Exam #4 Objectives

CHEM 1100 General Chemistry II

Text Reading

Chapter 16: sections 1-8, 10

Homework Assignment

McGraw-Hill LearnSmart and Connect online assignments.

Concepts

1. Write the autoionization reaction for water and connect the concept to the ion-product constant of water.
2. Write equilibrium reactions and equilibrium equations for strong and weak acids and for weak bases.
3. Demonstrate the ability to use the "p" function in calculations.
4. Demonstrate an understanding of the pH concept.
5. Rank substances as acidic, basic, or neutral by comparing the relative concentrations of H^+ and OH^- and by using the pH scale.
6. Convert between $[H^+]$, $[OH^-]$, *pH*, and *pOH* for given concentrations of strong acids and hydroxide bases.
7. Do calculations based on the relationship between $[H^+]$, $[OH^-]$, and K_w.
8. Convert between K_a and K_b.
9. Demonstrate an understanding of the differences between K_{a1}, K_{a2}, etc. and K_{b1}, K_{b2}, etc.
10. Do calculations based on the relationship between K_a, K_b, and K_w.
11. Calculate K_a or K_b from equilibria data and apply simplifications when appropriate.
12. Predict and calculate the acidic and basic properties of salt solutions.
13. Calculate the pH and the concentrations for all species in solution for polyprotic acids.
14. Demonstrate a working vocabulary of the following terms:

acidic	indicator	pK_b
acid ionization constant	K_a	pK_W
Arrhenius theory	K_b	*pOH*
autoionization	K_w	polyprotic
base ionization constant	neutral	strong
basic	"p" function	weak
Bronsted-Lowry theory	*pH*	
conjugate pairs	pK_a	

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15. Memorize and demonstrate the ability to use the following equation(s):

$$\left[H_3O^+\right]\left[OH^-\right] = K_w$$

$$pX = -\log\left[X\right] \qquad \left[X\right] = 10^{-X}$$

$$pH = -\log\left[H^+\right] \qquad \left[H^+\right] = 10^{-pH}$$

$$K_a K_b = K_w \qquad pK_a + pK_b = pK_w$$