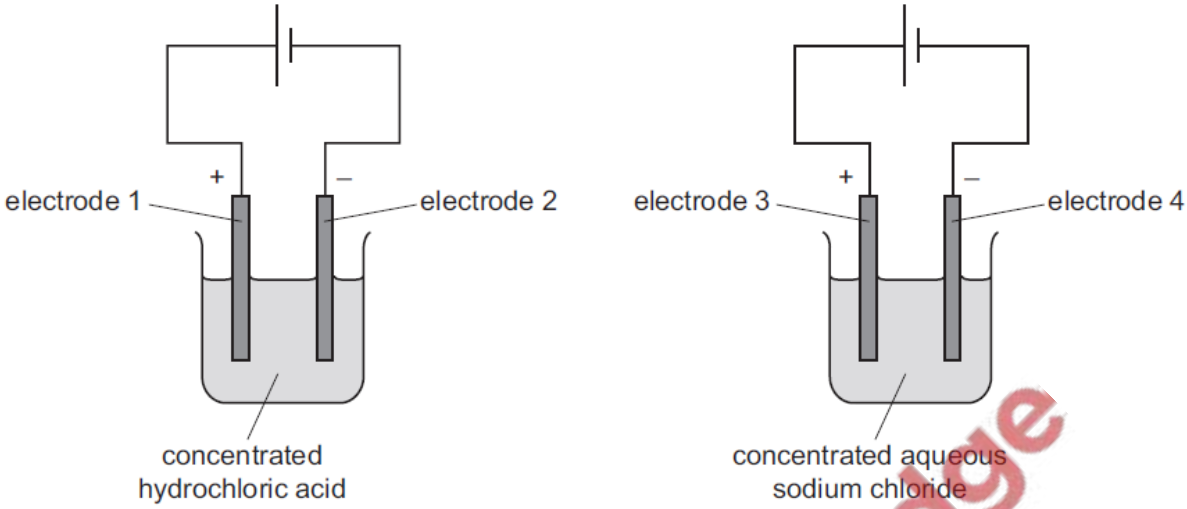
1. June/2022/Paper_11/No.10

The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium chloride using carbon electrodes.



At which electrodes is hydrogen produced?

A electrode 1 only

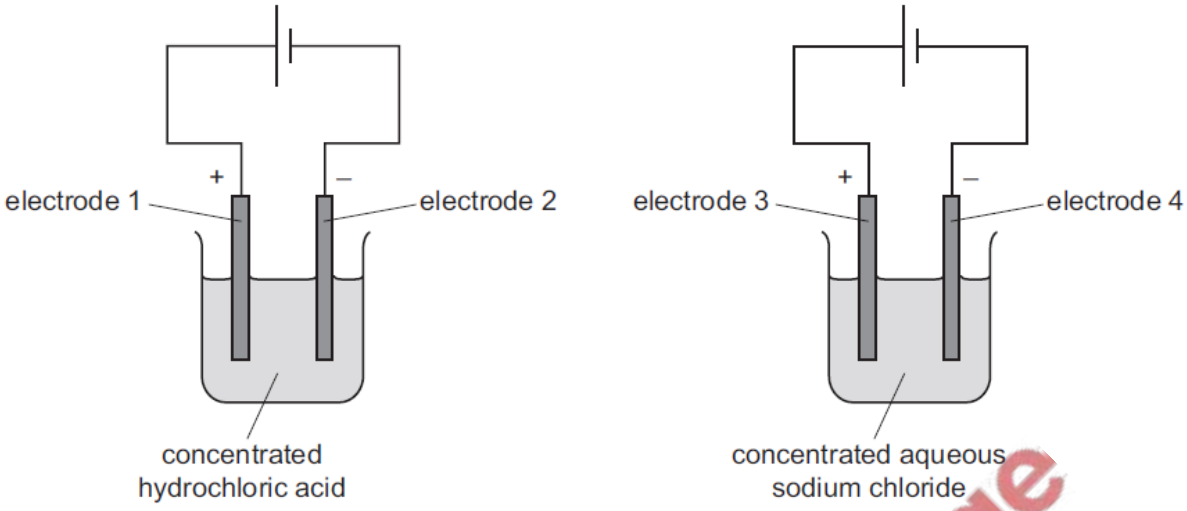
B electrodes 1 and 3

C electrode 2 only

D electrodes 2 and 4

2. June/2022/Paper_12/No.10

The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium chloride using carbon electrodes.



At which electrodes is hydrogen produced?

A electrode 1 only

B electrodes 1 and 3

C electrode 2 only

D electrodes 2 and 4

3. June/2022/Paper_12/No.16

In which equation is carbon both oxidised and reduced?

A $C + O_2 \rightarrow CO_2$

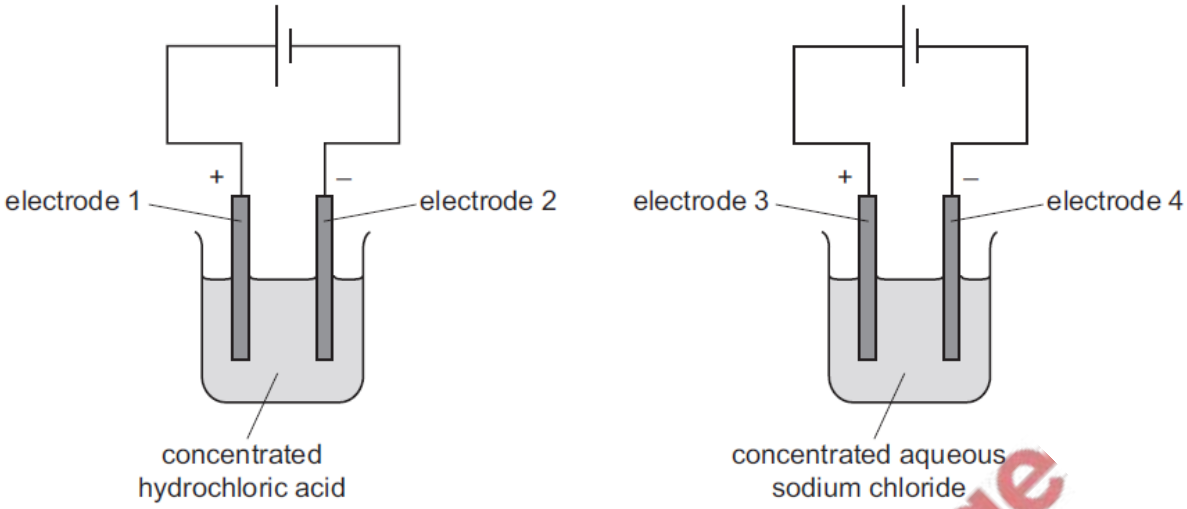
B $CO_2 + C \rightarrow 2CO$

C $3CO + Fe_2O_3 \rightarrow 3CO_2 + 2Fe$

D $2CO + O_2 \rightarrow 2CO_2$

4. June/2022/Paper_13/No.10

The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium chloride using carbon electrodes.



At which electrodes is hydrogen produced?

A electrode 1 only

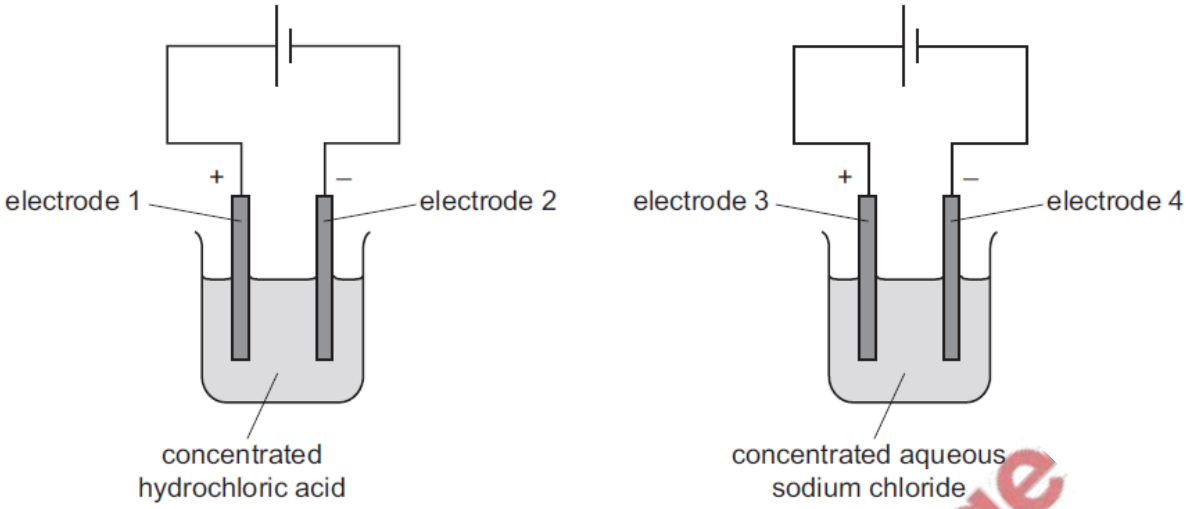
B electrodes 1 and 3

C electrode 2 only

D electrodes 2 and 4

5. June/2022/Paper_21/No.10

The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium chloride using carbon electrodes.



At which electrodes is hydrogen produced?

A electrode 1 only

B electrodes 1 and 3

C electrode 2 only

D electrodes 2 and 4

6. June/2022/Paper_21/No.11

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

What is the ionic half-equation for the reaction at the cathode?

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

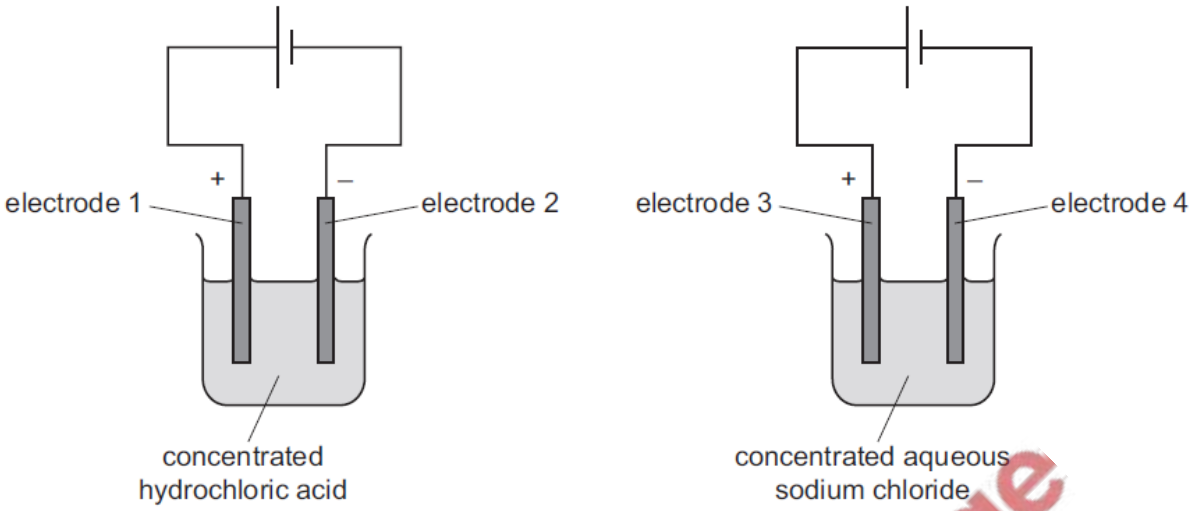
B $Cu^{2+} + 2e^- \rightarrow Cu$

C $2H^+ + 2e^- \rightarrow H_2$

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

7. June/2022/Paper_22/No.10

The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium chloride using carbon electrodes.



At which electrodes is hydrogen produced?

A electrode 1 only

B electrodes 1 and 3

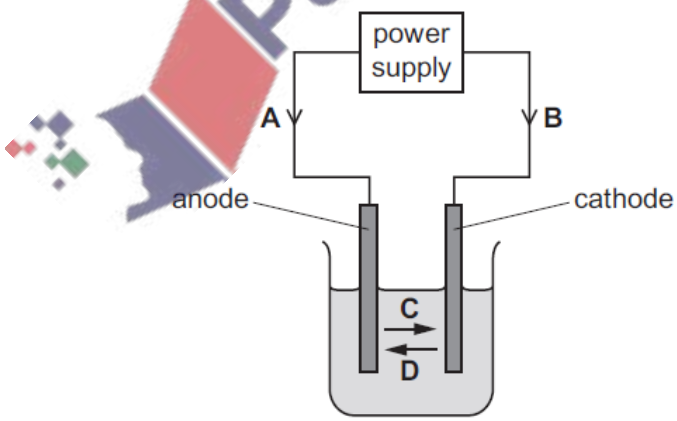
C electrode 2 only

D electrodes 2 and 4

8. June/2022/Paper_22/No.11

The diagram shows the electrolysis of aqueous copper(II) sulfate using inert electrodes.

Which arrow shows the movement of electrons in the circuit?



9. June/2022/Paper_22/No.20

Substance J takes part in a redox reaction.

In the reaction, J gains electrons.

Which statement is correct?

A J is the oxidising agent and it is oxidised in the reaction.

B J is the oxidising agent and it is reduced in the reaction.

C J is the reducing agent and it is oxidised in the reaction.

D J is the reducing agent and it is reduced in the reaction.

10. June/2022/Paper_23/No.9

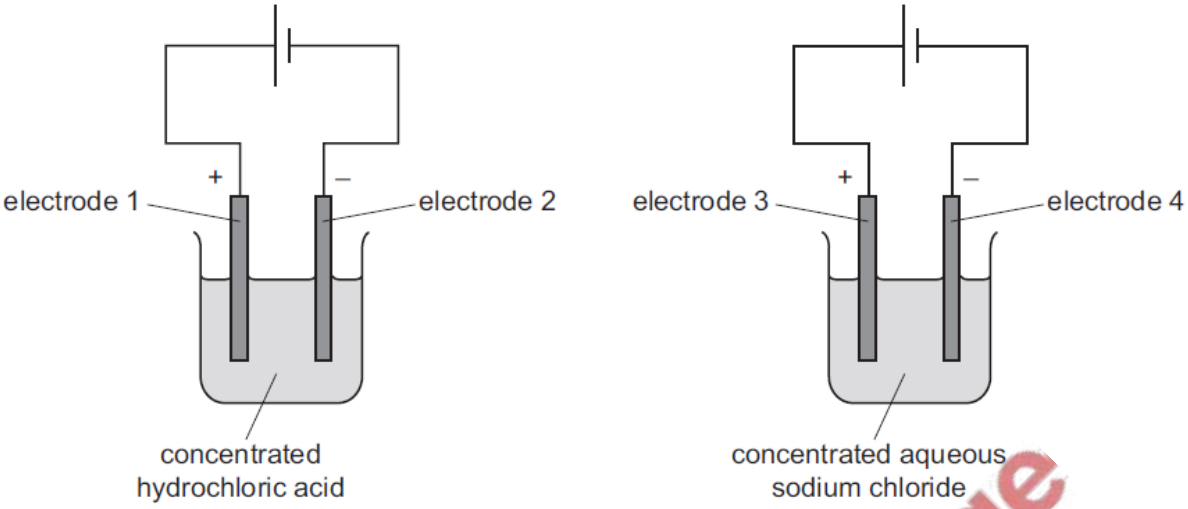
Aluminium is manufactured from aluminium oxide by electrolysis.

Which row shows the ionic half-equations at each electrode and describes the role of cryolite in the process?

	reaction at anode	reaction at cathode	role of cryolite
A	$2O^{2-} \rightarrow O_2 + 4e^-$	$Al^{3+} + 3e^- \rightarrow 3Al$	catalyst
B	$Al^{3+} + 3e^- \rightarrow Al$	$2O^{2-} \rightarrow O_2 + 4e^-$	solvent for aluminium oxide
C	$2O^{2-} \rightarrow O_2 + 4e^-$	$Al^{3+} + 3e^- \rightarrow Al$	solvent for aluminium oxide
D	$Al^{3+} + 3e^- \rightarrow 3Al$	$2O^{2-} \rightarrow O_2 + 4e^-$	catalyst

11. June/2022/Paper_23/No.10

The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium chloride using carbon electrodes.



At which electrodes is hydrogen produced?

A electrode 1 only

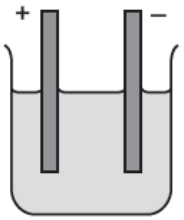
B electrodes 1 and 3

C electrode 2 only

D electrodes 2 and 4

12. June/2022/Paper_31/No.7(c)

(c) Molten zinc chloride is electrolysed.
The incomplete apparatus is shown.



(i) Complete the diagram by:
- completing the circuit to show the wires and power pack
- labelling the anode. [2]

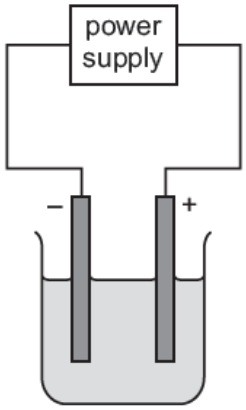
(ii) Name the products formed at each electrode.

positive electrode .....

negative electrode .....
[2]

13. June/2022/Paper_32/No.7(c)

(c) The diagram shows the apparatus used to electrolyse molten sodium iodide.



(i) Complete the diagram by labelling:

- the electrolyte
- the cathode.

[2]

(ii) Name the products formed at each electrode.

positive electrode .....

negative electrode .....

[2]

14. June/2022/Paper_33/No.7(a, **b)**

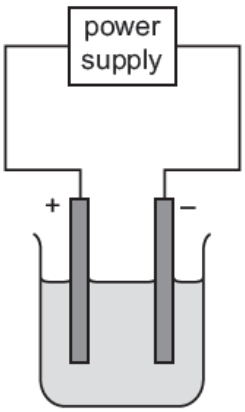
This question is about lithium and compounds of lithium.

(a) Lithium reacts with nitrogen to produce lithium nitride, Li_3N.

Complete the chemical equation for this reaction.

$$.....Li + N_2 \rightarrow .....Li_3N$$ [2]

(b) Molten lithium bromide is electrolysed using carbon electrodes.
The apparatus is shown.



(i) Complete the diagram by labelling:
- the anode
- the electrolyte. [2]

(ii) Name the products formed at each electrode.

positive electrode .....

negative electrode .....
[2]

(iii) The carbon electrodes conduct electricity.

Give one **other** property that these electrodes must have.

..... [1]

15. June/2022/Paper_43/No.5(**b)**

(b) A metal spoon is electroplated with copper.

State what is used as:

the positive electrode (anode) .....

the negative electrode (cathode) .....

the electrolyte. .....

[3]

16. March/2022/Paper_12/No.13

Molten sodium chloride and concentrated aqueous sodium chloride are electrolysed using platinum electrodes.

What are the products at the negative electrode (cathode) in each electrolysis?

	molten sodium chloride	concentrated aqueous sodium chloride
A	hydrogen	hydrogen
B	hydrogen	sodium
C	sodium	hydrogen
D	sodium	sodium

17. March/2022/Paper_12/No.14

An object is electroplated with silver using an aqueous silver salt as the electrolyte.

Which row is correct?

	the object to be electroplated is the	the other electrode is made from
A	anode	carbon
B	anode	silver
C	cathode	carbon
D	cathode	silver

18. March/2022/Paper_12/No.20

Methyl orange is added to dilute hydrochloric acid and to aqueous sodium hydroxide.

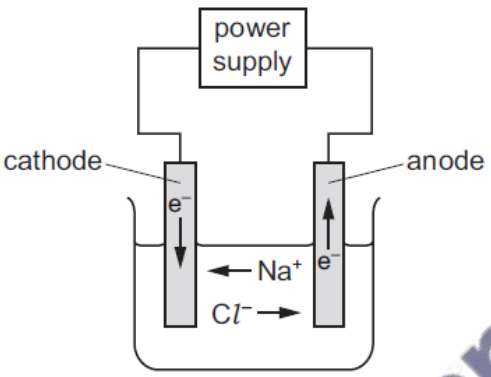
What is the colour of the methyl orange in each solution?

	colour in dilute hydrochloric acid	colour in aqueous sodium hydroxide
A	orange	red
B	red	yellow
C	red	orange
D	yellow	red

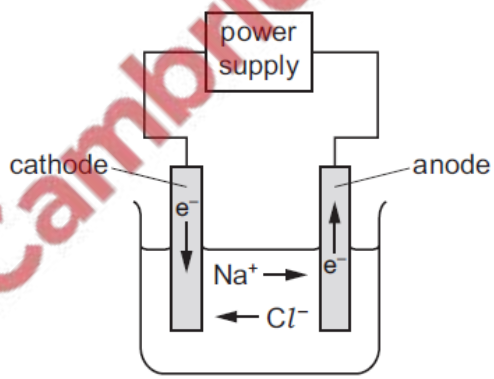
19. March/2022/Paper_22/No.11

Which diagram shows the direction of movement of ions and electrons during the electrolysis of molten sodium chloride?

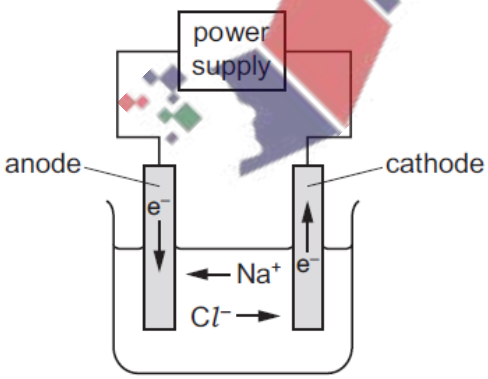
A



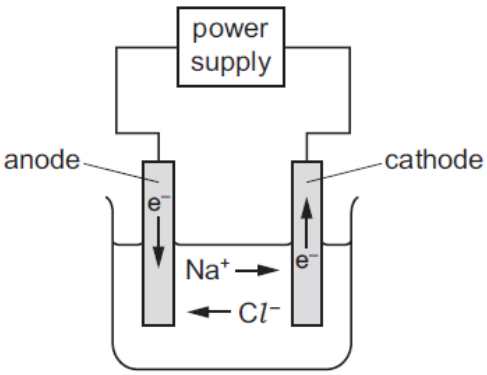
B



C



D



20. March/2022/Paper_22/No.13

Molten sodium chloride and concentrated aqueous sodium chloride are electrolysed using platinum electrodes.

What are the products at the negative electrode (cathode) in each electrolysis?

	molten sodium chloride	concentrated aqueous sodium chloride
A	hydrogen	hydrogen
B	hydrogen	sodium
C	sodium	hydrogen
D	sodium	sodium

21. March/2022/Paper_22/No.14

An object is electroplated with silver using an aqueous silver salt as the electrolyte.

Which row is correct?

	the object to be electroplated is the	the other electrode is made from
A	anode	carbon
B	anode	silver
C	cathode	carbon
D	cathode	silver

22. March/2022/Paper_32/No.6(c, d)

(c) Lithium is extracted by the electrolysis of molten lithium chloride.

(i) Name a non-metal used to make the electrodes.

..... [1]

(ii) Give one property, **other** than the conduction of electricity, that makes this substance suitable for use as an electrode.

..... [1]

(iii) State the products of the electrolysis of molten lithium chloride at:

the negative electrode (cathode) .....

the positive electrode (anode). .....

[2]

(d) Lithium chloride conducts electricity when molten and when in aqueous solution.

Give two **other** physical properties of lithium chloride that show it is an ionic compound.

1 .....

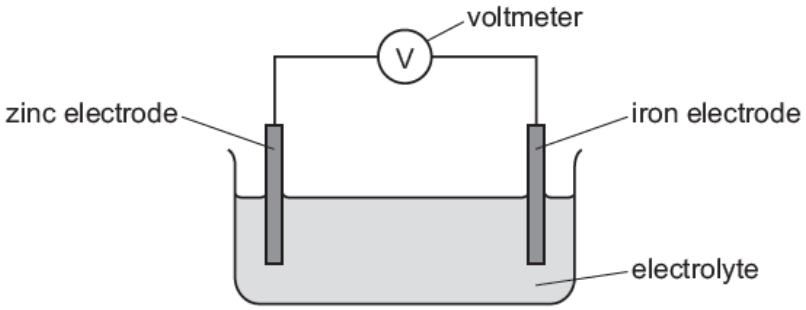
2 .....

[2]

23. March/2022/Paper_32/No.4

This question is about chemical reactions and electricity.

(a) The diagram shows the apparatus used in the production of electrical energy in a simple cell.



The zinc electrode dissolves in the electrolyte forming $Zn^{2+}(aq)$ ions.

(i) Draw an arrow on the diagram to show the direction of electron flow. [1]

(ii) Write the ionic half-equation for the reaction that occurs when the zinc electrode dissolves.

..... [2]

(b) The reading on the voltmeter can be increased if either zinc or iron is replaced by another metal.

(i) Name a metal that can replace zinc and increase the reading on the voltmeter.

..... [1]

(ii) Name a metal that can replace iron and increase the reading on the voltmeter.

..... [1]

(c) Fuel cells are used to generate electricity.

(i) Name the reactants in a fuel cell.

..... [1]

(ii) Name the waste product of a fuel cell.

..... [1]

(d) Electricity can be used to break down aqueous or molten ionic compounds.

(i) Name the process which uses electricity to break down aqueous or molten ionic compounds.

..... [1]

(ii) Explain why the ionic compound needs to be aqueous or molten.

..... [1]

(e) Brine is concentrated aqueous sodium chloride.

(i) Name **three** substances which are manufactured by passing electricity through brine.

1 .....

2 .....

3 .....

[3]

(ii) Name a different substance formed when molten sodium chloride is used instead of concentrated aqueous sodium chloride.

..... [1]