FINAL EXAM STUDY GUIDE

Topic	*Text Reference*
CHAPTER 9	
• Know the types of bonds and their general characteristics	9.2
• Draw Lewis structures for all main group elements	9.3
• Draw Lewis structures for ionic compounds	9.4
• Use Lewis symbols to predict the formula for an ionic compound	9.4
• Know the definition of lattice energy and how it affects the energetics of formation of ionic bonds	9.4
• Construct a Born-Haber cycle for formation of crystalline solids from their elements	9.4
• Calculate the lattice energy of an ionic bond from given data	9.4
• Know factors affecting lattice energy and rank lattice energies for various formulas based on these factors	9.4
• Draw Lewis structures for covalent compounds and ions with single and multiple bonds	9.5, 9.7
• Know the concept of electronegativity (EN) and its effect on the polarity of bonds	9.6
• Rank polarity of bonds based on ΔEN	9.6
• Classify bond types based on ΔEN	9.6
• Determine approximate value for % ionic character of a bond from ΔEN and Figure 9.10	9.6
• Know the concept of resonance and draw resonance hybrids for structures requiring them	9.8
• Assign formal charges to atoms in a structure and determine the more favored resonance structure based on formal charges	9.8
• Know the exceptions to the octet rule	9.9
• Know the relationship of bond length, bond energy and bond order	9.10, Notes
• Calculate the enthalpy of reaction from bond energies	9.10
CHAPTER 10	
• Use VSEPR model to assign electron-pair geometry for molecules with 2-6 electrons pairs around the central atom	10.2
• Predict and explain the effect of lone pairs on the geometry of the molecule	10.3
• Distinguish between electron pair geometry and molecular geometry for molecules with nonbonding electrons pairs	10.3
• Know the bond angles of various shapes predicted by VSEPR	10.3
• Predict the shape of larger molecules along the interior atoms	10.4
• Distinguish between bond polarity and molecular polarity	10.5
• Predict the polarity of molecules based on their geometry	10.5
• Explain chemical bonding based on valence bond theory	10.6
• Use electron configuration and valence bond theory to explain bonding in simple molecules	10.6
• Explain the general principles in hybridization of orbitals and characterize the differences between hybrid and standard orbitals	10.7
• Identify bonding orbitals (hybridized and standard) involved in bonding of molecules	10.7
• Distinguish between sigma and pi bonds in molecules	10.7
• Predict formation of pi bonds in molecules with hybridized orbitals	10.7
• Assign hybridization for each geometry predicted by VSEPR model	10.7

CHAPTER 11	
• Distinguish between intermolecular forces and bonding forces present in molecules	11.3
• Explain why intermolecular forces are smaller in magnitude compared to bonding forces	11.3
• Classify the four types of intermolecular force and identify which substances contain each	11.3
• Predict the effect of different type of intermolecular force on the properties of substances	11.3
• Know the definition of vapor pressure and its relationship to the boiling point and volatility of a substance.	Notes
• Rank substances according to boiling point, and other properties based on their intermolecular forces.	11.3
• Explain why different molecules contain different intermolecular forces.	11.3
CHAPTER 13	
• Know concentration units of molarity, molality, mass percent and mole fraction.	13.5
• Convert between mass %, molarity, molality and mole fraction.	13.5
• Know colligative properties and factors they depend on.	13.6
• Calculate boiling point elevation and freezing point depression of a solvent by addition of solute.	13.6
• Use Raoult's law to determine the vapor pressure of a solution containing a nonelectrolytes and nonvolatile solute.	13.6
• Use Raoult's law to determine the vapor pressure of a solution containing 2 volatile components.	12.6
• Use Law of partial pressures to determine the pressure and composition of vapor over an ideal solution.	13.6
• Differentiate between effects of nonelectrolyte and electrolyte solutes on properties of solutions.	13.7
• Calculate vapor pressure lowering, b.p. elevation and f.p. depression of a solution containing a strong electrolyte.	13.7
• Calculate van't Hoff factor for solutions containing strong electrolytes from given data.	13.7

SUMMARY OF EQUATIONS

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

$$\Delta T_f = i\ m\ K_f \qquad \Delta T_b = i\ m\ K_b$$

$$P_{solution} = X_{solvent}\ P°_{solvent} \qquad \Delta P = X_{solute}\ P°_{solvent}$$

$$P_A = X_A\ P°_A \qquad P_B = X_B\ P°_B \qquad P_{tot} = P_A + P_B$$