Chemistry 51

FINAL EXAM STUDY GUIDE

Topic	***Text Ref.***
CHAPTER 8	
• Know the general properties of gases	8.1
• Know the units and instruments for measurement of pressure	8.1
• Know the relationship between volume and pressure of a gas (Boyle's Law)	8.2
• Know the relationship between volume and temp. of a gas (Charles's Law)	8.3
• Know the relationship between pressure and temp. of a gas (Gay-Lussac's Law)	8.4
• Know what vapor pressure is and what factors it depends on	8.4
• Know the definition of boiling point and how it changes with external pressure	8.4
• Determine volume, temp., or pressure of a gas using the Combined Gas Law	8.5
• Know molar volume of gases at STP conditions	8.6
• Use molar volume and STP conditions to solve chemical problems involving gases	8.6
• Use the Ideal Gas Law to determine pressure or volume of a gas	8.7
• Use Dalton's law of partial pressures to determine partial pressure of each gas in a mixture	8.8
• Calculate the partial pressure of each gas in a mixture based on its fractional composition and total pressure	Notes
CHAPTER 9	
• Know the definition of a solution and its components (solute and solvent)	9.1
• Know the types of solution and an example of each (Table 9.1)	9.1
• Determine the solubility of a solute in a solvent based on polarity	9.1
• Distinguish between strong electrolytes, weak electrolytes and non-electrolytes	9.2
• Write equations for solution of a substance based on its electrolyte nature	9.2
• Determine the number of equivalents per mole for an ion	9.2
• Calculate the equivalents of an ion based on its concentration and charge	9.2
• Solve problems with equivalents and mass/mole of an ion	9.2
• Know the factors that affect the solubility of a solute in a solvent	9.3
• Know the effect of temperature on solubility of solids and gases	9.3
• Differentiate between unsaturated and saturated solutions.	9.3
• Determine the solubility of a substance at any temperature using solubility graphs.	9.3
• Identify an ionic salt as soluble or insoluble based on solubility rules	9.3
• Predict formation of a precipitate and write net ionic equation for its formation	9.3
• Calculate the concentration of solutions as mass percent (m/m and m/v)	9.4, Notes
• Calculate the concentration of solutions as moles/liter (molarity).	9.4
• Solve problems using mass percent and molarity as conversion factors	9.4
• Solve problems involving dilutions	9.5
• Calculate the osmolarity of a solution from its molarity	Notes
• Determine the tonicity of a solution based on its osmolarity	9.6, Notes
• Know what a buffer does and how it works	
• Write equations to show how a buffer neutralizes acids and bases	
• Determine the relative strength of weak acids based on their K_a values	
• Calculate he pH of a buffer solution	

Topic	*Text Reference*
CHAPTER 11	
• Know the common characteristics of acids and bases	11.1
• Know the Arrhenius definition of acids and bases and identify them	11.1, Notes
• Know the definition of Bronsted-Lowry acids and bases and identify them	11.2
• Identify conjugate acids and base pairs in a chemical equation	11.2
• Differentiate between strong and weak acids and bases and write chemical equations representing them	11.3
• Know the electrolyte nature of strong and weak acids and bases and salts	11.3
• Know the common strong and weak acids and bases (Table in notes)	Notes
• Know how water ionizes and know the $[H_3O^+]$ and $[OH^-]$ in pure water	11.5
• Know the relationship of $[H_3O^+]$ and $[OH^-]$ in an aqueous solution	11.5
• Identify acidity and basicity of solutions based on their $[H_3O^+]$ and $[OH^-]$	11.5
• Calculate $[H_3O^+]$ and $[OH^-]$ in a solution using K_w	11.5
• Identify acids and bases based on pH of the soluton	11.6
• Calculate pH of a solution from $[H_3O^+]$ and vice versa	11.6
• Know the relationship of $[H_3O^+]$, $[OH^-]$, pH, and in a solution	11.6
• Know what a buffer does and how it works	
• Write equations to show how a buffer neutralizes acids and bases	
• Determine the relative strength of weak acids based on their K_a values	
• Calculate he pH of a buffer solution	

SUMMARY OF EQUATIONS

The equations listed below will be provided for your use on the test.

$$P_1V_1 = P_2V_2 \qquad R = 0.0821 \text{ Latm/molK}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \qquad \frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \qquad PV = nRT$$

$$P_{tot} = P_1 + P_2 + P_3 + \ldots \qquad [H_3O^+] = K_a \times \frac{[HX]}{[X^-]}$$