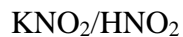
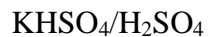


**Acid-Base – Buffers/Titrations - Practice**

Name: \_\_\_\_\_

*(Look up the  $K_a$  and  $K_b$  from data tables of your text book)*

1) Which of the following solutions can be buffers?



2) Calculate the pH of the following buffers:

a) 0.15 M NH<sub>3</sub>/0.35 M NH<sub>4</sub>Cl ( $K_b = 1.8 \times 10^{-5}$ ) (ans: 8.89)b) 0.10 M Na<sub>2</sub>HPO<sub>4</sub>/0.15M KH<sub>2</sub>PO<sub>4</sub> ( $K_a = 6.3 \times 10^{-8}$ ) (ans: 7.03)3) The pH of a sodium acetate/acetic acid buffer is 4.50. Calculate the ratio of [CH<sub>3</sub>COO<sup>-</sup>]/[CH<sub>3</sub>COOH] needed to make the buffer. ( $K_a = 1.76 \times 10^{-5}$ ) (ans: 0.58)4) In a titration experiment 12.5 mL of 0.500 M H<sub>2</sub>SO<sub>4</sub> neutralizes 50.0 mL of NaOH. What is the concentration of the NaOH solution? (ans: 0.25M)

- 5) Calculate the pH of a 1.00 L of a buffer 1.00 M  $\text{CH}_3\text{COONa}$ /1.00 M  $\text{CH}_3\text{COOH}$  before and after the addition of a) 0.080 mol NaOH and b) 0.12 mol HCl. (Assume there is no change in volume) ( $K_a = 1.76 \times 10^{-5}$ ) (ans: 4.82; 4.64)

- 6) Calculate the pH at the equivalence point for the titration of 0.20 M HCl and 0.20 M ( $\text{CH}_3\text{NH}_2$ ). ( $K_b = 4.4 \times 10^{-4}$ ) (ans: 5.82)

- 7) A 25.0 mL of 0.100 M  $\text{CH}_3\text{COOH}$  is titrated with 0.200 M KOH solution. Calculate the pH after the addition of a) 0.00 mL, b) 5.0 mL and c) 12.5 mL of the KOH. ( $K_a = 1.76 \times 10^{-5}$ ) (ans: 2.87, 4.56, 8.78)