

Study Guide: Light and Quantized Energy

(Chemistry Textbook p. 136 – 145)

Standard 8: Understand the electromagnetic spectrum & the mathematical relationships between energy, frequency, and wavelength of light.

Standard 9: Calculate the wavelength, frequency, & energy of light using Planck's constant and the speed of light

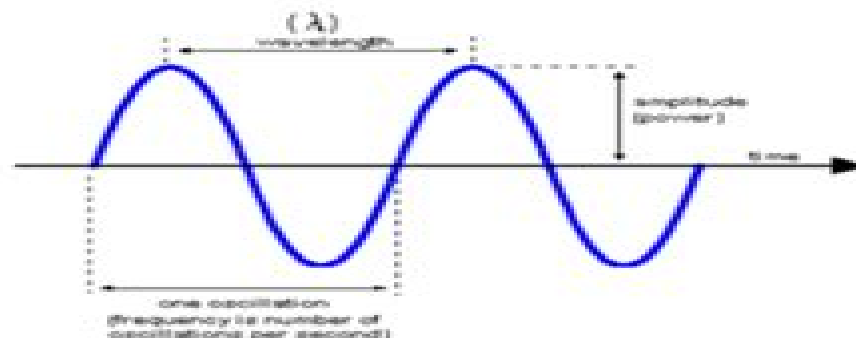
LIGHT AND ATOMIC SPECTRA

Much of what we know about the atom has been learned through experiments with light; thus, you need to know some fundamental concepts of light in order to understand the structure of the atom, especially the placement of the electrons.

The speed of light in a vacuum is the most accurately-known constant in the universe. You should memorize the value for the speed of light because we will be using it extensively.

The speed of light (c) in a vacuum is 3.0×10^8 meters per second.

Light actually has a "dual" nature (or split personality) because there are instances in which it behaves like a wave and other times when it behaves like a particle and sometimes as both. When we consider light as a wave, we must be able to describe its wavelength, its frequency and its velocity.



- (1) **wavelength is represented by the Greek letter lambda (λ)** which looks like an upside down "y". It is the length between corresponding parts of adjacent crests and can be expressed in ANY units of length you choose (feet, inches, meters, kilometers, miles) but normally we choose meters or nanometers as the most common units for wavelength.
- (2) **frequency is represented by the Greek letter nu (ν)** which looks like a "v". Frequency is the number of wave crests which pass a given point in 1 second. Its units are therefore (most commonly) cycles/second or sometimes simply /sec. The unit "Hertz" (abbreviated Hz) is also used as a label for frequency, although this label seems to be gradually going out of existence.

Example 3-8 Does a longer or a shorter wavelength have a greater frequency?

Example 3-9 What mathematical relationship can you draw about wavelength and frequency?

Study Guide Light And Quantized Energy

Martin Silberberg, Libby Weberg



Study Guide Light And Quantized Energy:

Chemistry, Student Study Guide James E. Brady, Fred Senese, 2008-01-28 The image on the front cover depicts a carbon nanotube emerging from a glowing plasma of hydrogen and carbon as it forms around particles of a metal catalyst Carbon nanotubes are a recently discovered allotrope of carbon Three other allotropes of carbon buckyballs graphite and diamond are illustrated at the left as is the molecule methane CH_4 from which nanotubes and buckyballs can be made The element carbon forms an amazing number of compounds with structures that follow from simple methane found in natural gas to the complex macromolecules that serve as the basis of life on our planet The study of chemistry also follows from the simple to the more complex and the strength of this text is that it enables students with varied backgrounds to proceed together to significant levels of achievement

Physics for Scientists and Engineers Study Guide Paul A. Tipler, Gene Mosca, 2008-01-11 The study guide provides students with key physical quantities and equations misconceptions to avoid questions and practice problems to gain further understanding of physics concepts and quizzes to test student knowledge of chapters All written with the same level of detail as the examples found in the text

Basic Concepts of Chemistry, 9e Study Guide and Solutions Manual Leo J. Malone, Theodore O. Dolter, 2012-01-03 The 9th edition of Malone's Basic Concepts of Chemistry provides many new and advanced features that continue to address general chemistry topics with an emphasis on outcomes assessment New and advanced features include an objectives grid at the end of each chapter which ties the objectives to examples within the sections assessment exercises at the end each section and relevant chapter problems at the end of each chapter A new Math Check allows quick access to the needed basic skill The first chapter now includes brief introductions to several fundamental chemical concepts and Chapter Synthesis Problems have been added to the end of each chapter to bring key concepts into one encompassing problem Every concept in the text is clearly illustrated with one or more step by step examples Making it Real essays have been updated to present timely and engaging real world applications emphasizing the relevance of the material they are learning This edition continues the end of chapter Student Workshop activities to cater to the many different learning styles and to engage users in the practical aspect of the material discussed in the chapter

Study Guide to Accompany Calculus for the Management, Life, and Social Sciences Clyde Metz, 1984-01-01 Study Guide to Accompany Calculus for the Management Life and Social Sciences

Physics for Scientists and Engineers Study Guide Gene Mosca, Todd Ruskell, 2003-04 Each chapter in this physics study guide contains a description of key ideas potential pitfalls true false questions that test essential definitions and relations questions and answers that require qualitative reasoning and problems and solutions

Physics for Scientists and Engineers Study Guide Todd Ruskell, 2007-06-08 The Study Guide provides students with key physical quantities and equations misconceptions to avoid questions and practice problems to gain further understanding of physics concepts and quizzes to test student knowledge of chapters

General, Organic, and Biochemistry Study Guide Marcia L. Gillette, Ira Blei, Wendy Gloffke, George Odian, 2006-01-27 This study guide

provides reader friendly reinforcement of the concepts covered in the textbook Features include Chapter outlines Are you able to Worked text problems Fill ins Test yourself Concept maps Can also be used for Blei and Odian s Organic and Biochemistry

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Fundamentals Of Solid-state Electronics: Study Guide Chih Tang Sah,1994-02-08 This companion to Fundamentals of Solid State Electronics provides a helpful summary of the main text for students and lecturers alike The clear typeface large font and point form layout are designed to produce viewgraphs for lectures and to provide ample margins for study notes This Study Guide comes complete with a detailed description of two one semester solid state electronics core courses taught to about 80 100 sophomore junior students each time four years apart It links the contents of the one semester lecture course to the textbook

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Student Study Guide to Accompany Fundamentals of Physics, Rev. Printing, Physics, 3d Ed., Parts 1 and 2 Stanley A. Williams,1978

Study Guide to Accompany Halliday and Resnick Fundamentals of Physics 2nd Ed. and Physics, Combined, 3rd Ed. Stanley A. Williams,1981-04-27 This popular book incorporates modern approaches to physics It not

only tells readers how physics works it shows them Applications have been enhanced to form a bridge between concepts and reasoning *ASAP Chemistry: A Quick-Review Study Guide for the AP Exam* The Princeton Review, 2019-02-12 Looking for sample exams practice questions and test taking strategies Check out our extended in depth AP chem prep guide *Cracking the AP Chemistry Exam LIKE CLASS NOTES ONLY BETTER* The Princeton Review s *ASAP Chemistry* is designed to help you zero in on just the information you need to know to successfully grapple with the AP test No questions no drills just review Advanced Placement exams require students to have a firm grasp of content you can t bluff or even logic your way to a 5 Like a set of class notes borrowed from the smartest student in your grade this book gives you exactly that No tricks or crazy stratagems no sample essays or practice sets Just the facts presented with lots of helpful visuals Inside *ASAP Chemistry* you ll find Essential concepts terms and functions for AP Chem all explained clearly concisely Diagrams charts and graphs for quick visual reference A three pass icon system designed to help you prioritize learning what you **MUST SHOULD** and **COULD** know in the time you have available Ask Yourself questions to help identify areas where you might need extra attention A resource that s perfect for last minute exam prep and for daily class work Topics covered in *ASAP Chemistry* include Atomic structure Covalent bonding intermolecular forces Thermochemistry Acids bases and more *Student Study Guide to accompany Chemistry* Martin Silberberg, Libby Weberg, 2005-01-06 **Student Study Guide and Solutions Manual to Accompany General, Organic, and Biochemistry** Katherine J. Denniston, Denniston Katherine, 2006

Chemistry, Student Study Guide John A. Olmsted, Gregory M. Williams, 2002-01-04 This third edition continues to innovate by providing students with an integrated and modern approach to the subject The text emphasizes the modern tools of chemistry while incorporating historical evidence and its unique molecular quantitative emphasis is further reinforced by an integrated media package developed by the authors Also of benefit is the just in time presentation of key content only providing details once they are needed While key topics and analytical techniques have been updated there is now an additional third chapter on chemical equilibrium The authors have also developed an expanded and more integrated problem solving emphasis that now incorporates a 4 step strategy throughout complete with text icons The whole is backed by a range of supplements including a new illustration program a tutorial CD interactive learningware an extensive Web CT component an instructor s resource CD and a solution CD **Study Guide for Chemical Principles** Thomas Elliott Taylor, 1979 **Chemistry for the IB Diploma Study and Revision Guide** Christopher Talbot, Richard

Harwood, 2017-07-24 Exam Board IB Level IB Subject Chemistry First Teaching September 2014 First Exam Summer 2016 Stretch your students to achieve their best grade with these year round course companions providing clear and concise explanations of all syllabus requirements and topics and practice questions to support and strengthen learning Consolidate revision and support learning with a range of exam practice questions and concise and accessible revision notes Practise exam technique with tips and trusted guidance from examiners on how to tackle questions Focus revision with key terms and

definitions listed for each topic sub topic No-Frills Physics Matthew D. McCluskey, 2019-05-01 This textbook provides everything you need to get through a basic physics course It guides students through all the essentials with a concise review of the concept simple illustrations to demonstrate it worked problems to showcase how to apply it and a short quiz for self testing Whereas other standard books can be overwhelming to students the author shares what has worked with his own students trimming back unnecessary detail and focusing on the core basic physical concepts required to gain solid footing The full range of topics are addressed in a manner that facilitates understanding and will encourage students to continue forward with their learning

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