CHEMISTRY 12
ACID BASES UNIT
Lesson #7-8
K_W, K_a and K_b

When a STRONG ACID and a STRONG BASE react a great amount of HEAT is RELEASED, therefore the reaction is said to be_____.

Formula Equation for NaOH and HCl:

Complete Net Ionic Equation:

Net Ionic Equation:

By CONVENTION, the SELF-IONIZATION reaction of water is written as:

The EQUILIBRIUM EXPRESSION for the self-ionization of water is:

Kw=

Because the only thing that affects Keq is TEMPERATURE, what would happen to the Kw value if heat was ADDED to the system?If heat was removed from the system?

SOME IMPORTANT RELATIONSHIPS:
In a NEUTRAL SOLUTION-

In an ACIDIC SOLUTION-

In a BASIC SOLUTION-

Recall: In an aqueous solution the [Strong acid] = $[H_3O^+]$
   In an aqueous solution the [Strong base]=$[OH^-]$

Example 1. What is the $[H_3O^+]$ and $[OH^-]$ in 0.0010 M HCl (aq)?

Example 2. What is the $[H_3O^+]$ and $[OH^-]$ in 0.150 M $Ca(OH)_2$?

To solve problems for $[H_3O^+]$ or $[OH^-]$ using the Kw $=1.00 \times 10^{-14}$ note that if the $[H_3O^+]$ increases then the $[OH^-]$ decreases, and vice versa so that the Kw value is kept CONSTANT!!!

IMPT: unless you are told otherwise, assume the temperature is at @25 C and therefore the value of Kw is 1.00×10^{-14}
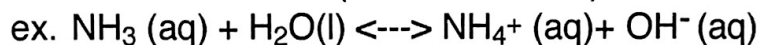
THE ACID IONIZATION CONSTANT (for weak acids):

ex. $CH_3COOH(aq) + H_2O(l) \longleftrightarrow CH_3COO^- (aq) + H_3O^+ (aq)$
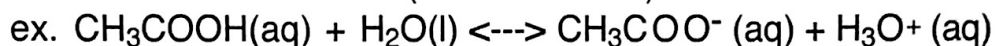
$Ka=$

The value for Ka is called the _____. The larger the Ka the _____ and vice versa.

THE BASE IONIZATION CONSTANCT (for weak bases):

ex. $NH_3 (aq) + H_2O(l) \longleftrightarrow NH_4^+ (aq) + OH^- (aq)$

$Kb=$

The value for the Kb is called the _____. The larger the Kb the _____ and vice versa.

NOTICE: the TABLE OF RELATIVE STRENGTHS OF ACIDS and BASES only gives the Ka values, in the next lesson we will learn how to use the Ka to calculate the Kb.

SEATWORK/HOMEWORK: Exercises 28-34
PLO's:L1-L7 also from previous lessons you are able to do K10-K12