

Sundas Saqib Acids, Bases & Salts

Chapter #02

Properties of Acid.	Properties of Base	Arrhenius Concept:- (1887)	Bronsted-Lowry Concept	Amphoteric Substances
- Tastes sour. - Turns red on blue litmus paper. - no effect on red litmus. - Corrosive for skin	- Tastes Bitter - no effect on blue litmus. - turns blue on red litmus. - Corrosive on skin	Acid:- Ionizes in water to produce H^+ ions. Base:- Ionizes in water to produce OH^- ions. Examples:- $H_2O \rightleftharpoons H^+ + OH^-$ $HCl \rightleftharpoons H^+ + Cl^-$ $NaOH \rightleftharpoons Na^+ + OH^-$	Acid:- Proton donor Base:- Proton acceptor Example:- $HCl + H_2O \rightarrow H_3O^+ + Cl^-$ $H_2O + NH_3 \rightarrow NH_4^+ + OH^-$	$HCl + H_2O \rightarrow H_3O^+ + Cl^-$ acid base $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$ base acid In one example water donates H^+ while in other it accepts H^+. This means water acts as an acid as well as base. It is amphoteric in nature. Substances that react with both acids and bases are called Amphoteric substances.
Lewis Concept:- (1923) Acid:- Substance that accepts a pair of e^- to form covalent coordinate bond. Base:- Substance that donates a pair of e^- to form covalent coordinate bond. $\therefore$ A coordinate covalent bond is formed b/w the acid & base Example:- $HCl + H_2O \rightleftharpoons H_3O^+ + Cl^-$ base acid		Intro:- 1887 Self-ionization of water Definition:- Reaction in which two water molecules produce ions. $\rightarrow$ occurs at a small extent $2H_2O \rightarrow H_3O^+ + OH^-$ $H_2O \rightarrow H^+ + OH^-$ At $25^\circ C$ concentration of H^+ & OH^- is $1 \times 10^{-7} M$. $K_c = [H^+][OH^-]$ $K_w = [H_3O^+][OH^-]$ $K_w = (1 \times 10^{-7})(1 \times 10^{-7})$ $K_w = 1 \times 10^{-14}$	pH Scale:- A number scale from 0-14 to describe concentration of H^+ ions in a solution. $pH = 7$ (neutral) $pH < 7$ (acid) $pH > 7$ (base)	Measurement of pH:- - universal indicator paper. - litmus paper. - Indicators (methyl red, Bromothymol blue, phenolphthalein) - pH meter.
pH:- Negative logarithm of the molar concentration of H^+ ions in aqueous solutions. $pH = -\log [H^+]$ $[H^+] = 1 \times 10^{-7} M$ $pH = -\log (1 \times 10^{-7})$ $pH = 7$ (pH of water)	$[H^+] = [OH^-] = 1 \times 10^{-7}$ (neutral) $[H^+] > 1 \times 10^{-7}$ (acidic) $[H^+] < 1 \times 10^{-7}$ (basic)	Application of pH:- - create soil conditions for plant growth. - medical diagnosis. - maintaining acid-base balance in swimming pools. - electroplating. - manufacture of medicines.	Etch Art:- It is a type of art in which a glass or metal is covered with a thin layer of wax. Then patterns are carved onto the wax and the glass or metal with pattern is dipped into any acid. Acid eats away at the exposed portion, leaving behind a textured mark. Plate is taken out of acid and cleaned. Inks can be used to make the designs colourful.	Salts:- An acid contains replaceable hydrogen atoms. When these are completely or partially replaced by metal cations, salt is formed. $HCl \rightarrow NaCl$
POH:- Negative logarithm of molar concentration of OH^- ions in aqueous solutions. $pOH = -\log [OH^-]$	Neutral Salt:- salt formed by complete neutralization of an acid is normal salt. Example:- Na_2CO_3 $H_2CO_3 + 2NaOH \rightarrow Na_2CO_3 + H_2O$	Basic Salt:- salt containing replaceable OH group. Example:- $Zn(OH)_2$ $Zn(OH)_2 + HCl \rightarrow ZnCl_2 + H_2O$	Acid Salt:- salt containing replaceable H group. Example:- $NaHCO_3$ $H_2CO_3 + NaOH \rightarrow NaHCO_3 + H_2O$	SLD
Methods for making Salts:- - Acid + Base $\rightarrow$ Salt + Water - Acid + metal $\rightarrow$ Salt + Water - Acid + Metal $\rightarrow$ Salt + Hydrogen	1. Acid + Base $\rightarrow$ Salt + Water $HCl + NaOH \rightarrow NaCl + H_2O$ 2. Acid + metal $\rightarrow$ Salt + Water $H_2SO_4 + CuO \rightarrow CuSO_4 + H_2O$ 3. Acid + Metal $\rightarrow$ Salt + Hydrogen $2HCl + Mg \rightarrow MgCl_2 + H_2$	4. Acid + carbonate $\rightarrow$ Salt + dioxide + water $2HCl + CaCO_3 \rightarrow CaCl_2 + CO_2 + H_2O$ 5. Salt + Salt $\rightarrow$ Salt + Salt $AgNO_3 + NaCl \rightarrow AgCl \downarrow + NaNO_3$	CORNER:- Q:- Clarify water as proton donor and proton acceptor? Q:- What is Lewis-acid base concept? Give examples. Q2: What is Bronsted-Lowry concept? Explain with examples? Q3: What is the effect of acid on a blue litmus paper? Q4: What are some properties of acid? Q5: Differentiate between acids and bases. Q: Write the methods for making salts with reactions.	Uses of salts:- - Salts such as benzoates, sulphites are used in preservation of food for thousands of years. - Side effects of preservatives:- can cause breathing difficulties, weaken heart tissues & transform into carcinogens.