
Contents

Chapter	1 . . . <i>The Scope of Thermodynamics, Chemical Thermodynamics, and Statistical Thermodynamics</i>	1
	2 . . . <i>Physical Units, Accepted Constants, and Empirical Temperatures</i>	4
	3 . . . <i>Historical Background of the First and Second Laws of Thermodynamics</i>	17
	4 . . . <i>Equations of State</i>	25
	5 . . . <i>The First Law of Thermodynamics and Its Formal Applications</i>	38
	6 . . . <i>Formal Treatment of the Second Law of Thermodynamics</i>	59
	7 . . . <i>Equilibria between Two or More Phases of a Pure Substance</i>	93
	8 . . . <i>Partial Molal Quantities</i>	102
	9 . . . <i>Generalized Thermodynamics (The Methods of J. Willard Gibbs, Part I)</i>	121
	10 . . . <i>Imperfect Gases. Fugacity and Entropy Diagrams</i>	133
	11 . . . <i>Solutions. The Activity of Non-electrolytes</i>	155
	12 . . . <i>Systematic Calculation of Heat Content (Enthalpy), Free Energy, and Entropy Changes in Chemical Reactions. The</i>	

	<i>Equilibrium Constant. Use of Tables. The Third Law of Thermodynamics</i>	176
Chapter 13	<i>Solutions of Electrolytes</i>	200
14	<i>Electromotive Force of Cells</i>	215
15	<i>Thermodynamics Involving Variables Other than Pressure, Temperature, and Composition</i>	227
16	<i>Energy Levels of Particles, Atoms, and Molecules. Atomic and Molecular Spectra</i>	248
17	<i>Introduction to Statistical Mechanics. The Distribution Laws</i>	309
18	<i>Thermodynamic Functions for Systems of Localized Elements and "Dilute" Gases</i>	329
19	<i>Calculation of the Thermodynamic Properties of Diatomic Gases</i>	356
20	<i>Calculation of the Partition Functions and Thermodynamic Properties of Polyatomic Gases</i>	378
21	<i>Calculation of the Thermodynamic Properties of Crystals</i>	397
22	<i>Calculation of the Magnetic Contribution to Thermodynamic Properties</i>	415
23	<i>The General Principles of Statistical Mechanics (Methods of J. Willard Gibbs, Part II)</i>	429
Appendix 1	<i>Physical Constants and Useful Relationships</i>	463
2	<i>Data of State</i>	464
3	<i>Relationships for the Calculation of Partial Molal Properties for Binary Solutions</i>	467
4	<i>Debye, Einstein, and Hindered Rotor Functions</i>	471
5	<i>Mathematical and Geometrical Quantities</i>	476
6	<i>Wave Functions, Selection Rules, and Allowed Vibrational Modes</i>	481
7	<i>Thermodynamic Properties of Simple Molecules in the Ideal Gas State from Statistical Calculations</i>	521
8	<i>Derivations of Equations</i>	530
9	<i>List of Symbols</i>	534
10	<i>Answers to Numerical Problems</i>	537
Author Index		543
Subject Index		547