

Chemistry – Ch.19 (continued)

Name:
Date:
Hour:

CALVIN

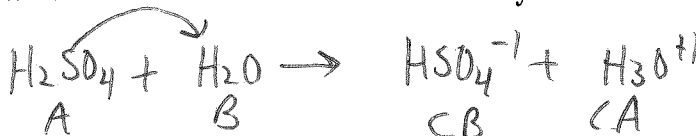
1) KNOW the descriptions and be able identify the following:

	A	B
a) Arrhenius acid/base	increase $[H_3O^+]$	increase $[OH^-]$
b) Lewis acid/base	e^- pair acceptor	e^- pair donor
c) Bronsted-Lowry acid/base	proton donor	proton acceptor
d) Conjugate acid/base		

2) Write a rxn between Ammonia and water. Identify the acid/base and conj.acid/conj.base.



3) Write a reaction between Sulfuric acid and water. Identify the acid/base and conj.acid/conj.base.



4) Why do you think Mr. Vineyard adds baking soda to his water?

→ increase pH

5) The pH of a solution is measured to be 7.52. Find the concentrations of Hydronium ion, Hydroxide ion, and indicate if the soln is acidic or basic.

pH = 7.52 pOH = $[H_3O^+] =$ $[OH^-] =$

6) Complete FOUR formulas from the chapter:

a. $k_w = [H_3O^{+1}] [OH^{-1}] = 1.00 \times 10^{-14} M^2$

b. $pH = -\log [H_3O^+]$

c. $pOH = -\log [OH^-]$

d. $pH + pOH = 14$

7) List at least TWO foods you have eaten that have a taste that is:

a. Bitter
dark chocolate
etc...

b. Sour
citrus fruits
etc.

8) Write about acid rain. (if you don't know much, write what you THINK). Include what causes it and some possible effects...

Revs.

9) People who own a pool or hot tub would need to check the pH level. Explain WHY they should to this and HOW they could increase or decrease it.

Revs.

10) Find the pH, pOH, [Hydronium], [Hydroxide] for a $2.32 \times 10^{-4} \text{M}$ Na(OH) solution.

$$\text{pH} = 10.4$$

$$[\text{H}_3\text{O}^+] = 4.31 \times 10^{-11} \text{M}$$

$$\text{pOH} = 3.63$$

$$[\text{OH}^-] = 2.32 \times 10^{-4} \text{M}$$

11) Determine the $[\text{H}_3\text{O}^+]$ for the following pH values:

a) 2.32 $4.79 \times 10^{-3} \text{M}$

b) 7.98 $1.05 \times 10^{-8} \text{M}$

12) Determine pH values for the following $[\text{OH}^-]$:

a) $2.77 \times 10^{-5} \text{M}$ 9.44

b) $6.89 \times 10^{-12} \text{M}$ 2.84

c) $4.12 \times 10^{-9} \text{M}$ 5.61

13) Find pOH, [Hydronium], [Hydroxide], and pH for a $2.34 \times 10^{-6} \text{M}$ Hydrochloric acid solution.

$$\text{pOH} = 8.37 \quad \text{pH} = 5.63$$

$$[\text{OH}^-] = 4.27 \times 10^{-9} \text{M} \quad [\text{H}_3\text{O}^+] = 2.34 \times 10^{-6} \text{M}$$

14) Find pH, [Hydroxide], [Hydronium], and pOH for a $1.57 \times 10^{-2} \text{M}$ solution of Lithium Hydroxide.

$$\text{pH} = 12.2 \quad \text{pOH} = 1.80$$

$$[\text{H}_3\text{O}^+] = 6.37 \times 10^{-13} \text{M} \quad [\text{OH}^-] = 1.57 \times 10^{-2} \text{M}$$

15) Write out the reaction between the following and water. Label the conjugate acid/base pairs.

a. Phosphoric acid



16) In general, how can you recognize a formula as an 'acid' or 'base'?

starts with "H" ends with "OH"

17) Write a balanced equation showing the reaction that takes place between Hydrochloric acid and Barium Hydroxide.



17) Find pH if:

a) [Hydronium] = $1.23 \times 10^{-7} \text{M}$ 6.91

b) [Hydroxide] = $4.56 \times 10^{-12} \text{M}$ 2.66

c) [Hydronium] = $7.52 \times 10^{-3} \text{M}$ 2.12

18) Classify as an acid or base:

- a. pH = 6.5 A
- b. pOH = 2.0 B
- c. pH = 12 B
- d. pOH = 12 A
- e. $[H_3O^{+1}] = 1 \times 10^{-7} M$ N
- f. $[H_3O^{+1}] = 1 \times 10^{-12} M$ B
- g. $[OH^{-1}] = 1 \times 10^{-12} M$ A
- h. [Hydroxide] = $2.56 \times 10^{-3} M$ A B
- i. [Hydronium] = $7.54 \times 10^{-9} M$ B

19) An example of a binary acid:

HCl, HF, HCl, etc...

20) Which acid is:

- a) used in fertilizers, detergents, and beverage flavoring phosphoric
- b) produced in the stomach HCl (hydrochloric)
- c) Found in vinegar Acetic

21) Find the molarity of Hydrochloric acid solution if 125 mL is neutralized by 50.0 mL

of 1.55 M Potassium Hydroxide.



1) $M = \frac{n}{L}$

$n = M \cdot L = (1.55 \frac{mol}{L})(0.05L) = 0.0775 mol KOH$

2) $\frac{0.0775 mol KOH}{1 mol KOH} = \frac{1 mol HCl}{x mol HCl} = 0.0775 mol HCl$

22) Give an example of each:

- a. Dilute, weak acid _____
- b. Concentrated, weak base _____
- c. Dilute, strong acid _____
- d. Concentrated, strong base _____
- e. Concentrated, strong acid _____

3) $M = \frac{n}{L} = \frac{0.0775 mol}{0.125 L} = 0.62 M$

$M = 0.62 M$
HCl

23) In the titration of vinegar done in class, the base was 0.500 M Sodium Hydroxide.

a. Find the pH:

$[OH^-] = 0.5 M$

$pOH = 0.3$

$pH = 13.7$

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Chemistry Ch.19 REVIEW

1. Acetic acid is found in Vinegar
2. Water and Salt are produced when a strong acid reacts with a strong base.
3. Which of the following is a binary acid?
 a. H_2SO_4
 b. CH_3COOH
 c. HBr
 d. NaOH
4. A substance that ionizes nearly completely in aqueous solutions and produces H_3O^+ is a
 a. weak base.
 b. strong base.
 c. weak acid.
 d. strong acid.
5. In the reaction represented by the equation $\text{CH}_3\text{COOH} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{CH}_3\text{COO}^-$, the conjugate acid of CH_3COO^- is
 a. H_2O .
 b. CH_3COOH .
 c. H_3O^+ .
 d. not shown.
6. A water solution whose pH is 10
 a. is always neutral.
 b. is always basic.
 c. is always acidic.
 d. might be neutral, basic, or acidic.
7. Which of the following liquids is acidic?
 a. seawater
 b. blood
 c. milk of magnesia
 d. orange juice
8. What is the formula for phosphoric acid? H_3PO_4
9. What type of acid is sulfuric acid?
 a. monoprotic
 b. diprotic
 c. triprotic
 d. none of the above
10. Which compound can act as both a Brønsted-Lowry acid and a Brønsted-Lowry base? Water
11. What is the charge on the hydronium ion? +1
12. What is the best description for a solution with a hydroxide-ion concentration of $1 \times 10^{-4} \text{ M}$?
 Acid Base Neutral Not enough information
13. A 0.12 M solution of an acid that ionizes only slightly in solution would be termed _____.
 a. concentrated and weak
 b. strong and dilute
 c. dilute and weak
 d. concentrated and strong
14. The process of adding a known amount of solution of known concentration to determine the concentration of another solution is called _____. titration

KNOW:

- Arrhenius, Bronsted-Lowry, Lewis definitions of acids/bases
- Using calculator to find pH, pOH, [Hydronium], [Hydroxide]
- pH scale
- properties of acids, properties of bases
- Bronsted-Lowry equations (label acid/base, donate proton and label conjugate acid/base)
- Strong/weak, concentrated/dilute
- Neutralization reactions ~ what are the products and BALANCE with coefficients
- Amphoteric
- Acid/base indicators (examples!)
- GO VIKINGS!!!