

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.

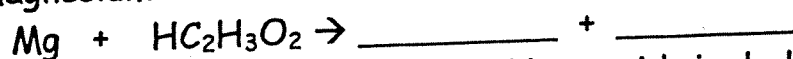
3. Acids have a sour taste.

4. Dilute acids react with certain metals to produce _____ gas.

a) Magnesium will react with dilute hydrochloric acid as follows:



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

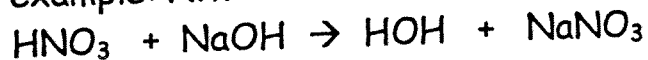


c) Metals that will not react with dilute acids include: _____,

_____, _____, _____, and _____.

5. Acids react with hydroxides to form water and a salt.

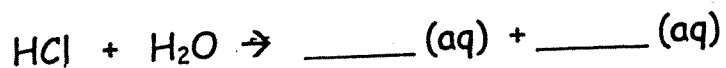
a) For example: Nitric acid reacts with sodium hydroxide:



b) This reaction is called _____.

6. Arrhenius theory = an acid is a substance that yields hydrogen ions in aqueous solutions

a) For example:



** 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 bases 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: $\text{NaOH} \rightarrow \text{Na}^+ (\text{aq}) + \text{OH}^- (\text{aq})$

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 proton.

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

For example:



In the forward rxn (left to right), the OH^- accepts the proton and it is the base, while the NH_3 donates the H^+ and it is considered the acid.

In the reverse rxn (right to left), the NH_4^+ accepts the proton and is the base, while the OH^- donates the H^+ and is the acid.

Other facts: