5070 Chemistry Paper 1 - Electrochemistry

Topical questions | 30 questions

1. Question | 5070 May-June 2023 P1 V1 Q11

11 Concentrated aqueous sodium chloride is electrolysed using inert electrodes.

Which row shows what happens in this electrolysis and why it happens?

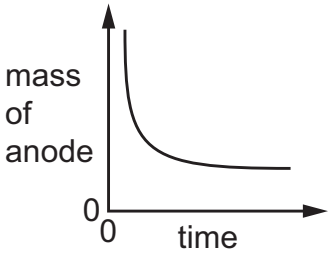
	change occurring	explanation
A	oxygen is discharged at the anode	$OH^-(aq)$ loses electrons more easily than $Cl^-(aq)$
B	during electrolysis the pH of the electrolyte increases	the electrolysis in aqueous solution involves the reduction of $H^+(aq)$ ions
C	solid sodium is produced at the cathode	$Na^+(aq)$ is present in aqueous solution
D	the products stay the same if the aqueous sodium chloride is replaced by molten sodium chloride	Na^+ and Cl^- are present in both molten and aqueous sodium chloride

2. Question | 5070 May-June 2023 P1 V2 Q12

12 Aqueous copper(II) sulfate is electrolysed using copper electrodes. The current is constant and the anode is weighed at regular time intervals.

Which graph is obtained when the mass of the anode is plotted against time?

A



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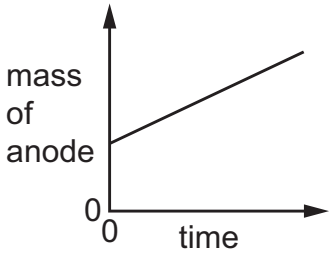

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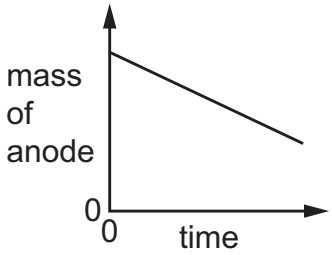

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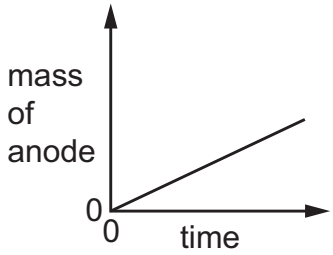


3. Question | 5070 May-June 2023 P1 V2 Q13

13 What is a chemical product of a hydrogen–oxygen fuel cell?

A electricity

B hydrogen

C oxygen

D water

4. Question | 5070 Oct-Nov 2023 P1 V1 Q12

12 Aqueous copper(II) sulfate is electrolysed with copper electrodes.

What is the equation for the reaction occurring at the anode?

A $Cu \rightarrow Cu^{2+} + 2e^-$

B $Cu^{2+} + 2e^- \rightarrow Cu$

C $4OH^- \rightarrow O_2 + 2H_2O + 4e^-$

D $2SO_4^{2-} + 2H_2O \rightarrow 2H_2SO_4 + O_2 + 4e^-$

5. Question | 5070 Oct-Nov 2023 P1 V1 Q13

13 Three statements about fuel cells are given.

1 A hydrogen-oxygen fuel cell requires a continuous input of fuel and oxygen.

2 In a hydrogen-oxygen fuel cell, hydrogen is burned in oxygen to produce electricity.

3 When a hydrogen-oxygen fuel cell is operating, water is the only chemical product.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

6. Question | 5070 Oct-Nov 2023 P1 V2 Q12

12 Aqueous copper(II) sulfate is electrolysed using copper electrodes.

Which row correctly describes what happens?

	mass of anode	mass of cathode	colour of electrolyte
A	increases	decreases	remains blue
B	remains the same	decreases	becomes colourless
C	decreases	increases	remains blue
D	remains the same	increases	becomes colourless

7. Question | 5070 Specimen 2023 P1 Q16

16 Carbon electrodes are used to electrolyse aqueous copper(II) sulfate.

Which observations are made?

	at the anode	electrolyte	at the cathode
A	colourless gas forms	blue colour fades	pink solid forms
B	colourless gas forms	blue colour fades	colourless gas forms
C	electrode increases in mass	blue colour fades	pink solid forms
D	electrode increases in mass	no change	pink solid forms

8. Question | 5070 Specimen 2023 P1 Q17

17 Electrolysis is used to plate a metal coin with silver.

The coin is used as an electrode in a suitable electrolyte.

Which row is correct?

	coin	electrolyte
A	anode	$AgCl(aq)$
B	anode	$AgNO_3(aq)$
C	cathode	$AgCl(aq)$
D	cathode	$AgNO_3(aq)$

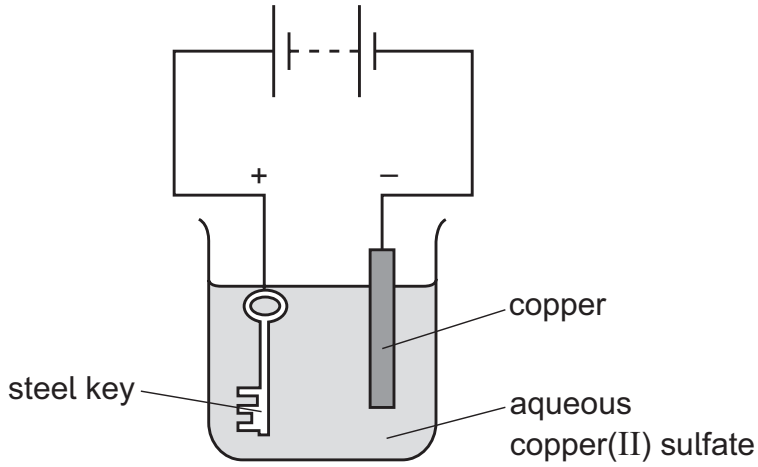
9. Question | 5070 May-June 2024 P1 V1 Q12

12 Which row shows the substances that can be electrolysed?

	aqueous sodium chloride	copper	graphite	molten lead(II) bromide
A	✓	✓	✗	✓
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

10. Question | 5070 May-June 2024 P1 V1 Q13

13 The apparatus shown is set up to electroplate a steel key with copper.



The key does **not** get coated with copper.

Which change needs to be made to electroplate the key?

A increase the concentration of the aqueous copper(II) sulfate

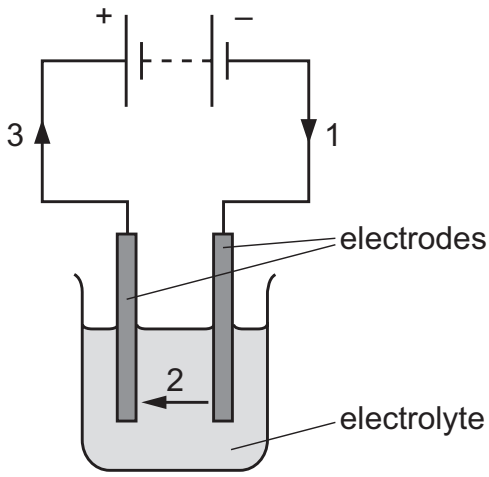
B increase the electric current

C replace the solution with dilute sulfuric acid

D reverse the electrical connections

11. Question | 5070 May-June 2024 P1 V2 Q11

11 The diagram shows a simple electrolytic cell.



Which arrows show the movement of electrons?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 only

12. Question | 5070 May-June 2024 P1 V2 Q12

12 Which changes are observed during the electrolysis of aqueous copper(II) sulfate using copper electrodes?

1 A pink solid is deposited on the negative electrode.

2 Bubbles form on the positive electrode.

3 The colour of the solution does not change.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

13. Question | 5070 May-June 2024 P1 V2 Q13

13 Which row describes a hydrogen-oxygen fuel cell?

	chemical product	comparison of fuel cell with petrol engine
A	hydrogen and oxygen	hydrogen has a lower energy content by mass than petrol
B	hydrogen and oxygen	a renewable fuel may be used in a fuel cell, a petrol engine uses a non-renewable fuel
C	water only	hydrogen has a lower energy content by mass than petrol
D	water only	a renewable fuel may be used in a fuel cell, a petrol engine uses a non-renewable fuel

14. Question | 5070 Oct-Nov 2024 P1 V1 Q11

11 Aqueous copper(II) sulfate is electrolysed using copper electrodes.

Which row describes the changes that take place during the electrolysis?

	mass of anode	mass of cathode	colour of solution
A	increases	decreases	becomes paler
B	increases	decreases	stays the same
C	decreases	increases	becomes paler
D	decreases	increases	stays the same

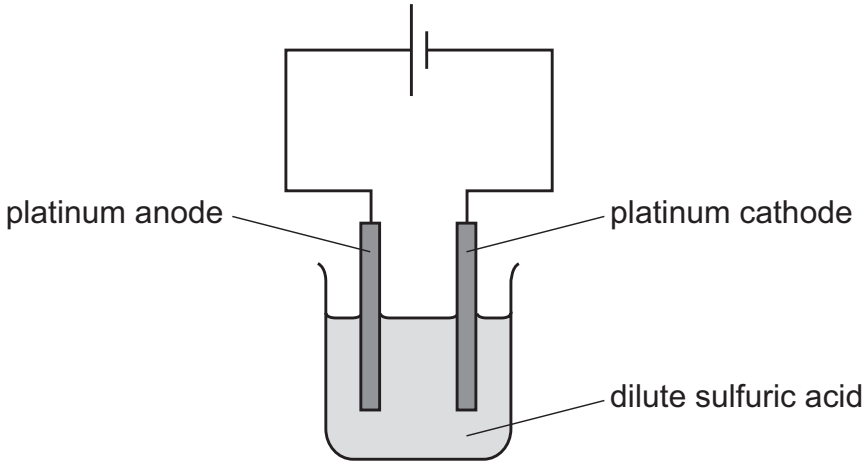
15. Question | 5070 Oct-Nov 2024 P1 V1 Q12

12 Which row describes one advantage and one disadvantage of using a hydrogen-oxygen fuel cell to power a road vehicle?

	advantage	disadvantage
A	The fuel cell obtains the oxygen from the air.	The hydrogen has to be stored in a very strong tank.
B	The fuel cell obtains the oxygen from the air.	The only chemical product causes acid rain.
C	The fuel cell obtains the oxygen from water.	The hydrogen has to be stored in a very strong tank.
D	The fuel cell obtains the oxygen from water.	The only chemical product causes acid rain.

16. Question | 5070 Oct-Nov 2024 P1 V2 Q12

12 An electrolytic cell is shown.



Which statement is correct?

A Electrons move from the cathode to the anode in the external circuit.

B Hydrogen ions gain electrons at the anode.

C In the electrolyte, positive ions move to the cathode and negative ions move to the anode.

D The hydroxide ions in the electrolyte move to the cathode.

17. Question | 5070 Oct-Nov 2024 P1 V2 Q13

13 An aqueous mixture of copper(II) nitrate and silver nitrate is electrolysed with pure copper electrodes.

Which ionic half-equation describes the change occurring at the anode?

A $Cu \rightarrow Cu^{2+} + 2e^{-}$

B $Cu^{2+} + 2e^{-} \rightarrow Cu$

C $Ag \rightarrow Ag^{+} + e^{-}$

D $Ag^{+} + e^{-} \rightarrow Ag$

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18. Question | 5070 Oct-Nov 2024 P1 V2 Q14

14 What is a disadvantage of using a hydrogen-oxygen fuel cell to power a car?

A Gasoline / petrol is a non-renewable resource.

B The hydrogen tank may split in an accident, leading to an explosion.

C The product of the reaction between oxygen and hydrogen is toxic.

D The oxygen is obtained from air.

19. Question | 5070 May-June 2025 P1 V1 Q14

14 Which statement about electrolysis is correct?

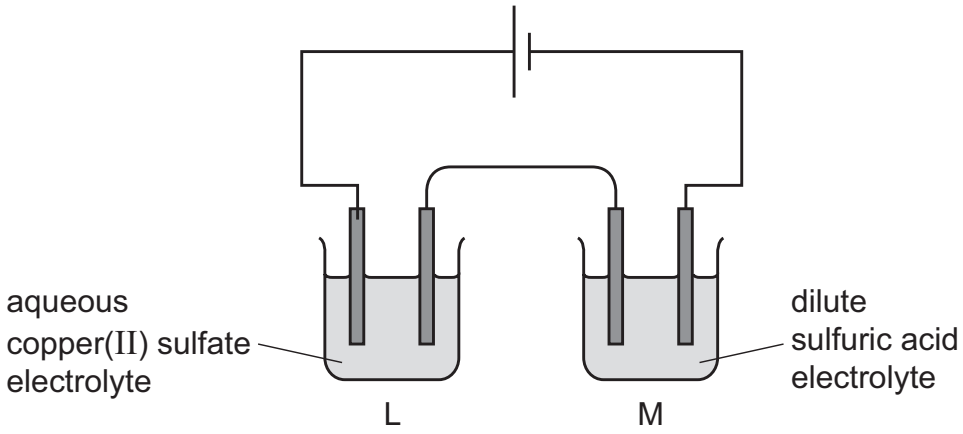
A Negative anions move towards the positive cathode.

B Negative cations move towards the positive cathode.

C Positive anions move towards the negative cathode.

D Positive cations move towards the negative cathode.

15 The diagram shows an electrolysis experiment using inert electrodes.



Which row shows what happens to the concentration of the electrolyte in L and in M as the electrolysis proceeds?

	L	M
A	✗	✗
B	✗	✓
C	✓	✗
D	✓	✓

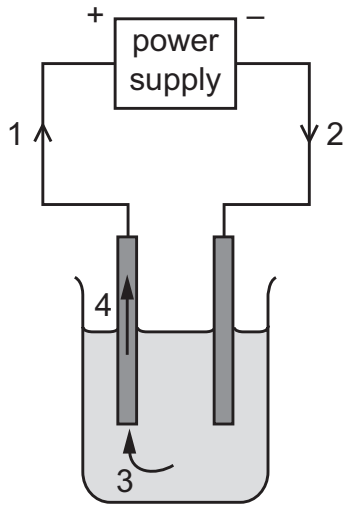
key

✓ = concentration stays constant

✗ = concentration does not stay constant

21. Question | 5070 May-June 2025 P1 V2 Q12

12 The diagram shows the electrolysis of molten lead bromide with inert electrodes.



Which row identifies the particles that carry charge along each arrow?

	1	2	3	4
A	bromide ions	electrons	lead ions	electrons
B	electrons	electrons	bromide ions	lead ions
C	electrons	electrons	bromide ions	electrons
D	electrons	electrons	electrons	electrons

22. Question | 5070 May-June 2025 P1 V2 Q13

13 What are the products formed at the two electrodes when aqueous copper(II) sulfate is electrolysed using copper electrodes?

	anode product	cathode product
A	aqueous copper(II) ions	copper metal
B	aqueous copper(II) ions	hydrogen gas
C	oxygen gas	copper metal
D	oxygen gas	hydrogen gas

23. Question | 5070 May-June 2025 P1 V2 Q14

14 Which statement about a hydrogen–oxygen fuel cell is correct?

A It uses a chemical reaction that has only one product.

B It works by burning hydrogen in air.

C It requires a continuous input of electrical energy.

D It is less efficient than a petrol engine.

24. Question | 5070 Oct-Nov 2025 P1 V1 Q12

12 Electrolysis is used to plate a metal statue with silver.

The statue is an electrode in a suitable electrolyte.

Which row is correct?

	statue	electrolyte
A	cathode	AgCl(aq)
B	cathode	$AgNO_3$(aq)
C	anode	AgCl(aq)
D	anode	$AgNO_3$(aq)

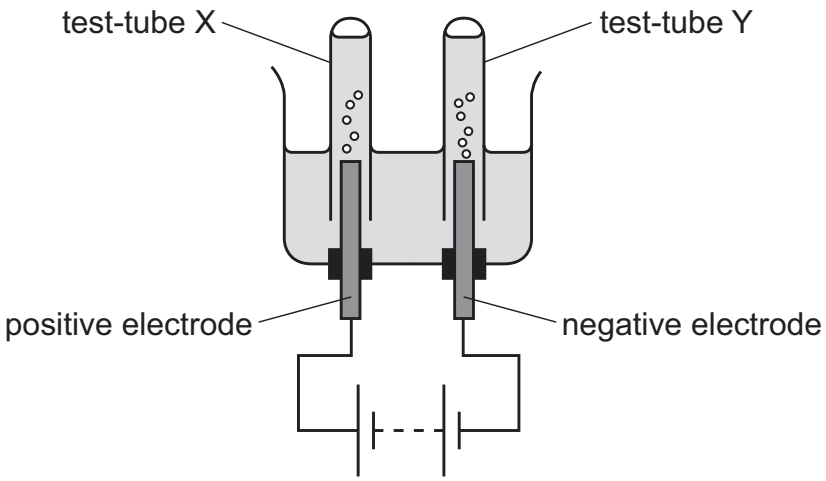
25. Question | 5070 Oct-Nov 2025 P1 V1 Q13

13 Which row is correct?

	purpose of hydrogen–oxygen fuel cell	chemical product of hydrogen–oxygen fuel cell
A	to recycle waste	hydrogen
B	to recycle waste	water
C	to produce electrical energy	hydrogen
D	to produce electrical energy	water

26. Question | 5070 Oct-Nov 2025 P1 V2 Q11

11 The apparatus shown is used to investigate the electrolysis using inert electrodes of dilute sulfuric acid and concentrated aqueous sodium chloride in separate experiments.



Which row shows the ratio of volume of gas collected in each test-tube?

	ratio of volume of gas in X and Y with dilute H_2SO_4 X : Y	ratio of volume of gas in X and Y with concentrated aqueous NaCl X : Y
A	1 : 2	2 : 1
B	1 : 1	1 : 1
C	1 : 2	1 : 1
D	2 : 1	1 : 2

27. Question | 5070 May-June 2026 P1 V1 Q12

12 Molten sodium chloride is electrolysed.

Which change occurs at the cathode?

A Sodium ions are oxidised.

B Sodium ions are reduced.

C Chloride ions are oxidised.

D Chloride ions are reduced.

28. Question | 5070 May-June 2026 P1 V1 Q13

13 Three statements about hydrogen–oxygen fuel cells are listed.

1 They produce less carbon dioxide than petrol engines.

2 They produce hydrogen and oxygen as the only chemical products.

3 They are used to generate electricity.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

29. Question | 5070 May-June 2026 P1 V2 Q10

10 Concentrated and dilute aqueous XCl are electrolysed separately using inert electrodes.

X is a more reactive metal than sodium.

Which row shows the products at the cathode and the anode?

	concentrated aqueous XCl		**dilute aqueous XCl**	
	product at the cathode	**product at the anode**	**product at the cathode**	**product at the anode**
A	hydrogen	chlorine	X	oxygen
B	hydrogen	oxygen	X	chlorine
C	hydrogen	chlorine	hydrogen	oxygen
D	X	oxygen	hydrogen	chlorine

30. Question | 5070 May-June 2026 P1 V2 Q11

11 Which statement comparing hydrogen–oxygen fuel cells with gasoline / petrol engines is correct?

A A disadvantage of a hydrogen–oxygen fuel cell is that hydrogen is more difficult to store than gasoline / petrol.

B A disadvantage of a hydrogen–oxygen fuel cell is that it is less efficient than a gasoline / petrol engine.

C An advantage of a hydrogen–oxygen fuel cell is that it only produces carbon dioxide and water as products.

D An advantage of gasoline / petrol engines is that they produce carbon monoxide by incomplete combustion.