

## FINAL EXAM STUDY GUIDE

<i>Topic</i>	<i>Text Reference</i>
<b>CHAPTER 9</b>	
<ul style="list-style-type: none"> <li>• Know the types of bonds and their general characteristics</li> <li>• Draw Lewis structures for all main group elements</li> <li>• Draw Lewis structures for ionic compounds</li> <li>• Use Lewis symbols to predict the formula for an ionic compound</li> <li>• Know the definition of lattice energy and how it affects the energetics of formation of ionic bonds</li> <li>• Construct a Born-Haber cycle for formation of crystalline solids from their elements</li> <li>• Calculate the lattice energy of an ionic bond from given data</li> <li>• Know factors affecting lattice energy and rank lattice energies for various formulas based on these factors</li> <li>• Draw Lewis structures for covalent compounds and ions with single and multiple bonds</li> <li>• Know the concept of electronegativity (EN) and its effect on the polarity of bonds</li> <li>• Rank polarity of bonds based on <math>\Delta EN</math></li> <li>• Classify bond types based on <math>\Delta EN</math></li> <li>• Determine approximate value for % ionic character of a bond from <math>\Delta EN</math> and Figure 9.10</li> <li>• Know the concept of resonance and draw resonance hybrids for structures requiring them</li> <li>• Assign formal charges to atoms in a structure and determine the more favored resonance structure based on formal charges</li> <li>• Know the exceptions to the octet rule</li> <li>• Know the relationship of bond length, bond energy and bond order</li> <li>• Calculate the enthalpy of reaction from bond energies</li> </ul>	9.2 9.3 9.4 9.4 9.4 9.4 9.4 9.4 9.5, 9.7 9.6 9.6 9.6 9.6 9.8 9.8 9.9 9.10, Notes 9.10
<b>CHAPTER 10</b>	
<ul style="list-style-type: none"> <li>• Use VSEPR model to assign electron-pair geometry for molecules with 2-6 electrons pairs around the central atom</li> <li>• Predict and explain the effect of lone pairs on the geometry of the molecule</li> <li>• Distinguish between electron pair geometry and molecular geometry for molecules with nonbonding electrons pairs</li> <li>• Know the bond angles of various shapes predicted by VSEPR</li> <li>• Predict the shape of larger molecules along the interior atoms</li> <li>• Distinguish between bond polarity and molecular polarity</li> <li>• Predict the polarity of molecules based on their geometry</li> <li>• Explain chemical bonding based on valence bond theory</li> <li>• Use electron configuration and valence bond theory to explain bonding in simple molecules</li> <li>• Explain the general principles in hybridization of orbitals and characterize the differences between hybrid and standard orbitals</li> <li>• Identify bonding orbitals (hybridized and standard) involved in bonding of molecules</li> <li>• Distinguish between sigma and pi bonds in molecules</li> <li>• Predict formation of pi bonds in molecules with hybridized orbitals</li> <li>• Assign hybridization for each geometry predicted by VSEPR model</li> </ul>	10.2 10.3 10.3 10.3 10.4 10.5 10.5 10.6 10.6 10.7 10.7 10.7 10.7 10.7

<p><u>CHAPTER 11</u></p> <ul style="list-style-type: none"> <li>• Distinguish between intermolecular forces and bonding forces present in molecules</li> <li>• Explain why intermolecular forces are smaller in magnitude compared to bonding forces</li> <li>• Classify the four types of intermolecular force and identify which substances contain each</li> <li>• Predict the effect of different type of intermolecular force on the properties of substances</li> <li>• Know the definition of vapor pressure and its relationship to the boiling point and volatility of a substance.</li> <li>• Rank substances according to boiling point, and other properties based on their intermolecular forces.</li> <li>• Explain why different molecules contain different intermolecular forces.</li> </ul>	<p>11.3 11.3 11.3 11.3 Notes 11.3 11.3</p>
<p><u>CHAPTER 13</u></p> <ul style="list-style-type: none"> <li>• Know concentration units of molarity, molality, mass percent and mole fraction.</li> <li>• Convert between mass %, molarity, molality and mole fraction.</li> <li>• Know colligative properties and factors they depend on.</li> <li>• Calculate boiling point elevation and freezing point depression of a solvent by addition of solute.</li> <li>• Use Raoult's law to determine the vapor pressure of a solution containing a nonelectrolytes and nonvolatile solute.</li> <li>• Use Raoult's law to determine the vapor pressure of a solution containing 2 volatile components.</li> <li>• Use Law of partial pressures to determine the pressure and composition of vapor over an ideal solution.</li> <li>• Differentiate between effects of nonelectrolyte and electrolyte solutes on properties of solutions.</li> <li>• Calculate vapor pressure lowering, b.p. elevation and f.p. depression of a solution containing a strong electrolyte.</li> <li>• Calculate van't Hoff factor for solutions containing strong electrolytes from given data.</li> </ul>	<p>13.5 13.5 13.6 13.6 13.6 12.6 13.6 13.7 13.7 13.7</p>