

# Contents

<b>Introduction</b>	<b>CONCEPTS FROM THERMODYNAMICS</b>	<b>1</b>
<b>Chapter 1</b>	<b>ATOMIC STRUCTURE</b>	<b>5</b>
<b>1-1</b>	One-Electron Wave Functions	5
<b>1-2</b>	Many-Electron Atoms	14
<b>1-3</b>	Vector Model of the Atom	16
<b>1-4</b>	Magnetic Properties of Atoms	20
<b>1-5</b>	Electronic Spectra	26
<b>1-6</b>	Ionization Potential	28
<b>1-7</b>	Electron Affinity	30
<b>Chapter 2</b>	<b>MOLECULES</b>	<b>33</b>
<b>2-1</b>	Description of Molecules	33
<b>2-2</b>	Valence Bond	34

2-3	Hybrid Orbitals	35
2-4	$\sigma$ Bonds	41
2-5	Resonance	42
2-6	Molecular Orbitals	43
2-7	Three-Center Bonds	51
2-8	Ligand Field Theory	53
2-9	Molecular Parameters	63
<b>Chapter 3</b>	<b>SOLID STATE</b>	<b>74</b>
3-1	Classification	74
3-2	Ionic Crystals	78
3-3	Packing of Atoms	83
3-4	Metals	90
3-5	Semiconductors	94
3-6	Magnetic Properties of Solids	98
3-7	Defect Solid State	99
3-8	Luminescence	103
<b>Chapter 4</b>	<b>LIQUIDS AND SOLUTIONS</b>	<b>104</b>
4-1	Structure of Liquids	104
4-2	Structure of Water	107
4-3	Liquid Ammonia	109
4-4	Liquid Hydrogen Fluoride	113
4-5	Hydration	114
4-6	Species in Aqueous Solutions	122
<b>Chapter 5</b>	<b>CHEMICAL REACTIONS</b>	<b>133</b>
5-1	Oxidation Potentials	133
5-2	Reaction Kinetics	140
5-3	Mechanisms of Oxidation-Reduction	141
5-4	Mechanisms of Substitution	145
5-5	Acid-Base Reactions	153
5-6	Ion Pairing	156
5-7	Interphase Reactions	158
<b>Index</b>		<b>161</b>