November 20, 2008
Chem 116 Lecture 20 Notes
TC

pH (information about):

- The measurement of the Hydronium ion concentration.
- Finding the pH of an acid given its concentration:
>> $pH = -\log[H^+]$
>> $[H^+]$ = Concentration in M ($^{mols}/_{liters}$)
- Finding the concentration ($[H^+]$):
>> $[H^+]$ = antilog(-pH)
>> antilog = 10^x (on some calculators)
>> to get 10^x on some graphing calculators you have to type it: 10 ^ x
- H_3O^+ are called 'Hydronium Ions'.
- H^+ (ions) don't actually exist in a solution.

- The lower the pH, the more acidic it is.
- The higher the pH, the less it is acidic, and it is more basic instead.

Acid-Base Problems:

> Predicting pH:
- Amount of Acid, Base, and/or salt (added to water) are given.
- The variables are 'strong', 'weak', acid, and/or base.
- Salts in this type of problem can break apart in water into ions that are actually weak acids
  or weak bases.
> Equilibrium:
- The measurement of the pH is often given.
- Figuring out how much acid, base, or salt added in water in order for you to match the
  pH value given.
> Titration:
- Concentration of an unknown acid or base solution is given.
- Neutralize it by the known amount of acid or base to get the unknown concentration.
- Stoichiometry is involved because a neutralization reaction is occurring.
- "Equivalence point" of a titration (the inflection point on the titration curve) is the point
  where moles of acid = moles of base
- Weak acids or bases involve equilibrium calculations.

Strong Acids or Bases:

> Strong Acids:
>> HCl, H_2SO_4, HNO_3, $HClO_4$, and HBr
> Strong Bases:
>> Most metal cations with OH^- ions.
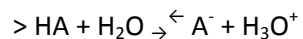> Stronger acids and bases dissociate more than others or completely. The easier that 'H^+' can be

removed, it indicates that it is a strong acid.
> Weak acids and bases only partially ionize.

Acid-Base Equilibria:
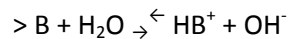> A general Acid Reaction has the equilibrium constant K_a.
> > Its form:
> > > HA + H_2O $\underset{\rightarrow}{\overset{\leftarrow}{}}$ A^- + H_3O^+

> A general Base Reaction has the equilibrium constant K_b.
> > Its form:
> > > B + H_2O $\underset{\rightarrow}{\overset{\leftarrow}{}}$ HB^+ + OH^-

> If an Acid-Base reaction is given, the direction of equilibrium can be determined.

Buffers:
> A buffer is when approximately equal amounts of a weak acid and its conjugate base are both present in the solution.

Hydrolysis:
> An ion that comes from a 'salt'. When 'salt' is added to water, it breaks apart into its basic + and – ions.
> The broken up ions can be weak acids or bases by themselves.