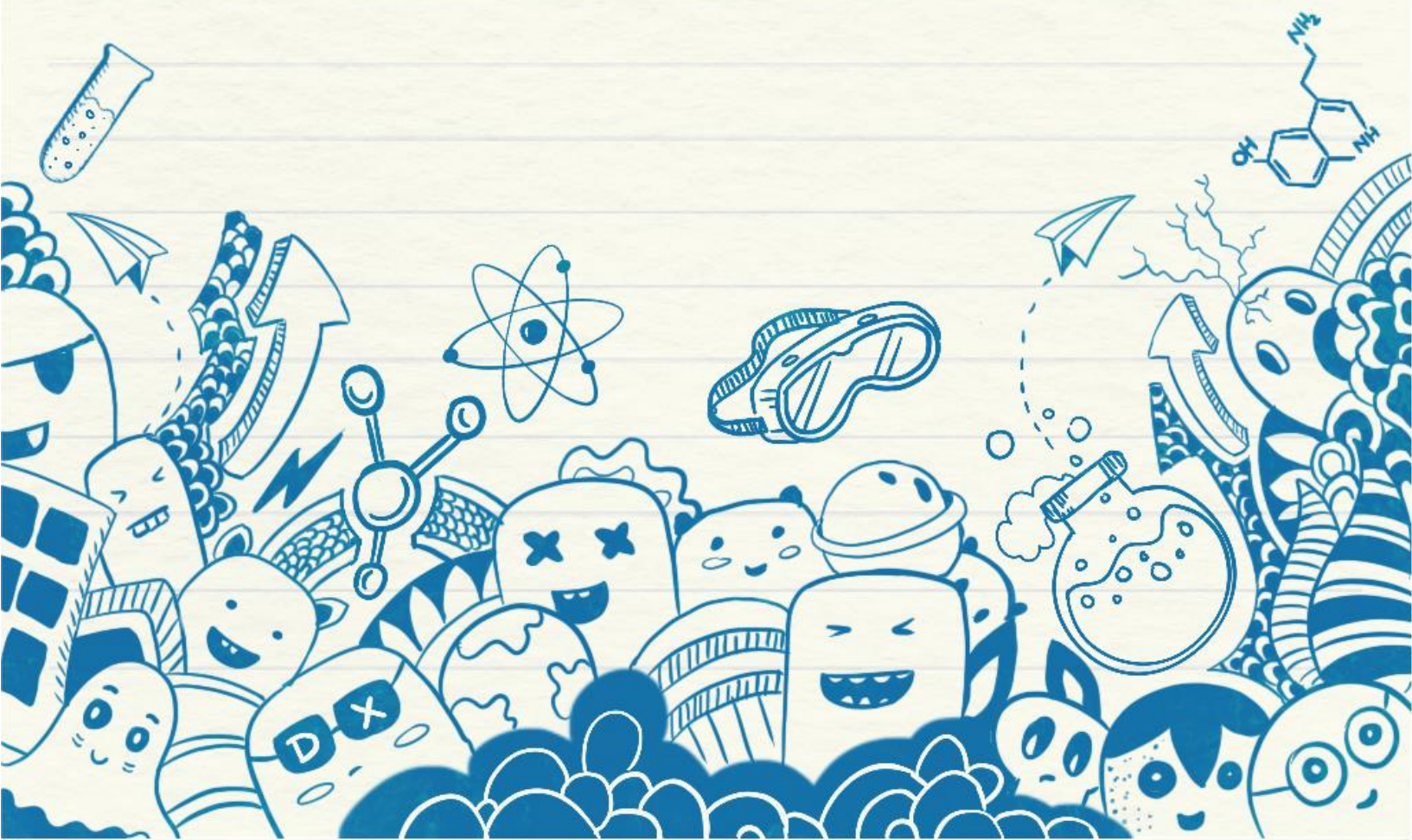


C H E M I S T R Y



POST CLASS NOTES

Acids, Bases and Salts



Topics



1. Introduction to acids and bases
2. Indicators
3. pH scale
4. Neutralisation reaction

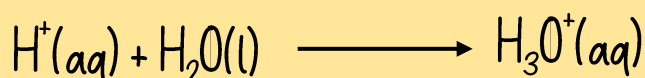


1. Introduction to Acids and Bases

Acid	Base
<ul style="list-style-type: none"> ★ Release H^+ ions in aqueous solution ★ Sour in taste ★ Conduct electricity in solution 	<ul style="list-style-type: none"> ★ Release OH^- ions in aqueous solution ★ Bitter in taste ★ Conduct electricity in solution



Note: H^+ ions do not exist by themselves, they combine with water molecules



1.1 General Reactions of Acids

- ★ Metal + Acid \longrightarrow Salt + Hydrogen gas
- ★ Metal oxide + Acid \longrightarrow Salt + Water
- ★ Metal carbonate + Acid \longrightarrow Salt + Water + Carbon dioxide or bicarbonate

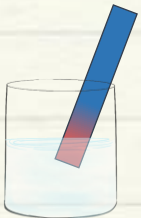





1.2 General Reactions of Bases

- ★ Non-metal oxide + Base \longrightarrow Salt + Water
- ★ Metals like Al, Zn react with bases like NaOH to form salt and hydrogen gas

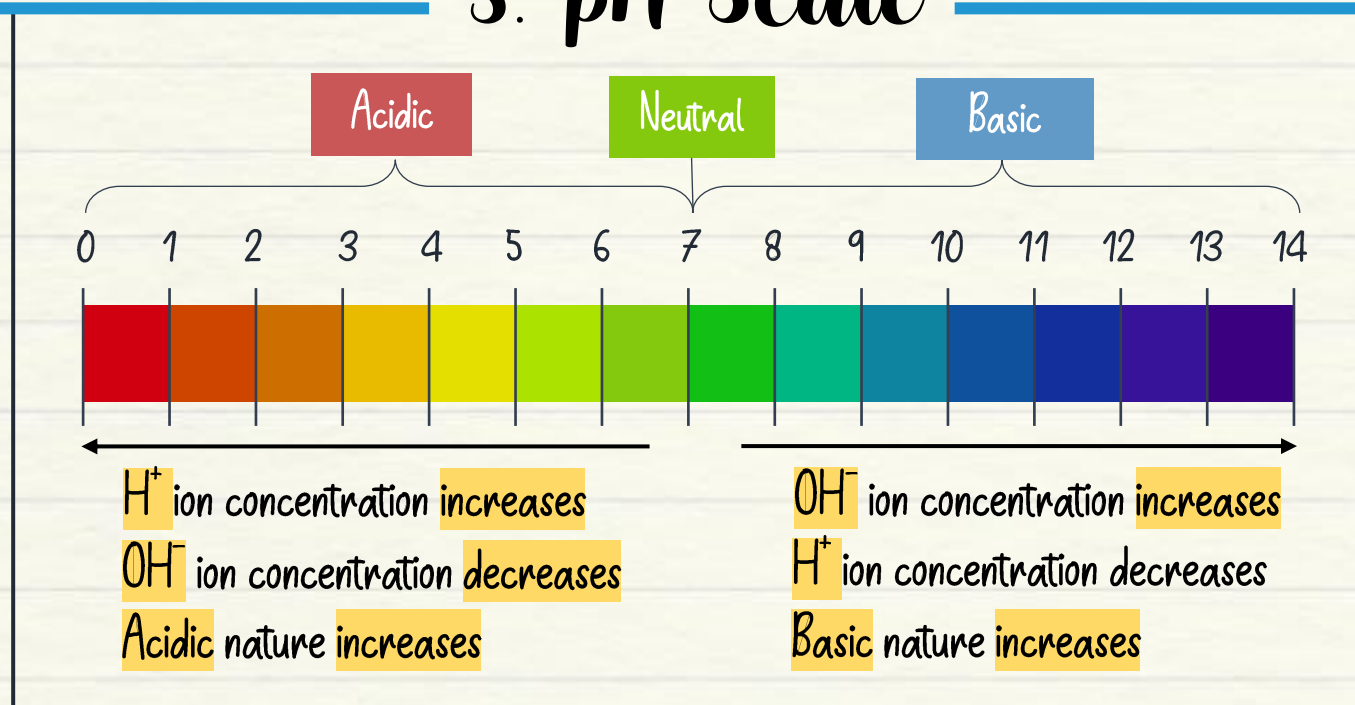
1.3 Dilution of Acids or Bases

- ★ Mixing acid or base with water is called dilution
- ★ Dilution results in decrease in the concentration of ions (H_3O^+ / OH^-) in the solution

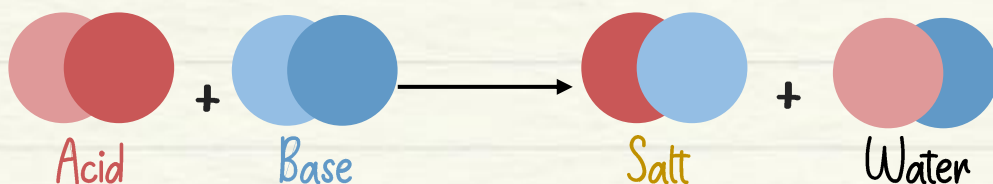
2. Indicators

Indicators	With Acids	With Bases
Litmus		
Phenolphthalein		
Methyl orange		
Olfactory (onion, vanilla extract)	Retains odour	Loses odour

3. pH Scale



4. Neutralisation Reaction



4.1 Applications of Neutralisation Reaction



Indigestion

Antacids neutralise excess HCl in stomach and relieve acid indigestion

Tooth decay

Toothpaste neutralises the effect of acids in mouth, preventing tooth decay



Nature's cure

Dock plant that grows beside nettle leaves, helps to cure the burning sensation caused by the stinging hair on nettle leaves

4.2 Types of Salts

- ★ Strong acid + Strong base → Neutral salt (pH = 7)
- ★ Strong acid + Weak base → Acidic salt (pH < 7)
- ★ Weak acid + Strong base → Basic salt (pH > 7)

4.3 Chemicals Obtained from Common Salt

Chemical	Preparation
Sodium hydroxide (NaOH)	Chlor-alkali process – passing electricity through an aqueous solution of sodium chloride (called brine)
Chlorine gas (Cl ₂)	$2\text{NaCl(aq)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{NaOH(aq)} + \text{Cl}_2\text{(g)} + \text{H}_2\text{(g)}$ (Brine) near cathode at anode at cathode
Hydrogen gas (H ₂)	
Bleaching powder (CaOCl ₂)	$\text{Ca(OH)}_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$ (Dry slaked lime)
Baking soda (NaHCO ₃)	$\text{NH}_3 + \text{H}_2\text{O} + \text{CO}_2 + \text{NaCl} \longrightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$ (Sodium bicarbonate)
Washing soda (Na ₂ CO ₃ ·10H ₂ O)	$2\text{NaHCO}_3 \longrightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$ (Sodium carbonate) $\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O} \longrightarrow \text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

4.4 Water of Crystallisation

Fixed number of water molecules present in one formula unit of a salt

Example: Washing soda (Na₂CO₃·10H₂O), hydrated copper sulphate (CuSO₄·5H₂O), gypsum (CaSO₄·2H₂O), plaster of Paris (CaSO₄· $\frac{1}{2}$ H₂O)

4.5 Uses of Different Chemicals

Chemical	Uses
Sodium chloride (NaCl)	<ul style="list-style-type: none"> ★ Preserving pickles ★ Flavouring food ★ In medicines
Sodium hydroxide (NaOH)	<ul style="list-style-type: none"> ★ De-greasing metals ★ Making soaps and detergents ★ Paper making ★ Making of artificial fibres
Chlorine gas (Cl ₂)	<ul style="list-style-type: none"> ★ Water treatment ★ Disinfectants ★ Pesticides
Hydrogen gas (H ₂)	<ul style="list-style-type: none"> ★ Fuels ★ Ammonia for fertilisers ★ Mangarine, Vanaspati ghee
Bleaching powder (CaOCl ₂)	<ul style="list-style-type: none"> ★ Textile industries ★ Disinfectant ★ Paper manufacture
Baking soda (NaHCO ₃)	<ul style="list-style-type: none"> ★ Cooking ★ Making baking powder ★ Antacid ★ Fire extinguishers
Washing soda (Na ₂ CO ₃ ·10H ₂ O)	<ul style="list-style-type: none"> ★ Cleaning agent ★ Removing permanent hardness ★ Glass, soap and paper industries ★ Manufacture of borax
Plaster of Paris (CaSO ₄ · $\frac{1}{2}$ H ₂ O)	<ul style="list-style-type: none"> ★ Setting fractured bones ★ Building construction ★ Toys and decorative items $(CaSO_4 \cdot \frac{1}{2}H_2O) + \frac{3}{2}H_2O \longrightarrow (CaSO_4 \cdot 2H_2O)$ <p style="text-align: right;">(Gypsum)</p>



Mind Map

