P. 7 of Chemstem.com. You may use these notes on the video quiz. Show all work!

Part 1: Circle the correct bold word. Do this part during or after you've watched the videos.

1) An acid that completely dissociates (or breaks apart) is considered a **STRONG** / **WEAK** acid. (For our class, our calculations are only for these.)

2) HCl is a(n) **ACID** / **BASE**, and NaOH is a(n) **ACID** / **BASE**.

3) The lab process for determining the pH or concentration of an acid or base is called **NEUTRALIZATION** / **TITRATION** / **OXIDATION**.

4) Acids produce the **HYDROGEN** / **HYDROXIDE** ion in a solution.

5) OH- is called the **HYDROGEN** / **HYDROXIDE** ion.

6) Square brackets around a chemical, such as [chemical], means **MOLARITY** / **ACIDITY** of it.

7) To determine if something is an acid or a base, use the **pH** / **pOH** scale to avoid confusion.

Part 2: Relevant equations:

8) pH + pOH = _____ (it's an integer)

    a. Practice: The **pH** of battery acid is **2.0**. What is the **pOH**?

    b. Practice: The **pOH** of apple juice **10.2**. What is the **pH**?
       i. Is apple juice acidic or basic?

9) **TRUE** or **FALSE** (circle one): "p" is a mathematical operator. It means to take the positive log of the ion concentration.
    a. *If the statement above is false, underline the word that makes it untrue.*

10) Write the equation for calculating **pH**, when you know the *hydrogen ion concentration* ($[H^+]$)

11) Write the equation for calculating **pOH**, when you know the *hydroxide ion concentration* ($[OH^-]$)

12) Water is H_2O, so it can act as either an acid (H^+) or a base (OH^-). What is the equation for the dissociation constant for water at 25°C? Write the product form in the left box and the constant (in *scientific notation*) in the right box.

$K_w =$ [_____] = [_____]

   a. You can use this equation to find $[H^+]$ if you know $[OH^-]$ … or to find $[OH^-]$ when you know $[H^+]$.

b. Practice: A solution has a hydroxide ion concentration where $[OH^-] = 3.6×10^{-8}$ M. Calculate $[H^+]$ using the equation for K_w.

c. Know that you know $[H^+]$, what is the pH of this solution?

13) Write the equation to calculate $[H^+]$ if you're given the pH. *(The same can be done to calculate $[OH^-]$ when you're given the pOH.)*

Part 3: Acid/Base Concepts:

14) Use the line below to sketch the pH scale, ***using the numbers 1, 7,*** and ***14*** under the notches, and ***the words "neutral", "acid,"*** and ***"base"*** in between the notches.
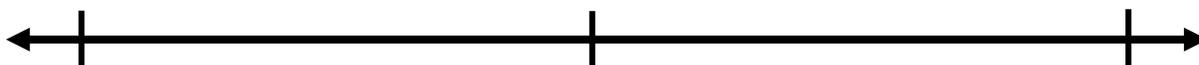

15) If an acid and a base are mixed together in equal molar ratios, what <u>two</u> products will be formed?

16) What is this process called? _____

17) Complete the equations. They're just like any other double-replacement.

HCl + NaOH → _____ + _____

HNO₃ + KOH → _____ + _____
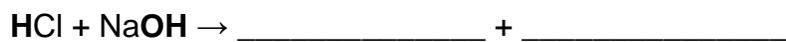
18) To calculate the pH or the concentration of an acid or base (unknown), you set up this lab process. It is called _____.

buret →

base of known concentration

stopcock

acid of unknown concentration
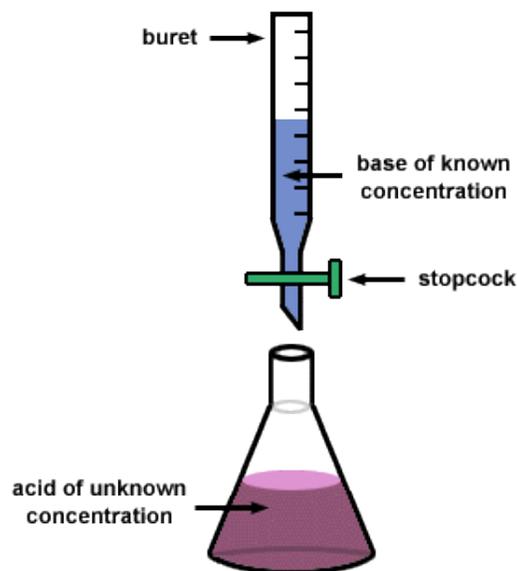
Any additional notes you take in your notebook can also be used on the quiz!

This diagram is helpful for knowing the conversions between pH, pOH, [H⁺] and [OH⁻] for strong acids and bases. If you know just one, you can actually get all the others too! Complete the diagram by labeling the arrows with an equation that takes you from one end to the other end. **A couple are provided to get you started. Use your resources and make sure you fill it in correctly (so be careful).**

pH → pOH

pH ← pOH

$pOH = -log[OH^-]$

$[OH^-] = \dfrac{K_w}{[H^+]}$

[H+]

[OH⁻]

FLIP→
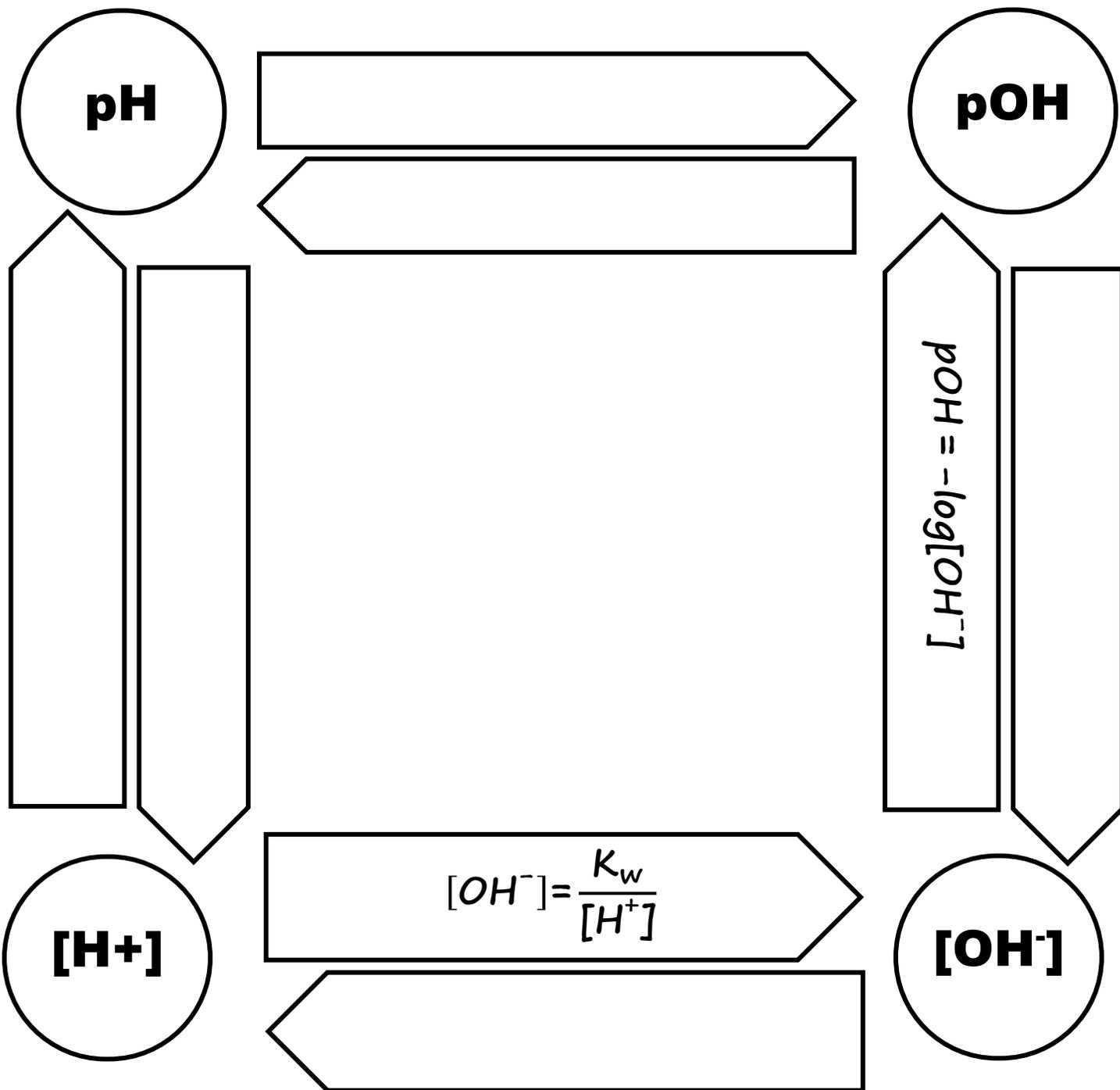
Practice: A solution has a pH of **9.7**.

1) Calculate the pOH

2) Calculate [H⁺]

3) Calculate [OH⁻]

Practice: A strong-acid solution has an [H⁺] concentration of **2.512×10⁻⁴ M**.

1) Calculate the pH

2) Calculate the pOH

3) Calculate the hydroxide ion concentration.