Overview of Acid Base Salt Solutions

Def. salt – general name of an ionic compound
- In acid-base reactions, salts are made up of the cation of a strong base reacting with the anion of a strong acid
- All salts are strong electrolytes

3 Definitions of Acid and Bases

- Arrhenius Definition (one we will use)
- Bronsted-Lowry (B-L)
- Lewis

Acids

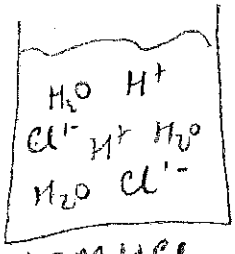
Arrhenius Def of Acid – A molecular compound that ionizes in H_2O to produce H^+ and anion.
H^+ is called Hydronium ion, $H^+ \equiv H_3O^+$

Some Properties of Acid –
- Taste sour
- Reacts with metals to form Hydrogen gas ($H_{2(g)}$)
- Turns Litmus paper red
- Neutralizes bases.

2 Types of Acids – based on substance

Strong acid – ionizes 100%

? which acid strong? 7 strong acid
HCl, HBr, HI, HNO_3, H_2SO_4, $HClO_3$, $HClO_4$

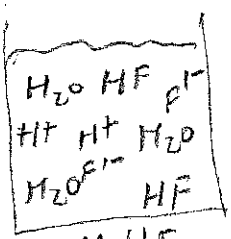


1.0M HCl

- $HCl \rightarrow H^+ + Cl^-$
- no HCl molecule in solution, only ions
- Counting $[H^+]$ requires STOICHIOMETRY

Weak acid – "NOT" ionize 100%
All other acids

- $HF \rightleftharpoons H^+ + F^-$
- Both HF molecule & ions in solution
- Count $[H^+]$ requires Equilibrium



1.0M HF

pH scale – $[H^+]$ counter

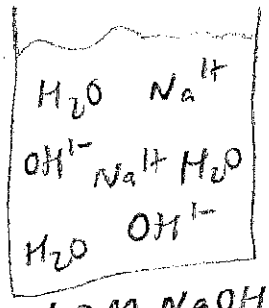
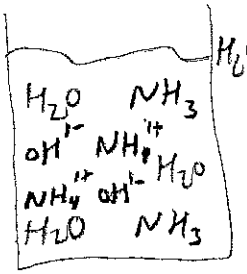
Overview of Acid Base Salt Solution (Cont'd)

Bases

Arrhenius Def of Base - An ionic (or molecular) compound that dissociates (ionizes) in H_2O to produce OH^{1-} and cation.

Some Properties of Bases -
- Taste bitter
- slippery to the touch
- Turns Litmus paper blue
- Neutralizes acid

2 Types of Bases - based on substances

Strong base - dissociates 100%	weak base - "NOT" dissociate 100% (ionize)
? which base strong? - Group 1 or 2 metal hydroxides (i.e. NaOH, $Ca(OH)_2$)	NH_3 (ammonia) and its derivatives (CH_3NH_2) methyl amine
 1.0M NaOH	$H_2O + NH_3 \rightleftharpoons NH_4^{1+} + OH^{1-}$  1.0M NH_3
• $NaOH \rightarrow Na^{1+} + OH^{1-}$ • no NaOH ionic compounds in solution, only ions • Counting $[OH^{1-}]$ requires STOICHIOMETRY	• Both NH_3 molecule + ions in solution • Counting $[OH^{1-}]$ requires Equilibrium

pOH scale - $[OH^{1-}]$ counter