Worksheet #12

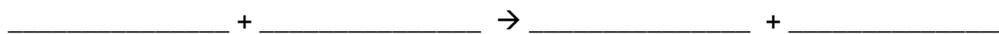**Name:**   **Period:**   **Seat#:**

Directions:
- Show your work!
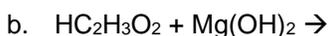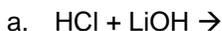- Some answers are provided at the end of the problem. They are underlined.

1) Give the word equation for the generic neutralization reaction of an acid and a base

_____ + _____ → _____ + _____

2) Complete the skeleton equation and the word equation for this neutralization reaction:

  a. Skeleton: $H_2SO_4 + NaOH →$

  b. Word: _____ + _____ → _____ + _____

3) Complete these neutralization equations:

  a. $HCl + LiOH →$

  b. $HC_2H_3O_2 + Mg(OH)_2 →$

4) A _____ is a laboratory method used to determine the concentration of an acid or a _____

in solution by performing a _____ reaction with a standard solution. At the _____

of the titration, the indicator changes color, which indicates neutralization. Once neutralized, moles of

_____ and moles of _____ are equal.

5) In our lab activity:

  a. What color did the solution turn when just enough base was added? _____

  b. What color did the solution turn when too much base was added? _____

6) Can I titrate a solution of unknown concentration with another solution of unknown concentration and still get a meaningful answer? Explain your answer in a few sentences.

7) These questions will require that you think a little bit…they aren't obvious answers! Think about how strong acids/bases turn into weak conjugates, and weak acids/bases turn into strong conjugate. Your choices for each question are: *neutral, acidic, or basic.* If you get stuck you can try this link…but try to reason through it on your own first! You have enough knowledge to be able to do this! It is connecting the dots between some topics you already know. This website goes into a little more detail than we do in this class. https://tinyurl.com/kbpdshd

  a. What is the pH if doing a titration of a strong acid with a strong base? Try to explain.

  b. What is the pH if doing a titration of a strong acid with a weak base? Try to explain.

  c. What is the pH if doing a titration of a weak acid with a strong base? Try to explain.

8) It took 54 mL of 0.1 M NaOH to neutralize 125 mL of HCl solution, what is the concentration of the HCl? _0.04M_

9) If it takes 25 mL of 0.05M HCl to neutralize 345 mL of NaOH solution, what is the concentration of the NaOH solution?_$4x10^{-3}M$_

10) If 10.0 mL of 0.300 M KOH are required to neutralize 30.0 mL of gastric juice (stomach acid, HCl), what is the molarity of the gastric juice?

11) In a titration of HCl with NaOH, 100.00 mL of the base was required to neutralize 20.0 mL of 5.0 M HCl. Write the neutralization reaction and determine what the molarity of the NaOH is.

12) 85 mL of nitric acid neutralizes 25.00 mL of 0.150 mol/L NaOH. What is the concentration of the nitric acid?

13) How many grams of HCl are needed to neutralize 0.10 L of 2.0 M NaOH?

14) If 45 mL of a 0.6 M HCl solution was used to neutralize 35.5 mL of a NaOH solution, what is the concentration of the NaOH solution and how many grams of NaOH were in the flask being titrated?

15) The following data were collected during titration. Calculate the concentration of the sodium hydroxide. _0.107 M_

Titration Data			
Volume of HCl	Concentration of HCl	Initial volume of NaOH	Final volume of NaOH
10.00 mL	0.235 M	1.06 mL	23.08 mL