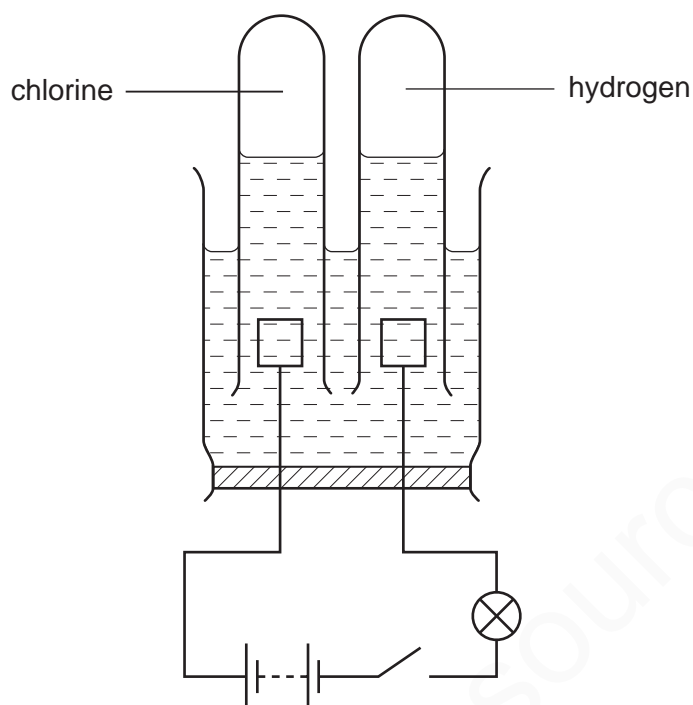


ELECTROLYSIS-CONCENTRATED -HCl

- 1 The diagram shows the apparatus used to pass an electric current through concentrated hydrochloric acid.



(a) Label the electrodes. [1]

(b) Give two observations when the current is switched on.

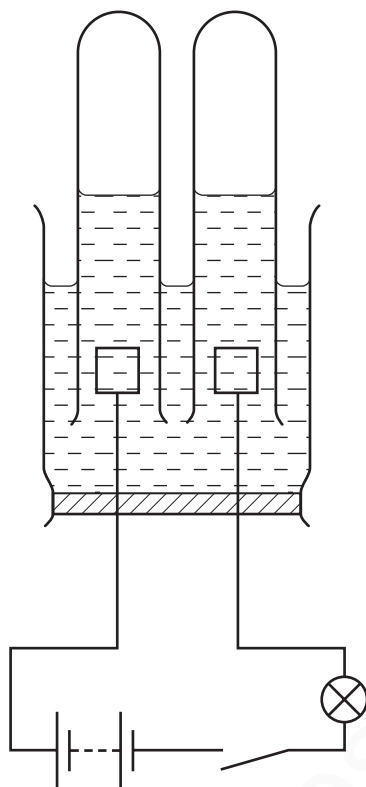
- 1
2 [2]

(c) Give a test for the product at the negative electrode (cathode).

test
result [2]

- | | | |
|------------|--|------------|
| (a) | electrodes correctly labelled | [1] |
| (b) | bubbles at positive/negative electrode (1) | |
| | bulb lights up (1) | [2] |
| (c) | lighted splint (1) | |
| | pops (1) | [2] |

2 Concentrated hydrochloric acid can be electrolysed using the apparatus shown.



(a) Label the position of the electrodes on the diagram. [1]

(b) Give two observations when the circuit is switched on.

1 [1]

2 [2]

(c) (i) Name the product at the positive electrode.

..... [1]

(ii) State a test for this product and the result of the test.

test

result [2]

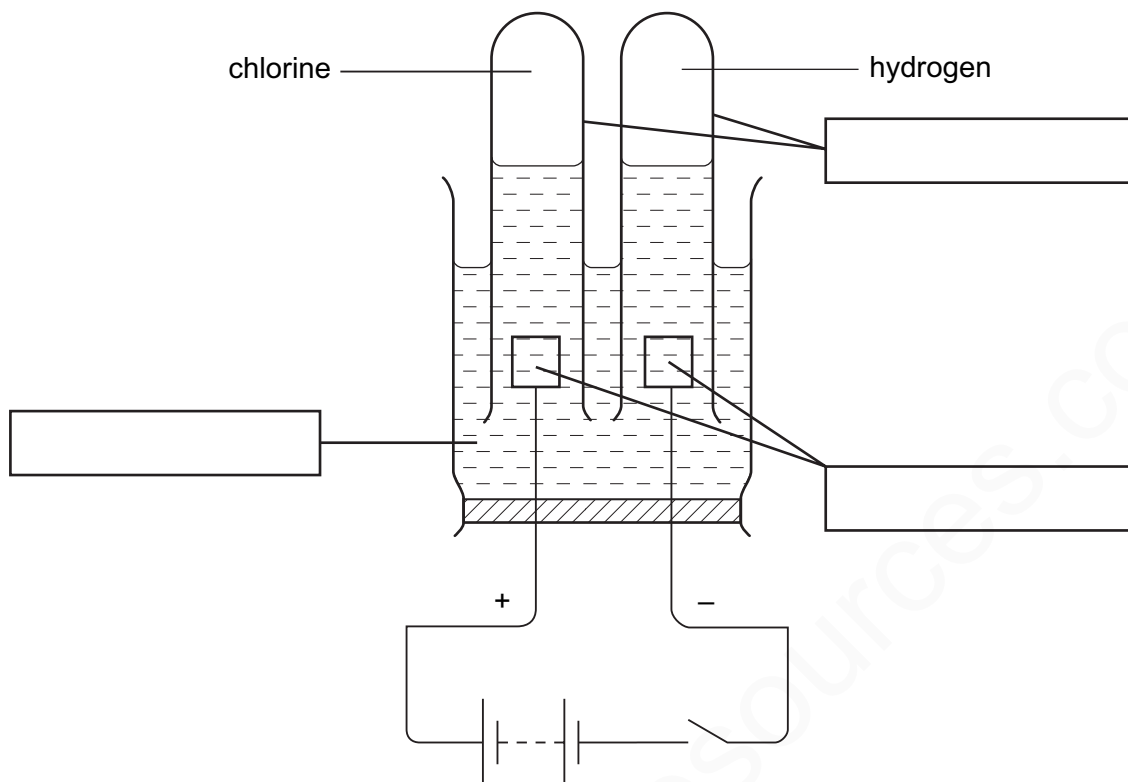
[Total: 6]

-----Marking Scheme-----

- (a) Correct indication of electrodes (1) [1]
- (b) bubbles / fizz / effervescence (1) / green gas / level of liquid falls (1)
bulb lights up (1) max 2 [2]
- (c) (i) chlorine / Cl_2 (1) [1]
(ii) litmus paper / indicator (1) bleaches (1) [2]

[Total: 6]

3 The diagram shows the effect of passing electricity through concentrated hydrochloric acid.



(a) Label the diagram by completing the boxes. [3]

(b) Name this process.

..... [1]

(c) Give a test for chlorine.

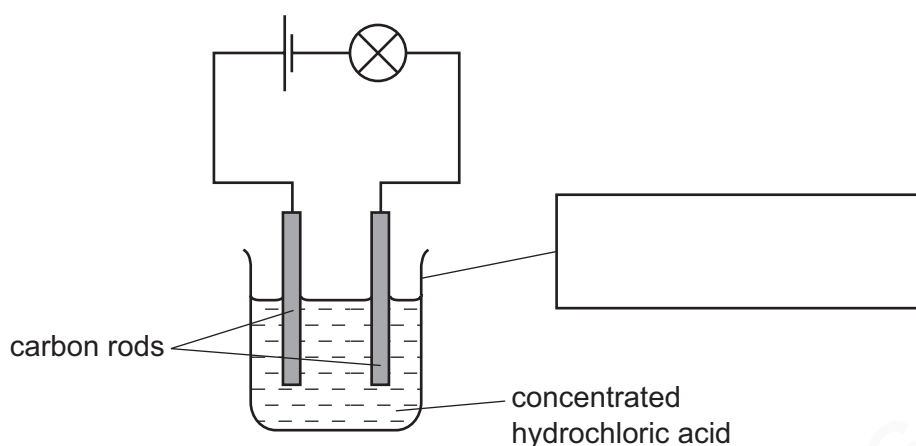
test

result [2]

-----Marking Scheme-----

- | | | |
|---|--|------------|
| (a) Boxes completed | tubes (1)
hydrochloric acid (1)
electrodes (1) | [3] |
| (b) Electrolysis (1) | | [1] |
| (c) Litmus paper (1), bleaches/white (1) | | [2] |

- 4** A student investigated the effect of using electricity to break down a solution of concentrated hydrochloric acid using the apparatus shown.



During the experiment, bubbles were observed at both carbon rods.

- (a)** Complete the box to identify the piece of apparatus used. [1]

- (b) (i)** Name the process that occurs when electricity is passed through concentrated hydrochloric acid.

..... [1]

- (ii)** What is the purpose of the carbon rods?

..... [1]

- (c)** Name **one** of the gases formed and state a test for this gas.

name

test

result [2]

- (d)** Draw a diagram of different apparatus that could be used to collect the gases formed at the carbon rods.

[2]

[Total: 7]

(a) beaker (1) [1]

(b) (i) electrolysis (1) [1]

(ii) electrodes (1) [1]

allow: conduct electricity / to transfer electrons

ignore: attract ions

(c) hydrogen:

lighted splint (1)

pops (1)

OR

chlorine:

litmus (1)

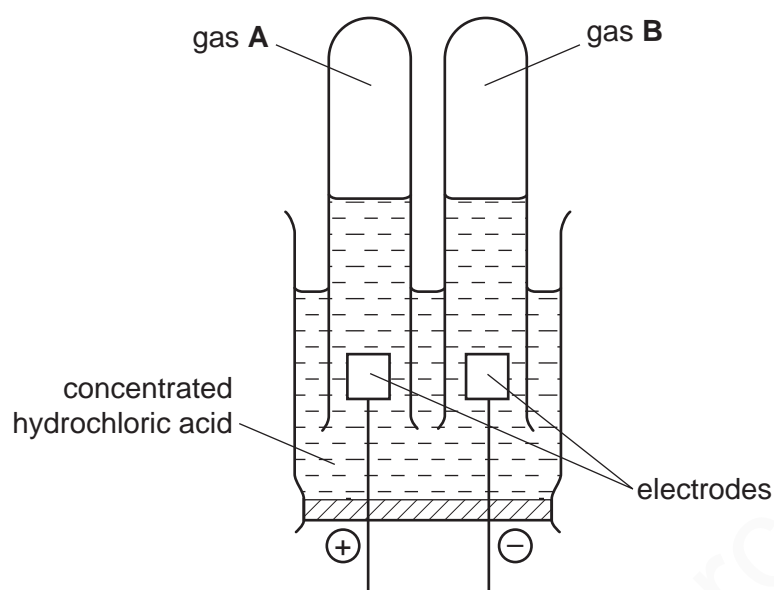
bleached (1) [2]

(d) diagram to show test-tubes above electrodes (1)

containing liquid (1) [2]

5

Concentrated hydrochloric acid was broken down by the passage of electricity using this apparatus.



(a) What is the name of this process?

..... [1]

(b) Suggest a suitable material from which to make the electrodes.

..... [1]

(c) Gas **A** is chlorine. Give a test for chlorine.

test

result [2]

(d) Gas **B** pops when tested with a lighted splint. What is gas **B**?

..... [1]

[Total: 5]

- (a) electrolysis (1) [1]
- (b) platinum/graphite/carbon (1) [1]
- (c) (blue) litmus/universal indicator paper/pH paper (1)
bleaches/turns white (1) [2]
- (d) hydrogen (1) [1]