ST ANDREW'S SECONDARY SCHOOL

NAME _____ CLASS _____

DATE _____

CHEMISTRY 6092

PRACTICAL PAPER – PLANNING

COMPILATION FROM OTHER SCHOOLS' PRELIM PAPERS

1 CHANGKAT CHANGI SECONDARY SCHOOL (2020)

According to Chemistry textbooks, the rate of a reaction can be affected by the reactivity of the metal used.

(a) Outline a method that you could use to determine the reactivity of metals on the rate of reaction.

You are **only** provided with samples of copper, iron, magnesium and zinc metal. You can assume all the apparatus and reagents normally found in a school laboratory are available.

You should include in your answer the measurements / observation you would take / make, and explain how your measurements / observation would show how the reactivity of metals used would affect the rate of a reaction. You may wish to use a labelled diagram to illustrate your answer. [4]

(b) What is / are the variable(s) that should be kept constant in your method? [2]

2 CHUNG CHENG HIGH SCHOOL (YISHUN) (2020)

A sample of copper(II) oxide powder is mixed with some carbon powder.

Given 10 g of the contaminated sample, outline a method by which the percentage purity of copper(II) oxide in the sample can be determined.

You can assume all the apparatus and reagents normally found in a school laboratory are available.

In your method you should note any assumptions that you make, include the measurements you would take and explain how you would use your results to determine the percentage purity of copper(II) oxide in the sample. You may wish to use a labelled diagram to illustrate your answer. [5]

3 DAMAI SECONDARY SCHOOL (2020)

Sodium carbonate is thermally stable while sodium hydrogencarbonate decomposes on heating.

$$2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$$

You are given 1 g of an impure solid sample of sodium hydrogencarbonate which contains sodium carbonate as the only impurity.

Without using any other chemicals, outline a method to determine the percentage by mass of sodium hydrogencarbonate present in the sample.

In your method you should note any assumptions that you make, include the measurements you would take and explain how you would use your results to determine the percentage by mass of sodium hydrogencarbonate in the provided sample.

You can assume all the apparatus normally found in a school laboratory are available. [6]

4 GREENRIDGE SECONDARY SCHOOL (2020)

Copper(II) sulfate crystals have the formula $CuSO_4.xH_2O$.

Plan an experiment to determine the value ***x*** in the formula above.

You are provided with common laboratory apparatus.

You should include in your answer the calculations needed to determine the value of ***x***. [6]

5 HOLY INNOCENTS' HIGH SCHOOL (2020)

You are provided with 2 known samples of sulfate solutions with unknown concentrations. Describe a method to determine which of the sulfate solutions has a higher concentration of sulfate ions.

You can assume all the apparatus and reagents normally found in a school laboratory are available.

In your method you should include the measurements that you would take and explain how your results would help to determine which known sulfate solution has a higher concentration of sulfate ions. [6]

6 PRESBYTERIAN HIGH SCHOOL (2020)

Iron oxide is used as durable pigments in paints, coatings and coloured concretes.

The empirical formula shows the simplest ratio of the elements, iron and oxygen, present in iron oxide.

Outline a method you could use to determine the empirical formula of the iron oxide by quantitative investigation.

You are **only** provided with 5 g of iron fillings. You can assume all the apparatus normally found in a school laboratory are available for your investigation.

In your method, you should include the measurements you would take, and explain how your results would help determine the empirical formula of the iron oxide. You may wish to use a labelled diagram to illustrate your answer. [6]

7 SINGAPORE CHINESE GIRLS' SCHOOL (2020)

An unlabelled bottle contains solid sodium carbonate, Na_2CO_3. Another unlabelled bottle contains solid sodium hydrogencarbonate, $NaHCO_3$.

The reaction between sodium carbonate and dilute hydrochloric acid is exothermic.
The reaction between sodium hydrogencarbonate and dilute hydrochloric acid is endothermic.

Plan experiments using the reaction of each solid with dilute hydrochloric acid:

- to identify each solid, and
- to determine which reaction produces the larger energy change per gram of solid.

You may use any of the apparatus normally found in a chemistry laboratory but no other chemicals.

You should state all the measurements you would make. [5]

8 TAMPINES SECONDARY SCHOOL (2020)

Mixture **T** is a mixture of zinc oxide and copper metal.

Outline a method that you can use to determine the percentage of zinc oxide in the mixture.

You are only provided with a packet of mixture **T** ranging from 10 to 20 g. You can assume all the apparatus and reagents normally found in a school laboratory are available.

You should include in your answer the measurements you would take, and explain how you use your results to determine the percentage of zinc oxide in the mixture. [6]

9 TANGLIN SECONDARY SCHOOL (2020)

Calcium burns in air to form calcium oxide. The reaction is vigorous and some of the calcium oxide can be lost as smoke.

Plan an investigation to determine the maximum mass of oxygen that combines to form calcium oxide when 2 g of calcium granules are burnt in air.

You are provided with common laboratory apparatus and calcium granules. [6]

10 ZHONGHUA SECONDARY SCHOOL (2020)

Sulfamic acid, H_2NSO_3H, is a soluble solid often used in a descaling agent to remove insoluble carbonates from metals surfaces which have contact with hot water.

$$HNO_3 + H_2NSO_3H \rightarrow H_2SO_4 + N_2O + H_2O$$

Dinitrogen monoxide gas, N_2O, which is produced from the reaction is insoluble in water.

Describe a method based on this reaction between sulfamic acid and dilute nitric acid to determine the percentage by mass of sulfamic acid in a sample of the descaling agent.

You can assume all the apparatus and reagents normally found in a school laboratory are available for your investigation.

In your method you should note any assumptions and include all measurements you would take and explain how the results of the experiment maybe used to calculate the percentage by mass of sulfamic acid in the descaling agent.

You may not use a titration method.

You may wish to use a labelled diagram to illustrate your answer. [5]