Name: _____KEY_____ Per: _____ Date: __June__

Unit 13 Review: Acids & Bases (CP1)

Answer the following questions. If you are missing any notes, they are posted on the website **www.msrobbinspnhs.weebly.com**

Are the following properties characteristics of acids, bases, or both?

BOTH 1. Can turn litmus paper a different color.

ACID 2. React with metals to produce H_2 gas.

ACID 3. Contain more hydrogen ions than hydroxide ions.

BASE 4. Feel slippery.

BASE 5. Hydrogen ion acceptors.

BASE 6. Taste bitter.

BOTH 7. Conduct electricity.

ACID 8. Taste sour.

BASE 9. pH ranges from 7 to 14.

ACID 10. Hydrogen ion donors.

11. a) Complete the reaction:

Acid + Base → __SALT__ + __WATER__

b) What is this type of reaction called? __NEUTRALIZATION__

12. Predict the products for the following acid-base reactions.

a) HNO_3 + LiOH → __H_2O__ + __$LiNO_3$__

b) HCl + NaOH → __H_2O__ + __NaCl__

c) KOH + HBr → __H_2O__ + __KBr__

13. Identify as an acid, base or salt.

a) H_2SO_4 __A__

b) NH_3 __B__

c) NaCl __S__

d) HF __A__

e) $(NH_4)_2CO_3$ __S__

f) $Ba(OH)_2$ __B__

14. a) Acids have pH values that range from __0__ to __7__.

a) Bases have pH values that range from __7__ to __14__.

b) Pure water has a pH of exactly __7__.

15. Each step along the pH scale changes the hydrogen ion concentration by what factor? __10__

16. Solutions that are acidic have higher __H^+__ concentrations than __OH^-__ concentrations.

17. Find the pH of the solution and whether it is acidic, basic, or neutral.

	pH	Acidic/Basic/Neutral	
a) $[H^+] = 1 \times 10^{-6}$ M	6	A	
b) $[H^+] = 1 \times 10^{-12}$ M	12	B	
c) $[OH^-] = 1 \times 10^{-9}$ M	5	A	$[H^+] = 1 \times 10^{-5}$
d) $[OH^-] = 1 \times 10^{-4}$ M	10	B	$[H^+] = 1 \times 10^{-10}$

18. a) In a neutral solution, the $[H^+]$ and $[OH^-]$ are equal to __1×10^{-7}__.

b) In a basic solution, the $[H^+]$ is between __1×10^{-7}__ and __1×10^{-14}__.

c) In an acidic solution, the $[H^+]$ is between __1×10^{-1}__ and __1×10^{-7}__.

19. Water undergoes self-ionization according to the reaction below.

$H_2O + H_2O \rightarrow$ __H_3O^+__ + __OH^-__ $\left(or\ \underline{H^+} + \underline{OH^-} \right)$
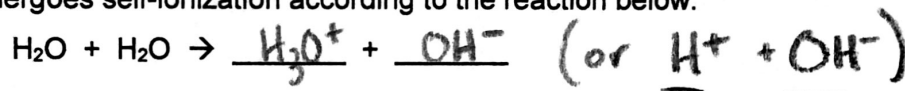
20. Which of these solutions is the most basic?

A. $[H^+] = 1 \times 10^{-2}$ M   pH = 2
B. $[H^+] = 1 \times 10^{-4}$ M   pH = 4
C. $[H^+] = 1 \times 10^{-11}$ M   pH = 11
D. $[H^+] = 1 \times 10^{-13}$ M   pH = 13 ⟵ (circled)

21. What is the H^+ concentration for the following solutions?

a) pH = 11.0   __1×10^{-11}__

b) pH = 5.0   __1×10^{-5}__

c) pOH = 8.0   __1×10^{-6}__

d) pOH = 13.0   __1×10^{-1}__

22. The hydronium ion concentration of a solution is 3.15×10^{-5} M.

a) What is the pH? = 4.5

b) What is the pOH? = 9.5

23. The hydrogen ion concentration of a solution is 0.0090 M.

   a) What is the pH? $= -\log(0.0090 M) = 2.05$

   b) What is the pOH? $= 14 - 2.05 = 11.95$

24. What is the [OH⁻] of a solution with a [H_3O^+] of 3.5×10^{-11} M?

$$[OH^-] = \frac{1 \times 10^{-14}}{3.5 \times 10^{-11}} = 2.9 \times 10^{-4} M$$

25. What is the [H^+] of a solution with a [OH^-] of 3.2×10^{-4} M?

$$[H^+] = \frac{1 \times 10^{-14}}{3.2 \times 10^{-4}} = 3.1 \times 10^{-11} M$$

26. What is titration? _A process used to determine the concentration of a solution by adding a known concentration to the measured amount of the solution of unknown concentration._

27. The point in a titration when the indicator permanently changes color is called the __end point__.

28. In a titration, when the moles of H^+ are equal to the moles of OH^-, the __equivalence point__ has been reached.

For questions 29 and 30, use the formula: $M_A V_A = M_B V_B$

CBASE   CACID
29. If 30.0 mL of KOH solution is titrated by 26.8 mL of 0.120 M $HClO_3$, what is the molarity of the KOH solution?

$M_A = 0.120 M$ $M_B = ?$

$V_A = 26.8 mL$ $V_B = 30.0$

$$M_B = \frac{M_A V_A}{V_B} = \frac{(0.120 M)(26.8 mL)}{(30.0 mL)} = 0.107 M \text{ KOH}$$

ACID   BASE
30. How many milliliters of 0.545 M HCl will neutralize 43.6 mL of a 0.250 M NaOH?

$M_A = 0.545 M$ $M_B = 0.250 M$

$V_A = ?$ $V_B = 43.6 mL$

$$V_A = \frac{M_B V_B}{M_A} = \frac{(0.250 M)(43.6 mL)}{(0.545 M)} = 20 mL \text{ HCl}$$