ACID BASE AND SALT PART- 1

WHAT IS ACID??

a substance with particular chemical properties including turning litmus red, neutralizing alkalis, and dissolving some metals; typically, a corrosive or sour-tasting liquid of this kind.

On the basis of origin, acids are classified as :

A. Organic acids: Acids derived from living organisms like plants and animals . For example: citric acid is present in fruits, acetic acid present in vinegar, oxalic acid present in tomato, tartaric acid present in tamarind, lactic acid present in sour milk and curd.

B. Mineral acids: They are also called inorganic acids. They are dangerous Example sulphuric acid (H_2SO_4), hydrochloric acid (HCl) etc.

➢ **On the basis of their strength, acids are classified as** :

a. Strong acids: Completely dissociate into its ions in aqueous solutions. Example: Nitric acid (HNO_3), sulphuric acid (H_2SO_4), hydrochloric acid (HCl).

b. Weak acids: Weak acids are those acids which do not completely dissociate into its ions in aqueous solutions. For example: carbonic acid (H_2CO_3), acetic acid (CH_3COOH).

➢ **On the basis of their concentration, acids are classified as :**

a. Dilute acids: Have a low concentration of acids in aqueous solutions.

b. Concentrated acids: Have a high concentration of acids in aqueous solutions.

➢ **On the basis of number of hydrogen ion, acids can be classified as :**

Monoprotic acid – Such type of acid produces one mole of H+ ions per mole of acid, e.g., HCl , HNO_3

Diprotic acid – They can produce two moles of H+ ions per mole of acid, e.g., H_2SO_4.

Triprotic acid – They produce three moles of H+ ions per mole of acid, e.g., H_3PO_4.

WHAT IS BASE??

– Produce hydroxide ions [OH –] in H2O.
– Water soluble bases are called alkalies.
– Bitter Taste.
– Turn Red Litmus blue.
– Act as electrolytes in Solution.
– Neutralize solutions containing H+ ions.
– Have a slippery, ‘soapy’ feel.
– Dissolve fatty material.

➢ **On the basis of their strength, bases are classified as:**

a. Strong bases: Strong bases are those bases which completely dissociate into its ions in aqueous solutions. Example: sodium hydroxide (NaOH), potassium hydroxide (KOH).

b. Weak bases: Weak bases are those bases which do not completely dissociate into its ions in aqueous solutions. For example: ammonium hydroxide (NH4OH).

➢ **On the basis of their concentration, bases are classified as:**

a. Dilute bases: Have a low concentration of alkali in aqueous solutions.

b. Concentrated bases: Have a high concentration of alkali in aqueous solutions.

➢ Strength Of Acid Or Base Solutions:

A scale for measuring hydrogen ion concentration in a solution, called pH scale has been developed. The p in pH stands for 'potenz' in German, meaning power.

p= potential or Power **H = Hydrogen**

1. pH =7	Neutral Solution	$H_3O^+ = OH^-$
2. pH>7	Basic Solution	$H_3O^+ < OH^-$
3. pH<7	Acidic Solution	$H_3O^+ > OH^-$

➢ pH Sensitivity of Plants & Animals:

• Human body works in a narrow range of pH 7 to 7.8. Acidity can be lethal for plants and animals.

• pH of Digestive System: Stomach secretes HCl to kill bacteria in the food. The inner lining of stomach protects vital cells from this acidic pH.

• pH and tooth decay: Lower pH because of sour food and sweet food can cause tooth decay. The pH of mouth should always be more than 5.5.

• pH as self defense mechanism in plants & animals: Certain animals like bee and plants like nettle secrete highly acidic substance for self defense.

Acid	Base	Salt	Example
Strong	Strong	Neutral	$NaOH + HCl \rightarrow NaCl + H_2O$
Strong	Weak	Acidic	$HCl + NH_4OH \rightarrow NH_4Cl + H_2O$
Weak	Strong	Basic	$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$
Weak	Weak	Neutral	$CH_3COOH + NH_4OH \rightarrow CH_3COONH_4 + H_2O$

1. SALTS FORM BY THE COMBINATION OF ACID AND BASE THROUGH NEUTRALIZATION REACTION.

2. THE ACIDIC AND BASIC NATURE OF SALTS DEPENDS ON THE ACID AND BASE COMBINED IN NEUTRALIZATION REACTION.

PROPERTIES AND USES OF SALTS

The most common salt is sodium chloride or table salt which forms by the combination of sodium hydroxide (base) and hydrochloric acid.

Other examples include Epsom salts ($MgSO_4$) used in bath salts.

Ammonium nitrate (NH_4NO_3) used as fertilizer,

Baking soda ($NaHCO_3$) used in cooking.

The colour of some acid – base indicators in acidic and basic medium are given below :

S. No.	Indicators	Colour in acidic medium	Colour in basic medium
1	Litmus solution	Red	Blue
2	Methyl Orange	Pink	Orange
3	Phenolphthalein	Colourless	Pink
4	Methyl red	Yellow	Red

MENTION THE CHEMICAL NAME AND WHICH ONE IS WEAK AND STRONG ACIDS??

1. CH_3COOH

2. HCl

3. CCl_3COOH

4. H_2SO_3

5. HBr

6. HI

7. $C_2H_2O_4$

MENTION THE NAME WHICH ONE IS WEAK AND STRONG BASE WITH THEIR CGEMICAL NAME ??

1. $CsOH$
2. C_5H_5N
3. $NaOH$
4. $LiOH$
5. H_2S
6. NH_4OH
7. $RbOH$

Thank you