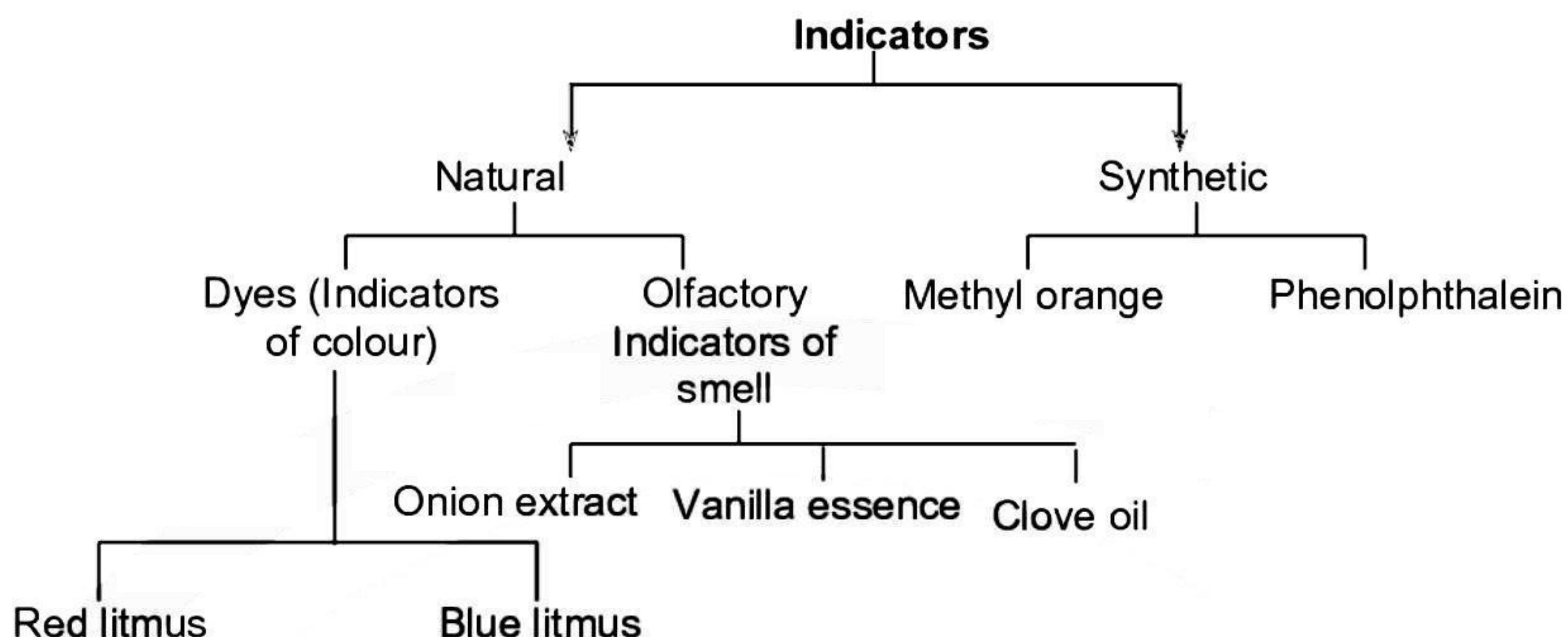


ACIDS, BASES AND SALTS



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

Chemical properties of Acids and Bases:

Type of Reaction		Acid	Base
1.	Neutralization reaction	Acid + Base $\rightarrow$ Salt + H ₂ O Example: $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$	Acid + Base $\rightarrow$ Salt + water Example: $\text{CaO} + \text{HCl(aq)} \rightarrow \text{CaCl}_2\text{(aq)} + \text{H}_2\text{O(l)}$
2.	Reaction with metals	Acid + Metal $\rightarrow$ Metallic salt + H ₂ (g) Example: $\text{Zn(s)} + \text{dil H}_2\text{SO}_4\text{(aq)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{H}_2\text{(g)}$	Base + Metals $\rightarrow$ Salt + H ₂ (g) Example: $\text{NaOH} + \text{Zn} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$ Only active metals like Zn and Al reacts with bases.
3.	Reaction with carbonates	Acid + Carbonates $\rightarrow$ Metallic salt + CO ₂ (g) + H ₂ O Example: $\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$	Base + carbonate $\rightarrow$ No reaction
4.	Reaction with bicarbonates	Acid + Bicarbonates $\rightarrow$ Metallic salt + CO ₂ (g) + H ₂ O Example: $\text{NaHCO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$	Base + bicarbonate $\rightarrow$ No reaction
5.	Reaction with oxide	Acid + Metal Oxide $\rightarrow$ Salt + H ₂ O Example: $\text{CaO} + \text{HCl(aq)} \rightarrow \text{CaCl}_2\text{(aq)} + \text{H}_2\text{O}$	Base + Non-metallic oxide $\rightarrow$ Salt + water Example: $\text{Ca(OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
6.	Dissolution in water	Acid gives H ⁺ ions in water. Examples: $\text{HCl(aq)} \rightarrow \text{H}^+ + \text{Cl}^-$ $\text{H}_2\text{SO}_4\text{(aq)} \rightarrow 2\text{H}^+ + \text{SO}_4^{2-}$	Bases gives OH ⁻ ions in water. Examples: $\text{NaOH(aq)} \rightarrow \text{Na}^+ + \text{OH}^-$ $\text{Ca(OH)}_2\text{(aq)} \rightarrow \text{Ca}^{2+} + 2(\text{OH})^-$

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 [H₃O⁺]

i.e. $\text{pH} = -\log[\text{H}^+]$ or $\text{pH} = -\log[\text{H}_3\text{O}^+]$

