

ScienceAcids, Bases and Salts [Tata Namak]

- Indicators
- Acids
- Bases
- Salt.

* Indicator:- A substance that shows change in colour or smell when come in a contact of acidic and basic solution.

→ It tells whether a substance is acidic or basic.

* Types of Indicators.

(i) Natural Indicators:- An indicators which is extracted from nature called natural indicators.

Ex- Red cabbage, litmus etc.

(ii) Synthetic Indicators:- Indicators that are synthesis in laboratory and industry are called synthetic indicator.

Ex- phenolphthalein, methyl orange

(iii) olfactory indicators:- Indicators that show change in smell or odour in acidic or

basic medium, solution are called olfactory indicator.

Ex - onion, clove oil, vanilla etc.

	Indicator	Original Colour	Acidic Solution	Basic Solution
(i)	Blue litmus	Blue	Red	No change
(ii)	Red litmus	Red	No change	Blue
(iii)	Turmeric	Yellow	No change	Reddish ^{Brown}
(iv)	Red Cabbage	Purple	Reddish	Greenish yellow
(v)	phenolphthalein	Colourless	Colourless	pink
(vi)	methyl orange	Orange	Red	yellow
(vii)	onion	-	No change	Smell vanishes
(viii)	Vanilla	-	No change	Smell vanishes

AINIL

↓

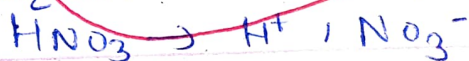
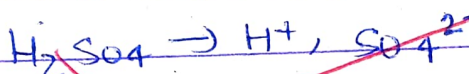
for litmus

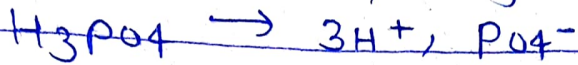
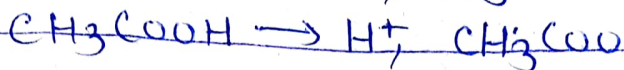
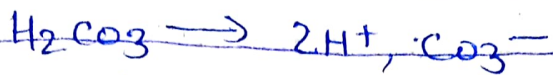
BAIN
GRP

→ for red cabbage

* Acid :- The substance which turns blue litmus to red called acid.

In aqueous soln acid break two ions, H⁺ ions and - ions. The H⁺ ions of all acids is same H⁺ ions. The H⁺ ions is responsible for their acidic property.



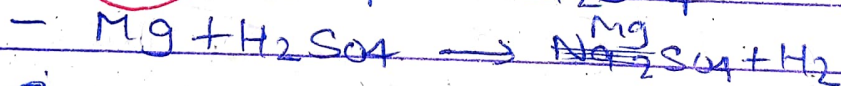
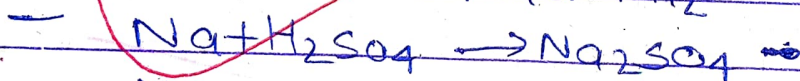
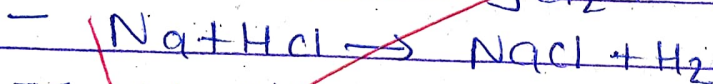
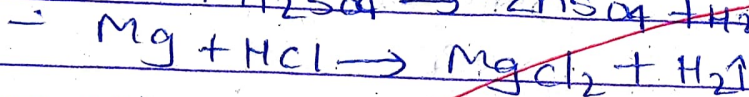
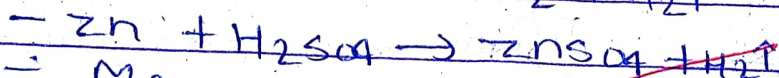
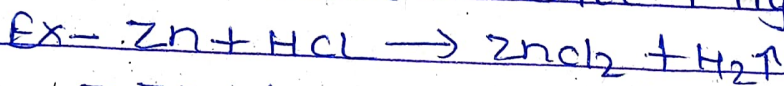


- Acids are corrosive in Nature
- Acids are sour in taste.

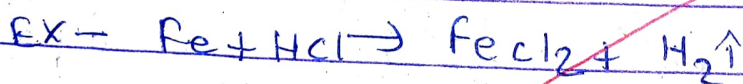
* Chemical properties of Acid.

(i) → Acid reacts with metal to form salt and release H_2 gas.

→ Metal + Acid → Salt + Hydrogen gas.

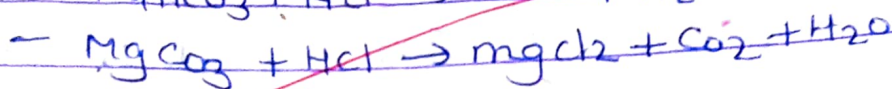
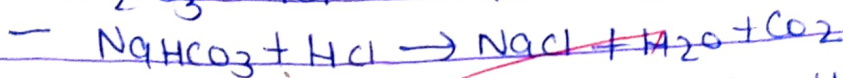
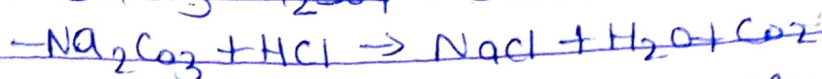
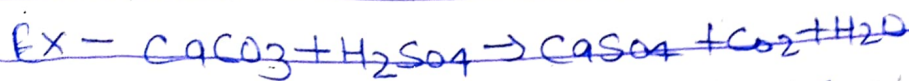


* Trick- Metal positive ions in nature hota hai | Acid ke negative part ko metal ke saath jar denge to form Salt.

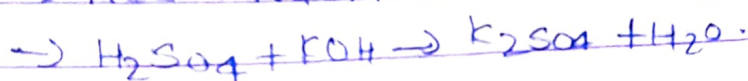
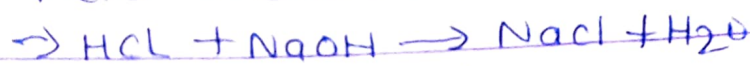
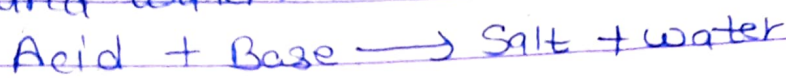


(ii) when Acid reacts with metal carbonate and metal bicarbonate it gives Salt, CO_2 and H_2O .

→ Acid + Metal Carbonate or metal bicarbonate →
Salt + CO_2 + H_2O



(iii) Acid reacts with base to form salt and water.



(iv) Acid react with metal oxide to form salt and water.

OR

Metal oxide is Basic in Nature when it react with acid it form salt and water.

→ Acid + Metal oxide → Salt + Hydrogen gas.



* Uses of acid.

(i) Sulphuric acid is used in batteries of vehicles.

Date: / /
Page No.:

(ii) Nitric acid is used in formation Ammonium Nitrate which is used as fertiliser in Agriculture.

(iii) HCl is used as cleansing agent in toilet.

(iv) Carbonic acid is used in aerated soft drinks.

(v) Salt of Benzoic acid [Sodium Benzoate] is used in food preservation.

* **Base**:- A Base is a compound which produce free hydroxide ion (OH^-) when dissolves in water called base.

→ It is bitter in taste.

→ It feels slippery or soapy to touch

→ It reacts with to form salt and water.

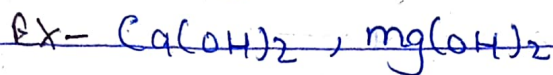
* **Type of Base**

(i) **Strong base**:- Bases which get completely ionised when dissolves in water called Strong bases. It is also known as Alkali.
Ex- NaOH , KOH .

→ Aqueous solution of strong base are good conductors of electricity. They have high concentration of OH^- ions.

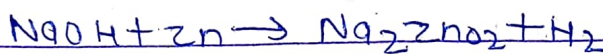
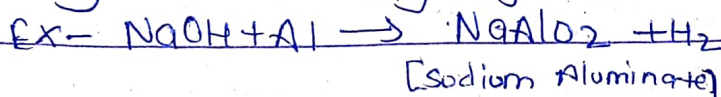
Class: _____
Page No.: _____

(ii) weak bases - Bases which are partially ionised when dissolve in water called weak bases.



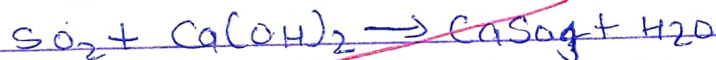
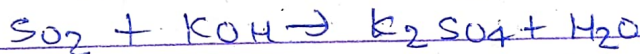
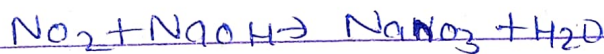
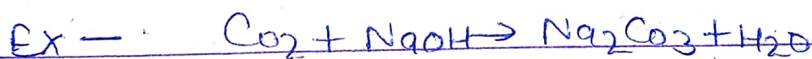
* Chemical properties of base:

→ When Bases like Sodium hydroxide reacts with Active metals like Zinc and Aluminium they liberate hydrogen gas.



(i) Base + Metal \rightarrow Salt + Hydrogen gas.

(ii) when Bases reacts with non-metallic oxide it forms salts and water.

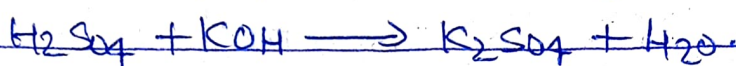
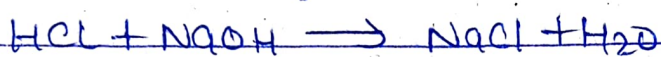


→ Non metallic oxides are Basic in nature

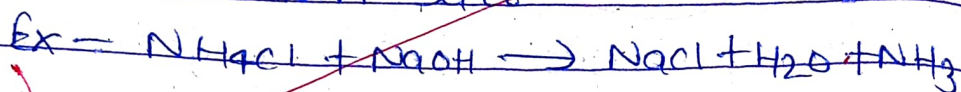
(iii) When Bases reacts with Acid to form Salt and water and the

Date: / /
Page No.:

The process is called neutralisation reaction.

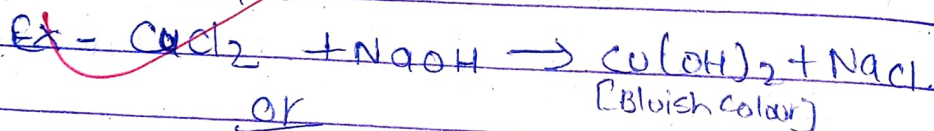


(iv) Bases liberates Ammonia gas from Ammonium salt.



When Ammonium chloride is heated with Sodium Hydroxide it liberates Ammonia gas along with the formation of NaCl and H_2O .

(v) Solution of Alkalies precipitates insoluble hydroxide of metals from the solution of their salt.



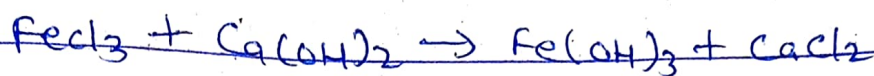
When Alkalies reacts with metallic salt to form metal hydroxide as a precipitate.

→ Jab Alkali kisi metallic salt ke saath react karta h to metal hydroxide as a precipitate form hota h.

→ Whenever Sodium hydroxide reacts with Copper chloride a bluish white precipitate

Date: / /
Page No.:

of Ca(OH)_2 is formed along with NaCl.



→ When Iron chloride react with Calcium hydroxide a reddish brown insoluble precipitate iron hydroxide is formed along with Ca(OH)_2 .

* Similarities between Acids and Bases.

(i) Both Acid and Base react with metal liberate hydrogen gas.

(ii) Both Acids and Bases are good conductor of Electricity in their Aqueous Solution.

(iii) Both Acids have the tendency to release ions when dissolve in water.

(iv) Both Acids and bases are Corrosive in Nature.

(v) Both acids and bases change the colour of litmus paper

(vi) Both acid and bases when mixed with water produces a lot amount of heat.

Date: _____
Page No. _____

* Do all acids and bases released ions when dissolve in water.

Ans Acid dissociates in their aqueous solution to released ions. This ions responsible for the ~~conductor~~ conduction of electricity in their aqueous solution. ~~acids do not dissociate in the absence of water that's why dry HCl gas has no effect on litmus paper.~~

* Uses of base.

- NaOH is used for making soaps.
- $Mg(OH)_2$ is used as an antacid.
- $Ca(OH)_2$ is used for white washing and for the preparation of bleaching powder. or used in Agriculture.
- Ammonium hydroxide is used as cleansing agent and for the formation of ammonium salt.

* pH [potenz of Hydrogen].

- The strength of an acidic and basic solution is determined by the concentration of H^+ and OH^- in it. The concentration of these ions is described by a parameter is called pH.

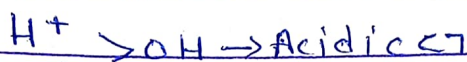
→ A device is used to measure pH of a solution is called pH scale or pH meter.

→ its range lies b/w 0 to 14.

→ for an acidic soln pH value is less than 7.

→ for a basic soln pH value is more than 7.

→ for neutral soln pH value is equal to 7.



* Importance of pH is everyday life.

→ pH plays vital role in the digestion of food and other bio chemical substance in the human and animal body. gastric juice have the pH value 1-2 due to secretion of HCl.

→ The pH change results in tooth decay.

Enamel of teeth is made up of $Ca_3(PO_4)_2$

it gets corroded when the pH of mouth is below 5.5 in acidic condition and

a yellow layer is formed over the teeth

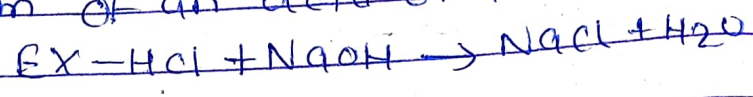
to neutralise the effect of acid we use

toothpaste containing base for detriming

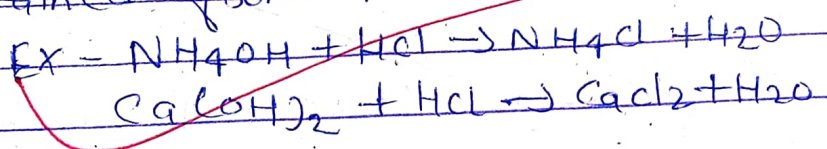
→ Plants also requires a specific pH range for the proper growth the soil may be acidic, basic or neutral depending upon the concentration of H^+ and OH^- ions.

* Salt

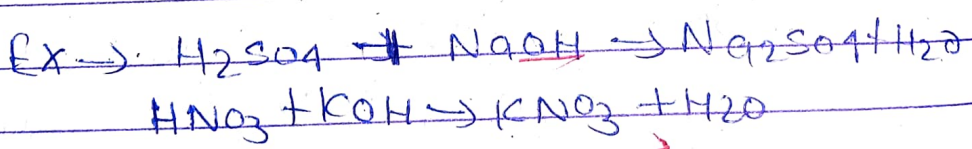
→ An ionic compound formed by the reaction of an acid or a base.



→ Cation of salt is always obtained from base and Anion is always obtained from acid.

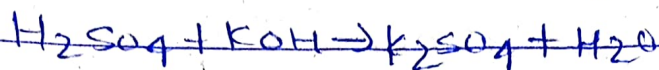
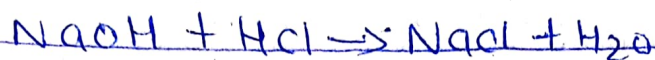


→ If an acid ^{end} with "ic" react with a base, the salt form will end with "ate".



* Classification of salt.

(i) Neutral Salt:- It is formed when strong acid and strong base reacts with each other.

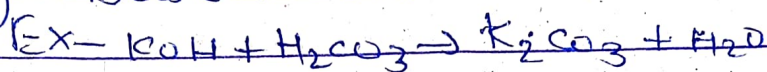


(ii) Acidic salt.

→ It is formed when strong acid and weak base reacts with each other.

(iii) Basic salt.

→ It is formed when weak acid and strong base react each other.

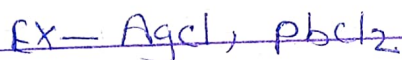


* Solubility of salt.

→ Salt of sodium and potassium are soluble in water.



→ Salt of silver and mercury and lead are insoluble in water.



* Chemical compound form various salt.

(i) NaOH [Caustic soda] :-

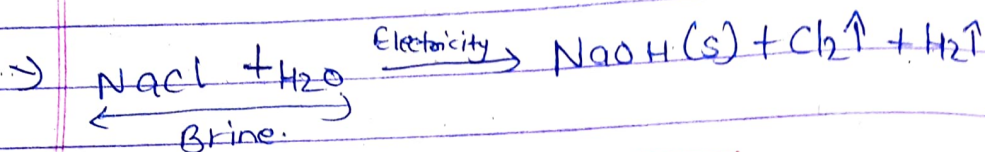
(a) preparation :-

(i) It is prepared by the electrolytic

decomposition of Aqueous solution of NaCl called Brine.

→ When electricity is passed through the brine it decomposes into sodium hydroxide, chlorine gas and hydrogen gas.

→ chlorine gas gets accumulated at anode and H_2 gas gets accumulated at cathode.



* Properties

→ It is white crystalline powder.

* Used

→ It is used for making soaps and detergents.

→ It is used as cleaning agent.

→ It is used for manufacturing paper.

→ It is used for making artificial textile fibre.

→ It is used in de-greasing metals, oil refining, and making dyes and bleaches.