Name _____ Date _____ Class _____

CHAPTER 14 REVIEW

Acids and Bases

SECTION 1

SHORT ANSWER **Answer the following questions in the space provided.**

1. Name the following compounds as acids:

_____ **a.** H_2SO_4

_____ **b.** H_2SO_3

_____ **c.** H_2S

_____ **d.** $HClO_4$

_____ **e.** hydrogen cyanide

2. _____ Which (if any) of the acids mentioned in item **1** are binary acids?

3. Write formulas for the following acids:

_____ **a.** nitrous acid

_____ **b.** hydrobromic acid

_____ **c.** phosphoric acid

_____ **d.** acetic acid

_____ **e.** hypochlorous acid

4. Calcium selenate has the formula $CaSeO_4$.

_____ **a.** What is the formula for selenic acid?

_____ **b.** What is the formula for selenous acid?

5. Use an activity series to identify two metals that will not generate hydrogen gas when treated with an acid.

_____

6. Write balanced chemical equations for the following reactions of acids and bases:

a. aluminum metal with dilute nitric acid

_____

b. calcium hydroxide solution with acetic acid

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CHAPTER 14 REVIEW

Acids and Bases

SECTION 2

SHORT ANSWER **Answer the following questions in the space provided.**

1. **a.** Write the two equations that show the two-stage ionization of sulfurous acid in water.

b. Which stage of ionization usually produces more ions? Explain your answer.

2. **a.** Define a Lewis base. Can OH^- function as a Lewis base? Explain your answer.

b. Define a Lewis acid. Can H^+ function as a Lewis acid? Explain your answer.

3. Identify the Brønsted-Lowry acid and the Brønsted-Lowry base on the reactant side of each of the following equations for reactions that occur in aqueous solution. Explain your answers.

a. $H_2O(l) + HNO_3(aq) \rightarrow H_3O^+(aq) + NO_3^-(aq)$

b. $HF(aq) + HS^-(aq) \rightarrow H_2S(aq) + F^-(aq)$

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CHAPTER 14 REVIEW

Acids and Bases

SECTION 3

SHORT ANSWER **Answer the following questions in the space provided.**

1. Answer the following questions according to the Brønsted-Lowry definitions of acids and bases:

_____ **a.** What is the conjugate base of H_2SO_3?

_____ **b.** What is the conjugate base of NH_4^+?

_____ **c.** What is the conjugate base of H_2O?

_____ **d.** What is the conjugate acid of H_2O?

_____ **e.** What is the conjugate acid of $HAsO_4^{2-}$?

2. Consider the reaction described by the following equation:

$$NH_4^+(aq) + CO_3^{2-}(aq) \rightleftarrows NH_3(aq) + HCO_3^-(aq)$$

a. If NH_4^+ is considered acid 1, identify the other three terms as acid 2, base 1, and base 2 to indicate the conjugate acid-base pairs.

_____ CO_3^{2-}

_____ HCO_3^-

_____ NH_3

_____ **b.** A proton has been transferred from acid 1 to base 2 in the above reaction. True or False?

3. Consider the neutralization reaction described by the equation: $HCO_3^-(aq) + OH^-(aq) \rightleftarrows CO_3^{2-}(aq) + H_2O(l)$

a. Label the conjugate acid-base pairs in this system.

_____

_____

b. Is the forward or reverse reaction favored? Explain your answer.

_____

_____

_____

_____

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CHAPTER 14 REVIEW

Acids and Bases

MIXED REVIEW

SHORT ANSWER **Answer the following questions in the space provided.**

1. _____ **a.** Write the formula for hypochlorous acid.

_____ **b.** Write the name for $HF(aq)$.

_____ **c.** If $Pb(C_2O_4)_2$ is lead(IV) oxalate, what is the formula for oxalic acid?

_____ **d.** Name the acid that is present in vinegar.

2. Answer the following questions according to the Brønsted-Lowry acid-base theory. Consult **Table 6** on page 485 of the text as needed.

_____ **a.** What is the conjugate base of H_2S?

_____ **b.** What is the conjugate base of HPO_4^{2-}?

_____ **c.** What is the conjugate acid of NH_3?

3. Consider the reaction represented by the following equation:

$$OH^-(aq) + HCO_3^-(aq) \rightarrow H_2O(l) + CO_3^{2-}(aq)$$

If OH^- is considered base 1, what are acid 1, acid 2, and base 2?

_____ **a.** acid 1

_____ **b.** acid 2

_____ **c.** base 2

4. Write the formula for the salt that is produced in each of the following neutralization reactions:

_____ **a.** sulfurous acid combined with potassium hydroxide

_____ **b.** calcium hydroxide combined with phosphoric acid

5. Carbonic acid releases H_3O^+ ions into water in two stages.

a. Write equations representing each stage.

_____

_____

_____ **b.** Which stage releases more ions into solution?