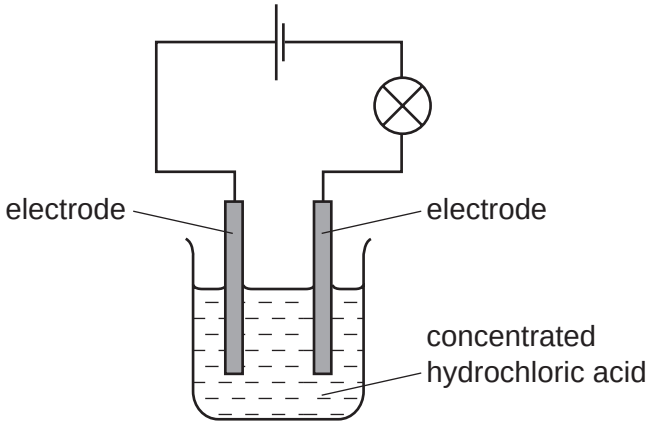
ELECTROLYSIS-CONCENTRATED HCl

1 Electricity was passed through a solution of concentrated hydrochloric acid using the apparatus shown.



(a) Give **two** expected observations.

1. .....

2. ..... [2]

(b) Suggest a suitable material for the electrodes.

..... [1]

(c) A lighted splint placed in a test-tube of the gas collected at the negative electrode gave a pop sound.

The identity of the gas was ..... [1]

(d) State **two** safety precautions that must be followed when carrying out this experiment.

1. .....

2. ..... [2]

[Total: 6]

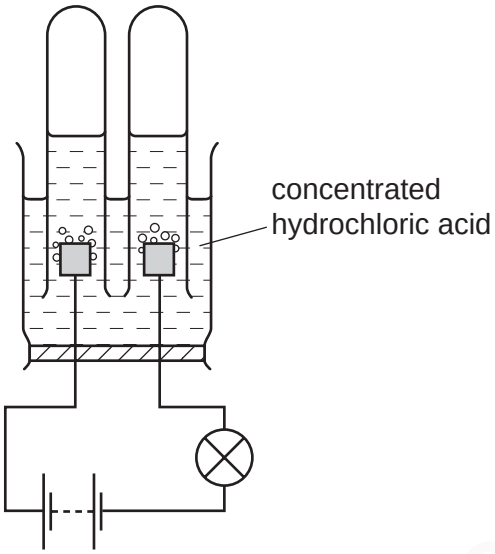
(a) lamp lights (1)
fizzing/bubbles/green gas (1) **ignore** gas/H_2 produced **allow** bleach like smell [2]

(b) carbon/graphite/platinum (1) [1]

(c) hydrogen/H_2 (1) **not** H [1]

(d) fume cupboard/ventilated area (1)
protective clothing e.g. gloves/goggles/lab coat/tie back hair (1) [2]

2 Electricity was passed through a solution of concentrated hydrochloric acid as shown below.



Bubbles were observed at both electrodes.

(a) Give **one** other expected observation.

..... [1]

(b) Label the electrodes. [1]

(c) **(i)** Name the gas given off at the cathode (negative electrode).

..... [1]

(ii) Give a test for this gas.

test .....

result ..... [2]

(d) Suggest why, at the beginning of the electrolysis, no gas was collected at the anode (positive electrode).

.....

..... [2]

[Total: 7]

(a) bulb/lamp lights/water level falls/green-yellow gas (1) [1]

(b) arrows labelling electrodes as anode/cathode or + – or the electrodes or Pt (1)
allow: labels either way round **not**: the wires labelled [1]

(c) **(i)** hydrogen (1) [1]

(ii) lighted splint (1) if Cl_2 in **(c)(i)** allow ecf for damp litmus/indicator paper
no ecf for anything other than Cl_2

pops (1) if Cl_2 in **(c)(i)** allow ecf for bleached/white/decolourised [2]
note: These are conditional marks so the result is conditional on the test, i.e. glowing splint pops = 0/2

(d) chlorine (1) soluble/dissolves/reacts (1) [2]

[Total: 7]