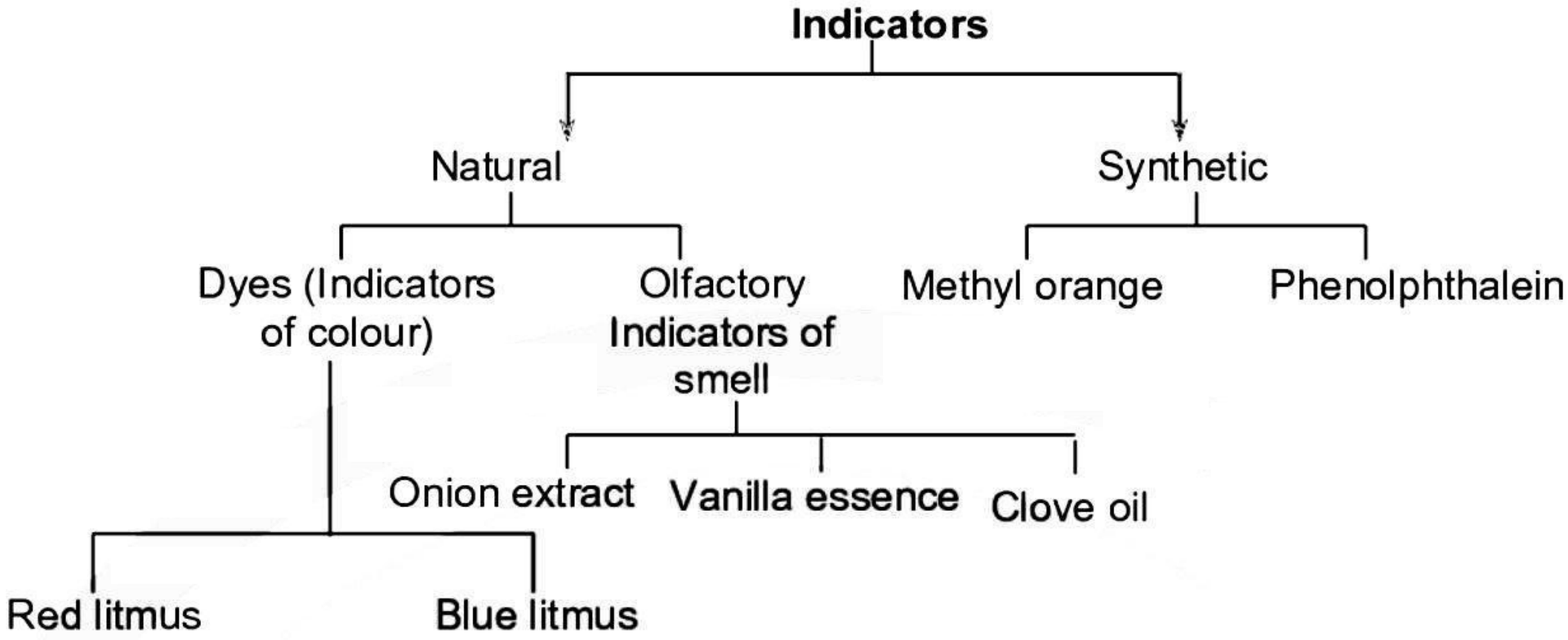
ACIDS, BASES AND SALTS



Indicator	Colour in acidic solution	Colour in basic solution
Blue litmus solution	Red	No colour change
Red litmus solution	No colour change	Blue
Phenolphthalein	Colourless	Pink
Methyl orange	Pink	Yellow

Physical properties of Acids and Bases:

Acids	Bases
→ Sour taste	→ Bitter taste
→ Turns blue litmus to red	→ Turns red litmus to blue
→ Provides H^+ ions when dissociated	→ Provides OH^- ions when dissociated
→ pH less than 7	→ Bases dissolve in water to give alkalies
→ strong acids HCl, HNO_3, H_2SO_4	→ pH more than 7 upto 14
→ weak acids H_2CO_3 CH_3COOH H_3PO_4	→ strong base NaOH, KOH
	→ weak base NH_4OH

Chemical properties of Acids and Bases:

	Type of Reaction	Acid	Base
1.	Neutralization reaction	Acid + Base ➜ Salt + H_2O Example: $HCl + NaOH \rightarrow NaCl + H_2O$	Acid + Base → Salt + water Example: $CaO + HCl(aq) \rightarrow CaCl_2(aq) + H_2O$ (l)
2.	Reaction with metals	Acid + Metal ➜ Metallic salt + $H_2(g)$ Example: $Zn(s) + dil\ H_2SO_4\ (aq) \rightarrow ZnSO_4\ (aq) + H_2(g)$	Base + Metals → Salt + $H_2(g)$ Example: $NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$ Only active metals like Zn and Al reacts with bases.
3.	Reaction with carbonates	Acid + Carbonates ➜ Metallic salt + $CO_2(g) + H_2O$ Example: $Na_2CO_3 + H_2SO_4 \rightarrow Na_2SO_4 + H_2O + CO_2$	Base + carbonate ➜ No reaction
4.	Reaction with bicarbonates	Acid + Bicarbonates ➜ Metallic salt + $CO_2(g) + H_2O$ Example: $NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$	Base + bicarbonate ➜ No reaction
5.	Reaction with oxide	Acid + Metal Oxide ➜ Salt + H_2O Example: $CaO + HCl\ (aq) \rightarrow CaCl_2\ (aq) + H_2O$	Base + Non-metallic oxide → Salt + water Example: $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$
6.	Dissolution in water	Acid gives H^+ ions in water. Examples: $HCl\ (aq) \rightarrow H^+ + Cl^-$ $H_2SO_4\ (aq) \rightarrow 2H^+ + SO_4^{2-}$	Bases gives OH^- ions in water. Examples: $NaOH\ (aq) \rightarrow Na^+ + OH^-$ $Ca(OH)_2\ (aq) \rightarrow Ca^{2+} + 2(OH)^-$

pH SCALE

pH scale: A scale of numbers from 0 to 14 on which the strength of an acid or base is measured is known as pH scale.

pH is defined as negative logarithm of $[H^+]$ or $[H_3O^+]$

i.e. $pH = -\log[H^+]$ or $pH = -\log[H_3O^+]$