

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**True/False (5 marks)**

Circle the letter T for True or F for False.

- T  F 1. Aqueous solutions of acids and bases conduct electricity.  
 T  F 2. Bases react with active metals to produce hydrogen gas.  
 T  F 3. According to the Brønsted-Lowry theory of acids and bases, a base is a proton acceptor.  
 T  F 4. All acids are dangerous because they are corrosive, but bases are not dangerous.  
 T  F 5. The formula of chloric acid is  $\text{HClO}_3$ .

**Matching (15 marks)**

Match the correct word or phrase from Column B with Column A.

1. Uses of Common Acids and Bases

A

- e i. lactic acid  
a ii. sodium hydroxide  
b iii. carbonic acid  
f iv. sodium hydrogen carbonate  
c v. acetic acid

B

- a. drain cleaner  
b. carbonated beverages  
c. vinegar  
d. citrus fruits  
e. dairy products  
f. baking soda

2. Classifying Acids and Bases

A

- d i. is a proton acceptor  
f ii. remains when a proton is removed from an acid  
a iii. dissociates to form  $\text{H}^+$  (aq) in solution  
c iv. is a proton donor  
e v. results when a base receives a proton

B

- a. Arrhenius acid  
b. Arrhenius base  
c. Brønsted-Lowry acid  
d. Brønsted-Lowry base  
e. conjugate acid  
f. conjugate base

3. Names and Formulas of Acids

A

- b i. HCl  
e ii.  $\text{H}_2\text{CO}_3$   
f iii.  $\text{H}_2\text{S}$   
a iv.  $\text{HClO}_2$   
c v.  $\text{H}_2\text{SO}_3$

B

- a. chlorous acid  
b. hydrochloric acid  
c. sulfurous acid  
d. chloric acid  
e. carbonic acid  
f. hydrosulfuric acid  
g. sulfuric acid  
h. hypochlorous acid

**Multiple Choice (3 marks)**

Circle the letter of the best answer.

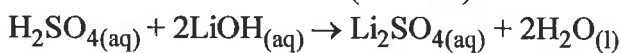
- d 1. Which property is *not* characteristic of a base?  
a) feels slippery  
b) does not react with an active metal  
c) reacts with ammonium chloride to produce ammonia gas  
d) reacts with carbonate compounds to produce carbon dioxide gas

- b 2. Which acid is a monoprotic acid?
- $\text{H}_2\text{SO}_4$
  - $\text{CH}_3\text{COOH}$
  - $\text{H}_3\text{PO}_4$
  - $\text{H}_2\text{CO}_3$
- d 3. What type of reaction is a neutralization reaction?
- synthesis reaction
  - decomposition reaction
  - single replacement reaction
  - double replacement reaction

**Problems (12 marks)**

Answer the following questions in the space provided.

1. 34.2 mL of 0.200 mol/L sulfuric acid neutralizes 23.8 mL of lithium hydroxide. Determine the concentration of the base. (4 marks)



$$\begin{array}{r} .0342 \quad .0238\text{L} \\ \times .2 \text{ mol/L} \quad ? \text{ C} \\ \hline n = .00684 \times 2 = 0.01368 \text{ mol} \\ C = \frac{n}{V} = \frac{0.01368}{0.0238} = 0.575 \text{ mol/L} \end{array}$$

2. Calculate the concentration of hydronium ions in each solution. (4 marks)
- a diluted base with pH 8.50

$$10^{-8.50} \quad -8.50 = \log[\text{H}_3\text{O}^+] \quad [\text{H}_3\text{O}^+] = 3.16 \times 10^{-9} \text{ mol/L}$$

- a concentrated acid with pH 2.54

$$10^{-2.54} \quad -2.54 = \log[\text{H}_3\text{O}^+] \quad [\text{H}_3\text{O}^+] = 2.88 \times 10^{-3} \text{ mol/L}$$

3. Calculate the pH of each solution. (4 marks)

- lake water, with a hydronium ion concentration of  $6.31 \times 10^{-7} \text{ mol/L}$

$$\text{pH} = -\log(6.31 \times 10^{-7}) = 6.2$$

- a solution with a hydronium ion concentration of  $7.80 \times 10^{-10} \text{ mol/L}$

$$\text{pH} = -\log(7.8 \times 10^{-10}) = 9.1$$