

Synopsis

This Study Guide accompanies the second edition of "Physics for Scientists and Engineers". The second edition emphasizes the conceptual unity of physics while providing a solid approach to helping students to solve problems. Skills are developed through end-of-chapter problems and a number of pedagogical aids, including "tips" boxes, in-chapter exercises, references within examples to related problems found at the ends of chapters, "strategy" boxes, extended summaries, paired problems to strengthen problem-solving skills, and cumulative problems to integrate concepts across several chapters. Included are photographs and line illustrations to assist students in visualizing concepts. Also featured is a bookmark listing important formulae and an index to the pedagogical use of colour found throughout the book. --This text refers to an alternate Paperback edition.

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Customer Reviews

A comprehensive, rigorous introduction to physics -- with careful and detailed development of physics principles and a strong emphasis on problem solving. --This text refers to an alternate Paperback edition.

PREFACE A Brand New Third Edition It has been more than ten years since the second edition of this calculus-based introductory physics textbook was published. A lot has changed since then, not only in physics itself, but also in how physics is presented. Research in how students learn has provided textbook authors new opportunities to help students learn physics and learn it well. This third edition comes in two versions. The standard version covers all of classical physics plus a

chapter on special relativity and one on the early quantum theory. The extended version, with modern physics, contains a total of nine detailed chapters on modern physics, ending with astrophysics and cosmology. This book retains the original approach: in-depth physics, concrete and nondogmatic, readable. This new third edition has many improvements in the physics and its applications. Before discussing those changes in detail, here is a list of some of the overall changes that will catch the eye immediately. Full color throughout is not just cosmetic, although fine color photographs do help to attract the student readers. More important, full color diagrams allow the physics to be displayed with much greater clarity. We have not stopped at a 4-color process; this book has actually been printed in 5 pure colors (5 passes through the presses) to provide better variety and definition for illustrating vectors and other physics concepts such as rays and fields. I want to emphasize that color is used pedagogically to bring out the physics. For example, different types of vectors are given different colors; see the chart on page xxxi. Many more diagrams, almost double the number in the previous edition, have all been done or redone carefully using full color; there are many more graphs and many more photographs throughout. See for example in optics where new photographs show lenses and the images they make. Marginal notes have been added as an aid to students to (i) point out what is truly important, (ii) serve as a sort of outline, and (iii) help students find details about something referred to later that they may not remember so well. Besides such "normal" marginal notes, there are also marginal notes that point out brief problem solving hints, and others that point out interesting applications. The great laws of physics are emphasized by giving them a marginal note all in capital letters and enclosed in a rectangle. The most important equations, especially those expressing the great laws, are further emphasized by a tan-colored screen behind them. Chapter opening photographs have been chosen to illustrate aspects of each chapter. Each was chosen with an eye to writing a caption which could serve as a kind of summary of what is in that chapter, and sometimes offer a challenge. Some chapter-opening photos have vectors or other analysis superimposed on them. Page layout: complete derivations. Serious attention has been paid to how each page was formatted, especially for page turns. Great effort has been made to keep important derivations and arguments on facing pages. Students then don't have to turn back to check. More important, readers repeatedly see before them, on two facing pages, an important slice of physics. Two kinds of Examples: Conceptual Examples and Estimates.

New Physics The whole idea of a new edition is to improve, to bring in new material, and to delete material that is verbose and only makes the book longer or is perhaps too advanced and not so useful. Here is a brief summary of a few of the changes involving the physics itself. These lists are selections, not complete lists. New discoveries: planets revolving around distant stars Hubble Space

Telescope updates in particle physics and cosmology, such as inflation and the age of the universe

New physics topics added: new treatment of how to make estimates (Chapter 1), including new Estimating Examples throughout (in Chapter 1, estimating the volume of a lake, and the radius of the Earth) symmetry used much more, including for solving problems new Tables illustrating the great range of lengths, time intervals, masses, voltages gravitation as curvature of space, and black holes (Chapter 6) engine efficiency (Chapter 8 as well as Chapter 20) rolling with and without slipping, and other useful details of rotational motion (Chapter 10) forces in structures including trusses, bridges, arches, and domes (Chapter 12) square wave (Chapter 15) using the Maxwell distribution (Chapter 18) Otto cycle (Chapter 20) statistical calculation of entropy change in free expansion (Chapter 20) effects of dielectrics on capacitor connected and not (Chapter 24) grounding to avoid electric hazards (Chapter 25) three phase ac (Chapter 31) equal energy in E and B of EM wave (Chapter 32) radiation pressure, EM wave (Chapter 32) photos of lenses and mirrors with their images (Chapter 33) detailed outlines for ray tracing with mirrors and lenses (Chapters 33, 34) lens combinations (Chapter 34) new radiation standards (Chapter 43) Higgs boson, supersymmetry (Chapter 44) Modern physics. A number of modern physics topics are discussed in the framework of classical physics. Here are some highlights: gravitation as curvature of space, and black holes (Chapter 6) planets revolving around distant stars (Chapter 6) kinetic energy at relativistic speeds (Chapter 7) nuclear collisions (Chapter 9) star collapse (Chapter 10) galaxy red shift, Doppler (Chapter 16) atoms, theory of (Chapters 17, 18, 21) atomic theory of thermal expansion (Chapter 17) mass of hydrogen atom (Chapter 17) atoms and molecules in gases (Chapters 17, 18) molecular speeds (Chapter 18) equipartition of energy; molar specific heats (Chapter 19) star size (Chapter 19) molecular dipoles (Chapters 21, 23) cathode ray tube (Chapters 23, 27) electrons in a wire (Chapter 25) superconductivity (Chapter 25) discovery and properties of the electron, e/m , oil drop experiment (Chapter 27) Hall effect (Chapter 27) magnetic moment of electrons (Chapter 27) mass spectrometer (Chapter 27) velocity selector (Chapter 27) electron spin in magnetic materials (Chapter 28) light and EM wave emission (Chapter 32) spectroscopy (Chapter 36) Many other examples of modern physics are found as Problems, even in early chapters. Chapters 37 and 38 contain the modern physics topics of Special Relativity, and an introduction to Quantum Theory and Models of the Atom. The longer version of this text, "with Modern Physics," contains an additional seven chapters (for a total of nine) which present a detailed and extremely up-to-date treatment of modern physics: Quantum Mechanics of Atoms (Chapters 38 to 40); Molecules and Condensed Matter (Chapter 41); Nuclear Physics (Chapter 42 and 43); Elementary Particles (Chapter 44); and finally Astrophysics, General Relativity, and Cosmology (Chapter 45).

Revised physics and reorganizations. First of all, a major effort has been made to not throw everything at the students in the first few chapters. The basics have to be learned first; many aspects can come later, when the students are more prepared. Secondly, a great part of this book has been rewritten to make it clearer and more understandable to students. Clearer does not always mean simpler or easier. Sometimes making it "easier" actually makes it harder to understand. Often a little more detail, without being verbose, can make an explanation clearer. Here are a few of the changes, big and small: new graphs and diagrams to clarify velocity and acceleration; deceleration carefully treated. unit conversion now a new Section in Chapter 1, instead of interrupting kinematics. circular motion: Chapter 3 now gives only the basics, with more complicated treatment coming later: non-uniform circular motion in Chapter 5, angular variables in Chapter 10. Newton's second law now written throughout as $\vec{m}\vec{a} = \sum \vec{F}$, to emphasize inclusion of all forces acting on a body. Newton's third law follows the second directly, with inertial reference frames placed earlier. New careful discussions to head off confusion when using Newton's third law. careful rewriting of chapters on Work and Energy, especially potential energy, conservative and nonconservative forces, and the conservation of energy. renewed emphasis that $\vec{L} = \vec{r} \times \vec{p} = I\vec{\omega}$ is not always valid: only for an axis fixed in an inertial frame or if axis is through the cm (Chapters 10 and 11). rolling motion introduced early in Chapter 10, with more details later, including rolling with and without slipping. rotating frames of reference and Coriolis, moved later, to Chapter 11, shortened, optional, but still including why an object does not fall straight down on Earth. fluids reduced to a single chapter (13); some topics and details dropped or greatly shortened. clearer details on how an object floats (Chapter 13). distinction between wave interference in space, and in time (beats) (Chapter 16). thermodynamics reduced to four chapters; the old chapters on Heat and on the First Law of Thermodynamics have been combined into one (19), with some topics shortened -- This text refers to an alternate Paperback edition.

The book came in perfect condition. Giancoli is the premium standard for high school and college physics books. They are well written and contain a variety of problem that make you think about the material in a different way. It is a great supplement for classroom learning. As an Petroleum Engineering major, this book should have 5 stars. But the main issue I have is the price of the book, which is why I only gave it 4 stars. I do not believe college students should have to pay that astronomical price. The price of this book can equal the price of the class, and that is not good.

This book provides an excellent supplement to my physics 1 class. I find that reading the chapters

really clarifies the concepts discussed/taught in my lecture and recitation, as the professors can get...distracted (physicists, am I right?) and ramble off topic. I also bought this because they recommended the 4th edition, but that was about a thousand dollars and there's really no difference between the two. Even most of the questions are the same. I'd recommend this for physics 1 students who want to save a few bucks.

Required for school, I did use the textbook a lot compared to others I have been asked to buy in the past. Worth the time reading.

Not a very good intro to physics book. I recommend University physics instead. The examples in this book are very unclear to the beginner in comparison to that book.

Good textbook! Lots of great examples that really incorporate lots of different concepts in each section :)

I'm a senior in high school taking AP Physics C. I bought this book as a supplement to our class textbook (mainly for additional practice) and for future use in college. Also, since this is the first time my teacher is teaching physics c, if there's something he can't explain very well, this book can. The content, descriptions, applications, and practice problems in this book are all great and very informative. The only complaint I have is their choice of certain variables for certain concepts (lower case l for ang. momentum, l instead of r for displacement vector) which can confuse someone who has taken previous classes in physics and is used to certain patterns.

It is a physics book. if you like physics you will like the book.

The text could have been a bit more polished and better examples could have been added. Not as comprehensive as I would have liked.

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