be correct for balancing mark to be awarded		2		2		2
				Question 8/2 total	**4**	**5**	**3**	**12**	**1**	**8**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	*(a)*			cryolite (1) (molten) aluminium (1) positive (1) bauxite (1) electrical (1)	5			5		
	(b)			$2Al_2O_3 \rightarrow 4Al + 3O_2$		1		1		
	(c)			78 (2) if answer incorrect award (1) for $\frac{195}{250}$		2		2	2	
	(d)			The energy used to extract metals is greater than that used in recycling them ☐ The difference between the energy used to extract and the energy used to recycle is the greatest ✓ The energy used in recycling is less than for copper but greater than for steel ☐			1	1		
				Question 2 total	**5**	**3**	**1**	**9**	**2**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	*(a)*	(i)		 award (1) for two shared pairs of electrons award (1) for complete octet in oxygen		2		2		
		(ii)		poor conductor of electricity: colourless: good conductor of heat: low melting point and boiling point: ✓	1			1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)	(i)	I	all points plotted correctly (1) tolerance ± ½ small square straight line passing through all points (1) do not penalise missing label		2		2	2	
			II	straight line passing through (0,0) and (10,25) do not penalise missing label			1	1	1	
			III	volume of hydrogen is double / twice the volume of oxygen (2) award (1) for either of following • as the volume of oxygen increases the volume of hydrogen increases • reading from graph given e.g. 50cm^3 of hydrogen formed with 25cm^3 of oxygen			2	2	2	2
		(ii)		**D**			1	1		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		plastics are (electrical) insulators / do not conduct (electricity)	1			1		2
		(ii)		it is negatively charged / it is the cathode (1) accept negative opposite charges attract / positive ions are attracted to negative electrode (1) neutral answer - it is attracted	2			2		2
		(iii)		$2Ag^+ + 2e^- \longrightarrow Ag$ ☐ $Ag^+ + e^- \longrightarrow Ag$ ☑ $Ag^+ - e^- \longrightarrow Ag$ ☐ $Ag^+ + 2e^- \longrightarrow Ag$ ☐		1		1		
				Question 4 total	**4**	**5**	**4**	**13**	**5**	**6**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		$PbBr_2$		1		1		1
		(ii)		liquid neutral answer - molten	1			1		
		(iii)		bromine / Br_2 accept Br ignore any reference to molten do not accept bromide / Br^-		1		1		1
		(iv)		$Pb + 2e^- \longrightarrow Pb^{2+}$ ☐ $Pb^{2+} - 2e^- \longrightarrow Pb$ ☐ $Pb^{2+} + 2e^- \longrightarrow Pb$ ✓ $Pb - 2e^- \longrightarrow Pb^{2+}$ ☐		1		1		
	(b)	(i)		coke (1) oxygen (1) limestone (1)	3			3		
		(ii)		**B** accept $2Fe + 3CO_2$		1		1	1	

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		mild steel		1		1		
		(ii)		brittleness increases			1	1		
		(iii)		award (1) for any of following malleable easily shaped easy to bend do not accept ductile / soft / strong / hard			1	1		
		(iv)		**A** (1) award (1) for either of following • contains two different types of atoms / contains two elements / contains iron and carbon (atoms) • B only has one type of atoms and C has three types of atoms neutral answers contains two atoms / contains different atoms		1 1		2		
				Question 4 total	**4**	**7**	**2**	**13**	**1**	**2**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
10/3	(a)	(i)		electrolysis	1			1		
		(ii)		Carbon is reduced ☐ Tin is oxidised ☐ Tin oxide is reduced ✓ Carbon dioxide is oxidised ☐	1			1		
		(iii)		$2Al + 3$ CuO $\longrightarrow$ Al_2O_3 $+$ **3** Cu award (1) for reactant award (1) for product award (1) for balancing - can only be awarded if reactant is correct		3		3		
	(b)			**D** **B** **A** **C** award (2) for correct order award (1) for any two in correct position			2	2		
				Question 10/3 total	**2**	**3**	**2**	**7**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		compound (1) lower (1) electrical (1) liquid (1)	4			4		
		(ii)		Al_2O_3		1		1		
		(iii)		carbon is more reactive than aluminium: ; iron is more reactive than aluminium: ; aluminium is more reactive than carbon: ✓	1			1		
	(b)			**Indicative content** **electrical wiring** • ductile – can be drawn into wires • good electrical conductor – current can pass through it **saucepans** • good thermal conductor – heat can pass through it • high melting point – can be heated to high temperatures • corrosion resistant – will not corrode • malleable – can be hammered into shape / shaped • non-toxic – safe to use for food	4		2	6		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				water pipes • malleable – can be hammered into shape / shaped • corrosion resistant – will not corrode • non-toxic – safe for (drinking) water references to strength, durability, low/high density are not directly relevant to these uses **5-6 marks** Description of two relevant properties linked to all three uses *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** Description of one relevant property linked to all three uses *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** Identification of one relevant property linked to one or two uses *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.*						
				Question 4 total	**9**	**1**	**2**	**12**	**0**	**0**