**Name: Period: Seat#:**

**Worksheet #5**

**Directions:** Show all work. Box your final answer.
*\*Remember – lots of ways to do these. If you get the right answer and someone can follow your work and units etc. then you are FINE!*

$pK\_{a}= -log\left(K\_{a}\right)$ $ K\_{a}= \frac{\left[H^{+}\right]\left[A^{-}\right]}{\left[HA\right]}$ $ \left[H^{+}\right]= \frac{K\_{a}\left[A^{-}\right]}{\left[HA\right]}$

$pH= pK\_{a}+log\left(\frac{\left[salt form\right]}{\left[acid form\right]}\right)$ $pOH= pK\_{b}+log\left(\frac{\left[salt form\right]}{\left[base form\right]}\right)$

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| --- | --- |
| 1. A buffer is prepared containing 1.00 molar acetic acid and 1.00 molar sodium acetate. What is its pH? *4.752Ka = 1.76 x 10-5*
 | 1. A buffer is prepared containing 1.00 molar acetic acid and 0.800 molar sodium acetate. What is its pH? *4.655Ka = 1.76 x 10-5*
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| 1. A buffer is prepared containing 0.600 M anisic acid and 0.800 M sodium anisate. What is its pH? *4.596Ka = 3.38 x 10-5*
 | 1. A buffer is prepared containing 1.00 M ammonia and 1.00 M ammonium chloride. What is its pH? *9.248Kb = 1.8 x 10-5*
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| 1. A buffer is prepared containing 1.00 M ammonia and 0.800 M ammonium chloride. What is its pH? *9.345Kb = 1.8 x 10-5*
 | 1. A buffer is prepared containing 0.600 M nicotine and 0.800 M nicotine hydrochloride. What is its pH? *7.896Nicotine is a base. pKa = 8*
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| 1. pKa for phenolphthalein is 9.3 at room temperature.
	1. Calculate ratio of its anionic form to acid form at pH 8.2 and then again at pH 10. *At pH 8.2 = ratio of base form to acid form = 0.0794 to 1 At pH 10 = ratio of base form to acid form = 5.01 to 1*
 | * 1. Using these values, explain the color change within this pH range from 8.2 – 10
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| **8)\*** Calculate the pH of the solution that results from the addition of 0.040 moles of HNO3 to a buffer made by combining 0.500 L of 0.380 M HC3H5O2 (Ka = 1.30 x 10−5) and 0.500 L of 0.380 M NaC3H5O2  *pH = 4.700**\*Assume addition of the nitric acid has no effect on volume.* | 1. What is the pH when 25.0 mL of 0.200 M of CH3COOH has been titrated with 35.0 mL of 0.100 M NaOH? (Ka = 1.8 x 10-5) *pH = 5.11*

*(\*hint\* Think about how much A- is formed when mol HA + mol OH- react. Then think about if you have [HA] and [A-] left over that you can uses with the He-Ha equation!)* |
| 1. A beaker with 100.0 mL of an acetic acid buffer with a pH of 5.000 is sitting on a benchtop. The molarity of acid is 0.100 M and the molarity of the conjugate base in this buffer is 0.100 M. A student adds 7.300 ml of a 0.3600 M HCl solution to the beaker. How much will the pH change? The pKa of acetic acid is 4.752. *pH = 4.518*
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| 1. Calculate the ratio of CH3NH2 to CH3NH3Cl required to create a buffer with pH = 10.14 The pKb of CH3NH2 = 3.357 *base/acid ratio = 0.314*
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