CHEM NOTES - Acids and Bases

Name: _____

I. Operational Definition - based on experimental observations

A. *Acids*

1. Aqueous solutions of acids conduct electricity.
   a) _____ acids ionize almost completely and are _____ electrolytes.
   b) _____ acids ionize to a much smaller degree.
2. Acids cause color changes in acid-base indicators.
   a) Litmus is _____ in an acid and _____ in a base.
   b) Phenolphthalein is _____ in an acid and _____ in a base.
3. Acids have a sour taste.
4. Dilute acids react with certain metals to produce _____ gas.
   a) Magnesium will react with dilute hydrochloric acid as follows:

      $Mg + HCl \rightarrow$ _____ + _____

   b) Magnesium will react with dilute acetic acid as follows:

      $Mg + HC_2H_3O_2 \rightarrow$ _____ + _____

   c) Metals that will not react with dilute acids include: _____, _____, _____, _____, and _____.
5. Acids react with hydroxides to form water and a salt.
   a) For example: Nitric acid reacts with sodium hydroxide:

      $HNO_3 + NaOH \rightarrow HOH + NaNO_3$

   b) This reaction is called _____.
6. Arrhenius theory = an acid is a substance that yields hydrogen ions in aqueous solutions
   a) For example:

      $HCl \rightarrow$ _____ (aq) + _____ (aq) or

      $HCl + H_2O \rightarrow$ _____ (aq) + _____ (aq)

   ** $H_3O^+$ is known as the _____ ion
   b) Strong acids ionize almost 100 %. There are 6 strong acids: _____, _____, _____, _____, _____, and _____
   c) Weak acids ionize to a much smaller extent. Most acids in nature are weak acids.
7. Bronsted-Lowry theory: an acid is any species (molecule or ion) that can donate a _____.

B. *Bases*

1. Aqueous solutions of bases conduct electricity.
2. Bases cause color changes in indicators.
3. Aqueous solutions of baes feel _____.
4. Bases neutralize acids to form a salt and water.
5. Strong bases are caustic to the skin.

6. Arrhenius definition - a base is a substance that yields hydroxide ions as the only negative ions in aqueous solutions.

For example: $NaOH \rightarrow$ _____ (aq) + _____ (aq)

a) Strong bases are the hydroxides of the Group 1 and 2 metals.

7. Bronsted-Lowry theory: a base is any species that can accept a _____.

a) Some molecules and ions that are classified as Bronsted-Lowry bases are not bases in the Arrhenius sense.

For example:

$NH_3 + H_2O =$ _____ + _____

Inthe forward rxn (left to right), the _____ accepts the proton and it is the base, while the _____ donates the $H^+$ and it is considered the acid.

In the reverse rxn (right to left), the _____ accepts the proton and is the base, while the _____ donates the $H^+$ and is the acid.

Other facts: