

CHE 120 A11 More Acid-base Self-assessment

Name: _____

$$\text{pH} = -\log [\text{H}_3\text{O}^+] \quad [\text{H}_3\text{O}^+] = 10^{-\text{pH}} \quad K_w = 1.0 \times 10^{-14} = [\text{H}_3\text{O}^+][\text{OH}^-]$$

$$\text{pOH} = -\log [\text{OH}^-] \quad [\text{OH}^-] = 10^{-\text{pOH}} \quad \text{pH} + \text{pOH} = 14.00$$

$$K_P = K_c(RT)^{\Delta n}$$

$$R = 8.314 \text{ J mol}^{-1} \text{ K}$$

$$\text{p}K_a = -\log K_a$$

$$K_w = K_a K_b$$

$$\text{pH} = \text{p}K_a + \log \left(\frac{[\text{A}^-]}{[\text{HA}]}\right)$$

$$\text{Kelvin} = 273 + ^\circ\text{C}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. What type of solution? Strong Acid (SA), Weak acid (WA), Strong Base (SB), Weak Base (WB), Buffer (B), or Neutral (N)

 HNO_3 _____

 NaF _____

 CH_3COOH _____

 $\text{CH}_3\text{CH}_2\text{NH}_3\text{Cl}$ _____

 CH_3NH_2 _____

 NaCN / HCN _____

 Li_2O _____

 HCl / NaCl _____

 HF / KF _____



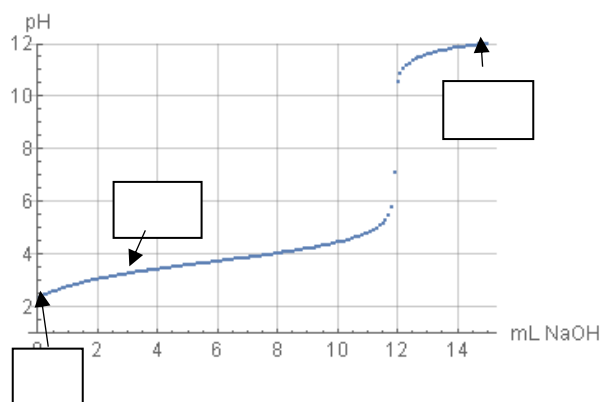
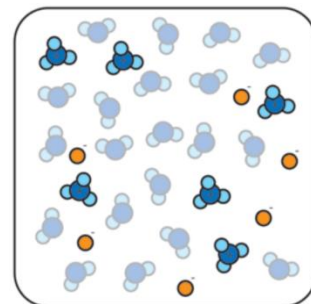
 KBr _____

 $\text{CH}_3\text{NH}_3\text{Cl} / \text{CH}_3\text{NH}_2$ _____

 2. HOCl has $K_a = 3.5 \times 10^{-8}$ and $\text{HC}_3\text{H}_5\text{O}_3$ has $K_a = 1.4 \times 10^{-4}$. Between OCl^- , $\text{C}_3\text{H}_5\text{O}_3^-$, and Cl^- ,

which is the strongest base? _____

which is the weakest base? _____. Briefly explain.

 3. Consider putting an acid HA () into water. A cartoon representation of the solution is shown at right ( = H_3O^+). Is this acid HBr or HOCl ? Why?

 4. You titrate 10.00 mL of 0.10 M formic acid (HCOOH) solution with a standard NaOH solution, producing the plot shown at left.

a) In each box, state what type of solution is present in that region of the curve (same labels from 1).

b) Draw a vertical line showing where the equivalence point is.

 c) What is the $\text{p}K_a$ of HCOOH ? _____

 d) What is the concentration of the NaOH solution? _____

 5. a) What is the pH of a 0.023 M solution of NaOH ?

 b) What is the pH of a solution with 0.50 M CH_3NH_2 and 0.20 M $\text{CH}_3\text{NH}_3\text{Cl}$?