

Name: _____

Period: _____

Seat#: _____

Directions: Any worksheet that is labeled with an * means it is suggested extra practice. We do not always have time to assign every possible worksheet that would be good practice for you to do. You can do this worksheet when you have extra time, when you finish something early, or to help you study for a quiz or a test. If and when you choose to do this Extra Practice worksheet, please do the work on binder paper. If we end up with extra class time then portions of this may turn into required work. If that happens you will be told which problems are turned into required. Remember there is tons of other extra practice on the class website...and the entire internet! See me if you need help finding practice on a topic you are struggling with.

For Q #1-8 - What would be the pH, pOH, [H⁺], [OH⁻] for each solution be?

- 1) What are the properties of acids/bases?
- 2) What are the three different definitions of acids and bases?
- 3) Give examples of acids/bases that fit each of the three definitions mentioned in Q #2
- 4) Why would we say that a solution with a H⁺ concentration of 1.00×10^{-7} M is said to be neutral? If it contains acid, shouldn't it be acidic? Explain.
- 5) Explain why even a basic solution contains some H⁺ ions.
- 6) Explain why even an acidic solution contains some OH⁻ ions.
- 7) List the strong acids and bases. What makes them strong?
- 8) What does it mean for something to be neutral? To be acidic? To be basic?

For Q #9 – 13 - Identify the acid/base/conjugate pairs for the following questions

- 9) $\text{HSO}_4^- + \text{H}_2\text{O} \rightarrow$
- 10) $\text{NH}_3 + \text{H}_2\text{O} \rightarrow$
- 11) $\text{CN}^- + \text{H}_2\text{O} \rightarrow$
- 12) $\text{H}^- + \text{H}_2\text{O} \rightarrow$
- 13) $\text{HClO}_4 + \text{H}_2\text{O} \rightarrow$

For Q #14-29 - What would be the pH, pOH, [H⁺], [OH⁻] for each solution be?

- 14) 0.0020 M HCl
- 15) 0.034 M HCl
- 16) 0.0050 M HNO₃
- 17) 0.065 M KOH
- 18) 0.020 M NaOH
- 19) 0.000455 M HCl
- 20) 0.0078 M HCl
- 21) 0.0000000000003M HCl

- 22) A solution containing 2.3 mole of HCl in 14 L of water
- 23) A solution containing 1.5 moles of hydrobromic acid in 37 L of water.
- 24) A solution containing 54.6 grams of hydrochloric acid in 135 mL of water
- 25) A solution containing 3.5×10^{-3} grams of hydroiodic acid in 250 mL of water
- 26) A solution made by adding 300 mL of water to 460 mL of 4.3×10^{-3} M NaOH solution
- 27) A solution with a volume of 4.9 L that contains 35 grams of hydrochloric acid and 20 grams of nitric acid
- 28) A solution that contains 2.8×10^{-5} moles of hydrobromic acid in 0.6 L of water?
- 29) A solution created by adding water to 2.5×10^{-4} moles of NaOH and 3.5×10^{-6} moles of HBr until the final volume is 1 L.

For Q #30-35 – assume the 5% rule is valid

- 30) Find the pH of a 0.085 M solution of formic acid. The K_a for formic acid is 1.8×10^{-4}
- 31) Find the pH of a 0.325 M acetic acid solution. $K_a = 1.8 \times 10^{-5}$
- 32) Find the pH of a solution that contains 0.045 M lactic acid ($K_a = 1.4 \times 10^{-4}$) and 0.075 M propionic acid ($K_a = 1.4 \times 10^{-5}$)
- 33) What is the pH of a 0.00239 M butyric acid solution? $K_a = 1.51 \times 10^{-5}$
- 34) Calculate the pH of a 2.00 M solution of nitrous acid (HNO₂). The K_a for nitrous acid is 4.5×10^{-4}
- 35) You dissolve enough benzoic acid in water to make a 0.15 M solution. The K_a of benzoic acid is 6.3×10^{-5} . What is the [H⁺]? What is the [C₆H₅CO₂]? What is the pH? What is the pOH? What is the [OH⁻]?