Dougherty Valley HS AP Chemistry
Acid Base – Henderson-HasselBalch

WORKSHEET #4

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

Show all work for each question, box your final answer

$$pH = pKa + \log\frac{[salt\ form]}{[acid\ form]}$$

A buffer is prepared containing 1.00 molar acetic acid and 1.00 molar sodium acetate. What is its pH? (4.752)	A buffer is prepared containing 1.00 molar acetic acid and 0.800 molar sodium acetate. What is its pH? (4.655)
A buffer is prepared containing 0.600 molar anisic acid and 0.800 molar sodium anisate. What is its pH? (4.596)	A buffer is prepared containing 1.00 molar ammonia and 1.00 molar ammonium chloride. What is its pH? (9.248)
A buffer is prepared containing 1.00 molar ammonia and 0.800 molar ammonium chloride. What is its pH? (9.345)	A buffer is prepared containing 0.600 molar nicotine and 0.800 molar nicotine hydrochloride. What is its pH? (7.896)

pKa for phenophthalein is 9.3 at room temp.

a) Calculate ratio of its anionic form to acid form at pH 8.2 and at pH 10. (pH 8.2 = ratio of base form to acid form = 0.0794 to 1 (call it 8 to 100, pH 10 = ratio of base form to acid form = 5.01 to 1 (call it 500 to 100))

b) Using these values, explain the colour change within this pH range.

Calculate the pH of the solution that results from the addition of 0.040 moles of HNO_3 to a buffer made by combining 0.500 L of 0.380 M $HC_3H_5O_2$ ($K_a = 1.30 \times 10^{-5}$) and 0.500 L of 0.380 M $NaC_3H_5O_2$ (pH = 4.700) Assume addition of the nitric acid has no effect on volume.

What is the pH when 25.0 mL of 0.200 M of CH_3COOH has been titrated with 35.0 mL of 0.100 M NaOH? (pH = 5.120)

A beaker with 100.0 mL of an acetic acid buffer with a pH of 5.000 is sitting on a benchtop. The total molarity of acid and conjugate base in this buffer is 0.1000 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)

Calculate the ratio of CH_3NH_2 to CH_3NH_3Cl required to create a buffer with pH = 10.14 (base/acid ratio = 0.313)