CHAPTER 12 ACID BASES & SALTS

An Acid is a substance which produces hydrogen Ions as the only positive Ions when dissolve in Water, there are two classes of acid.

I. Organic Acid and Inorganic Acid

Organic acid occurs as natural products in plants or animals, while inorganic are prepared from mineral elements or inorganic matter.

Example of Organic and Inorganic acids

Organic Acid	**Source**
Ethanoic Acid	Vinegar
Lactic Acid	Sour Milk
Citric Acid	Lime Lemon
Amino Acid	Protein
Fatty Acid	Fats and Oil
Ascorbic Acid	Orange

Inorganic Acid	**Formulae**	**Constituent**
Hydrochloric Acid	HCl	Hydrogen & Chlorine
Trioxonitrate (V)Acid	HNO_3	Hydrogen, Nitrogen, Oxygen
TetraoxoSulphate (vi)Acid	H_2SO_4	Hydrogen, Sulphu,r Oxygen

PHYSICAL PROPERTIES OF ACID

1. Dilute acid have a Sour taste Eg lemon

2. Acid turn blue litmus paper to red

3. Concentrated acid are corrosive, courses acid burns

CHEMICAL PROPERTIES OF AN ACID

1. Reacts with metals. Like Zinc, Iron and Magnesium to liberate Hydrogen gas

E.g. $2HCl_{(aq)} + Zn_{(s)} \longrightarrow ZnCl_{(aq)} + H_{2(g).}$

2. An Acid reacts with insoluble bases and alkali to form salt and water as the only products

$2HCl_{(aq)} + CaO_{(s)} \longrightarrow CaCl_{2\,(aq)} + H_2O_{(L)}$

3. Acid reacts with trioxocarbonate (iv) to liberate carbon (iv) oxide.

$2HCl_{(aq)} + Na_2CO_{3\,(aq)} \longrightarrow 2NaCl_{(aq)} + H_2O + CO_{2\,(g)}$

USES OF ACIDS

Acids are used in industrial processes as drying agent, used as oxidizing agents,, use in making fertilizer, detergents and drugs.

BASE: A base is substances which will neutralize an acid to yield a salt and water only.

ALKALI: Is a basic hydroxide which is soluble in water. Most oxide and hydroxides are bases.

Example of Basic Oxides

1. Sodium Oxide $N_{a2}O$

2. Potassium Oxide, K_2O

3. Magnesium Oxide, MgO

4. Sodium Hydroxide, NaOH

5. Aluminium Hydroxide $Al(OH)_3$

6. Copper ii hydroxide, $Cu(OH)_2$

7. Calcium hydroxide CaOH.

Like an acid, a base may be strong or weak eg. Sodium and potassium hydroxides are strong bases that Ionises completely in aqueous solution to produce negatively charged hydroxide Ion (OH^-) and positively charged metal Ions. Weak base Example. CaO Calcium Oxide.

NEUTRALISATION REACTION: is a reaction between an acid and a base to produce salt and water. only

E.g. $HCl + NaOH \longrightarrow NaCl + H_2O$

PHYSICAL PROPERTIS OF BASES / ALKALI

1. Bases have Bitter taste eg lime water

2. Bases are soapy to the touch and slippery eg NaOH solutios

3. Bases turn red litmus paper to blue

4. Concentrated bases are corrosive

CHEMICAL PROPERTIES OF BASES

1. Bases react with an acid to form salt and water

$NaOH + HCl \longrightarrow NaCl + H_2O$

2. Base reacts with ammonium salt to generate ammonia gas

$NaOH_{(aq)} + NH_4NO_3 \longrightarrow NaNO_{3(aq)} + H_2O_{(c)}NH_{3(g)}$

USES OF BASES AND ALKALIS

Used in manufacture of glass

Used in manufacture of soap

Used in manufacture of paper and Rayon

Some bases Alkali are also used to soften hard water.

SALTS

According to Arrhenius: - A salt is a compound whose Ions are left after an acid is neutralised by a Base.

For instance NaCl is a salt because it's Ions (Na^+ and Cl^-) are left in the solution after the acid (HCl) has been neutralized by the base (NaOH).

Another Definition of salt: - Is the compound formed when all or part of the Ionisable or replaceable hydrogen ions of an acid is replaced by metallic ions or ammonia Ion.

EXAMPLE OF SALTS

1. Sodium Chloride Na^+Cl
2. Cupper Sulphur Cu^{2+} SO_4^{2-}
3. Potassium Nitrate K^+ NO_3^-
4. Calcium Carbonate Ca^{4+} CO_3^{2-}