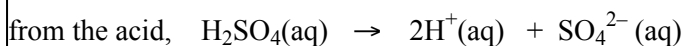


Electrolysis of Sulphuric Acid and Sodium Chloride

1. Read the passage carefully and then answer the questions.

The electrolysis of acidified water

After a few drops of dilute sulphuric acid have been added to some distilled water, there will be three types of ion in solution:



When the electrodes (anode and cathode) in a circuit are put into the acidified water, the hydroxide ions and the sulphate ions are both attracted to the electrode called the anode. However, it is harder for the sulphate ions to give up their electrons than for the hydroxide ions to do this. So the hydroxide ions are the ones which react and bubbles of oxygen are formed at the anode.

There are only hydrogen ions to be attracted towards the cathode and, when they get there, they take up electrons to form hydrogen molecules.

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Even in a small volume of water acidified with dilute sulphuric acid there will be billions of ions. Some will be anions and some will be cations.

- (i) Name the ions in water acidified with dilute sulphuric acid.

.....

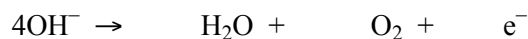
(1)

- (ii) Explain why only some of the ions are attracted to the anode.

.....
.....
.....

(2)

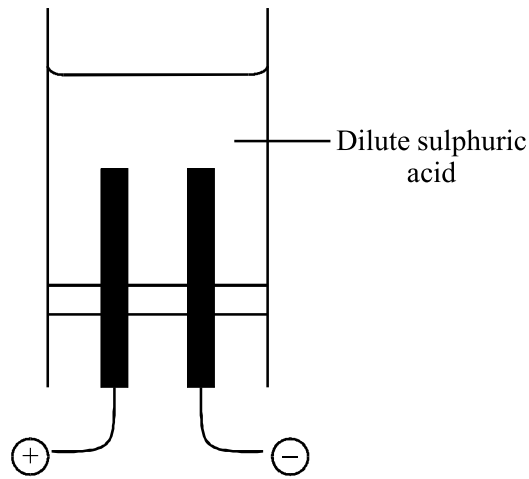
- (iii) Balance the equation for the reaction of hydroxide ions at the anode.



(1)

(Total 4 marks)

2. An electric current was passed through dilute sulphuric acid. The apparatus used is shown. Oxygen was formed at the anode.

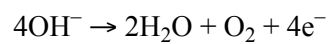


- (a) What name is given to solutions which decompose when electricity is passed through them?

.....

(1)

- (b) The ionic equation for the reaction at the anode is:



Explain this type of reaction.

.....

(2)

- (c) Write a **balanced** ionic equation for the reaction at the cathode.

.....

(2)

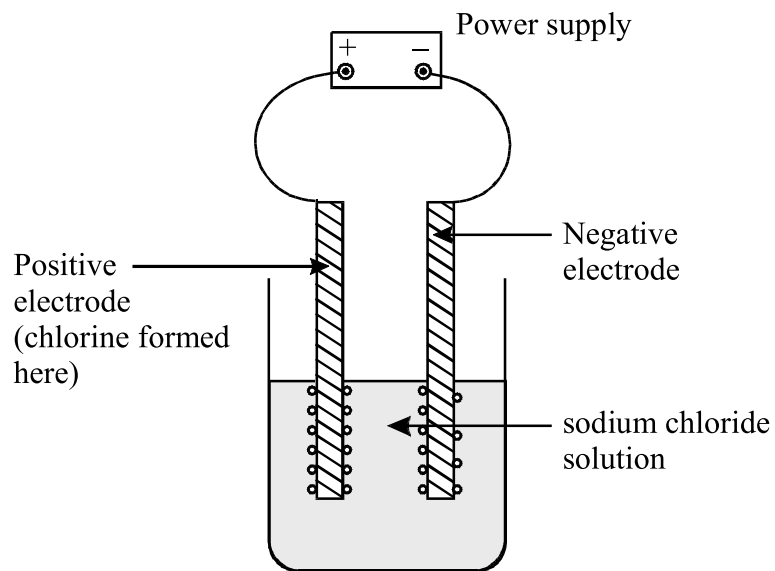
- (d) What happens to the concentration of the sulphuric acid as the electricity is passed through it? Explain your answer.

.....

(3)

(Total 8 marks)

3. The diagram below shows the electrolysis of sodium chloride solution, in the laboratory.



(a) Which gas forms at the negative electrode? (1)

(b) Explain why chlorine gas forms at the positive electrode.

 (2)

(c) State **one** use of chlorine gas.
 (1)
(Total 4 marks)

4. The electrolysis of sodium chloride solution produces useful substances.

(a) (i) Choose a word from the box to complete the sentence.

covalent	ionic	non-metallic
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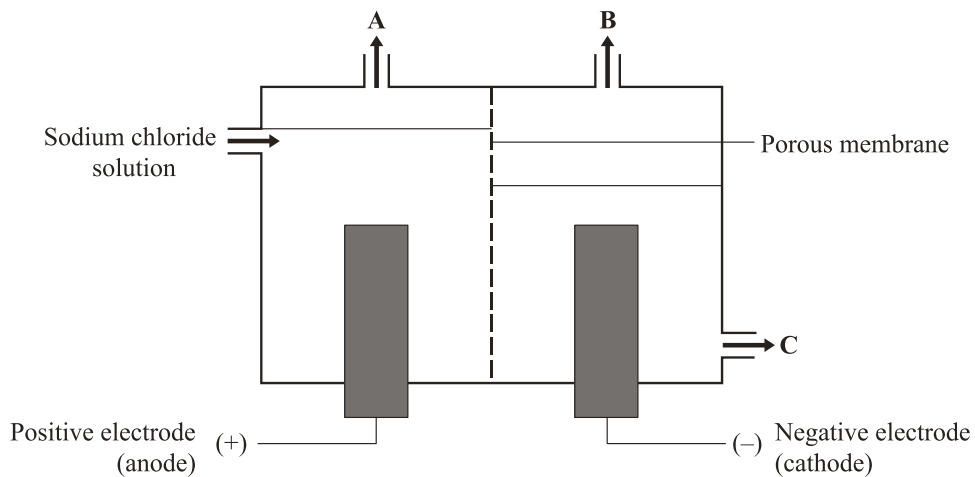
Electrolysis takes place when electricity passes through
 compounds when they are molten or in solution.(1)

(ii) Choose a word from the box to complete the sentence.

alkenes	elements	salts
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During electrolysis the compound is broken down to form.....(1)

(b) The diagram shows an apparatus used for the electrolysis of sodium chloride solution.



Identify the products **A**, **B** and **C** on the diagram using substances from the box.

chlorine gas	hydrogen gas	oxygen gas
sodium hydroxide solution	sodium metal	

- (i) **A** is (1)
- (ii) **B** is (1)
- (iii) **C** is (1)
- (Total 5 marks)**