Units and Measurements

SI Units

- The **International System of Units** (SI, abbreviated from the French:

  Système international (d'unités) - is the modern form of the metric system.
- It is the only metric system of measurement that is used universally as a standard for measurements.
- It is made up of 7 base units which are used for defining 22 derived units.

Sl. No.	Name of the Quantity	SI Unit	SI Unit Symbol
1.	Length (l)	Meter	m
2.	Mass (M)	Kilogram	kg
3.	Time (T)	Second	s
4.	Electric current (I)	Ampere	A
5.	Thermodynamic temperature (Θ)	Kelvin	K
6.	Amount of substance (N)	Mole	mol
7.	Luminous intensity (J)	Candela	cd

Perishable

- liable to perish.
- liable to spoil or decay.
- go bad after quite a short length of time.
- **Perishable** products need to be stored in the refrigerator.

Refrigeration can substantially reduce the rate at which product will deteriorate. Low temperatures slow down the growth of microorganisms and the rate of chemical (including enzymic) changes.

Molecular weight

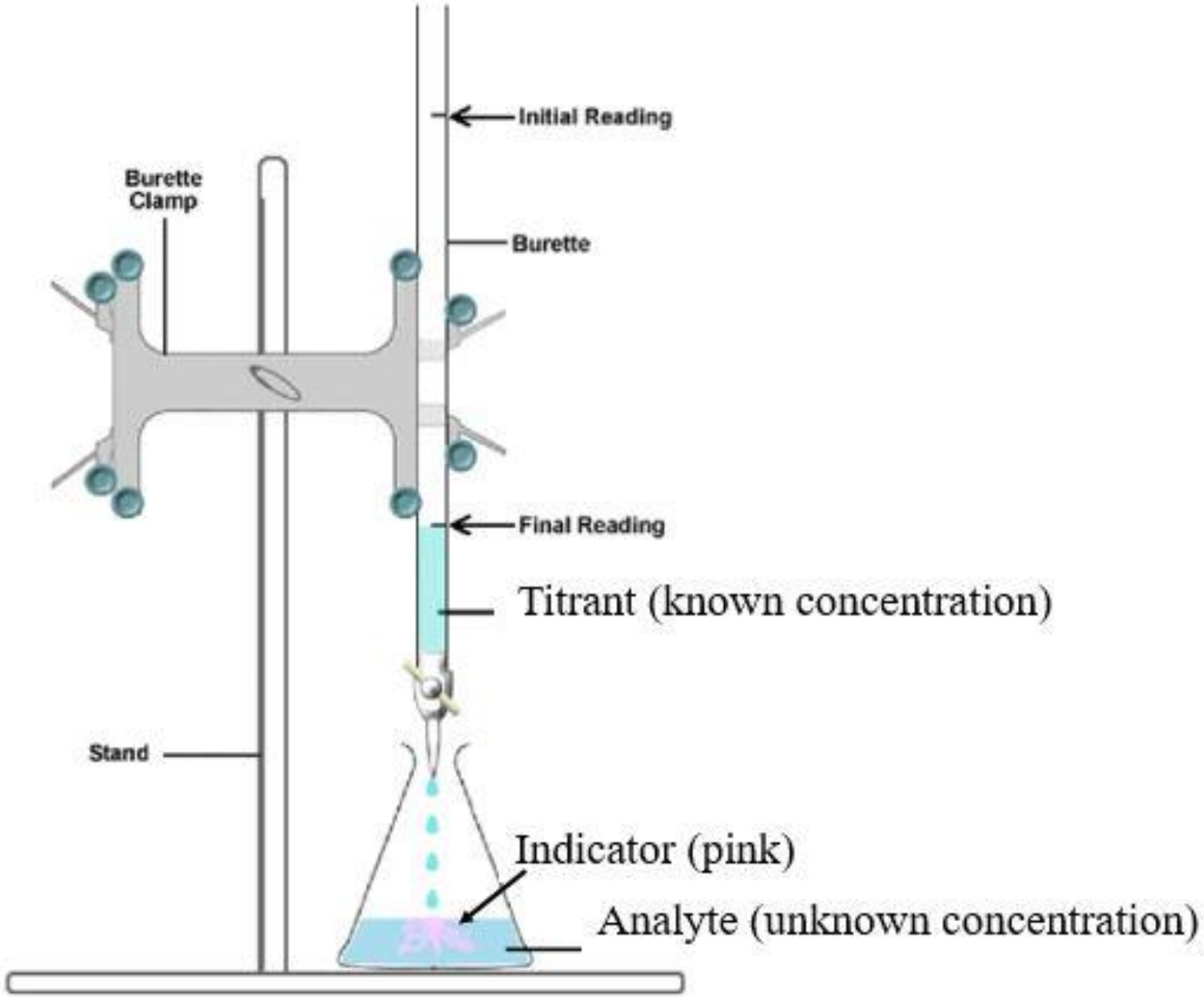
- The **molecular weight** is the **mass of** one mole of a substance.
- **Molecular weight** is a measure of the sum of the atomic weight values of the atoms in a molecule.
- To derive the **molecular formula** of a compound from its empirical formula.

Hygroscopic compounds

- Hygroscopic compounds are all those substances that attract water in vapor or liquid from its environment.
- Hygroscopy is the phenomenon of attracting and holding water molecules via either absorption or adsorption from the surrounding environment, which is usually at normal or room temperature.

Titration

- **Titration** is the slow addition of one solution of a known concentration (called a titrant) to a known volume of another solution of unknown concentration until the reaction reaches neutralization, which is often indicated by a color change.


Initial Reading
Burette Clamp
Burette
Final Reading
Titrant (known concentration)
Stand
Indicator (pink)
Analyte (unknown concentration)

Principle of titration

- It is based on the complete chemical reaction between the analyte and the reagent (titrant) of known concentration.

Analyte + Titrant → Product

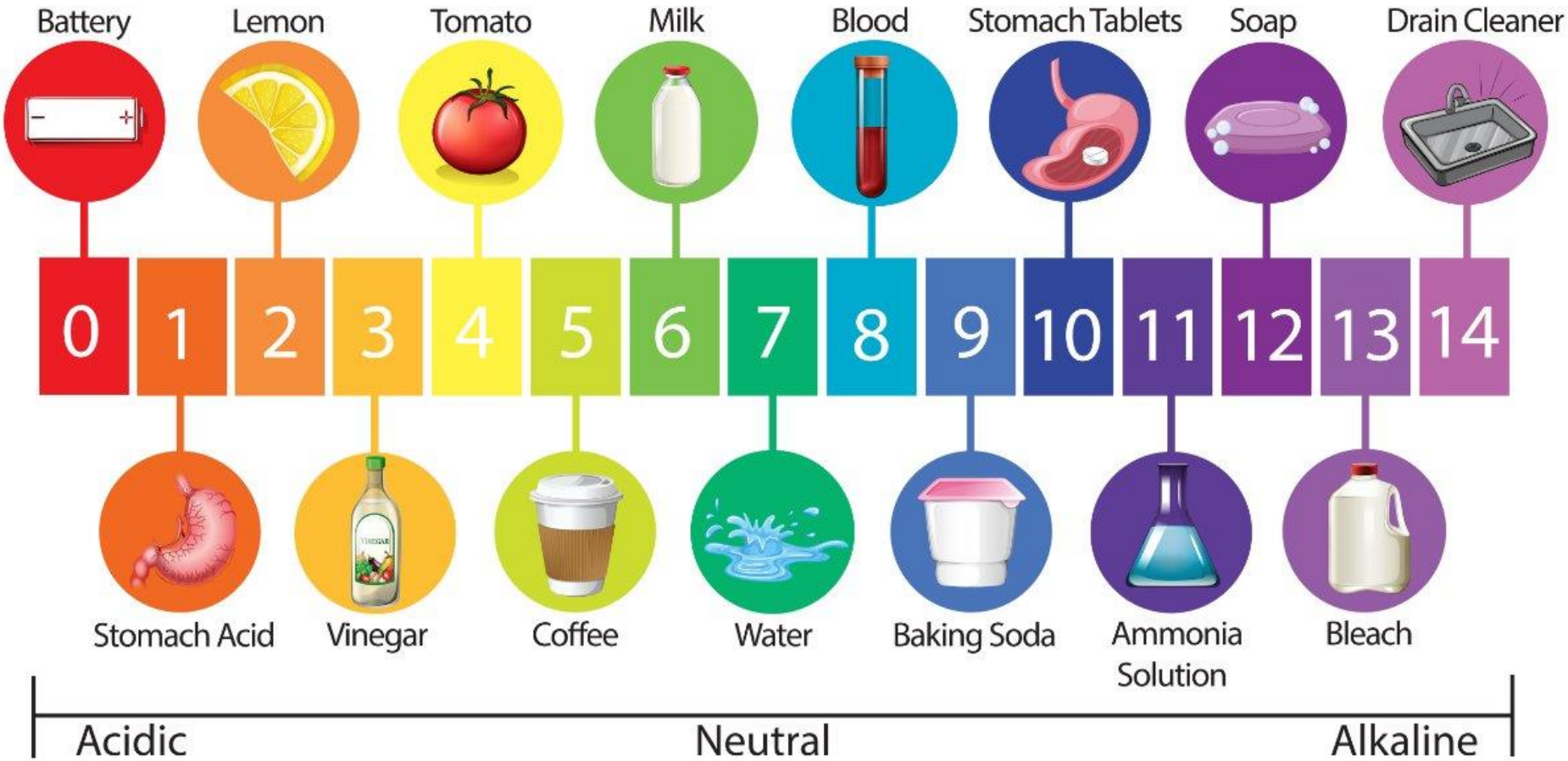
Indicators

- Indicators are the key in performing a successful titration reaction.
- The purpose of the indicator is to show when enough standard solution has been added to fully react with the unknown concentration.
- However, an indicator should only be added when necessary and is dependent upon the solution that is being titrated.
- The indicators must only be added to the solution of unknown concentration when no visible reaction will occur.
- Depending on the solution being titrated, the choice of indicator have to be used.
- The point at which the indicator used in a titration changes color is called the end point of the titration.

pH

- The concept of pH was first introduced by the Danish chemist Sorenson in 1909.
- It is the French word, where, P means “puissance d” means strength/power and H mean Hydrogen - which means strength/power of hydrogen.
- pH is a unit of measure which describes the degree of acidity or alkalinity (basic) of a solution.

The pH Scale


Battery
Lemon
Tomato
Milk
Blood
Stomach Tablets
Soap
Drain Cleaner
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Stomach Acid
Vinegar
Coffee
Water
Baking Soda
Ammonia Solution
Bleach
Acidic
Neutral
Alkaline

Buffer

- A **buffer solution** is a solution which resists changes in pH when a small amount of **acid** or **base** is added.
- Typically a mixture of a weak acid and a salt of its conjugate base or weak base and a salt of its conjugate acid.

Buffering mechanism

- A buffer is able to resist pH change because the two components (conjugate acid and conjugate base) are both present in appreciable amounts at equilibrium and are able to neutralize small amounts of other acids and bases when the are added to the solution.

Buffer capacity

- Buffer capacity is a quantitative measure of the resistance to change of pH of a solution containing a buffering agent with respect to a change of acid or alkali concentration.
- It is defined as the number of moles of an acid or a base required to be added to one litre of the buffer solution so as to change its pH by one.

Biological buffer systems

- Biological buffers are organic substances that maintain a constant pH over a given range by neutralizing the effects of hydrogen ions.
- Almost every biological process is pH-dependent; a small change in pH produces a large change in the rate of the process.
- Cells/ organisms maintain a specific and constant cytosolic pH, usually near pH 7, keeping biomolecules in their optimal ionic state.
- Constancy of pH is achieved primarily by biological buffers.