

Section A:

1. Select the correct chemical formula to complete the table below.

OH^-	HCl	NaCl	H^+	HNO_3	H_2SO_4
Chemical name	Chemical formula				
Hydrochloric acid					
Nitric acid					
Sulphuric acid					
Sodium chloride					
Hydrogen ions					
Hydroxide ions					

2. Below shows the general equation for the reaction of a metal and an acid.



Complete the word equations below:

- Magnesium + hydrochloric acid \rightarrow magnesium chloride + _____
- Zinc + hydrochloric acid \rightarrow _____ + _____
- Calcium + nitric acid \rightarrow calcium nitrate + _____
- Iron + sulphuric acid \rightarrow iron sulphate + _____
- Copper + nitric acid \rightarrow _____ + _____
- _____ + _____ \rightarrow potassium nitrate + hydrogen
- _____ + _____ \rightarrow calcium sulphate + hydrogen
- _____ + _____ \rightarrow zinc chloride + hydrogen



3. Match each test with the correct description.

Test for hydrogen gas
Test for carbon dioxide gas
Testing the pH of a solution

Place universal indicator and the colour will change
Place a lit splint in the sample and a squeaky pop sound is produced
Shake the sample with lime water and the colour changes to cloudy

4. Neutralisation reactions are when acids are neutralised by alkalis or bases to produce a salt and water. Bases are insoluble metal hydroxides (for example, zinc hydroxide) and metal oxides. Alkalies are soluble metal hydroxides (for example, sodium hydroxide) that release OH^- in water.

Complete the neutralisation reaction word equations below:

- Acid + base \rightarrow _____ + water
- Hydrochloric acid + calcium carbonate \rightarrow _____ + carbon dioxide + water
- Nitric acid + sodium hydroxide \rightarrow sodium nitrate + _____
- Potassium hydroxide + sulphuric acid \rightarrow _____ + _____
- Nitric acid + copper carbonate \rightarrow _____ + _____ + _____
- _____ + _____ \rightarrow magnesium chloride + water



Section B

1. Some metals are unreactive, this means that... _____.

2. Some metals are very reactive, this means that... _____.

3. This table shows the reactivity series of some metals.

The most reactive metal shown on this reactivity series is _____ and the least reactive metal is _____.

potassium
sodium
lithium
magnesium
zinc
iron

4. Describe what the reactivity series shows.
Include examples of metals in your answer.

5. Magnesium can be oxidised.

(a) Write a definition for oxidation.

(b) Write the word equation for this reaction.

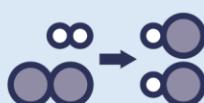
(c) Write a metal that is more easily oxidised than magnesium.

Explain your answer.

6. When magnesium is added to dilute nitric acid in a test tube, a fizzing sound and bubbles are produced.

Suggest what would be observed if zinc was added to nitric acid in a test tube.
Explain your answer.

Use information from the reactivity series.



Section C

A student tested the reactivity of three metals. They used the method below.

- Place 2 g of magnesium powder in a test tube
- Add 5 cm³ of each chloride solution to each test tube
- Observe whether a reaction takes place
- Repeat with copper powder and calcium powder

The results are shown in the table below.

	Was a reaction observed?		
	Magnesium	Copper	Calcium
Magnesium chloride	No	No	Yes
Copper chloride	Yes	No	Yes
Calcium chloride	No	No	No

1. Use the results shown in the table to place these metals in order of reactivity.

Most reactive _____

Least reactive _____

2. (a) State the dependent variable in this experiment.

(b) Suggest what could have been observed when a chemical reaction took place.

(c) Suggest why potassium should **not** be used in this experiment.

3. (a) Is magnesium chloride an ionic or covalent substance? Explain your answer.

(b) Compare magnesium chloride solution and molten (molten) magnesium chloride.

