

Acids, Bases and Buffers

Acids, Bases are defined by Four main theories

1. **Traditional theory / concept**
2. **Arrhenius theory**
3. **Bronsted and Lowry theory**
4. **Lewis theory**

General concept :

- Acid: are the substance
- Which converts blue litmus paper to red
- Having the PH <7
- Sour taste
- React with bases to form salts and
- water
- Eg :- Hydrochloric acid (HCl)

Base

- **Base: are the substance which converts red litmus paper to blue**
- **Having the PH >7**
- **Bitter taste**
- **React with Acids to form salts and water**
- **Eg: Sodium Hydroxide (NaOH)**

Arrhenius theory

- **In 1884 of Svante Arrhenius Also known as, Arrhenius theory of ionization**
- **b)Electron dissociation theory**
- **This theory define acids & bases according to there formation of ions when dissolved in water**

Acids

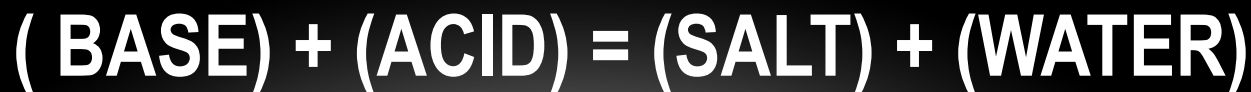
- **An Acid is a substance that can release hydrogen ion (H^+) when dissolved in water or A substance which when dissolved in water gives hydrogen ions (H^+) is known as acid**
- **Hydrochloric acid (HCl)**

Base

- **A Base is a substance that can release a Hydroxyl ion (OH⁻) when dissolved in water Or A substance which when dissolved in water gives Hydroxyl ion (OH⁻) is known as acid**
- **Eg : Sodium Hydroxide [NaOH (Na⁺ + OH⁻)]**

Neutralization reaction

- **Acids react with Base and form Salt & Water**
- **Eg: Hydrochloric acid react sodium hydroxide and form Sodium chloride (Salt) & water**



Limitations

- **Water is essential**
- **Not explain Acidity or Basisity of non aqueous Solvent Eg :Benzene**
- **Basisity of Ammonia (No OH- ion) is not explained**
- **Acidity of BF_3 , AlCl_3 (No H^+ ion) is not explained**

Boric Acid

Hydrochloric acid

Strong ammonium hydroxide

Calcium hydroxide

Sodium hydroxide

Boric Acid
(H₃BO₃ / 61.83)

Syn- Orthoboric Acid, Aecidium boricum

Preparation :-

Borax with Sulphuric acid in presence of water



Properties

Physical Properties:

- White crystalline powder
- Odourless
- Soluble in water
- Soluble in Ethanol
- Soluble in glycerine

Uses of Boric Acid

- Local anti-infective
- To maintain acidic pH medium in Medicament
- Preparation of buffer solution
- In ophthalmic preparation
- Dusting powder
- Preparation of ointment

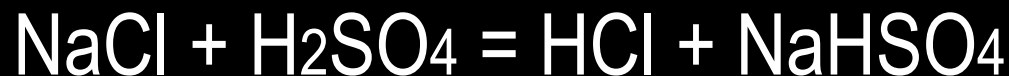
Hydrochloric Acid

HCl / 36.46

Syn: spirit of salt, muriatic acid, acidium hydrochloricum

Preparation :-

Conc.Sulphuric acid react with sodium chloride



Physical Properties

- Clear colorless liquid
- Pungent odour
- Miscible with water
- Miscible with alcohol
- fuming liquid

Uses

- As a Pharmaceutical Aid (Acidifying agent)
- Solvent in Industry
- For Manufacturing of Basic Pharmaceuticals
- Reagent in Laboratory

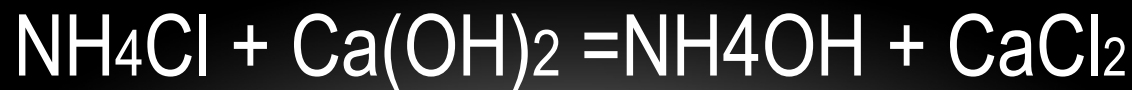
Strong Ammonium Hydroxide

NH₃ / 17.03

Syn: Ammonia solution, ammonium hydroxide, strong ammonium water, liquor ammoniae forties

Preparation:-

By mixing ammonium chloride with slaked lime



Physical Properties

- Clear colourless liquid
- Pungent odour
- Characteristic taste
- Miscible with water
- Aqueous solution is strongly
- Alkaline in nature

Uses

- Alkalizing agent
- Reflux stimulant (fainted person)
- Vasoconstrictor
- Strong base
- Antacid
- Reagent in Laboratory

Calcium hydroxide (Ca(OH)₂ / 74.10)

Synonym: Slaked Lime, Lime water

Preparation:- By treating calcium chloride with sodium hydroxide



Physical Properties: White amorphous powder, Slight bitter taste, Slightly soluble in Water, Insoluble in

Alcohol & soluble in Glycerin

Uses

- Antacid
- Astringent
- Fluid electrolyte
- Emulsifying agent
- Absorb carbon dioxide
- Making of glass
- White washing of cloth

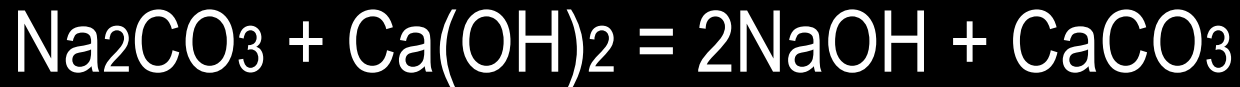
Sodium hydroxide (NaOH / 40)



Syn: Caustic soda, soda lye

Preparation:

By treating sodium carbonate with lime water



Properties :-

White amorphous pellets, Slight bitter taste,
Soluble in water, Soluble in alcohol, Soluble in
glycerine & Deliquescent in nature

Uses

- Alkalizing agent
- Disinfectant for animal houses
- For preparation of soap
- Absorb CO₂ gas
- Common laboratory reagent

Thank U