Question	Answers	Extra information	Mark	AO / Specification reference
01.1	hydrogen		1	AO2 4.4.3.4
01.2	$2Cl^-(aq) \rightarrow Cl_2(g) + 2e^-$	one mark for formulae and state symbols of reactants one mark for formulae and state symbols of reactants **or** one mark for correct formulae one mark for correct state symbols one mark for balancing	3	AO2 4.4.3.5
01.3	independent – concentration of sodium chloride solution dependent – current		1 1	AO2
01.4	distance between electrodes or size of electrodes or volume of solutions		1	AO3
01.5	Graph of 'concentration of sodium chloride solution in g/dm^3' (horizontal axis) against 'current in amps' (vertical axis) Points plotted at (0.2,0.2), (0.4,0.33), (0.6,0.43), (0.8, 0.47), (1.0, 0.52)	one mark for plotting three points one mark for plotting all points one mark for line of best fit	3	AO2 AO3
01.6	as concentration increases, the current also increases as concentration increases, more ions are present to carry the charge		1 1	AO3 4.4.3.1

AQA GCSE Chemistry

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
02.1	cathode/negative		1	AO1 4.4.3.1
02.2	chlorine zinc		1	AO2 4.4.3.2
02.3	in solid zinc, chloride ions are not free to move so cannot conduct electricity and move to the electrodes		1 1 1	AO1 4.4.3.1
02.4	$ZnCl_2(l) \rightarrow Zn(s) + Cl_2(g)$		1	AO1 4.4.2.2
03.1	too reactive to extract by reduction (with carbon)/reacts with carbon		1	AO1 4.4.3.3
03.2	cathode/negative		1	AO1 4.4.3.2
03.3	lots of energy needed to melt potassium sulfate		2	AO3 4.4.3.3
03.4	cathode: $2H^+(aq) + 2e^- \rightarrow H_2(g)$ anode: $4OH^-(aq) \rightarrow O_2(g) + 2H_2O(l) + 4e^-$		6	AO2 4.4.3.3

Question	Answers	Extra information	Mark	AO / Specification reference
03.5	potassium metal is not produced in the electrolysis of potassium solution of potassium would react with the water/is too reactive		1	AO3 4.4.3.3
04.1	aluminium is above carbon in the reactivity series		1	AO1 4.4.3.3
04.2	carbon/graphite		1	AO1 4.4.3.3
04.3	carbon reacts with oxygen produced at the anode, forming carbon dioxide which burns away the anode		1	AO1 4.4.3.3
04.4	(liquid) aluminium oxide and cryolite	accept 'bauxite' instead of '(liquid) aluminium oxide'	1 1	AO1 4.4.3.3
04.5	$Al^{3+}(aq) + 3e^- \rightarrow Al(l)$	one mark for formulae and state symbols of reactants one mark for formulae and state symbols of reactants **or** one mark for correct formulae one mark for correct state symbols one mark for balancing	3	AO2 4.4.3.5
04.6	large amounts of energy are required for the electrolysis/to keep the aluminium liquid		1	AO1 4.4.3.3

Question	Answers	Extra information	Mark	AO / Specification reference
05.1	unreactive/does not react conductor that carries an electric current into a liquid or solution		1 1	AO1 4.4.3.1
05.2	$PbBr_2$		1	AO2 4.2.1.2
05.3	**Level 3:** The description, explanation and names of the products are correct. The account is clearly written and well-structured.		5-6	AO1 4.4.3.1 4.4.3.5
	Level 2: The description, explanation and names of the products are mainly correct, although there might be one or two errors. The account is written fairly clearly, but is somewhat disorganised.		3-4	
	Level 1: The description, explanation and names of products are partly correct, but there are several errors and the account lacks detail. The account is not written clearly, and consists of isolated facts rather than one flowing piece of work.		1-2	
	No relevant content.		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content • the current causes the ions to move to the electrodes • positive lead ions move to the negative electrode/cathode • negative bromide ions move to the positive electrode/anode • at the positive electrode, positive lead ions gain electrons, so lead atoms are formed • at the negative electrode, negative bromide ions lose electrons, so bromine is formed • cathode: $Pb^{2+} + 2e^- \rightarrow Pb$ • anode: $2Br^- \rightarrow 2e^- + Br_2$			
06.1	higher temperatures are required to melt the salts		1	AO3
06.2	to collect any gases given off at the electrodes		1	AO1 4.4.3.4
06.3	the cathode will become pink-brown		1	AO2 4.4.3.4
06.4	if lit splint goes out with a squeaky pop, then the gas is hydrogen/H_2 if glowing splint relights, then the gas is oxygen/O_2		1 1	AO1 4.4.3.4
06.5	some water molecules break down to make hydrogen ions and hydroxide ions the hydrogen ions are attracted to the cathode where they gain electrons, as shown in the half equation below $2H^+(aq) + 2e^- \rightarrow H_2(g)$		1 1 3	AO1 4.4.3.4 4.4.3.5

Question	Answers	Extra information	Mark	AO / Specification reference
07.1	row one: does not conduct because ions not free to move row two: positive sodium ions move to the negative electrode, where they pick up electrons to make sodium metal negative chloride ions move to the positive electrode, where they donate electrons to make chlorine gas		1 1 1	AO2 4.2.2.3
07.2	$2H^+(aq) + 2e^- \rightarrow H_2(g)$	one mark for formulae and state symbols of reactants one mark for formulae and state symbols of reactants **or** one mark for correct formulae one mark for correct state symbols one mark for balancing	3	AO2 4.4.3.5
07.3	**Level 3:** The explanation is correct. The account is clearly written and well-structured.		5-6	AO2 × 3 AO3 × 3 4.4.3.4
	Level 2: The explanation is mainly correct. The account is written fairly clearly, but is somewhat disorganised.		3-4	
	Level 1: The explanation is partly correct, but there are several errors and the account lacks detail and clarity.		1-2	
	No relevant content		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content • in the solution, water molecules break down producing hydrogen ions and hydroxide ions • sodium and chloride ions are also present in the solution • the current causes the ions to move to the electrodes • positive sodium and hydrogen ions move to the negative electrode/cathode • negative chloride and hydroxide ions move to the positive electrode/anode • at the positive electrode, positive hydrogen ions gain electrons, so hydrogen is formed • hydrogen gas makes a lit splint give a squeaky pop • at the negative electrode, hydroxide ions react to make oxygen gas • oxygen gas relights a glowing splint • both chlorine and oxygen are formed because of the relatively low concentration of chloride ions in the dilute solution • also, at the negative electrode, chloride ions react to make chlorine gas, which has a characteristic smell			
08.1	too reactive/reacts with carbon/more reactive than carbon		1	AO1 4.4.3.3
08.2	carbon/graphite		1	AO1 4.4.3.3

Question	Answers	Extra information	Mark	AO / Specification reference
08.3	aluminium oxide must be molten for electrolysis to take place cryolite reduced the melting point of the mixture therefore, reducing the cost of the electrolysis		1 1 1	AO1 AO2 4.3.3.3
08.4	aluminium ions have a positive charge so they are attracted to the negatively charged cathode		1 1	AO1 4.4.3.3
08.5	because of the high temperatures involved oxygen reacts with the carbon to form carbon dioxide		1 1	AO1 4.4.3.3
09.1	copper		1	AO2 4.4.3.4
09.2	hydrogen		1	AO1 4.4.3.4
09.3	placing lit splint in collected gas gives a squeaky pop		2	AO1
09.4	brown liquid resulting from the formation of bromine from bromide ions $2Br^-(aq) \rightarrow Br_2(aq) + 2e^-$ bubbles (of colour) gas resulting from the formation of oxygen $4OH^-(aq) \rightarrow O_2(g) + 2H_2O(l) + 4e^-$		1 3 1 3	AO2 x 6 AO3 X 2 4.4.3.4 4.4.3.5

Question	Answers	Extra information	Mark	AO / Specification reference
09.5	**two** from: • smaller quantity of solution required (so cheaper / less waste to dispose of) • easier to make observations at electrodes • bromine is toxic/ harmful so safer to generate small amounts	one mark for each correct answer	2	AO3
10.1	only partially ionised in aqueous solution		1	AO1 4.4.2.6
10.2	$3Mg(s) + 2H_3PO_4(aq) \rightarrow Mg_3(PO_4)_2(aq) + 3H_2(g)$		1	AO2 4.3.1.1
10.3	oxidised: magnesium reduced: hydrogen		1 1	AO2 4.4.2.1
10.4	Na_3PO_4 $3NaOH(aq) + H_3PO_4(aq) \rightarrow Na_3PO_4(aq) + 3H_2O(l)$	one mark for Na_3 one mark for one PO_4 accept a balanced equation for the salt provided	2 1	AO3 4.4.2.2
10.5	moles of $H_3PO_4 = 0.5 \times \frac{25}{1000}$ $= 0.0\ 125$ moles of NaOH = 0.0 125 x 3 = 0.0 375 $\frac{0.0375}{0.15}$ $= 0.25\ dm^3$ **or** $250\ cm^3$		1 1 1 1 1	AO2 4.3.4

Question	Answers	Extra information	Mark	AO / Specification reference
11.1	$2\ Mg(NO_3)_2(S) \rightarrow 2\ MgO(s) + 4\ NO_2(g) + O_2(g)$	one mark for formulae and state symbols of reactants one mark for formulae and state symbols of reactants **or** one mark for correct formulae one mark for correct state symbols one mark for balancing	3	AO2 4.3.1.1
11.2	calcium carbonate		1	AO1
11.3	M_r of $CaCO_3 = 40 + 12 + (3 \times 16)$ $= 100$		1 1	AO2 4.3.1.2
11.4	50 kg - 22 kg = 28 kg		1 1	AO2 4.3.1.2
12.1	two spots drawn at different heights	do not award mark if a spot for water is provided	1	AO2 4.1.1.2
12.2	D		1	AO2 4.1.1.2

Question	Answers	Extra information	Mark	AO / Specification reference
12.3	water will release vapours before its boiling point or boiling points of water and this substance are quite similar in fractional distillation, these vapours will condense on the glass beads and drop back into the mixture whereas the substance vapours will only evaporate in the condenser so will collect in a separate vessel		1 1 1 1 1	AO2 4.1.1.2
13.1	increases		1	AO1 4.1.2.6
13.2	Group 1 – reactivity increases down group Group 7 – reactivity decreases down group		1 1	AO1 4.1.2.5 4.1.2.6
13.3	sodium hydroxide hydrogen		1 1	AO1 4.1.2.5