Electricity and Chemistry – 2023 IGCSE Chemistry 0620

1. Nov/2023/Paper_0620/11/No.9

What is produced at each electrode during the electrolysis of aqueous solutions using inert electrodes?

	positive electrode (anode)	negative electrode (cathode)
A	metals or hydrogen	non-metals only
B	metals or oxygen	non-metals only
C	non-metals only	metals or hydrogen
D	non-metals only	metals or oxygen

2. Nov/2023/Paper_0620/11/No.10

Which statement about a hydrogen-oxygen fuel cell in a car is correct?

A The fuel cell produces heat, which powers the car.

B The fuel cell is supplied with hydrogen directly from the air.

C The only emission from the fuel cell is nitrogen gas, which is non-polluting.

D The fuel cell produces electricity, which powers an electric motor.

3. Nov/2023/Paper_0620/12/No.11

Which statement about electrolysis is correct?

A Bromine and hydrogen are formed during the electrolysis of molten lead(II) bromide.

B Metals are formed at the positive electrode.

C Molten covalent compounds are broken down by electricity.

D Platinum is used as an inert electrode.

4. Nov/2023/Paper_0620/12/No.12

Which statements about hydrogen-oxygen fuel cells are correct?

1 The reaction between hydrogen and oxygen is endothermic.

2 The waste product in a hydrogen-oxygen fuel cell is water.

3 A chemical reaction in the cell produces hydrogen which is used as the fuel.

4 A hydrogen-oxygen fuel cell is used to generate electricity.

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

5. Nov/2023/Paper_0620/13/No.10

Dilute sulfuric acid is electrolysed using platinum electrodes. The gases produced at each electrode are collected.

The gases are mixed together and ignited with a lighted splint.

What is formed during this reaction?

A hydrogen sulfide

B sulfur dioxide

C sulfuric acid

D water

6. Nov/2023/Paper_0620/13/No.11

Electricity is passed through molten sodium chloride using inert electrodes.

What is observed at the electrodes?

A A colourless gas is produced at the negative electrode.

B A pale yellow-green gas is produced at the positive electrode.

C A silver-coloured metal is produced at the positive electrode.

D No change is observed because the electrodes are inert.

7. Nov/2023/Paper_0620/13/No.12

Fuel cells are used as energy sources in cars.

Which row gives a fuel used in a fuel cell and the products formed?

	fuel in a fuel cell	products formed
A	hydrogen	carbon dioxide and water
B	hydrogen	water only
C	petrol	carbon dioxide and water
D	petrol	water only

8. Nov/2023/Paper_0620/21/No.8

Which statements about hydrogen and oxygen are correct?

	hydrogen and oxygen can react to produce electrical energy	hydrogen and oxygen can be made by the electrolysis of dilute aqueous sodium chloride
A	✗	✗
B	✗	✓
C	✓	✗
D	✓	✓

9. Nov/2023/Paper_0620/22/No.10

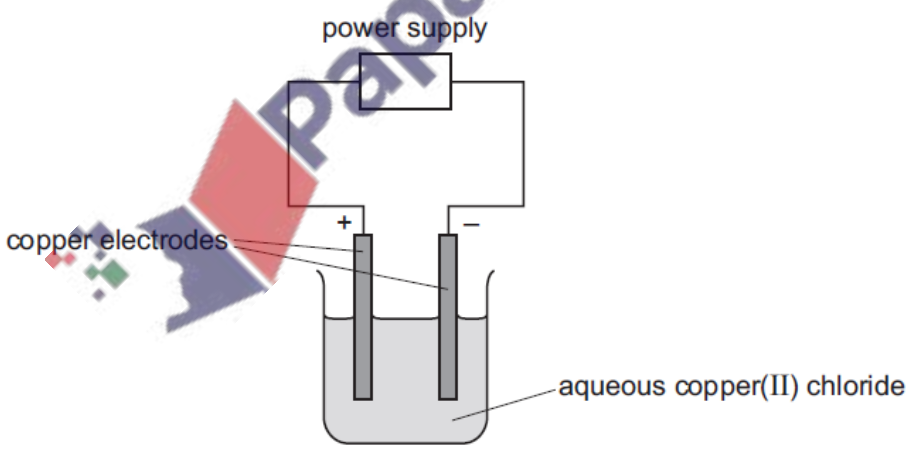
Dilute aqueous potassium chloride is electrolysed using platinum electrodes.

Which row identifies the product at each electrode?

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

10. Nov/2023/Paper_0620/22/No.11

Concentrated aqueous copper(II) chloride is electrolysed using copper electrodes, as shown.



What happens to the mass of each electrode during this process?

	positive electrode	negative electrode
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

11. Nov/2023/Paper_0620/23/No.12

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

Which statement is correct?

A Bubbles of hydrogen gas are formed at the anode.

B Bubbles of oxygen gas are formed at the cathode.

C Copper is deposited at the anode.

D The blue colour of the solution fades.

12. Nov/2023/Paper_0620/31/No.8(d)

Lithium bromide is a compound with ionic bonding.

(d) Molten lithium bromide is electrolysed using graphite electrodes.

State the names of the product at each electrode and give the observations at the positive electrode.

product at the negative electrode .....

product at the positive electrode .....

observations at the positive electrode

.....

[3]

13. Nov/2023/Paper_0620/32/No.8(d, e)

(d) Molten zinc chloride is electrolysed using graphite electrodes.

State the names of the products at each electrode and give the observations at the positive electrode.

product at the negative electrode .....

product at the positive electrode .....

observations at the positive electrode

.....

[3]

(e) Graphite electrodes conduct electricity.

(i) State one **other** property that the electrode should have.

..... [1]

(ii) Choose the correct statement about the structure and bonding in graphite.

Tick (✓) **one** box.

simple ionic	☐
simple covalent	☐
giant ionic	☐
giant covalent	☐

[1]

(iii) State **one** use of graphite other than as an electrode.

..... [1]

14. Nov/2023/Paper_0620/33/No.1(e)

A list of substances is shown.

ammonia
calcium oxide
carbon monoxide
cobalt(II) chloride
ethane
ethanol
ethene
oxygen
potassium oxide
sodium sulfate
sulfuric acid
water

Answer the following questions using only the substances from the list.
Each substance may be used once, more than once or not at all.

Give the name of the substance that:

(e) is the product formed in a hydrogen–oxygen fuel cell

..... [1]

15. Nov/2023/Paper_0620/33/No.8(c, d)

Potassium chloride is an ionic compound.

(c) Molten potassium chloride is electrolysed using graphite electrodes.

(i) Define the term electrolysis.

.....

..... [2]

(ii) State the names of the products at each electrode and give the observations at the positive electrode.

product at the negative electrode .....

product at the positive electrode .....

observations at the positive electrode

.....

[3]

(d) Graphite electrodes are inert.

Name one **other** inert electrode.

..... [1]

16. Nov/2023/Paper_0620/42/No.4(b)

This question is about lead(II) chloride, $PbCl_2$.

(b) The student carries out an electrolysis experiment on molten lead(II) chloride using the apparatus shown in Fig. 4.1. Chlorine gas forms at the anode and escapes from the apparatus.

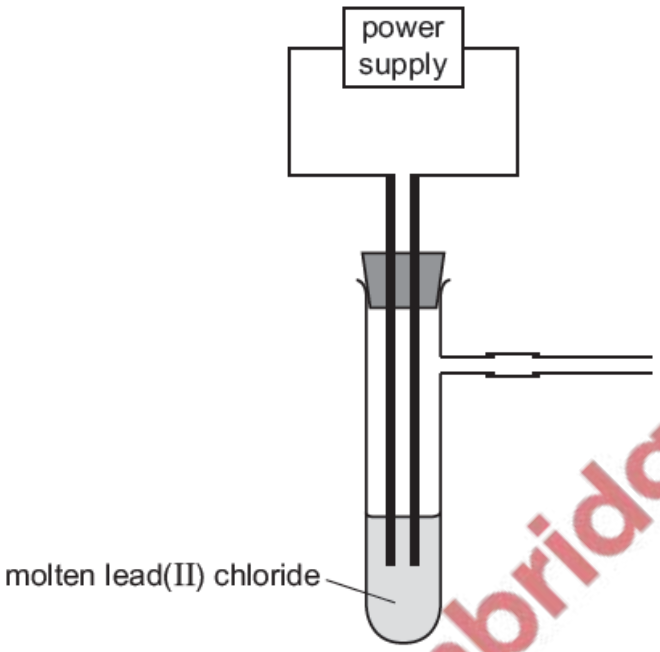


Fig. 4.1

(i) Explain why lead(II) chloride needs to be molten before it will conduct electricity.

.....

..... [1]

(ii) Write the ionic half-equation for the reaction occurring at the anode.

..... [2]

(iii) State the test for chlorine gas.

test .....

observations .....

[2]

(iv) Describe what is observed at the cathode.

..... [1]