

Chemistry

Unit #12: Acids and Bases

Homework Part Four

1. Calculate the pH, pOH, $[H^+]$, $[OH^-]$, and percent ionization for a 0.56 M solution of acetic acid, $HC_2H_3O_2$. The K_a is 1.8×10^{-5} .
2. Calculate the pH, pOH, $[H^+]$, $[OH^-]$, and percent ionization for a 15.0 M solution of NH_3 . The K_b is 1.8×10^{-5} .
3. The pH of a 0.1000 M solution of acetylsalicylic acid (aspirin-"HAsp") was found to be 2.24. Determine the value of K_a , pH, pOH, $[H^+]$, $[OH^-]$, and percent ionization. The formula for acetylsalicylic acid is $CH_3CO_2C_6H_4COOH$, but we use "HAsp" as an abbreviation.
4. The pH of a 0.1000 M solution of aniline solution was found to be 8.79. Determine the value of K_b , pH, pOH, $[H^+]$, $[OH^-]$, and percent ionization. The formula for aniline is $C_6H_5NH_2$.
5. The pH of a 0.115 M solution of chloroacetic acid, $ClCH_2COOH$, is measured to be 1.92. Calculate K_a , pOH, $[H^+]$, $[OH^-]$, and Percent Ionization.
6. Phenylacetic acid, $HC_8H_7O_2$, is one of the substances that accumulate in the blood of people with phenylketonuria, an inherited disorder that can cause mental retardation or even death. A 0.085 M solution is found to have a pH of 2.68. Calculate K_a , pOH, $[H^+]$, $[OH^-]$, and Percent Ionization.
7. Codeine, $C_{18}H_{21}NO_3$, is a weak organic base. A 5.0×10^{-3} M solution has a pH of 9.95. Calculate K_b , pOH, $[H^+]$, $[OH^-]$, and Percent Ionization.
8. Ephedrine, $C_{10}H_{15}ON$, is a central nervous system stimulant. It is also used in nasal sprays as decongestant and considered a weak organic base. A 0.035 M solution of it has a pH of 11.33. Calculate K_b , pOH, $[H^+]$, $[OH^-]$, and Percent Ionization.

Acid Ionization and Acid Equilibrium Expression, K_a

1. Write the acid ionization reaction and acid equilibrium expression for hydrochloric acid, HCl.
2. Write the step-wise ionization reaction and each acid equilibrium expression for sulfuric acid, H_2SO_4 .

Base Ionization and Base Equilibrium Expression, K_b

1. Write the base ionization reaction and base equilibrium expression for sodium hydroxide.
2. Write the ionization reaction and base equilibrium expression for potassium hydroxide.
3. Write the ionization reaction and base equilibrium expression for titanium (III) hydroxide.