Name KEY Date _____ Class _____

19 ACIDS, BASES, AND SALTS

Practice Problems

In your notebook, solve the following problems.

#s 3,4,6,7

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. Donates H^+ $H_2SO_4 + H_2O \rightarrow HSO_4^- + H_3O^+$ Accepts H^+
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. $2Li + 2H_2O \rightarrow 2LiOH + H_2$
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. sour, burns, electrolyte
7. Describe some distinctive properties of bases. bitter, slippery, electrolyte

#s 1-7, 9

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? pH = 6.0
2. What is the pH of a solution if the $[H^+] = 7.2 \times 10^{-9} M$? pH = 8.14
3. What is the pOH of a solution if the $[OH^-] = 3.5 \times 10^{-2} M$? pOH = +1.46
4. What is the pOH of a solution that has a pH of 3.4? pOH = 10.6
5. Classify each solution as acidic, basic, or neutral.
   a. $[H^+] = 2.5 \times 10^{-9} M$ pH = 8.60, BASE **d.** $[H^+] = 1 \times 10^{-7} M$ pH = 7.0, NEUTRAL
   b. pOH = 12.0 pH = 2.0, ACID **e.** pH = 0.8 ACID
   c. $[OH^-] = 9.8 \times 10^{-11} M$ pOH = 10.0, pH = 4.0, ACID
6. Calculate the pH of each solution.
   a. $[H^+] = 1 \times 10^{-5} M$ pH = 5.0, ACID **c.** $[OH^-] = 2.2 \times 10^{-7} M$ pOH = 6.66, pH = 7.34, slight BASE
   b. $[H^+] = 4.4 \times 10^{-11} M$ pH = 10.36, BASE **d.** pOH = 1.4 pH = 12.6, BASE
7. Classify the solutions in problem 6 as acidic or basic. SEE ABOVE
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? pH = 1.6
10. What is the pH of a solution with $[H^-] = 1 \times 10^{-3} M$?