Chemistry – Chapter 19 Book problems #1: Arrhenius & Brønstad-Lowry acids/bases

1. What is the Arrhenius definition of an acid and a base?

2. How are acids and bases defined by the Brønstad-Lowry theory?

3. How are the properties of acids and bases similar? How are they different? (do a quick Google search for similarities and differences between acids and bases)

4. Write a chemical equation for the ionization of HNO_3 in water and for the reaction of CO_3^{2-} with water. Identify the hydrogen-ion donor and the hydrogen-ion acceptor in each equation. Then, label the conjugate acid-base pair in the two equations. (We solve this just like we do our Arrhenius analysis).

5. Classify each compound as an Arrhenius acid or an Arrhenius base:

A. $Ca(OH)_2$ C. HNO_3 E. HBr

B. CH_3COOH D. KOH F. H_2SO_4

6. Identify each reactant in the following equations as a hydrogen-ion donor (acid) or a hydrogen-ion acceptor (base):

A. $HNO_3 + H_2O \rightarrow H_3O^+ + NO_3^-$

B. $CH_3COOH + H_2O \rightarrow H_3O^+ + CH_3COO^-$

C. $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$

D. $H_2O + CH_3COO^- \rightarrow CH_3COOH + OH^-$

7. Label the conjugate acid-base pairs for each equation in question #6.

8. Write the formula and name of the conjugate base of each Brønstad-Lowry acid:

A. HCO_3^- C. HI

B. NH_4^+ D. H_2SO_4

9. Write the formula and name of the conjugate acid of each Brønstad-Lowry base:

A. ClO_2^- C. $H_2PO_4^-$

B. H_2O D. NH_3

10. Use the Brønstad-Lowry and Lewis definitions of acids and bases to identify each **reactant** as an acid or a base:

A. $KOH + HBr \rightarrow KBr + H_2O$ B. $HCl + H_2O \rightarrow Cl^- + H_3O^+$

11. Write the formula for the conjugate base of each of the following acids:

A. H_2SO_4 C. H_2O

B. CH_3COOH