Ch-2 Acids, Bases and Salts

1. **Acids –** Acids are sour in taste, turn blue litmus to red, dissolve in water to release H^+ ions. Ex., vinegar, hydrochloric acid and sulphuric acid.
    a. Reaction with Metal
    Acid + Metal → Salt + Hydrogen gas
    Ex., $2HCl + Zn \rightarrow ZnCl_2 + H_2$
    b. Reaction with Metal carbonate
    Acid + Metal carbonate → Salt + CO_2 + H_2O
    Ex., $2HCl + Na_2CO_3 \rightarrow 2NaCl + CO_2 + H_2O$
    c. Reaction with Metal hydrogen carbonate
    Acid + Metal hydrogen carbonate → Salt + CO_2 + H_2O
    Ex., $HCl + NaHCO_3 \rightarrow NaCl + H_2O + CO_2$
    d. Reaction with Metallic oxide
    Acid + Metal oxide → Salt + Water
    Ex., $2HCl + CuO \rightarrow CuCl_2 + H_2O$
2. Acids in water – Acids produce H^+ ions when dissolved in water. H+ ions cannot exist alone. They combine with water molecule (H_2O) to form H_3O^+ (hydronium ions). It conducts electricity.
    a. Decrease in H_30^+ ions concentration per unit volume results in formation of dilute acids.
    b. It is a highly exothermic reaction.
    c. Acids when dissolved in water release large amount of heat. If water is added to concentrated acid then the heat generated may cause the mixture to splash out and cause bums. Hence to avoid burns acid must be added drop wise into water with constant stirring. So that the heat generated spreads over in water.
    d. strong acids → release more H^+ ions → HCl
    e. weak acids → releases a smaller number of H^+ ions → acetic acid
    f. strong base → give more OH^- ions → NaOH
    g. weak base → gives less OH^- ions → CH_3COOH

3. **Bases –** Bases are bitter in taste, turns red litmus to blue and when dissolved in water releases OH^- ions. Ex., NaOH and KOH.
    a. Reaction with metal
    Base + Metal → Salt + H_2 gas
    Ex., $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$
    (This reaction is possible only with reactive metals like sodium and potassium.)
    b. Reaction with non-metallic oxide
    Base + Non-metallic oxide → Salt + H_2O
4. Bases in water – Bases produce OH^- ions when dissolved in water. Bases soluble in water are called alkalis. It conducts electricity.
    a. Decrease in OH^- ions single concentration per unit volume results in formation of dilute bases.
    b. It is an exothermic reaction.

c. To make basic solution, base must be added drop wise into water with constant stirring, so that the heat generated spreads over in water.

5. **Indicators –** Indicators are those substances which tell us whether a substance is acidic or basic by change in colour. Ex., litmus solution.
   a. Olfactory indicators – Those substances whose odour changes in acidic or basic media are called olfactory indicators. Ex., clove, vanilla, onion.
   b. Natural indicators – Turmeric, litmus (obtained from lichen)
   c. Synthetic indicators – Methyl orange, phenolphthalein.

Indicator	Acids	Bases
Red litmus	remains red	turns blue
Blue litmus	turns red	remains blue
Phenolphthalein	colourless	pink
Methyl orange	red	yellow