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Adiabatic; 3.7 Determination of Entropy from a Heat Capacity; 3.8 Determination of Entropy from an Equation of State; 3.9 Phase Transitions and Phase Diagrams; 3.9.1 Conditions for Coexistence; 3.9.2 Clausius-Clapeyron Equation; 3.9.3 The Maxwell Equal Areas Construction; 3.9.4 Metastability and Nucleation; 3.10 Work Processes without Volume Change; 3.11 Consequences of the Third Law 3.12 Limitations of Classical Thermodynamics Exercises; Chapter 4 Core Ideas of Statistical Thermodynamics; 4.1 The Nature of Probability; 4.2 Dynamics of Complex Systems; 4.2.1 The Principle of Equal a Priori Probabilities; 4.2.2 Microstate Enumeration; 4.3 Microstates and Macrostates; 4.4 Boltzmann's Principle and the Second Law; 4.5 Statistical Ensembles; 4.6 Statistical Thermodynamics: the Salient Points; Exercises; Chapter 5 Statistical Thermodynamics of a System of Harmonic Oscillators; 5.1 Microstate Enumeration; 5.2 Microcanonical Ensemble; 5.3 Canonical Ensemble 5.4 The Thermodynamic Limit 5.5 Temperature and the Zeroth Law of Thermodynamics; 5.6 Generalisation; Exercises; Chapter 6 The Boltzmann Factor and the Canonical Partition Function; 6.1 Simple Applications of the Boltzmann Factor; 6.1.1 Maxwell-Boltzmann Distribution; 6.1.2 Single Classical Oscillator and the Equipartition Theorem; 6.1.3 Isothermal Atmosphere Model; 6.1.4 Escape Problems and Reaction Rates; 6.2 Mathematical Properties of the Canonical Partition Function; 6.3 Two-Level Paramagnet; 6.4 Single Quantum Oscillator; 6.5 Heat Capacity of a Diatomic Molecular Gas 6.6 Einstein Model of the Heat Capacity of Solids

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Sommario/riassunto

"This undergraduate textbook provides students with a statistical mechanical foundation to the classical laws of thermodynamics through a comprehensive treatment of the basics of classical thermodynamics, equilibrium statistical mechanics, irreversible thermodynamics, and statistical mechanics of non-equilibrium phenomena. The concept of entropy is studied starting from the ideal gas law, known to every undergraduate. By considering various thermodynamic processes, it then explores the concept's generality. An accessible style enables undergraduates to easily follow the presentation without much prior knowledge. The focus on entropy distinguishes the book from many other treatments of this subject"--

"Focuses from the beginning on entropy as the important quantity and introduces it thoroughly in the context of classical thermodynamics"--

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