

**Week 11**School: Ba Sangam CollegeYear: 11Subject: Chemistry

Name: _____

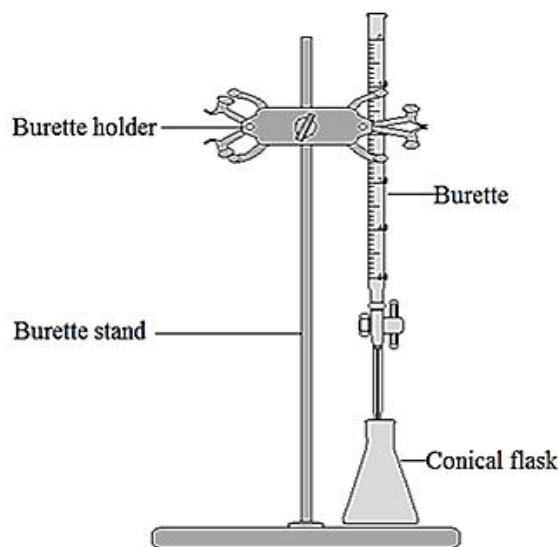
Strand	3 - Reactions
Sub strand	3.3 – Acids, Bases and Salt
Content Learning Outcome	-State and illustrate the solubility rules of salts and use it to predict the formation of a precipitate.

Preparing a Standard Solution

- **Standard Solution-** a solution whose concentration is known.
- **Primary Solution-** is the salt used to prepare the standard solution.

Steps

Step	Description
Step 1	Weigh a mass of salt in a clean dry beaker. Add 20-30ml of distilled water and stir to dissolve.
Step 2	Transfer the dissolved sample to a clean volumetric flask using a funnel. Rinse the stirring rod with distilled water.
Step 3	Rinse the beaker with little distilled water and add the washing to the flask.
Step 4	Add water till the level is just below (2cm) the meniscus. Put back the funnel and make up to the mark using an eye dropper.
Step 5	Stopper and turn flask upside down several times.

A Titration Setup**Indicators**

These are substances which indicate the acidic or basic nature of a solution by their colour change.

Common indicators used in the laboratory

Indicator	Colour		
	Basic	Endpoint	Acidic
Phenolphthalein	Pink	Light/faint/pale pink	Colourless
Methyl orange	Yellow	Orange	Red
Bromothymol blue	Blue	Green	Yellow

Example

During an experiment on preparing a standard solution, a Year 11 Chemistry student dissolved 4.6 g of anhydrous sodium carbonate (Na_2CO_3) in 500 mL of water.

- (i) Name the glassware used to prepare the standard solution.

Standard flask OR Volumetric flask

- (ii) Calculate the concentration of the solution prepared in g L⁻¹.

$$\begin{aligned} \text{Concentration} &= \frac{\text{Mass}}{\text{Volume}} \\ &= \frac{4.6 \text{ g}}{0.5 \text{ L}} \\ &= 9.2 \text{ gL}^{-1} \end{aligned}$$

$$\begin{aligned} \text{Volume} &= 500 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \\ &= 0.5 \text{ L} \end{aligned}$$

Titration

- Is a technique in which a solution of known concentration is used to determine the unknown concentration of another solution.

Concentration of a Solution

- ❖ The concentration of a solution is the amount of solute divided by the volume of solvent.
- ❖ The units of concentration are g mL^{-1} and g L^{-1} .
- ❖ A conversion factor can be used to convert between units eg. Convert mL to L.

$$\text{Concentration} = \frac{\text{Mass}}{\text{Volume}}$$

(iii) State **one** possible source of error during the preparation of the solution

- **Incorrect weighing**
- **Not using a wash bottle to transfer left over salt in the beaker**
- **Use of wet volumetric flask**
- **Spilling the solution while transferring from beaker into the volumetric flask**
- **Impurities in chemicals**

Exercise

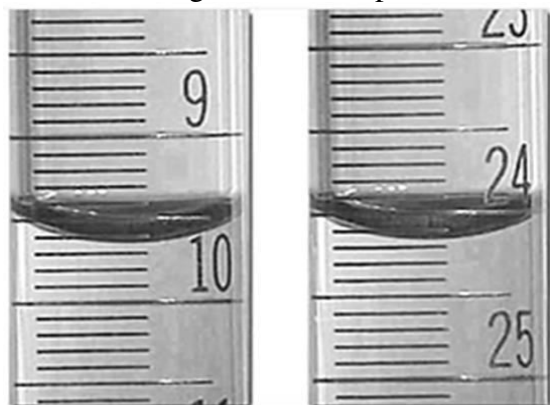
1. How many grams of KOH is used to make 2.5 L of a 50 g/L solution of KOH. **(1 mark)**

2. Preparing a standard solution requires a series of steps. Arrange the steps given below in the order you would follow to prepare a standard solution of sodium carbonate.

- Rinse the funnel and the beaker with distilled water.
- Measure the mass of sodium hydroxide.
- Pour the solution into a standard flask.
- Dissolve the sodium hydroxide in 100 mL of water.
- Make the volume to exactly 250 mL.

(2 ½ marks)

3. Given below are the initial and final readings of a burette during a titration experiment.



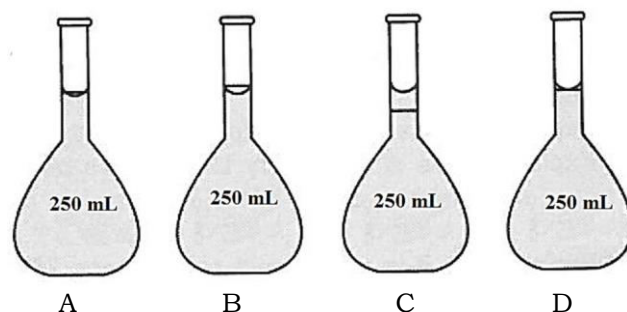
Initial Reading

Final Reading

i. Explain why it is important to have the meniscus at eye level when reading a burette. **(1 mark)**

ii. Calculate the titre used in the titration in litres. **(1 mark)**

4. Which standard flask contains exactly 250 mL of standard solution? **(1 mark)**



5. The measuring instrument used for transferring and measuring small volumes of liquids accurately is a **(1 mark)**

- beaker.
- pipette.
- standard flask.
- measuring cylinder.

6. During the course of an acid-base titration experiment, state:

(i) the purpose of using an indicator. **(1 mark)**

(ii) why the contents of the conical flask are swirled continuously. **(1 mark)**

7. Define the term standard solution. **(½ mark)**
