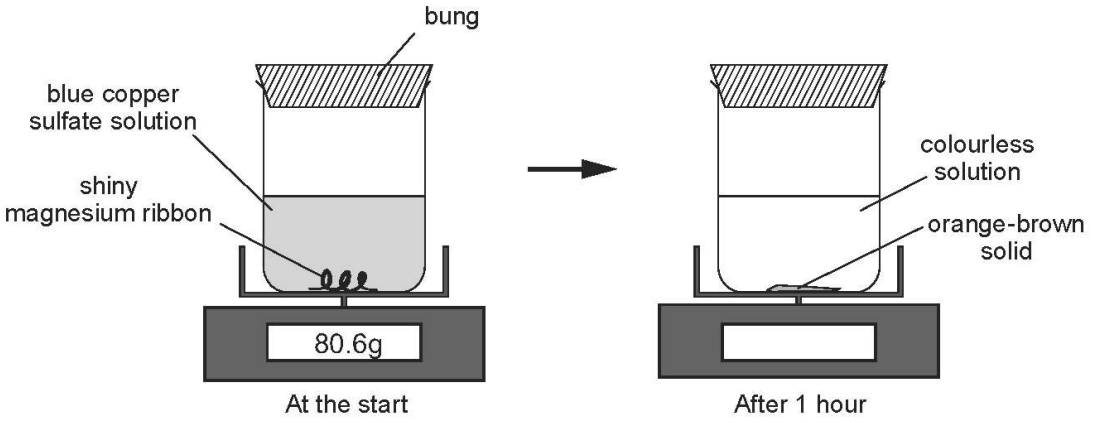
Cognitio - Chemical Changes Overview Paper

1. A pupil was asked to investigate what happens when a piece of shiny magnesium ribbon is added to copper sulfate solution. The apparatus was set up as shown below. The mass was recorded at the start and again after one hour.



(a) Complete the **word** equation:

magnesium + copper sulfate ⟶ ..... + ...

[1]

(b) Choose from the box below the name given to this type of reaction. [1]

combustion	**corrosion**	**displacement**	**electrolysis**

.....

(c) Put a tick (✓) in the box next to the mass of the beaker and contents after 1 hour.

more than 80.6g ☐ equal to 80.6g ☐ less than 80.6g ☐

Give the reason for your choice. [2]

.....

(d) The experiment was repeated using sodium sulfate solution instead of copper sulfate solution. No reaction took place.

Put the metals copper, magnesium and sodium in order of reactivity. [1]

Most reactive .....

.....

Least reactive .....

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2.

The order of reactivity of some elements is shown below.

Most reactive	sodium
	calcium
	magnesium
	aluminium
	carbon
	zinc
	iron
	hydrogen
	lead
	copper
	silver
Least reactive	gold

Predict, giving a reason for your answer, whether the following pairs of substances react and give any expected observation(s).

(a) Iron and copper sulfate solution [2]

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(b) Magnesium and dilute hydrochloric acid [2]

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(c) Aluminium oxide and carbon [2]

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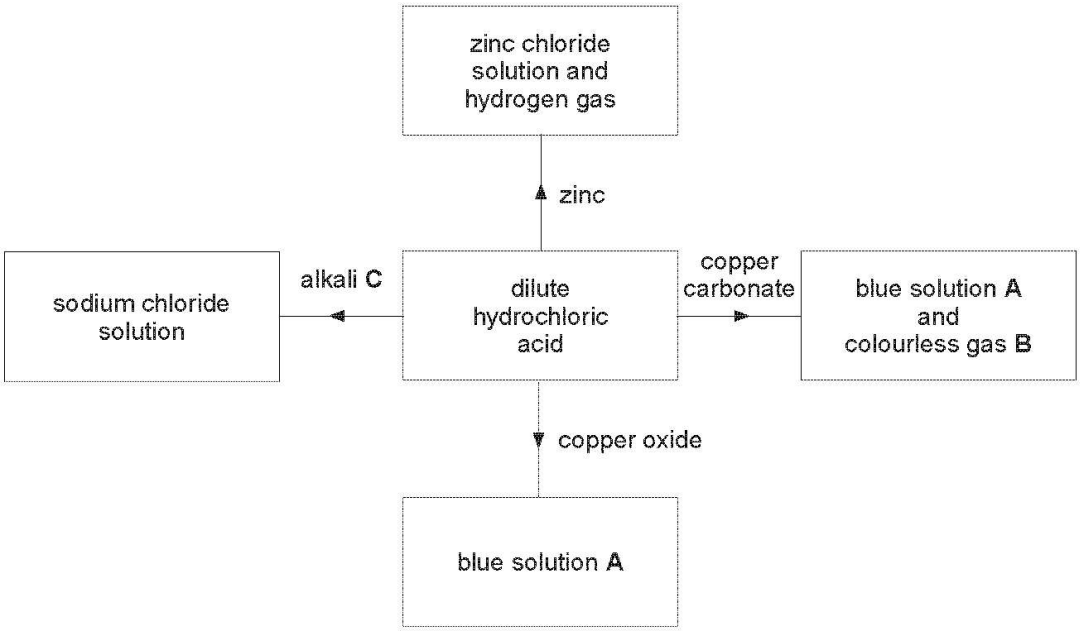
3. The diagram below shows some reactions of dilute hydrochloric acid.



(a) Name the following substances.

blue solution **A** .....

colourless gas **B** .....

alkali **C** ..... [3]

(b) Balance the **symbol** equation for the reaction between zinc and dilute hydrochloric acid. [1]

$Zn + \square HCl \longrightarrow ZnCl_2 + H_2$

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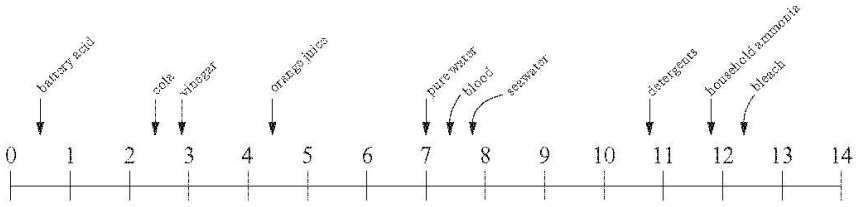
4. The following diagram shows the pH scale and the pH values of some common substances.



(a) From the substances above, name

(i) the strongest acid, ... [1]

(ii) the weakest alkali, ... [1]

(iii) a neutral substance. ..... [1]

(b) John was studying the reactions of acids with three different substances, **A**, **B** and **C**. He recorded his observations and temperature changes in the table shown below.

Substance added to acid	Observations	Temperature change (°C)
A	bubbles of gas produced, gas collected turns limewater milky, substance reacts to produce blue solution	+4
B	no gas produced, substance reacts to produce a blue solution	0
C	no visible change	+8

Identify **A**, **B** and **C** from the substances in the box below. [3]

copper carbonate	**copper oxide**	**magnesium**
sodium chloride	**sodium hydroxide**	

A .....

B .....

C .....

6

5.

The following table shows the pH of some common substances.

Substance	pH
limewater	10.5
saliva	6.4
lemon juice	2.2
orange juice	2.6
milk of magnesia	10.0

(a) Use only information from the table to answer parts (i) and (ii).

(i) Name the strongest acid. [1]

.....

(ii) Name the substance closest to being neutral. [1]

.....

(b) Milk of magnesia is used to treat indigestion. It contains magnesium hydroxide which reacts with excess hydrochloric acid in the stomach.

(i) Complete the following word equation to show the products formed. [2]

magnesium hydroxide + hydrochloric acid ⟶ ..... + ...

(ii) Another indigestion remedy contains calcium carbonate. Name the gas produced when calcium carbonate reacts with hydrochloric acid and state how this gas can be identified. [2]

Gas produced .....

How this gas can be identified .....

.....

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