***O LEVEL CHEMISTRY 5070* ACIDS, BASES & SALTS**

**WORKSHEET SHEET 1**

A food scientist checked the quality of a bottle of vinegar.

He took 50 cm3 of the vinegar and found out how much sodium hydroxide was needed to neutralise it.

1. Explain what is meant by ‘neutralise’

**………………………………………………………………………………………………………………………………………………………………………………………………………………**

1. What apparatus could the scientist have used to measure the amount of sodium hydroxide needed?

..........................................................................................................................................................................................

He also tested some ethanoic acid solution. Ethanoic acid is the acid which is found in vinegar.

His results are shown below.

.

|  |  |  |
| --- | --- | --- |
|  | vinegar | ethanoic acid |
| 3  volume used/cm | 50 | 10 |
| volume of NaOH needed  3  to neutralise/cm | 30 | 10 |

The ethanoic acid solution contained 10 g of acid in every 100 cm3 of solution.

1. How many grams of ethanoic acid are there in 10 cm3 of solution?

…………………………………………………………………………………………………………………………..

1. How many grams of ethanoic acid are there in 10 cm3 of solution?

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

1. Work out how many grams of ethanoic acid are in 50 cm3 of the vinegar.

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

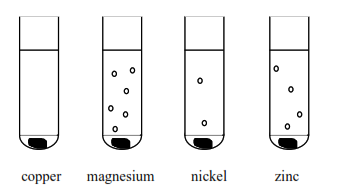
1. What must you assume is kept constant to allow you to work out the answer to (E) ?

**……………………………………………………………………………………………………………………………………………………………………………………………..**

**WORKSHEET SHEET 2**

Small pieces of the metals copper, magnesium, nickel and zinc were placed in test tubes containing small

quantities of hydrochloric acid. The following results were observed.



1. Use the observations from above to complete the following reactivity series.

MOST REACTIVE

LEAST REACTIVE

1. What is the name of the gas produced in the above reactions?

………………………………………………………………………………………………………..

1. Describe the test and result you would use to identify this gas.

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. The reaction between the metals and the hydrochloric acid also produces a chemical compound

known as a salt.

1. What is the name of the salt formed in the reaction between magnesium and hydrochloric acid?

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. What type of bonding is present in this salt?

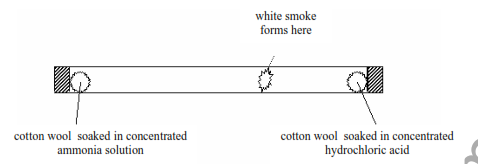
……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. This salt is a solid at room temperature. Explain why a salt has a high melting and boiling point.

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**QUESTIONSHEET 3**

The following experiment was carried out using concentrated ammonia solution and concentrated hydrochloric acid.



Ammonia contains the elements hydrogen and nitrogen and has the chemical formula NH3.

1. Name the type of bonding that exists in ammonia

…………………………………………………………………………………………………….

1. Use the Periodic Table to draw a 'dot and cross' diagram to show the bonding in a molecule of

ammonia. You need only show the electrons in the outer energy level.

1. Explain why ammonia has a low boiling point.

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

The ammonia and hydrogen chloride gases meet and react to form the ring of white smoke which is

shown in the diagram.

1. Explain, in terms of the particles of the gases, why the gases meet

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. Explain why the ring of white smoke forms nearer to the concentrated hydrochloric acid.

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

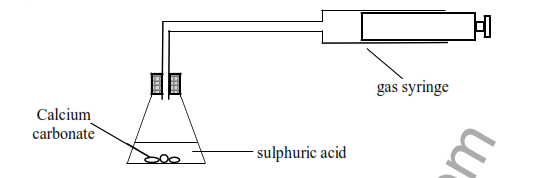
1. What is the name of the chemical formed when ammonia and hydrogen chloride react?

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**WORKSHEET 4**

The diagram below shows an experiment to measure the rate of reaction between calcium carbonate and

sulphuric acid.



The reaction between calcium carbonate and sulphuric acid produces a chemical compound called a

salt, a gas and water

1. The gas produced can be identified using limewater. Name the gas and the result of this test

Name of gas ...............................................................................................................................................

Result of test .........................................................................................................................................

1. What is the name of the salt produced?

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

1. The experiment was repeated with exactly the same volume of sulphuric acid and the same mass of

calcium carbonate. This time the calcium carbonate used was a powder.

1. What happens to the rate of the reaction?

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Use the idea of particles to explain your answer to (C) (i).

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

1. The experiment was repeated but with magnesium metal instead of calcium carbonate and a different salt

and a different gas were produced

1. What gas is produced in the reaction between magnesium and sulphuric acid?

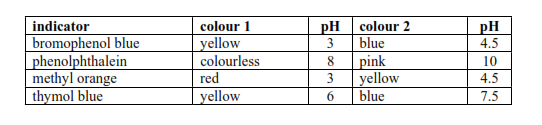
…………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. Describe the test you would use to identify this gas and the result that you would obtain.

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**QUESTIONSHEET 5**

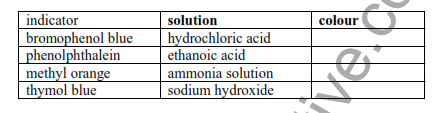
The table below shows the colours of various indicators at different pH values.



Hydrochloric acid has a pH of 1.0 and ethanoic acid has a pH of 5.0

Ammonia solution has a pH of 10.0 and sodium hydroxide has a pH of 12.5

1. Complete the table below to show colours of the indicators in the solutions.



1. Name one indicator which turns the same colour in both ethanoic acid and sodium hydroxide

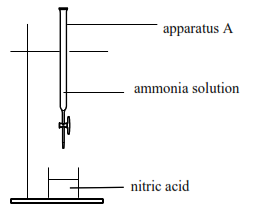
………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. Which two indicators turn the same colour in hydrochloric acid?

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

**QUESTIONSHEET 6**

In an experiment ammonia solution, an alkali, was added to nitric acid.



1. What is the name of apparatus A?

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. What is the name of the reaction when the acid reacts with the alkali?

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. What is the pH when just enough ammonia solution is added to react with all the nitric acid?

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. What is the ion which is present in any solution of acid?

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. What is the ion which is present in any solution of alkali?

…………………………………………………………………………………………………………………

1. Write the simplest ionic equation which represents the above reaction

……………………………………………………………………………………………………………………………………………………………………..............................................................................................

1. The following label is found on the bottle containing the nitric acid.



1. What does the label tell you about the nitric acid?

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. Suggest two precautions which should be taken when using the nitric acid in the experiment

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………..