Electricity and Chemistry – 2021 IGCSE 0620

1. Nov/2021/Paper_11&21/No.10

Which statements about the products of electrolysis, using inert electrodes, are correct?

1 When molten lead(II) bromide is electrolysed, bromine is formed at the cathode.

2 When dilute sulfuric acid is electrolysed, oxygen is formed at the anode.

3 When concentrated aqueous sodium chloride is electrolysed, sodium is formed at the cathode.

4 When concentrated hydrochloric acid is electrolysed, chlorine is formed at the anode.

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

2. Nov/2021/Paper_12/No.10

Iron can be electroplated with zinc to make it resistant to corrosion.

Which row about electroplating iron with zinc is correct?

	positive electrode (anode)	negative electrode (cathode)	electrolyte
A	iron	zinc	iron nitrate
B	iron	zinc	zinc nitrate
C	zinc	iron	iron nitrate
D	zinc	iron	zinc nitrate

3. Nov/2021/Paper_13/No.10

Effervescence is observed at the negative electrode (cathode) during the electrolysis of concentrated aqueous sodium chloride.

Which element is produced at the negative electrode (cathode)?

A chlorine

B hydrogen

C oxygen

D sodium

4. Nov/2021/Paper_22/No.10

Iron can be electroplated with zinc to make it resistant to corrosion.

Which row about electroplating iron with zinc is correct?

	positive electrode (anode)	negative electrode (cathode)	electrolyte
A	iron	zinc	iron nitrate
B	iron	zinc	zinc nitrate
C	zinc	iron	iron nitrate
D	zinc	iron	zinc nitrate

5. Nov/2021/Paper_22/No.13

Concentrated aqueous sodium chloride is electrolysed.

Which equation represents the reaction at the cathode?

A $Na^+ + e^- \rightarrow Na$

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

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

D $2Cl^- \rightarrow Cl_2 + 2e^-$

6. Nov/2021/Paper_23/No.10

Effervescence is observed at the negative electrode (cathode) during the electrolysis of concentrated aqueous sodium chloride.

Which element is produced at the negative electrode (cathode)?

A chlorine

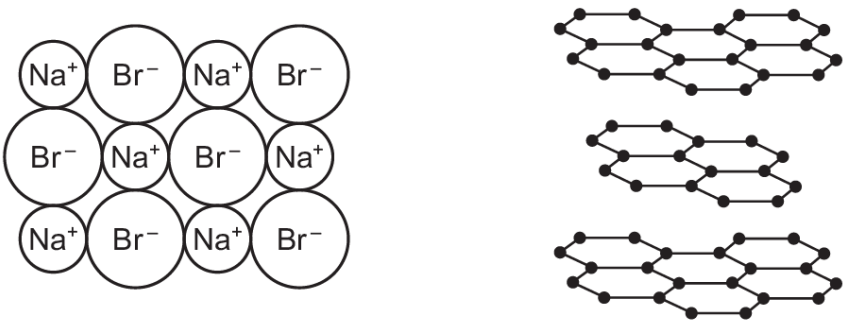
B hydrogen

C oxygen

D sodium

7. Nov/2021/Paper_31/No.6

The diagram shows part of the structures of sodium bromide and graphite at room temperature and pressure.



(a) Describe the physical properties of these substances in terms of:

- volatility

sodium bromide .....

graphite .....

- solubility in water

sodium bromide .....

graphite .....

- electrical conductivity when solid.

sodium bromide .....

graphite .....

[5]

(b) When dilute sulfuric acid is electrolysed using inert electrodes, oxygen gas is produced at the positive electrode.

Name the gas produced at the negative electrode.

..... [1]

(c) Aqueous sodium bromide reacts with aqueous chlorine.

(i) Complete the word equation for this reaction.

sodium bromide	+	chlorine	→	....	+	.....

[2]

(ii) Explain in terms of the reactivity of the halogens why aqueous sodium chloride does **not** react with aqueous bromine.

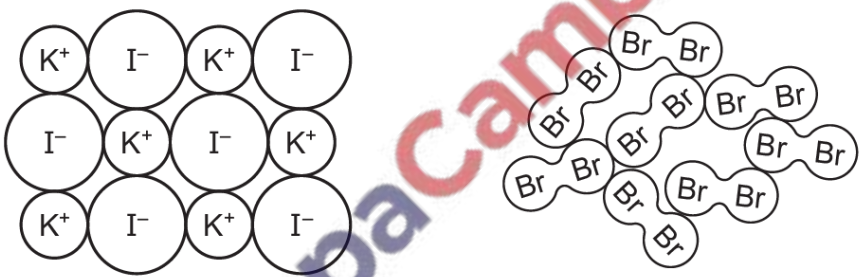
.....

..... [1]

[Total: 9]

8. Nov/2021/Paper_32/No.6

The diagrams show part of the structures of potassium iodide and bromine at room temperature and pressure.



(a) Describe the physical properties of these substances in terms of:

- volatility

potassium iodide .....

bromine .....

- solubility in water

potassium iodide .....

bromine .....

- electrical conductivity when molten (liquid).

potassium iodide .....

bromine .....

[5]

(iii) Explain in terms of the reactivity of the halogens why aqueous potassium chloride does **not** react with aqueous bromine.

.....

..... [1]

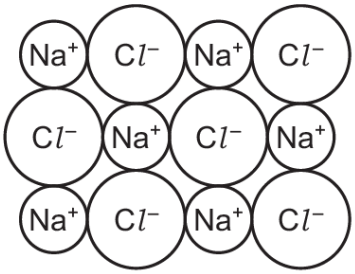
(c) Name the change of state when liquid bromine changes to solid bromine.

..... [1]

[Total: 10]

9. Nov/2021/Paper_33/No.6

The diagram shows part of the structures of sodium chloride and pentane at room temperature and pressure.



represents pentane, $CH_3CH_2CH_2CH_2CH_3$

(a) Describe the differences in the physical properties of these substances in terms of:

- volatility

sodium chloride .....

pentane .....

- solubility in water

sodium chloride .....

pentane .....

- electrical conductivity when molten (liquid).

sodium chloride .....

pentane .....

[5]

(b) Concentrated aqueous sodium chloride is electrolysed using carbon (graphite) electrodes.

Name the gas produced at the positive electrode.

..... [1]

(c) Pentane is a fuel. Under some conditions pentane forms carbon monoxide.

(i) State the condition under which pentane forms carbon monoxide.

..... [1]

(ii) State **one** adverse effect of carbon monoxide on health.

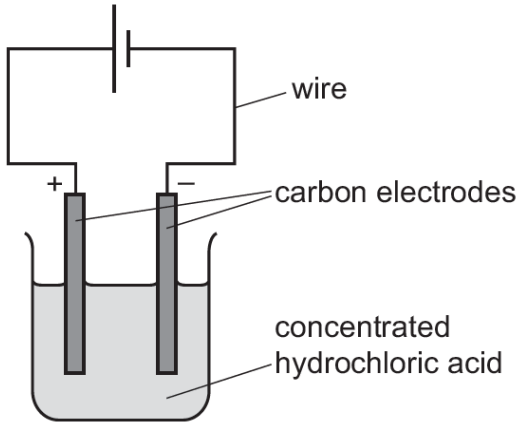
..... [1]

[Total: 8]

10. Nov/2021/Paper_41/No.3

This question is about electrolysis.

Concentrated hydrochloric acid is electrolysed using the apparatus shown.



(a) Chloride ions are discharged at the anode.

(i) Complete the ionic half-equation for this reaction.

.....Cl^-(aq) → .....(g) + ...e^- [2]

(ii) State whether oxidation or reduction takes place. Explain your answer.

.....

..... [1]

(b) Describe what is seen at the cathode.

..... [1]

(c) Write the ionic half-equation for the reaction at the cathode.

..... [2]

(d) The pH of the electrolyte is measured throughout the experiment.

(i) Suggest the pH of the electrolyte at the beginning of the experiment.

..... [1]

(ii) State how the pH changes, if at all, during the experiment.

Explain your answer.

.....

..... [2]

(e) The electrolysis is repeated using molten lead(II) bromide.

Describe what is seen at the:

- cathode .....
- anode. .....

[2]

(f) State **two** properties of graphite (carbon) which make it suitable for use as an electrode.

1 .....

2 .....

[2]

[Total: 13]

11. Nov/2021/Paper_43/No.2

This question is about electrolysis.

(a) State the meaning of the term *electrolyte*.

.....

..... [2]

(b) The table gives information about the electrolysis of two electrolytes. Carbon (graphite) electrodes are used in each experiment.

(i) Complete the table to show the observations and products of electrolysis.

	positive electrode (anode)		negative electrode (cathode)	
electrolyte	observations	name of product	observations	name of product
aqueous copper(II) sulfate	colourless bubbles			
concentrated aqueous sodium bromide			colourless bubbles	hydrogen

[5]

(ii) Hydrogen is produced at the negative electrode (cathode) during the electrolysis of concentrated aqueous sodium bromide.

Write the ionic half-equation for this reaction.

..... [2]

(iii) State **two** reasons why carbon (graphite) is suitable to use as an electrode.

1 .....

2 .....

[2]

(iv) Name the particle responsible for the conduction of electricity in the metal wires used in a circuit.

..... [1]

[Total: 12]