Electrolysis MCQS

Compiled by: Mustafa Asif

1 In the electrolysis of $CuSO_4(aq)$, what is the ionic equation for the reaction at the cathode?

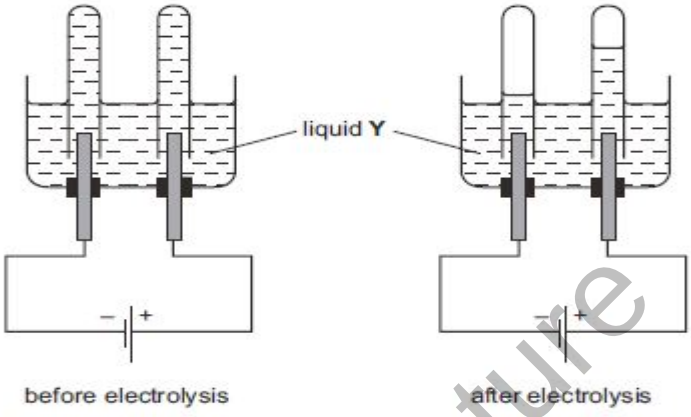
A $Cu + 2e^- \rightarrow Cu^{2+}$

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

C $2H_2O + Cu^{2+} + 2e^- \rightarrow Cu(OH)_2 + O_2$

D $SO_4^{2-} + 4H^+ + 2e^- \rightarrow H_2SO_4 + H_2$

2 The diagrams show an electrolysis experiment using inert electrodes.



What could liquid **Y** be?

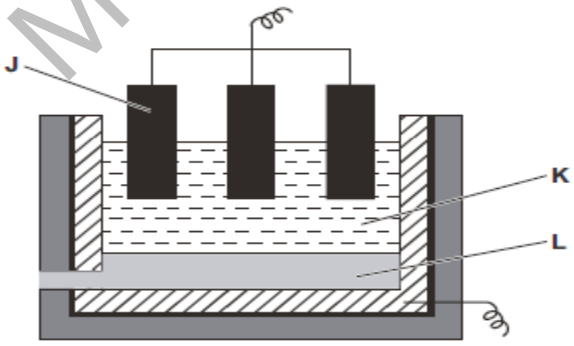
A aqueous copper(II) sulfate

B concentrated aqueous sodium chloride

C dilute sulfuric acid

D ethanol

3 The diagram shows apparatus that can be used to extract aluminium from its ore.



What are **J**, **K** and **L**?

	J	K	L
A	negative electrode	aluminium oxide + cryolite	aluminium
B	negative electrode	cryolite	aluminium oxide
C	positive electrode	aluminium oxide	cryolite
D	positive electrode	aluminium oxide + cryolite	aluminium

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4 What is observed during the electrolysis of aqueous copper(II) sulfate using carbon electrodes?

A A pink solid is deposited on the anode.

B Bubbles form on the negative electrode.

C The colour of the solution fades.

D The negative electrode becomes smaller.

5 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	AgC*l*(aq)
B	cathode	$AgNO_3$(aq)
C	anode	AgC*l*(aq)
D	anode	$AgNO_3$(aq)

6 An old commercial process for aluminium extraction used large quantities of sodium to convert aluminium ions into aluminium atoms.

The modern aluminium extraction process uses electrolysis.

Which statements are correct?

In the old process:

1 The sodium acted as an oxidising agent.

2 The reaction worked because sodium is more reactive than aluminium.

In the modern process:

3 The equation for the cathode reaction is $Al^{3+}(l) + 3e^- \rightarrow Al(l)$.

4 The carbon anode needs replacing often because it is oxidised to carbon dioxide by the oxygen evolved.

	old process	modern process
A	1 and 2	3 and 4
B	1 and 2	3 only
C	1 only	4 only
D	2 only	3 and 4

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7 What is observed during the electrolysis of aqueous copper(II) sulfate using carbon electrodes?

A A pink solid is deposited on the anode.

B Bubbles form on the negative electrode.

C The colour of the solution fades.

D The negative electrode becomes smaller.

8 Four processes using electrolysis are listed.

1 the electrolysis of concentrated aqueous sodium chloride

2 the electrolysis of dilute sulfuric acid

3 the extraction of aluminium from pure aluminium oxide

4 the purification of copper using aqueous copper(II) sulfate

Which processes produce oxygen at one of the electrodes?

A 1 and 2 **B** 2 and 3 **C** 2 and 4 **D** 3 and 4

9 Magnesium can be produced by the electrolysis of molten magnesium chloride, $MgCl_2$.

What are the products formed at the anode and at the cathode during the electrolysis of molten magnesium chloride?

	anode	cathode
A	chlorine	hydrogen
B	chlorine	magnesium
C	magnesium	chlorine
D	oxygen	hydrogen

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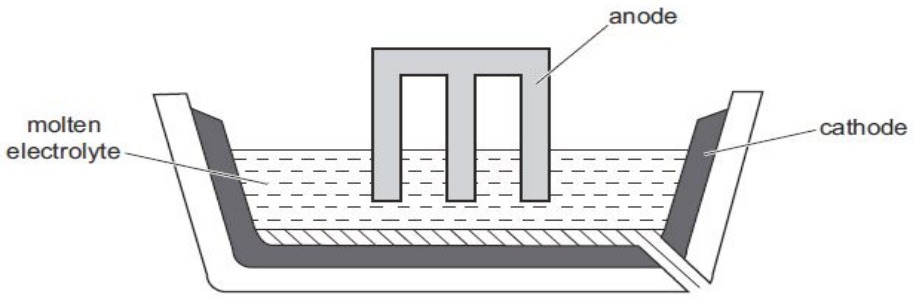
10 The diagram shows a cell that can be used to extract a metal from its oxide.



Molten aluminium oxide, copper(II) oxide, lead(II) oxide and magnesium oxide are each electrolysed in separate cells. Each cell receives the same number of electrons.

Which statement is correct?

A All the metals can also be extracted from their oxides using coke.

B The anode and cathode should be made of the metal being extracted.

C The pure metal is always produced at the cathode.

D The same mass of each metal is formed.

11 Aluminium is produced by the electrolysis of molten aluminium oxide.

What is the correct equation for the reaction at the positive electrode?

A $Al \rightarrow Al^{3+} + 3e^-$

B $Al^{3+} + 3e^- \rightarrow Al$

C $O_2 + 4e^- \rightarrow 2O^{2-}$

D $2O^{2-} \rightarrow O_2 + 4e^-$

12 When aqueous copper(II) sulfate is electrolysed using copper electrodes, which observations are correct?

	positive electrode	negative electrode	intensity of blue colour of electrolyte
A	electrode becomes smaller	electrode becomes bigger	constant
B	electrode becomes smaller	gas given off	fades
C	gas given off	electrode becomes bigger	fades
D	gas given off	gas given off	constant

13 Three different solutions were electrolysed using inert electrodes.

solution 1 aqueous sodium chloride
solution 2 concentrated hydrochloric acid
solution 3 dilute sulfuric acid

Which solutions produce hydrogen at the negative electrode?

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

14 A simple cell can be made using two different metals as the electrodes and an aqueous solution as the electrolyte.

Which statements about simple cells are correct?

1 A greater voltage is produced using magnesium and silver than using magnesium and copper.
2 The electrolyte is an aqueous solution containing both positive and negative ions.
3 The more reactive metal will release electrons.

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

15 Magnesium can be produced by electrolysis of molten magnesium chloride, $MgCl_2$.

What are the equations for the reactions that occur at the positive electrode and at the negative electrode?

	positive electrode	negative electrode
A	$2Cl^- \rightarrow Cl_2 + 2e^-$	$2H^+ + 2e^- \rightarrow H_2$
B	$Cl_2 + 2e^- \rightarrow 2Cl^-$	$Mg^{2+} + 2e^- \rightarrow Mg$
C	$2Cl^- \rightarrow Cl_2 + 2e^-$	$Mg^{2+} + 2e^- \rightarrow Mg$
D	$2Cl^- \rightarrow Cl_2 + 2e^-$	$Mg^{2+} + 2e^- \rightarrow 2Mg$

16 Three different solutions were electrolysed using inert electrodes.

solution 1 aqueous sodium chloride
solution 2 concentrated hydrochloric acid
solution 3 dilute sulfuric acid

Which solutions produce hydrogen at the negative electrode?

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

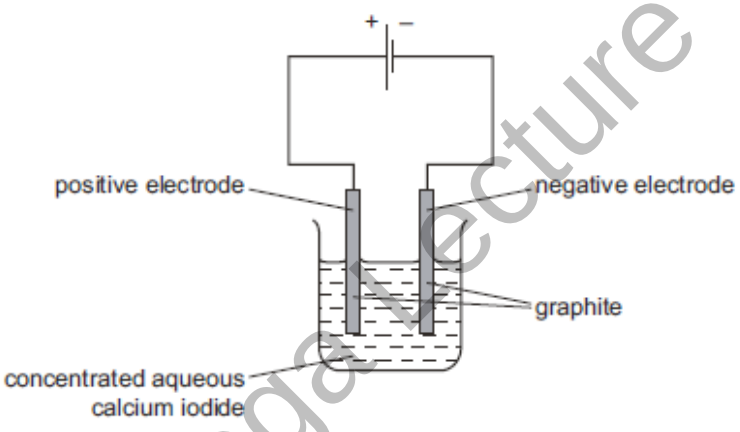
17 Dilute sulfuric acid is electrolysed between inert electrodes.

Which statements are correct?

1 Hydrogen is released at the negative electrode.
2 Oxygen is released at the positive electrode.
3 Sulfur dioxide is released at the positive electrode.
4 The acid becomes more concentrated.

A 1, 2 and 4 B 1 and 2 only C 2 and 3 D 3 and 4

18 Concentrated aqueous calcium iodide undergoes electrolysis in a similar way to concentrated aqueous sodium chloride.



What would be formed at each electrode?

	product at positive electrode	product at negative electrode
A	iodine	calcium
B	iodine	hydrogen
C	oxygen	calcium
D	oxygen	hydrogen

Electrolysis MCQS

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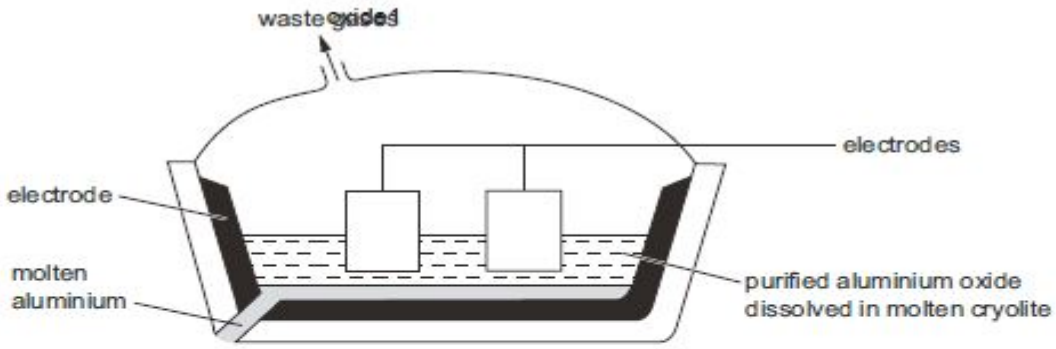
19 Aluminium is obtained by the electrolysis of molten aluminium



Which row shows the electrode at which aluminium is formed and the correct equation for its formation?

	electrode	equation
A	anode	$Al^{3+} + 3e^- \rightarrow Al$
B	anode	$Al^{3+} - 3e^- \rightarrow Al$
C	cathode	$Al^{3+} + 3e^- \rightarrow Al$
D	cathode	$Al^{3+} - 3e^- \rightarrow Al$

20 Dilute sulfuric acid is electrolysed between inert electrodes.

Which statements are correct?

1 Hydrogen is released at the negative electrode.

2 Oxygen is released at the positive electrode.

3 Sulfur dioxide is released at the positive electrode.

4 The acid becomes more concentrated.

A 1, 2 and 4 B 1 and 2 only C 2 and 3 D 3 and 4

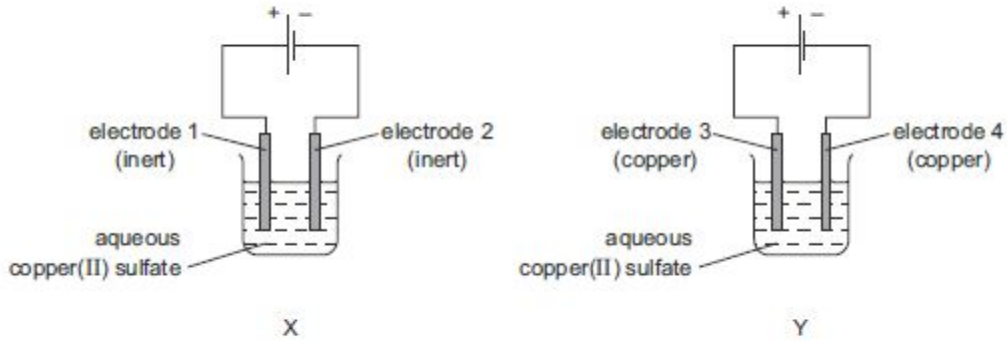
21 Caesium, Cs, is in the same group of the Periodic Table as sodium.

Which products are obtained from the electrolysis of concentrated aqueous caesium chloride?

	product at negative electrode	solution remaining
A	caesium	hydrochloric acid
B	chlorine	caesium hydroxide
C	hydrogen	caesium hydroxide
D	hydrogen	hydrochloric acid

22 The diagrams show the apparatus for the electrolysis of aqueous copper(II) sulfate.

In experiment X both electrodes are inert. In experiment Y both electrodes are made of copper.



On which electrodes is solid metal deposited?

A 1 and 2 B 1 and 3 C 2 and 4 D 3 and 4

23 Aqueous copper(II) sulfate is electrolysed using copper as the positive electrode and carbon as the negative electrode.

Which row gives correct information about this electrolysis?

	positive electrode	negative electrode	electrolyte
A	electrode dissolves	copper deposited	stays a constant blue colour
B	electrode dissolves	hydrogen gas given off	blue colour becomes more intense
C	hydrogen gas given off	oxygen gas given off	stays a constant blue colour
D	oxygen gas given off	hydrogen gas given off	stays a constant blue colour

24 Molten salts of four metals are electrolysed.

The ions of which metal require the smallest number of electrons for one mole of atoms to be liberated during electrolysis?

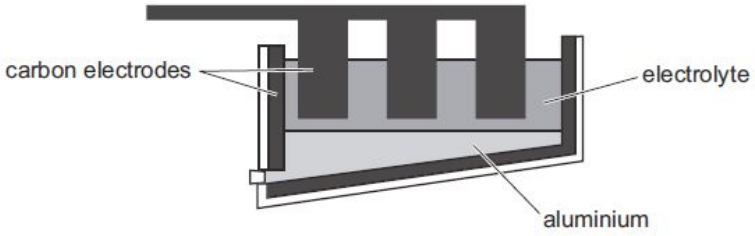
A aluminium

B calcium

C iron

D sodium

25 The diagram shows the apparatus used to extract aluminium from aluminium oxide.



Which statement about this process is correct?

A The electrolyte is a solid mixture of aluminium oxide and cryolite.

B The electrolyte is aluminium oxide dissolved in water.

C The equation for the reaction at the positive electrode is $Al^{3+} + 3e^- \rightarrow Al$.

D The positive carbon electrodes lose mass during the process and need regular replacement.

26 When solution Q is electrolysed using carbon electrodes, colourless gases are produced at both electrodes.

What is Q?

A concentrated hydrochloric acid

B concentrated sodium chloride solution

C dilute sulfuric acid

D pure water

27 Which electrodes and electrolyte can be used to electroplate a copper medal with gold?

	positive electrode	negative electrode	electrolyte
A	copper	gold	an aqueous copper compound
B	copper	gold	an aqueous gold compound
C	gold	copper	an aqueous copper compound
D	gold	copper	an aqueous gold compound

28 Molten salts of four metals are electrolysed.

The ions of which metal require the smallest number of electrons for one mole of atoms to be liberated during electrolysis?

A aluminium

B calcium

C iron

D sodium

Electrolysis MCQS

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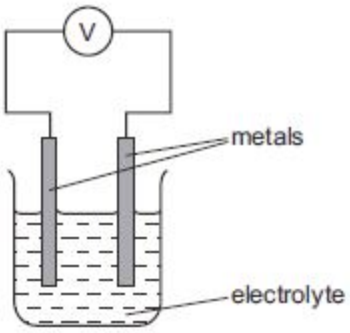
29 Electrical energy can be generated using simple cells as shown.



Which pair of metals, when used as electrodes, will give the largest reading on the voltmeter, V?

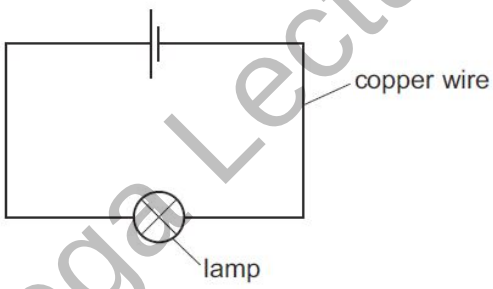
A lead and sodium

B magnesium and copper

C potassium and silver

D sodium and potassium

30 Copper wire is used to complete an electrical circuit.



What happens in the copper wire?

A Electrons move along the wire to the negative terminal. Positive ions stay in position.

B Electrons move along the wire to the positive terminal. Positive ions move to the negati terminal.

C Electrons move along the wire to the positive terminal. Positive ions stay in position.

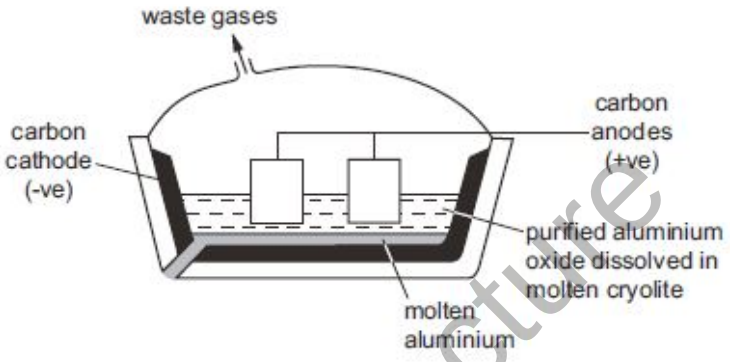
D Negative ions move along the wire to the positive terminal. Positive ions move to t negative terminal.

31 Aqueous copper(II) sulfate is electrolysed using carbon electrodes.

Which observations will be made?

	at the positive electrode	electrolyte	at the negative electrode
A	colourless gas forms	blue colour fades	pink solid forms
B	colourless gas forms	no change	colourless gas forms
C	electrode decreases in mass	blue colour fades	colourless gas forms
D	electrode decreases in mass	no change	pink solid forms

32 Aluminium is extracted from aluminium oxide by electrolysis.



Which statement about this electrolysis is correct?

A Aluminium ions gain electrons to form aluminium.

B Cryolite is added to increase the melting point of the electrolyte.

C Cryolite is added to react with impurities to form slag.

D The carbon cathode has to be replaced regularly as it reacts with oxygen.

Electrolysis MCQS

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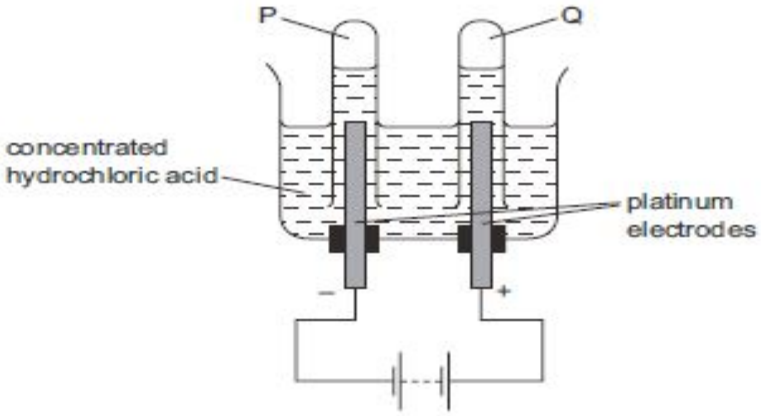
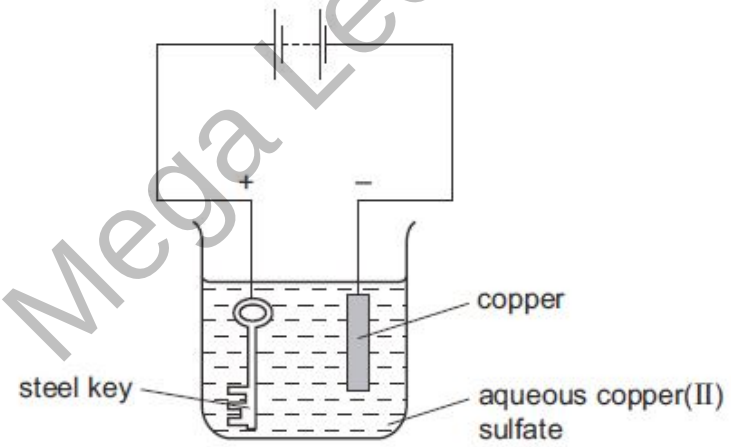
33 When concentrated hydrochloric acid is electrolysed, gases P and Q are formed.



What are P and Q?

	P	Q
A	chlorine	hydrogen
B	chlorine	oxygen
C	hydrogen	chlorine
D	hydrogen	oxygen

34 The apparatus shown is set up to plate a steel key with copper.



The key does not get coated with copper.

Which change needs to be made to plate the key?

A Increase the concentration of the aqueous copper(II) sulfate.

B Increase the voltage.

C Replace the solution with dilute sulfuric acid.

D Reverse the electrical connections.

35 Aluminium is manufactured from aluminium oxide by electrolysis. The compound cryolite is used in this process.

Which statement about cryolite is correct?

A It is the common name for aluminium oxide.

B It is used to dissolve the aluminium oxide.

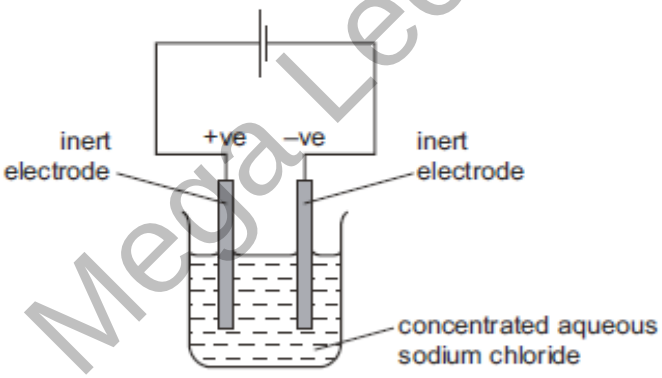
C It is used to make the positive electrode.

D It is used to make the negative electrode.

36 What are the correct anode (positive electrode) and cathode (negative electrode) products 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

37 Concentrated aqueous sodium chloride is electrolysed using inert electrodes.



Which statement about this electrolysis is correct?

A Chloride ions travel through the solution to the negative electrode.

B Electrons travel through the solution to the sodium ions.

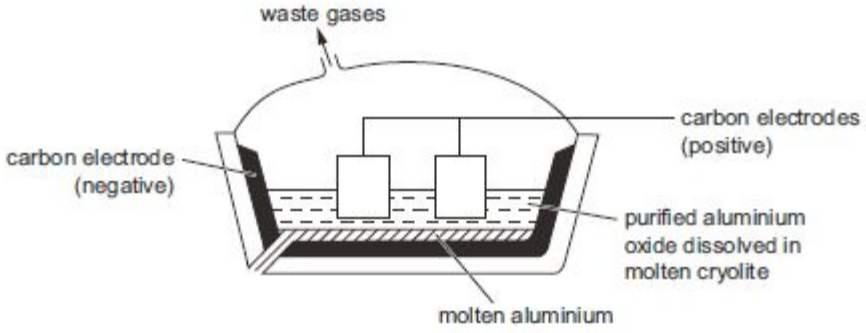
C Gases are given off at both electrodes.

D Sodium is formed at the negative electrode.

38 Which metal has to be extracted from its ore by electrolysis?

A Fe **B** Na **C** Pb **D** Zn

39 Aluminium is produced by the electrolysis of molten aluminium oxide.



Which statement about the process is correct?

A Aluminium ions are reduced to aluminium by gaining electrons.

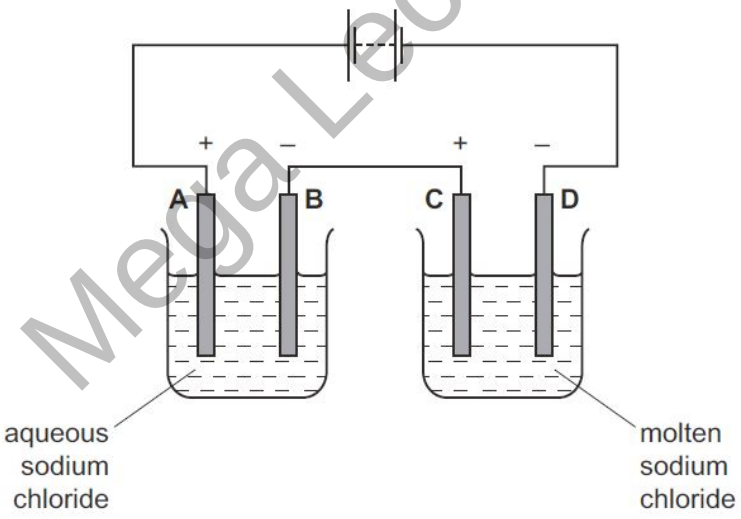
B Aluminium oxide is reduced by cryolite.

C Aluminium oxide is reduced by the carbon electrodes.

D Aluminium oxide is reduced by the carbon monoxide formed at the negative electrode.

40 The diagram shows an electrolysis circuit.

At which electrode is hydrogen formed?



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Marking Key

1.B
2.C
3.D
4.C
5.B
6.D
7.C
8.B
9.B
10.C
11.D
12.A
13.A
14.A
15.C
16.A
17.A
18.B
19.C
20.A
21.C
22.C
23.A
24.D
25.D
26.C
27.D
28.D
29.C
30.C
31.A
32.C
33.C
34.D
35.D
36.A
37.C
38.B
39.A
40.B

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