Name _____ Date _____ Class _____

19 ACIDS, BASES, AND SALTS

Practice Problems

In your notebook, solve the following problems.

SECTION 19.1 ACID–BASE THEORIES

1. Identify the hydrogen ion donor(s) and hydrogen ion acceptor(s) for ionization of H_2SO_4 in water. Label the conjugate acid–base pairs.
2. Identify all of the ions that may be formed when H_3PO_4 ionizes in water.
3. Classify the following acids as monoprotic, diprotic, or triprotic.
   a. HCOOH **b.** HBr **c.** H_2SO_3 **d.** H_3ClO_4
4. What would you expect to happen when lithium metal is added to water? Show the chemical reaction.
5. In the following chemical reaction, identify the Lewis acid and base.
   $$BF_3 + F^- \rightleftharpoons BF_4^-$$
6. Describe some distinctive properties of acids.
7. Describe some distinctive properties of bases.

SECTION 19.2 HYDROGEN IONS AND ACIDITY

1. A solution has a hydrogen ion concentration of $1 \times 10^{-6} M$. What is its pH?
2. What is the pH of a solution if the $[H^+] = 7.2 \times 10^{-9} M$?
3. What is the pOH of a solution if the $[OH^-] = 3.5 \times 10^{-2} M$?
4. What is the pOH of a solution that has a pH of 3.4?
5. Classify each solution as acidic, basic, or neutral.
   a. $[H^+] = 2.5 \times 10^{-9} M$
   b. pOH = 12.0
   c. $[OH^-] = 9.8 \times 10^{-11} M$
   d. $[H^+] = 1 \times 10^{-7} M$
   e. pH = 0.8
6. Calculate the pH of each solution.
   a. $[H^+] = 1 \times 10^{-5} M$
   b. $[H^+] = 4.4 \times 10^{-11} M$
   c. $[OH^-] = 2.2 \times 10^{-7} M$
   d. pOH = 1.4
7. Classify the solutions in problem 6 as acidic or basic.
8. Why is there a minus sign in the definition of pH?
9. A solution has a pOH of 12.4. What is the pH of this solution?
10. What is the pH of a solution with $[H^-] = 1 \times 10^{-3} M$?