

ELECTROLYSIS -DILUTE NaCl

1 (a) A **dilute** aqueous solution of sodium chloride is electrolysed using carbon electrodes.

Name the main product formed at the positive electrode.

..... [1]

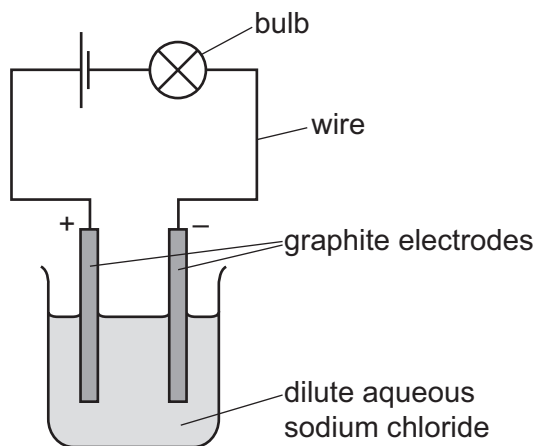
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MARKING SCHEME:

(a)	oxygen	1
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2 A student sets up the following electrolysis experiment.



(a) Define the term *electrolysis*.

.....
..... [2]

(b) The student observes bubbles of colourless gas forming at each electrode.

(i) Name the main gas produced at the positive electrode (anode).

..... [1]

(ii) Describe a test for the gas produced in (b)(i).

test

result

[2]

(iii) Write the ionic half-equation for the reaction taking place at the negative electrode (cathode).

..... [2]

(c) Charge is transferred during electrolysis.

Name the type of particle responsible for the transfer of charge in

the wires,

the electrolyte.

[2]

- (d) The student replaces the dilute aqueous sodium chloride with **concentrated** aqueous sodium chloride.

Suggest **two** differences that the student observes.

1

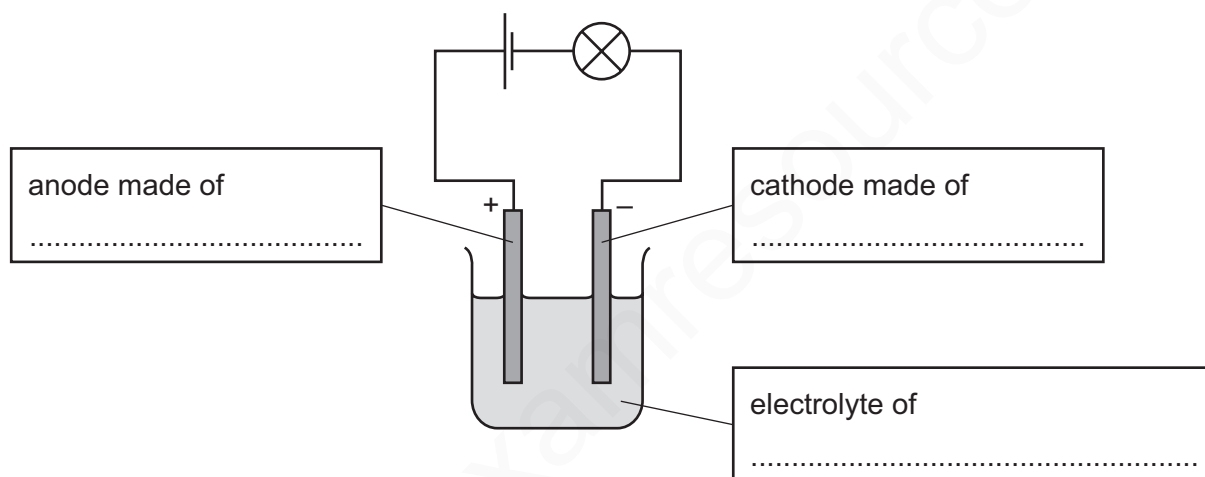
2

[2]

- (e) The student has a small piece of impure copper. The main impurities in the copper are small quantities of silver and zinc.

The student uses electrolysis to extract pure copper from the small piece of impure copper.

- (i) Complete the labels on the diagram of the student's electrolysis experiment.



[3]

- (ii) Use your knowledge of the reactivity series to suggest what happens to the silver and zinc impurities. Explain your answers.

silver impurities

.....

.....

zinc impurities

.....

.....

[3]

[Total: 17]

MARKING SCHEME:

(a)	the breakdown (into elements)	1
	of an (ionic) compound by (the passage of) electricity	1
(b)(i)	oxygen	1
(b)(ii)	glowing splint	1
	relights	1
(b)(iii)	$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$ M1 gain of electrons by H^+ M2 rest of equation	2
(c)	<i>the wires:</i> electrons	1
	<i>the electrolyte:</i> ions	1
(d)	any 2 from: <ul style="list-style-type: none"> • green gas at positive electrode • bulb is brighter • rate of bubbles increases 	2
(e)(i)	<i>anode made of:</i> impure copper	1
	<i>cathode made of:</i> (pure) copper	1
	<i>electrolyte of:</i> (aqueous) copper sulfate	1
(e)(ii)	silver (impurities) fall to the bottom of the cell	1
	zinc (impurities) (dissolve) into solution (as ions)	1
	because zinc is more reactive than copper AND silver is less reactive than copper	1