

Properties Of Atoms And The Periodic Table Worksheet Answers Chapter 18

Valence and the Structure of Atoms and Molecules **Physics of Atoms and Molecules**
Relativistic Quantum Theory of Atoms and Molecules *Density-Functional Theory of Atoms and Molecules* **Excitation of Atoms and Broadening of Spectral Lines** **Physics of Atoms and Molecules** *Atoms and Molecules* **The Basics of Atoms and Molecules** Spectra of Atoms and Molecules The Fundamentals of Atomic and Molecular Physics **Electronic Structure of Atoms** *Physics of Atoms and Ions* **Atoms, Electrons, and Change**
Computation of Atomic and Molecular Processes **The Physics of Atoms and Quanta** **The Physics of Atoms and Quanta** Chemistry *Atoms and Chemical Reactions* *Quantum Chemistry of Atoms and Molecules* *Atoms Reference Data on Atoms, Molecules, and Ions* **A History of Super Science** Atoms and Materials *Reference Data on Atomic Physics and Atomic Processes* Conceptual Chemistry *The Structure of Atoms and Molecules* **Analysis of Excitation and Ionization of Atoms and Molecules by Electron Impact** *Atoms in Molecules* **Review of Fundamental Processes and Applications of Atoms and Ions** *The Atomic Theory of Lucretius Contrasted with Modern Doctrines of Atoms and Evolution* *Atoms and Molecules* **Light-Matter Interaction** Electrons, Atoms, and Molecules in Inorganic Chemistry **The Quantum Theory of Atoms in Molecules** *Magnetic Atoms and Molecules* **Introduction to the Quantum World of Atoms and Molecules** *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles* Atoms and Molecules **Physics of Atoms and Ions** **Loose Leaf for Chemistry: Atoms First**

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Analysis of Excitation and Ionization of Atoms and Molecules by Electron Impact Aug

10 2020 The content of this book describes in detail the results of the present measurements of the partial and total doubly differential cross sections for the multiple-ionization of rare gas atoms by electron impact. These measurements show, beside other trends, the role of Auger transitions in the production of multiply ionized atoms in the region where the incident electron energy is sufficient to produce inner shell ionization. Other processes like Coster-Kronig transitions and shake off also contribute towards increasing the charge of the ions. The incident electron having energy of 6 keV, for example, in a collision with xenon atom can remove up to nine electrons! (*) X-ray-ion coincidence spectroscopy of the electron xenon atom collisions is also described. The present measurements of doubly differential cross sections for the dissociative and non-dissociative ionization of hydrogen, sulfur dioxide and sulfur hexa fluoride molecular gases by electron impact are also described in the text of this book. The results of the measurements for sulfur dioxide molecule show how this major atmospheric pollutant can be removed from the atmosphere by electron impact dissociation of this molecule. The present results of the measurements for sulfur hexa fluoride give an insight into the dissociation properties of this molecular gas, which is being so widely used as a gaseous insulator in the electrical circuits. The book also describes the present measurements of the polarization parameters of the fluorescence radiation emitted by the electron-impact-excited atoms of sodium and potassium. In these investigations the target atoms are polarized, therefore, the measurements of the polarization parameters give information about the electron atom interaction in terms of the interference, direct and exchange interaction channels.

Relativistic Quantum Theory of Atoms and Molecules Sep 03 2022 This book is intended for physicists and chemists who need to understand the theory of atomic and molecular structure and processes, and who wish to apply the theory to practical problems. As far as practicable, the book provides a self-contained account of the theory of relativistic atomic and molecular structure, based on the accepted formalism of bound-state Quantum Electrodynamics. The author was elected a Fellow of the Royal Society of London in 1992.

Density-Functional Theory of Atoms and Molecules Aug 02 2022 Provides an account of the fundamental principles of the density-functional theory of the electronic structure of matter and its applications to atoms and molecules. This book contains a discussion of the chemical potential and its derivatives. It is intended for physicists, chemists, and advanced students in chemistry.

Atoms in Molecules Jul 09 2020 The molecular structure hypothesis - that a molecule is a collection of atoms linked by a network of bonds - was forged in the crucible of nineteenth century experimental chemistry and has continued to serve as the principal means of ordering and classifying the observations of chemistry. There is a difficulty with the hypothesis, however, in that it is not related directly to the physics which governs the motions of the nuclei and electrons that make up the atoms and the bonds. It is the purpose of this important book - now available in paperback for the first time - to show that a theory can be developed to underpin the molecular structure hypothesis - that the atoms in a molecule are real, with properties predicted and defined by the laws of quantum mechanics can be incorporated into the resulting theory - a theory of atoms in molecules. The book is aimed at those scientists responsible for performing the experiments and collecting the observations on the properties of matter at the atomic level, in the belief that the

transformation of qualitative concepts into a qualitative theory will serve to deepen our understanding of chemistry.

The Fundamentals of Atomic and Molecular Physics Jan 27 2022 The Fundamentals of Atomic and Molecular Physics is intended as an introduction to the field for advanced undergraduates who have taken quantum mechanics. Each chapter builds upon the previous, using the same tools and methods throughout. As the students progress through the book, their ability to use these tools will steadily increase, along with their confidence in their efficacy. The book treats the two-electron atom as the simplest example of the many-electron atom—as opposed to using techniques that are not applicable to many-electron atoms—so that it is unnecessary to develop additional equations when turning to multielectron atoms, such as carbon. External fields are treated using both perturbation theory and direct diagonalization and spontaneous emission is developed from first principles. Only diatomic molecules are considered with the hydrogen molecular ion and neutral molecule treated in some detail. This comprehensive coverage of the quantum mechanics of complex atoms and simple diatomic molecules, developed from the very basic components, is extremely useful for students considering graduate studies in any area of physics.

Light-Matter Interaction Mar 05 2020 This book draws together the principal ideas that form the basis of atomic, molecular, and optical science and engineering. It covers the basics of atoms, diatomic molecules, atoms and molecules in static and electromagnetic fields and nonlinear optics. Exercises and bibliographies supplement each chapter, while several appendices present such important background information as physics and math definitions, atomic and molecular data, and tensor algebra. Accessible to advanced undergraduates, graduate students, or researchers who have been trained in one of the conventional curricula of physics, chemistry, or engineering but who need to acquire familiarity with adjacent areas in order to pursue their research goals.

Electrons, Atoms, and Molecules in Inorganic Chemistry Feb 02 2020 Electrons, Atoms, and Molecules in Inorganic Chemistry: A Worked Examples Approach builds from fundamental units into molecules, to provide the reader with a full understanding of inorganic chemistry concepts through worked examples and full color illustrations. The book uniquely discusses failures as well as research success stories. Worked problems include a variety of types of chemical and physical data, illustrating the interdependence of issues. This text contains a bibliography providing access to important review articles and papers of relevance, as well as summaries of leading articles and reviews at the end of each chapter so interested readers can readily consult the original literature. Suitable as a professional reference for researchers in a variety of fields, as well as course use and self-study. The book offers valuable information to fill an important gap in the field.

Incorporates questions and answers to assist readers in understanding a variety of problem types Includes detailed explanations and developed practical approaches for solving real chemical problems Includes a range of example levels, from classic and simple for basic concepts to complex questions for more sophisticated topics Covers the full range of topics in inorganic chemistry: electrons and wave-particle duality, electrons in atoms, chemical binding, molecular symmetry, theories of bonding, valence bond theory, VSEPR theory, orbital hybridization, molecular orbital theory, crystal field theory, ligand field theory,

electronic spectroscopy, vibrational and rotational spectroscopy

The Structure of Atoms and Molecules Sep 10 2020

Chemistry Jun 19 2021 The exciting topic of Chemistry is explored, covering the atom--protons, neutrons, electrons, nucleus--as well as the basics of the periodic table, elements and atomic number. This is followed by an examination of individual elements, such as Lithium, Helium, Carbon, Sodium, Neon and Oxygen. Sound it out sections aid young readers in pronunciation and elementary definitions allow basic understanding of complex topics. Learn the vocabulary of a genius at a young age!

Physics of Atoms and Molecules Oct 04 2022 The study of atomic and molecular physics is a key component of undergraduate courses in physics, because of its fundamental importance to the understanding of many aspects of modern physics. The aim of this new edition is to provide a unified account of the subject within an undergraduate framework, taking the opportunity to make improvements based on the teaching experience of users of the first edition, and cover important new developments in the subject. Key features of this new edition: Revised material on molecular structure and spectra Extended material on electronic and atomic collisions A new chapter describing applications based on the use of the maser and the laser, including laser spectroscopy, laser cooling and trapping of atoms, Bose-Einstein condensation, atom lasers and atomic systems in intense laser fields A new chapter describing other applications, including magnetic resonance, atom optics, atoms in cavities, ions in traps, atomic clocks and astrophysics Revised appendices include new material on molecules and updated tables of physical constants Solutions of selected problems B.H. Bransden is Emeritus Professor of Theoretical Physics at the University of Durham. C.J. Joachain is Professor of Theoretical Physics at the University of Brussels. They are co-authors of *Quantum Mechanics*, also published by Prentice Hall.

Valence and the Structure of Atoms and Molecules Nov 05 2022

Atoms Mar 17 2021 Atoms may be microscopic but they make up everything you see and even everything you don't see—like air. With this book, readers will journey into that microscopic realm of physical science to better understand the atom, its various components, and how they interact to form all the matter around us.

The Quantum Theory of Atoms in Molecules Jan 03 2020 This book distills the knowledge gained from research into atoms in molecules over the last 10 years into a unique, handy reference. Throughout, the authors address a wide audience, such that this volume may equally be used as a textbook without compromising its research-oriented character. Clearly structured, the text begins with advances in theory before moving on to theoretical studies of chemical bonding and reactivity. There follow separate sections on solid state and surfaces as well as experimental electron densities, before finishing with applications in biological sciences and drug-design. The result is a must-have for physicochemists, chemists, physicists, spectroscopists and materials scientists.

Atoms, Electrons, and Change Oct 24 2021 Reveals the links between an atom's structure and its chemical destiny showing how an atom makes its passage through nature.

Physics of Atoms and Molecules May 31 2022 Presents a unified account of the physics of atoms and molecules at a level suitable for undergraduate courses of physics and physical chemistry.

Physics of Atoms and Ions Jul 29 2019 Intended for advanced students of physics,

chemistry and related disciplines, this text treats the quantum theory of atoms and ions within the framework of self-consistent fields. Data needed for the analysis of collisions and other atomic processes are also included.

Atoms and Molecules Apr 29 2022 *Atoms and Molecules* describes the basic properties of atoms and molecules in terms of group theoretical methods in atomic and molecular physics. The book reviews mathematical concepts related to angular momentum properties, finite and continuous rotation groups, tensor operators, the Wigner-Eckart theorem, vector fields, and vector spherical harmonics. The text also explains quantum mechanics, including symmetry considerations, second quantization, density matrices, time-dependent, and time-independent approximation methods. The book explains atomic structure, particularly the Dirac equation in which its nonrelativistic approximation provides the basis for the derivation of the Hamiltonians for all important interactions, such as spin-orbit, external fields, hyperfine. Along with multielectron atoms, the text discusses multiplet theory, the Hartree-Fock formulation, as well as the electromagnetic radiation fields, their interactions with atoms in first and higher orders. The book explores molecules and complexes, including the Born-Oppenheimer approximation, molecular orbitals, the self-consistent field method, electronic states, vibrational and rotational states, molecular spectra, and the ligand field theory. The book can prove useful for graduate or advanced students and academicians in the field of general and applied physics.

Atoms and Molecules Apr 05 2020 Our eyes help us look at the world, but there are many things we cannot see. Atoms are the building blocks of everything in the universe, from planets and stars to the cells that make up plants, animals, and the human body. Atoms are invisible because they are so small, but bigger things can be invisible, too. Ancient artifacts and buried bones are hidden under the ground, while invisible forces such as earthquakes and winds shape life on Earth. This book explores the invisible world of atoms and molecules. Find out about the particles inside atoms, and see how they help atoms join up to form molecules. Learn about atoms and the digital age, and see how nanotechnology is changing the world. Book jacket.

The Basics of Atoms and Molecules Mar 29 2022 A fun-filled introduction to matter, the elements of the periodic table, atoms, electrons, reactions and bonding, and radioactivity, this volume provides young adults with chemistry examples that reflect their real-world interconnections in science. Key terms, easy experiments, and clear illustrations help to guide students through chemical applications. A chapter about Niels Bohr and his model for the atom honors his contribution to the understanding of atomic structure and to nuclear fission. Tools and techniques, such as a scanning tunneling microscope, Rutherford's gold foil experiment, and a mass spectrometer, highlight this instructive text that is aligned to the Common Core Standards.

The Atomic Theory of Lucretius Contrasted with Modern Doctrines of Atoms and Evolution May 07 2020

Reference Data on Atomic Physics and Atomic Processes Nov 12 2020 Each scientist works with certain information and collects it in the course of professional activity. In the same manner, the author collected data for atomic physics and atomic processes. This information was checked in the course of the author's professional activity and was published in the form of appendices to the corresponding books on atomic and plasma physics. Now it has been

decided to publish these data separately. This book contains atomic data and useful information about atomic particles and atomic systems including molecules, nanoclusters, metals and condensed systems of elements. It also gives information about atomic processes and transport processes in gases and plasmas. In addition, the book deals with general concepts and simple models for these objects and processes. We give units and conversion factors for them as well as conversion factors for standard formulas of general physics and the physics of atoms, clusters and ionized gases since such formulas are used in professional practice by each scientist of this area.

Review of Fundamental Processes and Applications of Atoms and Ions Jun 07 2020

This book reviews the major progress made in the fields of atomic, molecular and optical physics in the last decade. It contains eleven chapters in which contributors have highlighted the major accomplishments made in a given subfield. Each chapter is not a comprehensive review, but rather a succinct survey of the most interesting developments achieved in recent years. This book contains information on many AMO subfields and can be used as a textbook for graduate students interested in entering AMO physics. It may also serve researchers who wish to familiarize themselves with other AMO subfields.

The Physics of Atoms and Quanta Jul 21 2021 The Physics of Atoms and Quanta is a thorough introduction to experiments and theory in this field. Every classical and modern aspect is covered and discussed in detail. The sixth edition includes new developments, as well as new experiments in quantum entanglement, Schrodinger's cat, the quantum computer, quantum information, the atom laser, and much more. A wealth of experiments and problems are included. As this reference ends with the fundamentals of classical bonding, it leads into the authors' more advanced book Molecular Physics and Elements of Quantum Chemistry.

Loose Leaf for Chemistry: Atoms First Jun 27 2019 The Atoms First approach provides a consistent and logical method for teaching general chemistry. This approach starts with the fundamental building block of matter, the atom, and uses it as the stepping-stone to understanding more complex chemistry topics. Once mastery of the nature of atoms and electrons is achieved, the formation and properties of compounds are developed. Only after the study of matter and the atom will students have sufficient background to fully engage in topics such as stoichiometry, kinetics, equilibrium, and thermodynamics. Thus, the Atoms First approach empowers instructors to present the most complete and compelling story of general chemistry. Far from a simple re-ordering of topics, this is a book that will truly meet the needs of the growing atoms-first market. The fourth edition continues to build on the innovative success of the previous three editions. Changes to this edition include specific refinements intended to augment the student-centered pedagogical features that continue to make this book effective and popular both with professors, and with their students.

Excitation of Atoms and Broadening of Spectral Lines Jul 01 2022 A survey of elementary processes and mechanisms, presenting useful and relatively simple methods of approximation for calculating the effective cross sections, giving a number of approximate formulas. Extensive tables list cross sections and rate coefficients for various atoms and elementary processes. For this second edition several sections and formulas have been substantially revised, the tables recalculated using the updated version of ATOM and recent progress in the field has been added.

Physics of Atoms and Ions Nov 24 2021 Intended for advanced students of physics, chemistry and related disciplines, this text treats the quantum theory of atoms and ions within the framework of self-consistent fields. Data needed for the analysis of collisions and other atomic processes are also included.

Conceptual Chemistry Oct 12 2020 Conceptual Chemistry provides a fresh, insightful, and welcoming look into the concepts of chemistry at a level suitable for readers who tend to shy away from science courses. Emphasis is placed upon a conceptual understanding of our every day world from the perspective of atoms and molecules. Twelve core chapters cover basic chemical concepts such as atomic models, chemical bonding, and chemical reactions. These are followed by seven chapters organized around chemistry-related topics, such as nutrition, drugs, agriculture, water resources, the atmosphere, commercial materials, and sources of energy. The end-of-chapter study material for each chapter is extensive and includes Matching Key Terms, Review Questions, Insights to Hands-On Chemistry activities, Exercises, Suggested Readings and Websites, and, for select chapters, Problems and Discussion Topics.

Atoms and Molecules Aug 29 2019 Presents an introduction of atoms and molecules along with a variety of experiments and a description of the ways atoms and molecules are found in everyday life.

Electronic Structure of Atoms Dec 26 2021 The book presents the quantum theory of the electronic structure of atoms and focuses on the electronic structures and reactivity of atoms and molecules. It shows how to draw molecules such as the oxygen and water to far more complex molecules, using molecular orbital theory, and hybridization of orbitals. It gives quite clear picture of molecular polarity, together with symmetrical and unsymmetrical distribution of an atom or molecule when developing a temporary (instantaneous) dipole. The book provides a clear and comprehensive summary of oxidative and reductive processes. Electronegativity on oxidation and reduction is also introduced. Examples are provided. It enables the reader to master the principles and applications of organic functional groups. Readers will find information quickly and easily about alkanes, alkenes, alkynes and arenes. Bonding with p and s is also introduced. It explains the fundamental principles of nomenclature methods, using IUPAC (International Union of Pure and Applied Chemistry) and enables the reader to apply it accurately and with confidence. The book is replete with examples for guidance and there are extensive and complicated figures to direct the reader to nomenclature quickly. It gives hands-on chemistry activities with real-life functions. It provides clear and thorough understanding of carbohydrates, polysaccharides, starch and glycogen, cellulose and chitin, nucleotide, nitrogenous hydroxyl and phosphate, lipids, protein, ester, lipoprotein, glycolipid, steroid, mucin, etc. it is a useful reference for health professionals, practicing physicists, chemists, and materials scientists.

Atoms and Materials Dec 14 2020 Discusses the properties of atoms, the various materials they make up, and their uses in daily life.

The Physics of Atoms and Quanta Aug 22 2021 The third edition had been enlarged by the inclusion of new developments such as the direct observation of individual atoms in Paul traps and of atoms in molecules on solid surfaces using the scanning tunneling microscope. Furthermore, new experiments in atomic interferometry and the possibility of laser cooling of atomic beams were added. The fourth English edition takes minor

corrections and additions into account and remains a unique introduction to both experiments and theory. The student will find 160 problems and their solutions, which make this book a real study text.

Reference Data on Atoms, Molecules, and Ions Feb 13 2021 This reference book contains information about the structure and properties of atomic and molecular particles, as well as some of the nuclear parameters. It includes data which can be of use when studying atomic and molecular processes in the physics of gases, chemistry of gases and gas optics, in plasma physics and plasma chemistry, in physical chemistry and radiation chemistry, in geophysics, astrophysics, solid-state physics and a variety of cross-disciplinary fields of science and technology. Our aim was to collect carefully selected and estimated numerical values for a wide circle of microscopic parameters in a relatively "not thick" book. These values are of constant use in the work of practical investigators. In essence, the book represents a substantially revised and extended edition of our reference book published in Russian in 1980. Two main reasons made it necessary to rework the material. On the one hand, a great deal of new high-quality data has appeared in the past few years and furthermore we have enlisted many sources of information previously inaccessible to us. On the other hand, we have tried to insert extensive information on new, rapidly progressing branches of physical research, such as multiply charged ions, Rydberg atoms, van der Waals and excimer molecules, complex ions, etc. All this brings us to the very edge of studies being carried out in the field.

Atoms and Chemical Reactions May 19 2021 Introduces atoms, molecules, elements, compounds and mixtures and how chemical reactions occur.

Introduction to the Quantum World of Atoms and Molecules Oct 31 2019 This invaluable book provides a balanced and integrated introduction to the quantum world of atoms and molecules. The underlying basis of quantum mechanics is carefully developed, with respect for the historical tradition and from a molecular angle. The fundamental concepts in the theory of atomic and molecular structure are thoroughly discussed, as are the central techniques needed in quantum-chemical applications. Special attention is paid to exposing and clarifying the common ground of Hartree-Fock theory and density-functional theory. Throughout the text, the discussion is pedagogically obliging and aims at simplicity and mathematical clarity, while avoiding the use of advanced mathematics. End-of-chapter problems supplement the main text.

A History of Super Science Jan 15 2021 Describes a history of the elements, from the discovery of phosphorus to Mendeleev's creation of the Periodic Table, and how the knowledge of atoms has furthered science.

Magnetic Atoms and Molecules Dec 02 2019 This comprehensive graduate-level text by a leading researcher in atomic and molecular spectroscopy explores the electron-spin-resonance theory of randomly oriented molecules. "I recommend it highly." ? American Scientist. 119 illustrations.

Spectra of Atoms and Molecules Feb 25 2022 Spectra of Atoms and Molecules, 2nd Edition is designed to introduce advanced undergraduates and new graduate students to the vast field of spectroscopy. Of interest to chemists, physicists, astronomers, atmospheric scientists, and engineers, it emphasizes the fundamental principles of spectroscopy with its primary goal being to teach students how to interpret spectra. The book includes a clear

presentation of group theory needed for understanding the material and a large number of excellent problems are found at the end of each chapter. In keeping with the visual aspects of the course, the author provides a large number of diagrams and spectra specifically recorded for this book. Topics such as molecular symmetry, matrix representation of groups, quantum mechanics, and group theory are discussed. Analyses are made of atomic, rotational, vibrational, and electronic spectra. *Spectra of Atoms and Molecules*, 2nd Edition has been updated to include the 1998 revision of physical constants, and conforms more closely to the recommended practice for the use of symbols and units. This new edition has also added material pertaining to line intensities, which can be confusing due to the dozens of different units used to report line and band strengths. Another major change is in author Peter Bernath's discussion of the Raman effect and light scattering, where the standard theoretical treatment is now included. Aimed at new students of spectroscopy regardless of their background, *Spectra of Atoms and Molecules* will help demystify spectroscopy by showing the necessary steps in a derivation.

Quantum Chemistry of Atoms and Molecules Apr 17 2021 This 1986 book emphasises the fundamental ideas of quantum theory as they relate to its mainstream areas such as bonding and spectroscopy; elementary ideas on the use of symmetry are also included. No prior knowledge of quantum theory is assumed, and help is given in understanding the mathematics that is involved.

Computation of Atomic and Molecular Processes Sep 22 2021 This book presents numerical methods for solving a wide range of problems associated with the structure of atoms and simplest molecules, and their interaction with electromagnetic radiation, electrons, and other particles. It introduces the ATOM-M software package, presenting a unified software suite, written in Fortran, for carrying out precise atomic and molecular numeric calculations. The book shows how to apply these numerical methods to obtain many different characteristics of atoms, molecules, and the various processes within which they interact. In an entirely self-sufficient approach, it teaches the reader how to use the codes provided to build atomic and molecular systems from the ground up and obtain the resulting one-electron wave functions. The computational programs presented and made available in this book allow calculations in the one-electron Hartree–Fock approximation and take into account many-electron correlations within the framework of the random-phase approximation with exchange or many-body perturbation theory. Ideal for scholars interested in numerical computation of atomic and molecular processes, the material presented in this book is useful to both experts and novices, theorists, and experimentalists.

Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles Sep 30 2019 A revision of a successful junior/senior level text, this introduction to elementary quantum mechanics clearly explains the properties of the most important quantum systems. Emphasizes the applications of theory, and contains new material on particle physics, electron-positron annihilation in solids and the Mossbauer effect. Includes new appendices on such topics as crystallography, Fourier Integral Description of a Wave Group, and Time-Independent Perturbation Theory.