

BA SANGAM COLLEGE

YEAR 12

CHEMISTRY

WORKSHEET 1

2021

Instructions:

Students/Parents are requested to use this as a supplementary activity during extended holidays. Students can simply answer the questions in their respective subject books (from the back) after downloading this document.

Strand 1

General Chemistry

Identify the following examples as either **random error** or **systematic error**.

- (i) A plastic tape measure becomes slightly stretched over the years, resulting in measurements that are too high.
- (ii) The mass of a stone measured three times gave values of; 15.76 g, 15.72 g and 15.74 g.
- (iii) The position of an experimenter's eye level is slightly above the meniscus, resulting in higher measurements.
- (iv) A scale does not read zero when nothing is placed on it.

Strand 2

Investigating Matter

Q1

Define

i. Empirical formula

ii. Molecular formula

iii.

An organic compound is found to contain 37.5% Carbon, 12.5% Hydrogen and 50% Oxygen.

If the relative molecular mass of the compound is 64, calculate its molecular formula.

Q2 State a reason for the following statements based on their structure and bonding:

- (i) Diamond is a non-conductor of electricity.
- (ii) Crystals of sodium chloride are brittle.
- (iii) Linear solids like plastic sulphur are soft and stretchable.

Q2

Water of crystallisation is the number of water molecules, chemically combined in a definite molecular proportion, with the salt in its crystalline state.

- The masses of water and salt obtained after heating a hydrated salt were 1.2g and 2.8g respectively. Calculate the percentage water of crystallization.
- Differentiate between anhydrous salt and hydrous salt.

Strand 3 Reactions

Q1-Titration

During the preparation of a standard solution of sodium carbonate (Na_2CO_3) the following experimental steps were taken.

- Step 1** - Use the balance to accurately weigh a clean dry beaker.
- Step 2** - Transfer exactly 2.70 g of sodium carbonate into the beaker. Reweigh the **beaker and its content**. Record your measurement under result.
- Step 3** - Add about 100 mL of distilled water into the beaker and dissolve the salt.
- Step 4** - Using a clean funnel, transfer the solution into a clean 250 mL **standard flask**. Use a wash bottle to rinse the sides of the beaker and funnel into the flask.
- Step 5** - Swirl the standard flask to dissolve any remaining solid. Make the solution up to the mark, stopper and invert several times to ensure thorough mixing.
- Step 6** - Finally, transfer the solution to a labelled storage bottle, previously rinsed with this solution.

- How is the mass of sodium carbonate calculated?
- Why was the solution prepared in a **standard flask**?
- State the importance of rinsing the sides of the beaker and the funnel in **Step 4**.
- Calculate the concentration of the standard solution of sodium carbonate prepared in mol L⁻¹. [$M(\text{Na}_2\text{CO}_3) = 106 \text{ g mol}^{-1}$]

Q2

To determine the concentration of a sample of hydrochloric acid (HCl), 25 mL of 0.05 mol L⁻¹ solution of sodium hydroxide (NaOH) was titrated with it. An average volume of 12.50 mL of hydrochloric acid was required to reach the end point.

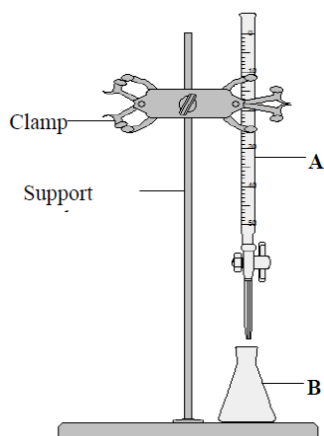
The balanced equation for this reaction is as follows:



- (i) Calculate the amount (in moles) of sodium hydroxide that has reacted.
- (ii) Determine the amount (in moles) of hydrochloric acid required to completely react with sodium hydroxide.
- (iii) Calculate the concentration (mol L^{-1}) of the hydrochloric acid sample.

Q3

Identify the laboratory equipment, **A** and **B**, in the figure below.



THE END