AQA GCSE Science Combined Foundation

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	A – Cathode B – Anode C – Electrolyte		3	AO1 5.4.3.2
01.2	A – sodium B – chlorine		1 1	AO2 5.4.3.2
01.3	ions are not free to move in solid sodium chloride		1	AO1 5.4.3.2
01.4	bulb lights up		1	AO3 5.4.3.2
02.1	independent variable is potential difference dependent variable is rate of bubbles		1 1	AO2 5.4.3.4
02.2	1V–5V	units (at least once) are needed for the answer; 4 v is not correct	1	AO2 5.4.3.4
02.3	chlorine gas is toxic too much released at high voltage		1 1	AO3 5.4.3.4
02.4	measure volume of gas/collect in measuring cylinder		1	AO3 5.4.3.4
03.1	aluminium and oxygen		1	AO1 5.4.3.3
03.2	arrow drawn pointing to correct place on bottom right		1	AO1 5.4.3.3

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03.3	carbon/graphite		1	5.4.3.3
03.4	carbon/graphite electrodes react with oxygen forms carbon dioxide therefore, electrode wears away		1 1 1	AO1 5.4.3.3
03.5	B		1	AO1 5.4.3.3
03.6	lower the melting point less energy needed for electrolysis electrolysis is cheaper to run		1 1 1	AO1 5.4.3.3
04.1	ionic		1	AO1 5.4.3.4
04.2	anode		1	AO1 5.4.3.4
04.3	chlorine gas		1	AO3 5.4.3.4
05.1	aluminium is too reactive/more reactive than carbon		1	AO1 5.4.3.3
05.2	carbon or graphite		1	AO1 5.4.3.3

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05.3	aluminium oxide must be molten for electrolysis to take place cryolite reduces the melting point of the mixture therefore, reducing the cost of the electrolysis		1 1 1	AO1 AO2 5.4.3.3
05.4	aluminium ions have a positive charge so they are attracted to the negatively charged cathode		1 1	AO1 5.4.3.3
05.5	because of the high temperatures involved oxygen reacts with the carbon to form carbon dioxide		1 1	AO1 5.4.3.3
06.1	cathode/negative electrode anode/positive electrode		1 1	AO1 5.4.3.2
06.2	bromine and lead		1	AO2 5.4.3.4
06.3	bubbles	or brown gas produced	1	AO3 5.4.3.1
07.1	**Level 3:** Full detailed method that describes how to produce the electrolyte and how to set up the circuit. Diagram provided with anode, cathode, and electrolyte labelled. Circuit should include a battery symbol.		5-6	AO1 5.4.3.4
	Level 2: Method provided that describes how to produce the electrolyte **or** how to set up the circuit. Diagram provided but some labels missing.		3-4	

Question	Answers	Extra information	Mark	AO / Specification reference
	Level 1: Attempt at a method provided but no detail on how to produce the electrolyte or how to set up the circuit. No diagram, or unlabelled/incorrectly labelled diagram provided.		1-2	
	No relevant content.		0	
	Indicative content: • dissolve potassium sulfate in water • pour electrolyte/potassium sulfate solution into a beaker • attach electrodes to a (DC) power supply • connect the electrodes in a series circuit/with the negative terminal attached to the cathode and the positive terminal attached to the anode • insert electrodes into the potassium sulfate solution • ensure electrode to not touch each other • switch the power supply onto a low voltage • Labelled diagram of electrolysis set-up	award a maximum of 5 marks if students use a method that involves molten potassium sulfate, as the melting point is too high for a student to carry out in a lab.		
07.2	bubbles because oxygen gas produced		1 1	AO2 AO3 5.4.3.4

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07.3	electrolysis of potassium sulfate: observe gas given off electrolysis of copper sulfate: (brown-coloured) metal/copper coating the electrode copper less reactive than hydrogen, so metal formed potassium is more reactive than hydrogen, so hydrogen gas formed		1 1 1 1	AO2 AO3 5.4.3.4
08.1	$MgCl_2$		1	AO2
08.2	• magnesium nitrate • most salts in solution will produce hydrogen gas at the cathode • as magnesium is more reactive than hydrogen • so need to electrolyse molten salt • melting point of magnesium chloride and magnesium phosphate significantly higher than magnesium nitrate • so more energy needed/process would be more expensive			AO2 5.4.3.2 5.4.3.3 5.4.3.4
08.3	cathode	accept negative electrode	1	
09.1	cathode	accept negative electrode	1	AO1 5.4.3.1
09.2	chlorine zinc		1	AO2 5.4.3.2

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09.3	in solid zinc, chloride ions are not free to move so cannot conduct electricity and move to the electrodes		1 1 1	AO1 5.4.3.1
09.4	$ZnCl_2(l) \rightarrow Zn(s) + Cl_2(g)$		1	AO1 5.2.2.2
10.1	a rock that has enough metal in it to be worth economically worth extracting		1	AO1 5.4.3.3
10.2	potash	accept potassium ore	1	
10.3	both require heat in catalytic cracking, the vapour is passed over a hot catalyst in steam cracking, the vapour is mixed with steam before heating		1	AO3 5.4.3.3
11.1	separate mixtures identify substances		1 1	AO1 4.8.1.3
11.2	chromatogram with dot at bottom for sample and solvent line above three different dots above solvent line		1 1	AO2 4.8.1.3
11.3	fractional distillation/crystallisation		1	AO1 4.1.1.2
11.4	substance would melt/boil at one specific temperature because a pure substance is made of only a single element or compound		1 1	AO1 4.8.1.1

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