

**Review section:**

1. Fill in the missing formula or name of the following acids or bases

- |                        |                                   |
|------------------------|-----------------------------------|
| a. nitric acid         | k. nitrous acid                   |
| b. phosphorous acid    | l. hydrochloric acid              |
| c. hydrobromic acid    | m. carbonic acid                  |
| d. magnesium hydroxide | n. barium hydroxide               |
| e. lithium hydroxide   | o. sodium hydroxide               |
| f. HCl                 | p. HNO <sub>3</sub>               |
| g. HClO                | q. HNO <sub>2</sub>               |
| h. HClO <sub>2</sub>   | r. H <sub>2</sub> SO <sub>3</sub> |
| i. HClO <sub>3</sub>   | s. H <sub>2</sub> SO <sub>4</sub> |
| j. HClO <sub>4</sub>   | t. H <sub>2</sub> S               |

2. Acids react with metals in single replacement reactions to produce hydrogen gas.

ex.  $\text{Mg} + 2 \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$  Write balanced equations for the reaction of...

- zinc + hydrochloric acid
- magnesium + phosphoric acid
- aluminum + sulfuric acid

3. Neutralization reactions are double replacement reactions between Arrhenius acids and bases. The products are water and a salt. ex.  $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ . (water is sometimes written HOH to show combination of H<sup>+</sup> with OH<sup>-</sup>). Write balanced neutralization reactions:

- sulfuric acid + calcium hydroxide
- nitric acid + magnesium hydroxide
- phosphorous acid + potassium hydroxide
- hydrobromic acid + aluminum hydroxide

**Bronsted-Lowry Theory (read 598-599 and 602 to 604)**

4. What are the definitions of Bronsted acids and bases? What is the primary difference compared to the Arrhenius theory?