

Day 6.4 Warm-Up

1. Arrange the following acids in order of increasing acid strength.
 - a. Chlorous acid (HClO_2) $\text{pK}_a = 1.92$
 - b. Chloric acid (HClO_3) $\text{pK}_a = 0$
 - c. Hypochlorous acid (HClO) $\text{pK}_a = 7.46$
 - d. Perchloric acid (HClO_4) $\text{pK}_a = -8$

2. Calculate the pH of 4.32×10^{-5} M HBr solution.

3. Calculate the pH of 6.0×10^{-3} M NaOH solution.

4. Calculate the pH of 5.03×10^{-4} M $\text{Ba}(\text{OH})_2$ solution.

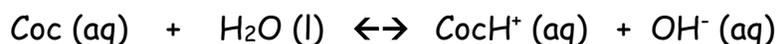
5. The K_a of HNO_2 is 4.0×10^{-4} . Identify the conjugate base of HNO_2 and calculate its K_b .

Acid Base Equilibrium #1

1. Calculate the K_a 's for the weak acids that have the following pK_a values:
a. 3.0 b. 5.8 c. 9.67

Which acid above, according to the K_a values, is the strongest? Explain how the value of the K_a tells you about the strength of the weak acid. Explain how K_a & $[H^+]$ are related.

2. Hypochlorous acid, $HClO$, has a K_a of 2.8×10^{-8} . What is the pH of a 0.10 M solution?
3. What is the pOH of a 0.250 M solution of NH_3 if its $K_b = 1.8 \times 10^{-5}$?
4. Propanoic acid, CH_3CH_2COOH , has a K_a of 1.4×10^{-5} . What is the pH of a 0.30 M propanoic acid solution?
5. What is the pH of a 1.50 M solution of CH_3NH_2 if its $K_b = 4.2 \times 10^{-4}$?
6. Benzoic acid, $HC_7H_5O_2$, is present in many berries. A benzoic acid solution is prepared by dissolving 1.00 g of benzoic acid in enough water to make 350.0 mL of solution. If the pH of the solution is 2.91 what is the K_a of benzoic acid? (you must use ICE)
7. What is the pOH, $[OH^-]$, and K_b for the solution in #4? What is the conjugate base? Write the Bronsted/Lowry ionization equation for the conjugate base in water.
8. Cocaine is a weak base. Its ionization in water can be represented by the equation:



A 0.0010M solution of cocaine has a pH of 9.70. Calculate K_b for cocaine? What is the K_a of $CocH^+$?