

Table of Contents

Preface	v
Acknowledgment	vii

Part I Mechanics

1 Mechanical Work	3
References	7
2 Mechanics of Gases	9
Reference	18

Part II Basic Thermodynamics

3 Heat Transfer	23
References	32
4 Thermodynamics	33
4.1 Entropy	34
4.2 Gibbs Free Energy	40
Reference	47

Part III Mixtures and Chemical Thermodynamics

5 Mixtures and Solutions	53
References	59
6 Chemical Reactions and Gibbs Free Energy	61
References	64

7	Gibbs Free Energy and Chemical Equilibria	65
7.1	Receptor and Ligand Equilibria	70
7.2	Acids and Bases	87
	References	94

Part IV Ionic Properties and Electrochemistry

8	Ions	99
8.1	Ion Activities	102
	Reference	109
9	Electrochemistry	111
9.1	Biological Electrochemistry	118
	References	126

Part V Kinetics

10	Kinetics	131
10.1	Enzyme Kinetics	140
10.2	Reaction Barriers	145
	References	149

Part VI Structure of Matter: Molecular Spectroscopy

11	The Structure of Matter	155
11.1	Simple Quantum Mechanics	155
	References	169
12	Interaction of Light and Matter	171
12.1	UV and Visible Spectroscopy	171
12.1.1	UV/Vis Spectrophotometry	172
12.2	Vibrational Spectroscopy	176
12.2.1	Isotopic Effects in Molecular Vibrations	180
12.3	Nuclear Magnetism and NMR Spectroscopy	184
12.4	Level Population	189
12.5	Down-Conversion of Photon Energy	192
	References	201

Index	205
--------------------	-----