Statistical Mechanics By S K Sinha

This symposium is dedicated to Prof N N Bogolubov on the occasion of his 80th birthday. Besides including a collection of articles by distinguished speakers, this volume also contains a review on the life and scientific activities of Prof N N Bogolubov.

Recent experimental evidence about the possibility of "absolute negative temperature" states in physical systems has triggered a stimulating debate about the consistency of such a concept from the point of view of Statistical Mechanics. It is not clear whether the usual results of this field can be safely extended to negative-temperature states; some authors even propose fundamental modifications to the Statistical Mechanics formalism, starting with the very definition of entropy, in order to avoid the occurrence of negative values of the temperature tout-court. The research presented in this thesis aims to shed some light on this controversial topic. To this end, a particular class of Hamiltonian systems with bounded kinetic terms, which can assume negative temperature, is extensively studied, both analytically and numerically. Equilibrium and out-of-equilibrium properties of this kind of system are investigated, reinforcing the overall picture that the introduction of negative temperature does not lead to any contradiction or paradox.

This book presents a variety of techniques for tackling phenomena that are not amenable to the conventional approach based on the concept of probabilities. The methods described rely on the use of path integration, thermal Green functions, time-temperature propagators, Liouville operators, second quantization, and field correlators at finite density and temperature. Also exploring the statistical mechanics of unstable quantum systems, the book is intended as a supplementary or reference text for use in one-semester graduate courses on Quantum Mechanics, Thermodynamics, Electromagnetism, and Mathematical Methods in Physics.

Statistical MechanicsThermal Physics and Statistical MechanicsNew Age International

A self-contained 2006 graduate-level introduction to the statistical mechanics of disordered systems. In three parts, the book treats basic statistical mechanics; disordered lattice spin systems; and latest developments in the mathematical understanding of mean-field spin glass models. It assumes basic knowledge of classical physics and working knowledge of graduate-level probability theory.

Statistical Mechanics is an integral part of theoretical physics, and this book aims at presenting the fundamentals of statistical mechanics in a clear and concise manner. The book begins with a clear exposition of classical as well as quantal equilibrium statistical mechanics. Then it moves on to give insights into the Gibbs canonical distribution, the grand canonical distribution, ideal Bose gas, ideal fermi gas, and imperfect gases. The text also delves into certain topics of special interest, such as phase-transitions, Ising model, and liquid Helium. The book concludes with a discussion of some selected topics of non-equilibrium statistical mechanics. Primarily intended as a text for postgraduate students of physics, it would also prove useful for students at the undergraduate level.

This document is based on my lecture notes for the Winter 2013, University of Toronto Basic Statistical Mechanics course (PHY452H1S), taught by Prof. Arun Paramekanti. Official course description: “Classical and quantum statistical mechanics of noninteracting systems; the statistical basis of thermodynamics; ensembles, partition function; thermodynamic equilibrium; stability and fluctuations; formulation of quantum statistics; theory of simple gases; ideal Bose and Fermi systems.” This document contains: • Plain old lecture notes. These mirror what was covered in class, possibly augmented with additional details. • Personal notes exploring details that were not clear to me from the lectures, or from the texts associated with the lecture material. • Assigned problems. two problem sets. • Some worked problems attempted as course prep, for fun, or for test preparation, or post test reflection. • Links to Mathematica workbooks associated with these notes.

This book covers the foundations of classical thermodynamics, with emphasis on the use of differential forms of classical and quantum statistical mechanics, and also on the foundational aspects. In both contexts, a number of applications are considered in detail, such as the general theory of response, correlations and fluctuations, and classical and quantum spin systems. In the quantum case, a self-contained introduction to path integral methods is given. In addition, the book discusses phase transitions and critical phenomena, with applications to the Landau theory and to the Ginzburg-Landau theory of superconductivity, and also to the phenomenon of Bose condensation and of superfluidity. Finally, there is a careful discussion on the use of the renormalization group in the study of critical phenomena.

This book covers the broad subject of equilibrium statistical mechanics along with many advanced and modern topics such as nucleation, spinodal decomposition, inherent structures of liquids and liquid crystals. Unlike other books on the market, this comprehensive text not only deals with the primary fundamental ideas of statistical mechanics but also covers contemporary topics in this broad and rapidly developing area of chemistry and materials science.

This monograph is devoted to quantum statistical mechanics. It can be regarded as a continuation of the book "Mathematical Foundations of Classical Statistical Mechanics.

Continuous Systems" (Gordon & Breach SP, 1989) written together with my colleagues V. I. Gerasimenko and P. V. Malyshev. Taken together, these books give a complete pre sentation of the statistical mechanics of continuous systems, both quantum and classical, from the common point of view. Both books have similar contents. They deal with the investigation of states of in finite systems, which are described by infinite sequences of statistical operators (reduced density matrices) or Green's functions in the quantum case and by infinite sequences of distribution functions in the classical case. The equations of state and their solutions are the main object of investigation in these books. For infinite systems, the solutions of the equations of state are constructed by using the thermodynamic limit procedure, accord ing to which we first find a solution for a system of finitely many particles and then let the number of particles and the volume of a region tend to infinity keeping the density of particles constant. However, the style of presentation in these books is quite different.

Statistical mechanics is concerned with defining the thermodynamic properties of a macroscopic sample in terms of the properties of the microscopic systems of which it is composed. The previous book Introduction to Statistical Mechanics provided a clear, logical, and self-contained treatment of equilibrium statistical mechanics starting from Boltzmann's two statistical assumptions, and presented a wide variety of applications to diverse physical assemblies. An appendix provided an introduction to non-equilibrium statistical mechanics through the Boltzmann equation and its extensions. The coverage in that book was enhanced and extended through the inclusion of many accessible problems. The current book provides solutions to those problems. These texts assume only introductory courses in classical and quantum mechanics, as well as familiarity with multi-variable calculus and the essentials of complex analysis. Some knowledge of thermodynamics is also assumed, although the analysis starts with an appropriate review of that topic. The targeted audience is first-year graduate students and advanced undergraduates, in physics, chemistry, and the related physical sciences. The goal of these texts is to help the reader obtain a clear working knowledge of the very useful and powerful methods of equilibrium statistical mechanics and to enhance the understanding and appreciation of the more advanced texts.

This textbook provides a comprehensive, yet accessible, introduction to statistical mechanics. Crafted and class-tested over many years of teaching, it carefully guides advanced undergraduate and graduate students who are encountering statistical mechanics for the first time through this – sometimes – intimidating subject. The book provides a strong foundation in thermodynamics and the ensemble formalism of statistical mechanics. An introductory chapter on probability theory is included. Applications include degenerate Fermi systems, Bose-Einstein condensation, cavity radiation, phase transitions, and critical phenomena. The book concludes with a treatment of scaling theories and the renormalization group. In addition, it provides clear descriptions of how to understand the foundational mathematics and physics involved and includes exciting case studies of modern applications of the subject in physics and wider interdisciplinary areas. Key Features: Presents the subject in a clear and entertaining style which enables the author to take a sophisticated approach whilst remaining accessible Contains contents that have been carefully reviewed with a substantial panel to ensure that coverage is appropriate for a wide range of courses, worldwide Accompanied by volumes on thermodynamics and non-equilibrium statistical mechanics, which can be used in conjunction with this book, on courses which cover both thermodynamics and statistical mechanics

Most of the interesting and difficult problems in statistical mechanics arise when the constituent particles of the system interact with each other with pair or multipartiele energies. The types of behaviour which occur in systems because of these interactions are referred to as cooperative phenomena giving rise in many cases to phase transitions. This book and its companion volume (Lavis and Bell 1999, referred to in the text simply as Volume 1) are princi pally concerned with phase transitions in lattice systems. Due mainly to the insights gained from scaling theory and renormalization group methods, this subject has developed very rapidly over the last thirty years. ' In our choice of topics we have tried to present a good range of fundamental theory and of applications, some of which reflect our own interests. A broad division of material can be made between exact results and ap proximation methods. We have found it appropriate to inelude some of our discussion of exact results in this volume and some in Volume 1. Apart from this much of the discussion in Volume 1 is concerned with mean-field theory. Although this is known not to give reliable results elose to a critical region, it often provides a good qualitative picture for phase diagrams as a whole. For complicated systems some kind of mean-field method is often the only tractable method available. In this volume our main concern is with scaling theory, algebraic methods and the renormalization group.

The aim of this advanced textbook is to provide the reader with a comprehensive explanation of the ground state configurations, the spin wave excitations and the equilibrium properties of spin lattices described by the IsingOCoHeisenberg Hamiltonians in the presence of short (exchange) and long range (dipole) interactions.The arguments are presented in such detail so as to enable advanced undergraduate and graduate students to cross the threshold of active research in magnetism by using both analytic calculations and Monte Carlo simulations.Recent results about unorthodox spin configurations such as stripes and checkerboards should then excite theoreticians in the field of magnetism and magnetic materials research.

This is a unique and exciting graduate and advanced undergraduate text written by a highly respected physicist who had made significant contributions to the subject. This book conveys to the reader that statistical mechanics is a growing and lively subject. It deals with many modern topics from a physics standpoint in a very physical way. Particular emphasis is given to the fundamental assumption of statistical mechanics S=1n and its logical foundation. Calculational rules are derived without resorting to abstract ensemble theory.

The purpose of this textbook is to bring together, in a self-contained introductory form, the scattered material in the field of stochastic processes and statistical physics. It offers the opportunity of being acquainted with stochastic, kinetic and nonequilibrium processes. Although the research techniques in these areas have become standard procedures, they are not usually taught in the normal courses on statistical physics. For students of physics in their last year and graduate students who wish to gain an invaluable introduction on the above subjects, this book is a necessary tool. Contents:Stochastic Processes and the Master Equation:Stochastic ProcessesMarkovian ProcessesMaster EquationsKramers Moyal ExpansionBrownian Motion, Langevin and Fokker-Planck EquationsDistributions, BBGKY Hierarchy, Density Operator:Probability Density as a FluidBBGKY HierarchyMicroscopic Balance EquationsDensity OperatorLinear Nonequilibrium Thermodynamics and Onsager Relations:Onsager Regression to Equilibrium HypothesisOnsager RelationsMinimum Production of EntropyLinear Response Theory, Fluctuation-Dissipation Theorem:Correlation Functions: Definitions and PropertiesLinear Response TheoryFluctuation-Dissipation TheoremInstabilities and Far from

Equilibrium Phase-Transitions:Limit Cycles, Bifurcations, Symmetry BreakingNoise Induced TransitionsFormation and Propagation of Patterns in Far from Equilibrium Systems:Reaction-Diffusion Descriptions and Pattern FormationPattern Propagation Readership: Graduate students in physics and chemistry. keywords:Stochastic Processes;Langevin and Fokker-Planck Equations;Statistical Physics;Onsager Relations;Linear Response;Nonequilibrium Statistical Physics;Transport Processes;Noise Induced Transitions;Instabilities;Pattern Formation and Propagation “This book introduces ways to investigate nonequilibrium statistical physics, mainly via stochastic processes, and presents results achieved with such methodology … it is suitable for seminars directed towards relatively mature students in theoretical physics or applied mathematics.” H Muthsam “The present book is a good choice for a single book covering the field … suitable for undergraduate students in the last year and graduate students. They will find in it a suggestive introduction that motivates them to dig deeper into the field and to look for those topics omitted from the text … highly recommended to anyone interested in becoming acquainted with nonequilibrium statistical physics.” Journal of Statistical Physics The present book is an outcome of the SERC school on Computational Statistical Physics held at the Indian Institute of Technology, Guwahati, in December 2008.

Numerical experimentation has played an extremely important role in statistical physics in recent years. Lectures given at the School covered a large number of topics of current and continuing interest. Based on lectures by active researchers in the field- Bikas Chakrabarti, S Chaplot, Deepak Dhar, Sanjay Kumar, Prabal Maiti, Sanjay Puri, Purusattam Ray, Sitangshu Santra and Subir Sarkar- the nine chapters comprising the book deal with topics that range from the fundamentals of the field, to problems and questions that are at the very forefront of current research. This book aims to expose the graduate student to the basic as well as advanced techniques in computational statistical physics. Following a general introduction to statistical mechanics and critical phenomena, the various chapters cover Monte Carlo and molecular dynamics simulation methodology, along with a variety of applications. These include the study of coarsening phenomena and diffusion in zeolites. /p In addition, graphical enumeration techniques are covered in detail with applications to percolation and polymer physics, and methods for optimisation are also discussed. Beginning graduate students and young researchers in the area of statistical physics will find the book useful. In addition, this will also be a valuable general reference for students and researchers in other areas of science and engineering.

A new and updated edition of the successful Statistical Mechanics: Entropy, Order Parameters and Complexity from 2006. Statistical mechanics is a core topic in modern physics. Innovative, fresh introduction to the broad range of topics of statistical mechanics today, by brilliant teacher and renowned researcher.

Dynamical systems and statistical mechanics have been developing in close interaction during the past decade, and the papers in this book attest to the productiveness of this interaction. The first paper in the collection contains a new result in the theory of quantum chaos, a burgeoning line of inquiry that combines mathematics and physics and is likely in time to produce many new connections and applications. Another paper, related to the renormalization group method for the study of maps of the circle with singularities due to a jump in the derivative, demonstrates that the fixed point of the renormgroup can be sufficiently described in this case. In certain situations, the renormgroup methods work better than the traditional KAM method.Other topics covered include thermodynamic formalism for certain infinite-dimensional dynamical systems, numerical simulation of dynamical systems with hyperbolic behavior, periodic points of holomorphic maps, the theory of random media, statistical properties of the leading eigenvalue in matrix ensembles of large dimension, spectral properties of the one-dimensional Schrodinger operator. This volume will appeal to many readers, as it covers a broad range of topics and presents a view of the some of the frontier research in the Soviet Union today.

This book aims to describe in simple terms the new area of statistical mechanics known as spin-glasses, encompassing systems in which quenched disorder is the dominant factor. The book begins with a non-mathematical explanation of the problem, and the modern understanding of the physics of the spin-glass state is formulated in general terms. Next, the 'magic' of the replica symmetry breaking scheme is demonstrated and the physics behind it discussed. Recent experiments on real spin-glass materials are briefly described to demonstrate how this somewhat abstract physics can be studied in the laboratory. The final chapters of the book are devoted to statistical models of neural networks. The material here is self-contained and should be accessible to students with a basic knowledge of theoretical physics and statistical mechanics. It has been used for a one-term graduate lecture course at the Landau Institute for Theoretical Physics. Contents:The Ising Magnetic SystemsPhysics of the Spin Glass StateReplica MethodReplica Symmetry BreakingPhysics of Replica Symmetry BreakingReplica Symmetry Breaking Solution Near TcUltrametricityScaling in the Space of Spin Glass StatesExperimentsPartial AnnealingStatistical Models of Neural NetworksThe Hopfield ModelPartial Annealing in Neural NetworksOther

Kinds of Neural NetworksAppendix: Stability of the Replica-Symmetric Solutions Readership: Researchers and graduate students in statistical mechanics and neural networks. keywords: “The book by Viktor Dotsenko in large parts presents the most important results of this research based on the replica method. Although these results have been presented systematically already elsewhere (for instance in the well-known book by Amit) their concise presentation makes the book self-contained and a good introduction to the theoretical tools.” Mathematics Abstracts

The 1952 Nobel physics laureate Felix Bloch (1905-83) was one of the titans of twentieth-century physics. He laid the fundamentals for the theory of solids and has been called the “father of solid-state physics.” His numerous, valuable contributions include the theory of magnetism, measurement of the magnetic moment of the neutron, nuclear magnetic resonance, and the infrared problem in quantum electrodynamics.Statistical mechanics is a crucial subject which explores the understanding of the physical behaviour of many-body systems that create the world around us. Bloch's first-year graduate course at Stanford University was the highlight for several generations of students. Upon his retirement, he worked on a book based on the course. Unfortunately, at the time of his death, the writing was incomplete.This book has been prepared by

Professor John Dirk Walecka from Bloch's unfinished masterpiece. It also includes three sets of Bloch's handwritten lecture notes (dating from 1949, 1969 and 1976), and details of lecture notes taken in 1976 by Brian Serot, who gave an invaluable opinion of the course from a student's perspective. All of Bloch's problem sets, some dating back to 1933, have been included.The book is accessible to anyone in the physical sciences at the advanced undergraduate level or the first-year graduate level.

In this new textbook, a number of unusual applications are discussed in addition to the usual topics covered in a course on Statistical Physics. Examples are: statistical mechanics of powders, Peierls instability, graphene, Bose-Einstein condensates in a trap, Casimir effect and the quantum Hall effect. Superfluidity and super-conductivity (including the physics of high-temperature superconductors) have also been discussed extensively. The emphasis on the treatment of these topics is pedagogic, introducing the basic tenets of statistical mechanics, with extensive and thorough discussion of the postulates, ensembles, and the relevant statistics. Many standard examples illustrate the microcanonical, canonical and grand canonical ensembles, as well as the Bose-Einstein and Fermi-Dirac statistics. A special feature of this text is the detailed presentation of the theory of second-order phase transitions and the renormalization group, emphasizing the role of disorder. Non-equilibrium statistical physics is introduced via the Boltzmann transport equation. Additional topics covered here include metastability, glassy systems, the Langevin equation, Brownian motion, and the Fokker-Planck equation. Graduate students will find the presentation readily accessible, since the topics have been treated with great deal of care and attention to detail. Request Inspection Copy

This is an overview of single molecule physics, the study of both equilibrium and non-equilibrium properties at the single molecule level. It begins with an introduction to this fascinating science and includes a chapter on how to build the most popular instrument for single molecule biophysics, the total internal reflection fluorescence (TIRF) microscope. It concludes with the Poisson process approach to statistical mechanics, explaining how to relate the process to diverse areas and see how data analysis and error bars are integral parts of science.

This book aims to provide a compact and unified introduction to the most important aspects in the physics of non-equilibrium systems. It first introduces stochastic processes and some modern tools and concepts that have proved their usefulness to deal with non-equilibrium systems from a purely probabilistic angle. The aim is to show the important role played by fluctuations in far-from-equilibrium situations, where noise can promote order and organization, switching among non-equilibrium states, etc. The second part adopts a more historical perspective, retracing the first steps taken from the purely thermodynamic as well as from the kinetic points of view to depart (albeit slightly) from equilibrium. The third part revisits the path outlined in the first one, but now undertakes the mesoscopic description of extended systems, where new phenomena (patterns, long-range correlations, scaling far from equilibrium, etc.) are observed. This book is a revised and extended version of an earlier edition published in 1994. It includes topics of current research interest in far-from-equilibrium situations like noise-induced phenomena and free energy-like functionals, surface growth and roughening, etc. It can be used as an advanced textbook by graduate students in physics. It also covers topics of current interest in other disciplines and interdisciplinary approaches in engineering, biophysics, and economics, among others. The level of detail in the book is enough to capture the interest of the reader and facilitate the path to more learning by exploring the modern research literature provided. At the same time, the book is also complete enough to be self-contained for those readers who just need an overview of the subject.

This is a masters/graduate level textbook on statistical physics. The basics of the discipline and its application in the current topics of interest like BoseEinstein condensate, statistical astrophysics and phase transitions have been discussed with thoroughness. This is a systematic introduction and development of a course material tried successful over a number of years. Feedback from the students tells that it has immensely helped them in their later research.

This completely revised edition of the classical book on Statistical Mechanics covers the basic concepts of equilibrium and non-equilibrium statistical physics. In addition to a deductive approach to equilibrium statistics and thermodynamics based on a single hypothesis this book treats the most important elements of non-equilibrium phenomena. Intermediate calculations are presented in complete detail. Problems at the end of each chapter help students to consolidate their understanding of the material. Beyond the fundamentals, this text demonstrates the breadth of the field and its great variety of applications.

Exactly Solved Models in Statistical Mechanics

This book addresses the application of methods used in statistical physics to complex systems—from simple phenomenological analogies to more complex aspects, such as correlations, fluctuation-dissipation theorem, the concept of free energy, renormalization group approach and scaling. Statistical physics contains a well-developed formalism that describes phase transitions. It is useful to apply this formalism for damage phenomena as well. Fractals, the Ising model, percolation, damage mechanics, fluctuations, free energy formalism, renormalization group, and scaling, are some of the topics covered in Statistical Physics of Phase Transitions.

Introduction to applications and techniques in non-equilibrium statistical mechanics of chaotic dynamics.

This book provides a theoretical, step-by-step comprehensive explanation of superconductivity for undergraduate and graduate students who have completed elementary courses on thermodynamics and quantum mechanics. To this end, it adopts the unique approach of starting with the statistical mechanics of quantum ideal gases and successively adding and clarifying elements and techniques indispensible for understanding it. They include the spin-statistics theorem, second quantization, density matrices, the Bloch–De Dominicis theorem, the variational principle in statistical mechanics, attractive interaction and bound states. Ample examples of their usage are also provided in terms of topics from advanced statistical mechanics such as two-particle correlations of quantum ideal gases, derivation of the Hartree–Fock equations, and Landau's Fermi-liquid theory, among others. With these preliminaries, the fundamental mean-field equations of superconductivity are derived with maximum mathematical clarity based on a coherent state in terms of the Cooper-pair creation operator, a quasiparticle field for describing the excitation and the variational principle in statistical mechanics. They have the advantage that the phase coherence due to the Cooper-pair condensation can be clearly seen making the superfluidity comprehensible naturally. Subsequently, they are applied to homogeneous cases to describe the BCS theory for classic s-wave superconductors and its extension to the p-wave superfluidity of 3He. Later, the mean-field equations are simplified to the Eilenberger and Ginzburg–Landau equations so as to describe inhomogeneous superconductivity such as Abrikosov's flux-line lattice concisely and transparently. Chapters provide the latest studies on the quasiclassical theory of superconductivity and a discovery of p-wave superfluidity in liquid 3He. The book serves as a standard reference for advanced

courses of statistical mechanics with exercises along with detailed answers.
This volume contains Introductory Notes and major reprints on conformal field theory and its applications to 2-dimensional statistical mechanics of critical phenomena. The subject relates to many different areas in contemporary physics and mathematics, including string theory, integrable systems, representations of infinite Lie algebras and automorphic functions. Contents:General Principles:Infinite Conformal Symmetry in Two-dimensional Quantum Field Theory (A A Belavin et al.)Conformal Invariance and Surface Critical Behaviour (J Cardy)Mathematical Background:Contravariant Form for Infinite-dimensional Lie Algebras and Superalgebras (V Kac)Verma Modules over the Virasoro Algebra (B Feigin & D Fuks)Unitary Representations of the Virasoro and Super-Virasoro Algebras (P Goddard et al.)Critical Models and Computation of Correlations:Conformal Algebra and Multipoint Correlation Functions in 2D Statistical Models (Vl Dotsenko & V Fateev)On the Identification of Finite Operator Algebras in Two-dimensional Conformally Invariant Field Theories (P Christe & R Flume)Finite Size Scaling:Conformal Invariance, the Central Charge and Universal Finite Size Amplitudes at Criticality (H Blöte et al.)Universal Term in the Free Energy at a Critical Point and the Conformal Anomaly (I Affleck)Exact Surface and Wedge Exponents for Polymers in Two Dimensions (B Duplantier & H Saleur)Modular Invariance:Modular Invariant Partition Functions in Two Dimensions (A Cappelli et al.)Modular Invariant Partition Functions for Parafermionic Field Theories (D Gepner & Z Qiu)Discrete Symmetries of

Conformal Theories (J-B Zuber)Connections With Integrable Systems:Exact Exponents for Infinitely many New Multicritical Points (D Huse)Automorphic Properties of Local Height Probabilities for Integrable Solid-on-solid Models (E Date et al.)Models with c = 1:Correlation Functions on the Critical Lines of the Baxter and Ashkin-Teller Models (L Kadanoff & A Brown)Supersymmetric Critical Phenomena and the Two Dimensional Gaussian Model (D Friedan & S Shenker)Curiosities at c=1 (P Ginsparg)Coulomb Gas Picture:Lattice Derivation of Modular Invariant Partition Functions on the Torus (V Pasquier)Vicinity of the Critical Point:Integrals of Motion in Scaling 3-state Potts Model Field Theory (A Zamolodchikov)Correlation Functions and Higher Topology:The Conformal Field Theory of Orbifolds (L Dixon et al.)Conformal and Current Algebras on a General Riemann Surface (T Eguchi & H Ooguri)and other papers Readership: Theoretical physicists in particle and statistical physics and mathematicians.

Sethna distills the core ideas of statistical mechanics to make room for new advances important to information theory, complexity, and modern biology. He explores everything from chaos through to life at the end of the universe.

This Book Emphasises The Development Of Problem Solving Skills In Undergraduate Science And Engineering Students.The Book Provides More Than 350 Solved Examples With Complete Step-By-Step Solutions As Well As Around 100 Practice Problems With Answers.Also Explains The Basic Theory, Principles, Equations And Formulae For A Quick Understanding And Review. Can Serve Both As A Useful Text

And Companion Book To Those Pre-Paring For Various Examinations In Physics.