

WS 20.1 1) Name the following acids:

Name: \_\_\_\_\_ p. \_\_\_\_

\_\_\_\_\_ a. H<sub>2</sub>SO<sub>4</sub>

\_\_\_\_\_ b. H<sub>2</sub>SO<sub>3</sub>

\_\_\_\_\_ c. HF

\_\_\_\_\_ d. HClO<sub>4</sub>

\_\_\_\_\_ e. HClO<sub>3</sub>

\_\_\_\_\_ f. CH<sub>3</sub>COOH (use organic naming)

2) Write formulas for the following acids:

\_\_\_\_\_ g. phosphoric acid

\_\_\_\_\_ h. hydrochloric acid

\_\_\_\_\_ i. hypochlorous acid

\_\_\_\_\_ k. methanoic acid (organic acid)

3) Selenate has the following formula: SeO<sub>4</sub><sup>-2</sup> and selenide has the following formula Se<sup>-2</sup>

\_\_\_\_\_ Write formula for selenic acid.

\_\_\_\_\_ Write formula for selenous acid

\_\_\_\_\_ Write formula for hydroselenic acid

4) Acids can react with most metals. Use the activity series to identify two metals that will NOT react with acids:

\_\_\_\_\_

5) Write balanced equations for these single replacement and double replacement reactions involving an acid:

a. Aluminum metal and hydrochloric acid: \_\_\_\_\_

b. Calcium hydroxide and acetic acid: \_\_\_\_\_

c. sodium hydroxide and nitric acid: \_\_\_\_\_

d. zinc metal with sulfuric acid: \_\_\_\_\_

8) Most acids react with carbonates. For example:  $\_\_ \text{CaCO}_{3(s)} + \_\_ \text{HCl}_{(aq)} \rightarrow \_\_ \text{CaCl}_{2(aq)} + \_\_ \text{H}_2\text{O}_{(l)} + \_\_ \text{CO}_{2(g)}$

a) Balance the equation    b) Identify a spectator ion in the reaction: \_\_\_\_\_ (doesn't change from reactant to product)

c) How many **grams** of CO<sub>2</sub> gas can be formed if 5.0 **grams** of CaCO<sub>3</sub> are reacted with excess HCl?  
Show all stoichiometry.

\_\_\_\_\_

\_\_\_\_\_

d) If you wanted to form exactly 10.0 grams of water, how many grams of CaCO<sub>3</sub> should you start with? (assume excess HCl)

\_\_\_\_\_

\_\_\_\_\_

6) Acids can be shown reacting with water to produce  $\text{H}_3\text{O}^{+1}$  as one product. This is called the ionization of acid. Write equations for the following ionization reactions:

a. ionization of HCl in water: \_\_\_\_\_

b. ionization of  $\text{HNO}_3$  in water: \_\_\_\_\_

c. two stage ionization of  $\text{H}_2\text{S}$  in water: \_\_\_\_\_

\_\_\_\_\_

d) two stage ionization of  $\text{H}_2\text{SO}_4$  in water: \_\_\_\_\_

\_\_\_\_\_

7) Explain how a "strong" acid behaves differently than a "weak" acid when added to water:

\_\_\_\_\_

\_\_\_\_\_

9) Draw Lewis structures for the following acids and circle the hydrogens that are acidic (will break off as  $\text{H}^+$ )

a) ethanoic acid

b) propanoic acid

10) Write and balance equations for these reactions: (don't worry about states of matter)

a) hydrochloric acid + lithium hydroxide: \_\_\_\_\_

b) nitric acid + barium hydroxide: \_\_\_\_\_

c) ammonium hydroxide + sulfuric acid: \_\_\_\_\_

d) acetic acid + potassium hydroxide: \_\_\_\_\_

11) A  $\text{H}^+$  ion is sometimes just called a proton. Explain why this is so:

\_\_\_\_\_

\_\_\_\_\_

12) Write the reaction that occurs almost instantaneously when a  $\text{H}^+$  ion comes into contact with  $\text{H}_2\text{O}$ :

\_\_\_\_\_

13) Draw the Lewis structure for the  $\text{H}_3\text{O}^{+1}$  ion (hydronium).

\_\_\_\_\_ #ve

structure: