CHAPTER : 2 ACIDS, BASES AND SALTS

MIND MAPS
ANJIT ACADEMY

Acids, Bases and Salts

ACIDS

Physical Properties of Acids
- Sour in taste
- Turns blue litmus red
- Give H^+ ions in aqueous solution
- Aqueous solution conduct electricity

Chemical Properties of Acids
- Reacts with metals to liberate hydrogen.
  Acid + Metal → Salt + Hydrogen Gas
  $2HCl + Zn \rightarrow ZnCl_2 + H_2\uparrow$
- Reacts with metal carbonates/metal hydrogen carbonate to liberate CO_2
  - $2HCl + Na_2CO_3 \rightarrow 2NaCl + CO_2 + H_2O$
  - $HCl + NaHCO_3 \rightarrow NaCl + CO_2 + H_2O$

Bases

Physical Properties of Bases
- Bitter in taste
- Turns red litmus blue
- Give OH^- ions in aqueous solution
- Does not conduct electricity

Chemical Properties of Bases
- Alkali reacts with metal to liberate hydrogen
  $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2\uparrow$
- Bases reacts with acidic oxides to form salts.
  $2NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$

Bases are classified On the basis of -

Strength
- Strong bases
- Weak bases

Concentration
- Dilute bases
- Concentrated bases

Type of Indicators

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

- **Natural Indicators**: Litmus, Turmeric, Red Cabbage
- **Synthetic Indicator**: Methyl orange, Phenolphthalein
- **Olfactory Indicator**: Onion, Vanilla, Clove Oil

S. No.	Indicators	pH range	Colour in Original Colour	Colour in Acidic medium	Colour in Basic medium
1.	Litmus paper	4.5 - 8.3	purple	Red	Blue
2.	Methyl Orange	3.2 - 4.4	Orange	Red	Yellow
3.	Phenolphthalein	8.2 - 10.0	Colourless	Colourless	Pink
4.	Methyl red	4.8 - 6.0		Yellow	Red

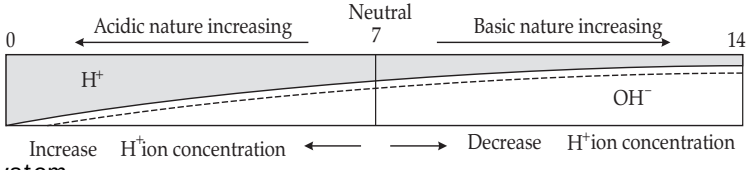
pH

PH of a Solution is the magnitude of the negative power to which 10 must be raised to express the hydrogen ion concentration of the solution in moles per litre.

i.e. $[H+] = 10^{-(x)} \Rightarrow PH = x \Rightarrow pH = -\log 10[H+]$

pH = 7 Neutral Solution H3O+ = OH –
pH > 7 Basic Solution H3O+ < OH –
pH < 7 Acidic Solution H3O+ > OH –

$\Rightarrow Kw = [H+] \times [OH-] = 10^{-14}$ at 25 °C (298 K)



Salts

When acid and base are combined under the given condition, Salt is obtained

Types of salts
- Common salt: $NaOH + HCl \rightarrow NaCl + H_2O$
- Bleaching Powder: $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$
- Baking Soda: $NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$
- Washing Soda: $Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3 \cdot 10H_2O$
- Plaster of Paris: $CaSO_4.2H_2O \rightarrow CaSO_4 \cdot \frac{1}{2} H_2O + 1\frac{1}{2} H_2O$
- Gypsum: $CaSO_4.\frac{1}{2} H_2O + 1\frac{1}{2} H_2O \rightarrow CaSO_4.2H_2O$

Uses:
1. pH of a soil
2. pH in tooth decay
3. pH in the digestive system