Name:_____
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Chemistry 12
ACID BASE Lesson #3+4

H_3O^+ and BRØNSTED-LOWRY ACIDS AND BASES

The water molecule is a *POLAR MOLECULE* that has a *DIPOLE* with one end being slightly **positive** and the other end being slightly **negative**. This characteristic can be illustrated with a LEWIS DOT STRUCTURE:

Any H^+ ion in water is so strongly attracted to the negatively charged side of the water molecule that following structure exists:

We refer to this structure as the **HYDRONIUM ION** or **HYDRATED PROTON**, NOTE: H^+ is often referred to as the _____. (remember this)

THEREFORE:

Example 1. In Chemistry 11 when we wrote the ionization reaction for HCl (g), the reaction looked like this:

Now we can re-write this as:

BRØNSTED LOWRY THEORY OF ACIDS AND BASES

As we saw in lesson #1 the Arrhenius definitions of acids and bases are slightly flawed. They do not account for acids and bases that exist in EQUILIBRIUM reactions, so a different definition had to be established.

ACID-_____

BASE-_____

Examine a typical Bronsted-Lowry acid base reaction:

$$NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$$

NH_3 is the _____ as it is _____.
while
H_2O is the _____ as it is _____.

Example 2. In the following reaction which reactant is the acid and which is the base?

$$CH_3COOH + H_2O \leftrightarrow CH_3COO + H_3O^+$$

Notice that in the first example water is a _____ while in the second example it is a _____.

Any substance that can act as either an acid or a base is said to be

_____

Apart from **water** there are TWO GUIDELINES that you can use to identify an AMPHIPROTIC substance:
1.

2.

Therefore the following substances are all amphiprotic:

In every Bronsted-Lowry reaction there is an acid and a base on BOTH sides of the equation.
Example 3. Label the species on both sides of the reaction as either an acid or a base. $HF + SO_3^{2-} \leftrightarrow F^- + HSO_3^-$

1.

2.

3.

Seatwork/HOMEWORK: Exercises 10 –14
PLO's: J6-J9