AlKarkh University of Science
College of science
Department of Microbiology
First year level
General chemistry Labs

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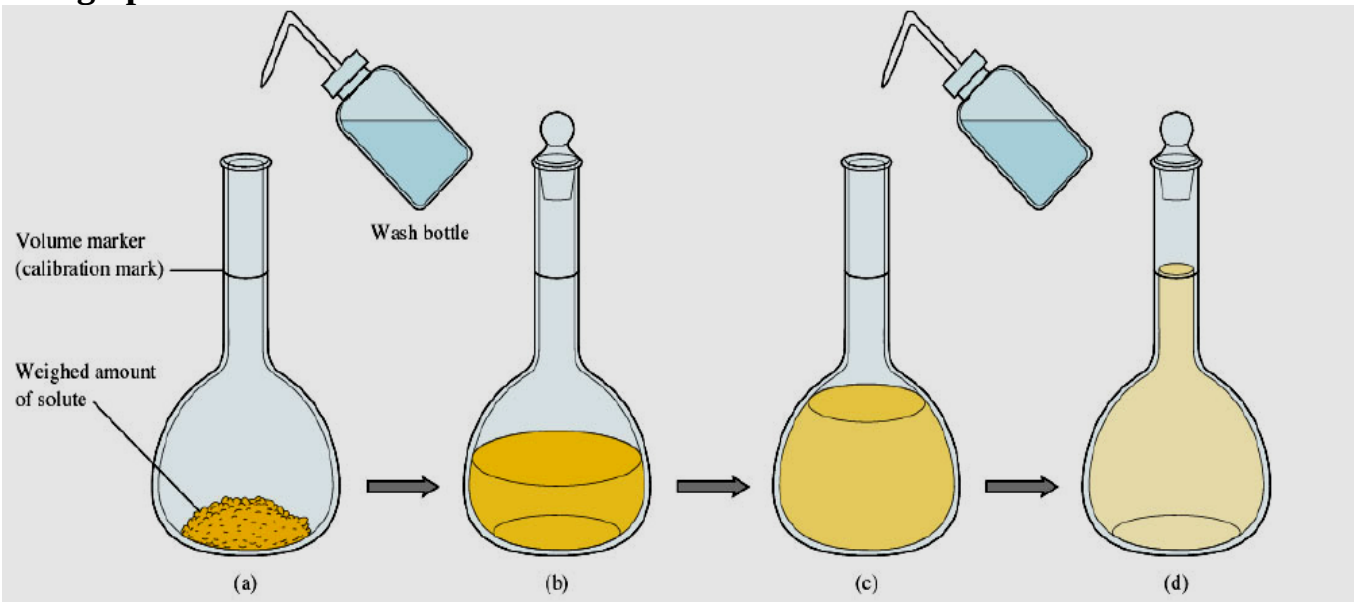
Lab -3-

Standard Solution

What is a standard solution?
A standard solution is a solution whose concentration is known accurately. Its concentration is usually given in mol dm^{-3}.

moles = concentration x volume

Making up the standard solution



Steps involved in the preparation of a standard solution. a) A weighed amount of a substance (the solute) is put into the volumetric flask, and a small quantity of water is added. (b) The solid is dissolved in the water by gently swirling the flask (with the stopper in place). (c) More water is added, until the level of the solution just reaches the mark etched on the neck of the flask (d).

Primary and secondary Standards solutions

A **primary standards** is a highly purified compound that serves as a reference material in titrations and in other analytical methods.

Important requirements for a primary standard are the following:
1. High purity.
2. Atmospheric stability (no sensitive to atmospheric oxygen)
3. Absence of hydrate water so that the composition of the solid does not change with variations in humidity.
4. Modest cost.

5. They are powerful reactants
6. They have known formula and molecular weight
7. They are usually high molecular weight compounds

Secondary standard solution:
A secondary standard solution is the one that must be standardized before use. This is because a secondary standard solution is not in its stable form. An example is the solution of NaOH.

Secondary standards are

1. Influenced by atmosphere/environment
2. Concentration change over time
3. Usually powerful reactants
4. Usually cheap & easy to use

Solute - The substance which dissolves in a solution.
Solvent - The substance which dissolves another to form a solution.
Solution - A mixture of two or more pure substances.

Types of standard solutions:

1. **Molarity: M** = moles of solute contained in one liter of solution.

   Molarity = M = moles of solute/ Volume of solution = moles/L

2. **Normality: N=** moles of reactive units per liter (equivalents per liter)

$$N = \frac{(1000)(\text{grams of solute})}{(\text{equivalent wt. of solute})(\text{ml of solution})}$$

Relationship between N and M

$$N = n \times M$$

Where ***N*** is normality, ***M*** is morality and ***n*** is number of equivalents.

Prepare (0.1 M) of sodium hydroxide

Measuring Mass using an analytical Balance

1. Turn on balance and wait for display to read 0.0000 g.
2. Check the level indicator & do not lean on table while weighing.
3. Place weighing vessel on the balance pan (e.g., creased weighing paper, weigh boat)
4. Close the sliding doors & wait for stability light indicator, indicating that the weight is stable.

5. Press tare button so that display reads 0.0g.
6. Gently add the substance being weighed to the weighing sample.
7. Record mass.
8. Remove weighed sample.

Clean spills off balance with brush or absorbent laboratory tissue. Discard any disposable weighing vessel

Making up the solution

1. Take a watch glass and put it onto analytical balance on zero pointer.
2. Weight ---- g from the sodium hydroxide, then transfer it into clean beaker.
3. Add small amount of distill water in the beaker and stirrer the solution by glass rod, until dissolve all crystal.
4. Transfer the solution carefully to volumetric flask (100 or 250 mL).
5. Wash the beaker 3 times with dist. water and transfer them to the volumetric flask.
6. Add distill water to the volumetric flask up to mark, then cover it by stopper.