Introduction To Solid State Physics By Charles Kittel 7th Edition

Introduction to Solid State PhysicsSolid State Physics Charles Kittel Neil W. Ashcroft John J. Quinn S. P. Kuila Giuseppe Grosso James Deane Patterson R. J. Singh H. P. Myers RK Puri | VK Babbar A. F. Gibson Simon Fraser University Summer School on Solid State Physics A.J. Dekker Adrianne Jacobus Dekker Philip Hofmann Gerald Burns Adrianus J. Dekker Siegfried Hunklinger Adrianus Jacobus Dekker J. S. Blakemore Introduction to Solid State Physics A.J. Dekker Adrianne Jacobus Dekker Philip Hofmann Gerald Burns Adrianus J. Dekker Siegfried Hunklinger Adrianus Jacobus Dekker J. S. Blakemore

since the publication of the first edition over 50 years ago introduction to solid state physics has been the standard solid state physics text for physics students the author s goal from the beginning has been to write a book that is accessible to undergraduates and consistently teachable the emphasis in the book has always been on physics rather than formal mathematics with each new edition the author has attempted to add important new developments in the field without sacrificing the book s accessibility and teachability a very important chapter on nanophysics has been written by an active worker in the field this field is the liveliest addition to solid state science during the past ten years the text uses the simplifications made possible by the wide availability of computer technology searches using keywords on a search engine such as google easily generate many fresh and useful references

this book provides an introduction to the field of solid state physics for undergraduate students in physics chemistry engineering and materials science

intended for a two semester advanced undergraduate or graduate course in solid state physics this treatment offers modern coverage of the theory and related experiments including the group theoretical approach to band structures moessbauer recoil free fraction semi classical electron theory magnetoconductivity electron self energy and landau theory of fermi liquid and both quantum and fractional quantum hall effects integrated throughout are developments from the newest semiconductor devices e g space charge

layers quantum wells and superlattices the first half includes all material usually covered in the introductory course but in greater depth than most introductory textbooks the second half includes most of the important developments in solid state researches of the past half century addressing e g optical and electronic properties such as collective bulk and surface modes and spectral function of a quasiparticle which is a basic concept for understanding leed intensities x ray fine structure spectroscopy and photoemission so both the fundamental principles and most recent advances in solid state physics are explained in a class tested tutorial style with end of chapter exercises for review and reinforcement of key concepts and calculations

solid state physics is a textbook for students of physics material science chemistry and engineering it is the state of the art presentation of the theoretical foundations and application of the quantum structure of matter and materials this second edition provides timely coverage of the most important scientific breakthroughs of the last decade especially in low dimensional systems and quantum transport it helps build readers understanding of the newest advances in condensed matter physics with rigorous yet clear mathematics examples are an integral part of the text carefully designed to apply the fundamental principles illustrated in the text to currently active topics of research basic concepts and recent advances in the field are explained in tutorial style and organized in an intuitive manner the book is a basic reference work for students researchers and lecturers in any area of solid state physics features additional material on nanostructures giving students and lecturers the most significant features of low dimensional systems with focus on carbon allotropes offers detailed explanation of dissipative and nondissipative transport and explains the essential aspects in a field which is commonly overlooked in textbooks additional material in the classical and quantum hall effect offers further aspects on magnetotransport with particular emphasis on the current profiles gives a broad overview of the band structure of solids as well as presenting the foundations of the electronic band structure also features reported with new and revised material which leads to the latest research

learning solid state physics involves a certain degree of maturity since it involves tying together diverse concepts from many areas of physics the objective is to understand in a basic way how solid materials behave to do this one needs both a good physical and mathematical background one definition of solid state physics is that it is the study of the physical e g the electrical dielectric magnetic elastic and thermal properties of solids in terms of basic physical laws in one sense solid state physics is more like chemistry than some other branches of physics because it focuses on common properties of large classes of materials it is typical that solid state physics emphasizes how physics properties link to electronic structure we have retained the term solid state physics even though condensed matter physics is more commonly used condensed matter physics includes liquids and non crystalline solids such as glass which we shall not discuss in detail modern solid state physics came of age in the late thirties and forties and had its most extensive expansion with the development of the transistor integrated circuits and microelectronics most of microelectronics however is limited to the properties of inhomogeneously doped semiconductors solid state physics includes many other areas of course among the largest of these are ferromagnetic materials and superconductors just a little less than half of all working physicists are in condensed matter a course in solid state physics typically begins with three broad areas 1 how and why atoms bind together to form solids 2 lattice vibrations and phonons and 3 electrons in solids one would then typically apply the above to 4 interactions especially of electrons with phonons 5 metals the fermi surface and alloys 6 semiconductors 7 magnetism 8 superconductivity 9 dielectrics and ferroelectrics 10 optical properties 11 defects and 12 certain other modern topics such as layered materials quantum hall effect mesoscopics nanophysics and soft condensed matter in this book we wil

solid state physics forms an important part of the undergraduate syllabi of physics in most of the universities the existing competing books by indian authors have too complex technical language which makes them abstractive to indian students who use english as their secondary language solid state physics is written as per the core module syllabus of the major universities and targets undergraduate b sc students the book uses lecture style in explaining the concepts which would facilitate easy understanding of the concepts the topics have been dealt with precision and provide adequate knowledge of the subject

the present edition is brought up to incorporate the useful suggestions from a number of readers and teachers for the benefit of students a topic on common collector configuration is added to the chapter xiii a new chapter on logic gates is intriduced at the end keeping in view the present style of university question papers a number of very short short and long thoroughly revised and corrected to remove the errors which crept into earlier editions

a must have textbook for any undergraduate studying solid state physics this successful brief course in solid state physics is now in its second edition the clear and concise introduction not only describes all the basic phenomena and concepts but also such advanced issues as magnetism and superconductivity each section starts with a gentle introduction covering basic principles progressing to a more advanced level in order to present a comprehensive overview of the subject the book is providing qualitative discussions that help undergraduates understand concepts even if they can't follow all the mathematical detail the revised edition has been carefully updated to present an up to date account of the essential topics and recent developments in this exciting field of physics the coverage now includes ground breaking materials with high relevance for applications in communication and energy like graphene and topological insulators as well as transparent conductors the text assumes only basic mathematical knowledge on the part of the reader and includes more than 100 discussion questions and some 70 problems with solutions free to lecturers from the wiley vch website the author's webpage provides online notes on x ray scattering elastic constants the quantum hall effect tight binding model atomic magnetism and topological insulators this new edition includes the following updates and new features expanded coverage of mechanical properties of solids including an improved discussion of the yield stress crystal structure mechanical properties and band structure of graphene the coverage of electronic properties of metals is expanded by a section on the quantum hall effect including exercises new topics include the tight binding model and an expanded discussion on bloch waves with respect to semiconductors the discussion of solar cells has been extended and improved revised coverage of magnetism with additional material on atomic magnetism more extensive treatment of finite solids and nanostructures now including topo

this highly regarded textbook provides a general introduction to solid state physics it covers a wide range of physical phenomena occurring in solids and discusses fundamental concepts for describing them traditional themes are complimented by modern topics like low dimensional systems strongly correlated materials nanoscale systems and non crystalline solids which are gaining increasing technical and scientific importance helpful for exam preparation are numerous exercises in all chapters

updated to reflect recent work in the field this book emphasizes crystalline solids going from the crystal lattice to the ideas of reciprocal space and brillouin zones and develops these ideas for lattice vibrations for the theory of metals and for semiconductors the theme of lattice periodicity and its varied consequences runs through eighty percent of the book other sections deal with major aspects of solid state physics controlled by other phenomena superconductivity dielectric and magnetic properties and magnetic resonance

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