

Basics of Electrolysis and Electrodes

Q1. (2018)

A)

Question Number	Answer	Mark
6(a)(i)	C chlorine zinc The only correct answer is C <i>A is not correct because oxygen cannot be produced by the electrolysis of this molten salt</i> <i>B is not correct because hydrogen cannot be produced by the electrolysis of this molten salt</i> <i>D is not correct because hydrogen and oxygen cannot be produced by the electrolysis of this molten salt</i>	(1) AO 2 1

B)

Question Number	Answer	Mark
6(a)(ii)	D it contains ions that can move The only correct answer is D <i>A is not correct because molten zinc chloride does not contain molecules</i> <i>B is not correct because molten zinc chloride does not have a giant structure</i> <i>C is not correct because delocalised electrons are not present</i>	(1) AO 1 1

Q2. (2018) – 6b

Question Number	Answer	Additional guidance	Mark
6(b)(i)	A diagram of a workable apparatus showing a complete circuit including - electrodes labelled in (copper sulfate) solution (1) {power supply / power pack / battery} connected (1)	max 1 if circuit not complete allow labelling as 'electrodes' or 'anode' and 'cathode' or 'copper' ignore 'connected to mains' allow symbol for cell/battery even if wrong way round	(2) AO 1 2

Q3. (2019) – 3a (ii)

Question number	Answer	Mark
3(a)(ii)	A description to include <i>volumes going up:</i> (oxygen/ hydrogen/ gas) increase (with time) / volume (directly) proportional to time (1) <i>quantitative comparing hydrogen and oxygen:</i> (volume of) hydrogen double (volume of) oxygen / OR A / 2:1 ratio (1)	allow hydrogen goes up by 4 (cm³) each time / by 2 cm³ per minute / equivalent for oxygen for MP1 explicit reference needed to a ratio and not just quoting 2 figures allow amount in place of volume throughout twice as much hydrogen produced as oxygen (1) rate of hydrogen production double that of oxygen (2)

Q4. (2019) – 3b

Question number	Answer	Mark
3(b)	C lead and bromine is the only correct answer A is incorrect because lead is produced at the cathode B is incorrect because lead and bromine are produced D is incorrect because bromine is produced at the anode	(1)

Q5. (2019) – 3c

Question number	Answer	Additional guidance	Mark
3(c)	An explanation linking: (calcium) nitrate {is soluble/ dissolves}/ (calcium) carbonate {is insoluble/ does not dissolve} (1) - so ions (free to move in solution / not free in solid) (1)	calcium nitrate dissolves so ions can move (2) or reverse argument for calcium carbonate	(2)

Q6. (2020) – 2a (ii, iii)

A)

Question number	Answer	Mark
2(a)(ii)	B oxygen The only correct answer is B A, C & D these gases are not produced in the electrolysis of sodium sulfate solution	(1)

B)

Question number	Answer	Additional guidance	Mark
2(a)(iii)	- electrical energy / electricity (1) {decomposes / breaks down / splits} {electrolytes / (ionic) compounds / substances} (1)	allow electric current allow separates ions reject decomposing elements for MP2	(2)

Q7. (2021)

A)

Question number	Answer	Mark
5(a)	D potassium and bromine D is the only correct answer. A is incorrect since neither hydrogen nor oxygen are products of this electrolysis. B is incorrect because only bromine is a product and hydrogen is not a product of this electrolysis. C is incorrect since only potassium is a product and oxygen is not a product of this electrolysis.	(1) AO1

B)

Question number	Answer	Additional guidance	Mark
5(b)	An explanation linking - zinc chloride soluble and zinc carbonate insoluble (1) - so ions free to move only in zinc chloride solution / comparison with zinc carbonate (1)		(2) AO1

C)

Question number	Answer	Mark
5(c)(i)	hydrogen / H ₂	(1) AO3

Q8. (2021) – 5d

Question number	Answer	Additional guidance	Mark
5(d)(i)	Diagram to show - electrodes in solution (1) - wires and power supply connected to give a complete circuit (1)	max 1 mark if no labelling Ignore any charges on the diagram	(2) AO1

Q7. (2022)

Question number	Answer	Additional guidance	Mark
5(a)	Diagram showing - two (copper) electrodes in {beaker / suitable container} of {copper sulfate / solution / electrolyte} (1) - connected to {power supply / battery / cell} (1)	diagram needs to be labelled to score full marks electrodes must go into solution for MP1 reject AC / mains supply	(2) AO1-2

Q8. (2023)

Question number	Answer	Mark
6(a)	C at the cathode is the only correct answer A, B and D are incorrect because the copper ions are positive so are reduced at the cathode.	AO2 2 (1)

Q9. (2024)

A)

Question number	Answer	Additional guidance	Mark
7(a)(i)	An explanation linking - it contains (hydrogen / sulfate) ions (1) - which can move (1)	MP2 depends on MP1 reject electrons for MP1 and MP2 allow formula for {hydrogen ion / sulfate ions} even if incorrect allow charged particles / cations / anions allow hydrogen or sulfate ions even if charge or formula is incorrect allow which are dissociated / are free / in a liquid / in a solution / go to electrodes ignore 'it conducts electricity'	(2) AO1-1

B)

Question number	Answer	Mark
7(a)(ii)	A  B, C and D are incorrect because they show the incorrect ratio of gases that are produced	(1) AO2-2