Neeraj Kumar Physical Chemistry

Fundamentals of Physical Chemistry is the signature compilation of the class tested notes of iconic chemistry coach Ananya Ganguly. Her unique teaching methodology and authoritative approach in teaching of concepts, their application and strategy is ideal for preparing for the IITJEE examinations. The author’s impeccable command and the authority on each foray of chemistry teaching are visible in each chapter and the chapter ending exercises. Each chapter unfolds the structured, systematic and patterned chemistry concepts in lucid and student friendly approach. The book is without those unnecessary frills that make the bulk in other popular books in the market for the IITJEE. An indispensible must have for in-depth comprehension of Chemistry for the coveted IITJEE.

Take some heat off the complexity of thermodynamics Does the mere thought of thermodynamics make you sweat? Itdoesn't have to! This hands-on guide helps you score your highestin a thermodynamics course by offering easily understood,plain-English explanations of how energy is used in things likeautomobiles, airplanes, air conditioners, and electric powerplants. Thermodynamics 101 — take a look at some examples of bothnatural and man-made thermodynamic systems and get a handle on howenergy can be used to perform work Turn up the heat — discover how to use the first andsecond laws of thermodynamics to determine (and improve upon) theefficiency of machines Oh, behave — get the 411 on how gases behave and relate toone another in different situations, from ideal-gas laws to realgases Burn with desire — find out everything you need to knowabout conserving mass and energy in combustion processes Open the book and find: The laws of thermodynamics Important properties and their relationships The lowdown on solids, liquids, and gases How work and heat go handin hand The cycles that power thermodynamic processes Chemical mixtures and reactions Ten pioneers in thermodynamics Real-world applications of thermodynamic laws and concepts Learn to: Master the concepts and principles of thermodynamics Develop the problem-solving skills used by professionalengineers Ace your thermodynamics course

Food Safety and Human Health provides a framework to manage food safety risks and insure safe food system. This reference takes a reader-friendly approach in presenting the entire range of toxic compounds found naturally in foods or introduced by industrial contamination or food processing methods. It provides the basic principles of food toxicology and its processing and safety for human health to help professionals and students better understand the real problems of toxic materials. This essential resource will help readers address problems regarding food contamination and safety. It will be particularly useful for graduate students, researchers and professionals in the agri-food industry. Encompasses the first pedagogic treatment of the entire range of toxic compounds found naturally in foods or introduced by industrial

contamination or food processing methods Features areas of vital concern to consumers, such as the toxicological implications of food, implications of food processing and its safety to human health Focuses on the safety aspects of genetically modified foods currently available

THE QUICK AND PAINLESS WAY TO TEACH YOURSELF BASIC CHEMISTRY CONCEPTS AND TERMS Chemistry: A Self-Teaching Guide is the easy way to gain a solid understanding of the essential science of chemistry. Assuming no background knowledge of the subject, this clear and accessible guide covers the central concepts and key definitions of this fundamental science, from the basic structure of the atom to chemical equations. An innovative self-guided approach enables you to move through the material at your own pace—gradually building upon your knowledge while you strengthen your critical thinking and problem-solving skills. This edition features new and revised content throughout, including a new chapter on organic chemistry, designed to dramatically increase how fast you learn and how much you retain. This powerful learning resource features: An interactive, step-by-step method proven to increase your understanding of the fundamental concepts of chemistry Learning objectives, practice questions, study problems, and a self-review test in every chapter to reinforce your learning An emphasis on practical concepts and clear explanations to ensure that you comprehend the material quickly Engaging end-of-chapter stories connecting the material to a relevant topic in chemistry to bring important concepts to life Concise, student-friendly chapters describing major chemistry concepts and terms, including the periodic table, atomic weights, chemical bonding, solutions, gases, solids, and liquids Chemistry: A Self-Teaching Guide is an ideal resource for high school or college students taking introductory chemistry courses, for students taking higher level courses needing to refresh their knowledge, and for those preparing for standardized chemistry and medical career admission tests.

Advanced Illustrations in Physics by seasoned expert Ashish Arora is a valuable asset for the Advanced Illustrations in Physics by seasoned expert Ashish Arora is a valuable asset for the aspirants of JEE Advanced examination. The book covers more than 700 advanced problems with illustrations. Detailed explanations have been included with video solutions so that students are able to grasp the fundamental examination edge of JEE Advanced. Every illustration is based on specific experimental analysis and practical situations from real life, so that students can understand how questions are framed in competitive exams. All illustrations are divided in several topics covering the syllabus of Advanced Physics for JEE. Features 700+ advanced problems illustrated with explanations Practical problems included from real life Video solutions included to help students grasp concepts better

This book presents a comprehensive treatment of the essential fundamentals of the topics that should be taught as the first-level course in Heat Transfer to the students of engineering disciplines. The book is designed to stimulate student

learning through clear, concise language. The theoretical content is well balanced with the problem-solving methodology necessary for developing an orderly approach to solving a variety of engineering problems. The book provides adequate mathematical rigour to help students achieve a sound understanding of the physical processes involved. Key Features : A well-balanced coverage between analytical treatments, physical concepts and practical demonstrations. Analytical descriptions of theories pertaining to different modes of heat transfer by the application of conservation equations to control volume and also by the application of conservation equations in differential form like continuity equation, Navier–Stokes equations and energy equation. A short description of convective heat transfer based on physical understanding and practical applications without going into mathematical analyses (Chapter 5). A comprehensive description of the principles of convective heat transfer based on mathematical foundation of fluid mechanics with generalized analytical treatments (Chapters 6, 7 and 8). A separate chapter describing the basic mechanisms and principles of mass transfer showing the development of mathematical formulations and finding the solution of simple mass transfer problems. A summary at the end of each chapter to highlight key terminologies and concepts and important formulae developed in that chapter. A number of worked-out examples throughout the text, review questions, and exercise problems (with answers) at the end of each chapter. This book is appropriate for a one-semester course in Heat Transfer for undergraduate engineering students pursuing careers in mechanical, metallurgical, aerospace and chemical disciplines.

The thyroid gland is a commonly diseased endocrine organ of human body. The disorders affecting the thyroid gland are varied but are very much amenable to treatment. The enlargement of the thyroid is termed goiter. It can affect the whole gland or only part of it. The disease is perplexing but in-depth knowledge of the pathophysiology helps in elucidating causes and thereby treating the disease. In this book, the diffuse and nodular goiter has been addressed as well as the functional abnormalities of the gland and its implications on the body are discussed in various chapters. The relevant updated information is included. To address a few of these current issues and recent updated information, authors have put in a lot of effort to organize the book.

This comprehensive textbook, now in its second edition, is mainly written as per the latest syllabi of physical chemistry of all the leading universities of India as well as the new syllabus recommended by the UGC. This thoroughly revised and updated edition covers the principal areas of physical chemistry, such as thermodynamics, quantum chemistry, molecular spectroscopy, chemical kinetics, electrochemistry and nanotechnology. In a methodical and accessible style, the book discusses classical, irreversible and statistical thermodynamics and statistical mechanics, and describes macroscopic chemical systems, steady states and thermodynamics at a molecular level. It elaborates the underlying principles of

quantum mechanics, molecular spectroscopy, X-ray crystallography and solid state chemistry along with their applications. The book explains various instrumentation techniques such as potentiometry, polarography, voltammetry, conductometry and coulometry. It also describes kinetics, rate laws and chemical processes at the electrodes. In addition, the text deals with chemistry of corrosion and nanomaterials. This text is primarily designed for the undergraduate and postgraduate students of chemistry (B.Sc. and M.Sc.) for their course in physical chemistry. Key Features • Gives a thorough treatment to ensure a solid grasp of the material. • Presents a large number of figures and diagrams that help amplify key concepts. • Contains several worked-out examples for better understanding of the subject matter. • Provides numerous chapter-end exercises to foster conceptual understanding.

The field of nanomedicine has risen quickly due to the increasing number of designer-made nanomaterials. These nanomaterials have the potential to manage diseases and change the way medicine is currently studied. However, the increased practice of using nanomaterials has shed light on how many concepts of nanomedicine and nanotoxicity have been overlooked. Nanotoxicology: Toxicity Evaluation of Nanomedicine Applications addresses the existing gaps between nanomedicine and nanotoxicity. This book also brings together up-to-date knowledge on advances toward safe-by-design nanomaterials and existing toxicity challenges. This book delivers a comprehensive coverage in the field with fundamental understanding, serving as a platform to convey essential concepts of nanotoxicology and how these concepts can be employed to develop advanced nanomaterials for a range of biomedical applications. This book is an effort to answer some of the thoughtful nanotoxicological complications and their auspicious probable solutions with new approaches and careful toxicity assessment. Key Features: Reveals novel nanoscale approaches, toxicity assessment, and biomedical applications Includes importance of nanotoxicity concepts in developing smart nanomaterials Highlights unique contributions and "A to Z" aspects on the state-of-the-art from global leaders Offers a complete package to learn fundamentals with recommendations on nanomaterials toxicity and safe-by-design nanomedicines Nanotoxicology: Toxicity Evaluation of Nanomedicine Applications illuminates the high potential of many innovative nanomaterials, ultimately demonstrating them to be promising substitutes for available therapies that can be effectively used in fighting a myriad of biomedical complications. Further, this book reports legal, ethical, safety, and regulatory issues associated with nanomaterials, which have often been neglected, if not overlooked in literature and limiting clinical translation at nanoscale level. It will equip readers with cutting-edge knowledge of promising developments in nanomedicine and nanotoxicology, along with potential future prospects.

Advanced Problems in Organic Chemistry for competitive examinations comprises 10 chapters which are designed in a coherently to aid problem solving. The exercises in the book have been divided into two levels. The first level will help

candidates to practice fundamental problems involving concepts learnt in the chapters. The second level contains advance level problems for students. Workbook exercises have also been added at the end of important chapters to give aspirants an extra edge to crack the examinations.

Present book covers new paradigms in Blockchain, Big Data and Machine Learning concepts including applications and case studies. It explains dead fusion in realizing the privacy and security of blockchain based data analytic environment. Recent research of security based on big data, blockchain and machine learning has been explained through actual work by practitioners and researchers, including their technical evaluation and comparison with existing technologies. The theoretical background and experimental case studies related to real-time environment are covered as well. Aimed at Senior undergraduate students, researchers and professionals in computer science and engineering and electrical engineering, this book: Converges Blockchain, Big Data and Machine learning in one volume. Connects Blockchain technologies with the data centric applications such Big data and E-Health. Easy to understand examples on how to create your own blockchain supported by case studies of blockchain in different industries. Covers big data analytics examples using R. Includes lllustrative examples in python for blockchain creation.

This book presents a comprehensive review of the methods and approaches being adopted to push forward the boundaries of computational catalysis.

Advanced Problems in Physical Chemistry has been conceived to meet the specific requirements of the students preparing for IIT-JEE, Olympiad and other competitive examinations. This book provides a comprehensive and systematic coverage of problems in physical chemistry and enables quick applications of concepts through numerous problems provided in each chapter. The problems are graded as per JEE Main and Advanced respectively. The best way to ensure that students understand the concepts of physical chemistry is to solve as many problems on each topic. This book is a must-have resource for candidates preparing for JEE Main and Advanced exams.

Problems in Physical Chemistry for JEE M

Data Science has become a popular field of work today. However a good resource to understand applied Data Science is still missing. In Data Science Uncovering the Reality, a group of IITians unravel how Data Science is done in the industry. They have interviewed Data Science and technology leaders at top companies in India and presented their learnings here. This book will give you honest answers to questions such as: How to build a career in Data Science? How A.I. is used in the world’s most successful companies. How Data Science leaders actually work and the challenges they face.

Advanced Materials and Technologies for Wastewater Treatment discusses the methods and technologies of physical, chemical, biological, and thermo-catalytic treatment techniques. It includes the treatment of waste generated by municipal, agro-industry, and other industries including chemical, biomedical, pharmaceutical, textile, and other sectors. FEATURES Covers implementation

of advanced water and wastewater treatment techniques, with a focus on pollutant or pathogen removal Includes qualitative and quantitative analyses Focuses on physical, chemical, and biological treatment technologies Discusses the advancements of materials and technologies applicable to both potable water and wastewater from industrial and municipal sources Explores future challenges and viable solutions This book is aimed at chemical and environmental engineers and researchers seeking a thorough treatment of innovative water treatment materials and techniques for practical applications.

The book deliberates a wide range of the latest research issues on polycystic ovary syndrome (PCOS). The topics discussed include the diagnosis and management of PCOS, dwelling in more depth into the pathophysiology of the syndrome and its genetic and epigenetic basis. The book covers a contemplative discussion on the influence of changing lifestyle patterns on PCOS. The book also includes a number of chapters defining a detailed description of the associated morbidities of PCOS and its long-term sequelae. Since PCOS is quite prevalent globally, the book is also of great interest to the public. Providing detailed information suitable for patients and clinicians, it provides information about the various treatment regimens and screening recommendations for women having this condition.

Biopharmaceuticals are emerging as frontline medicines to combat several life-threatening and chronic diseases. However, such medicines are expensive to develop and produce on a commercial scale, contributing to rising healthcare costs. Developability of Biotherapeutics: Computational Approaches describes applications of computational and molecular modeling techniques that improve the overall process of discovery and development by removing empiricism. The concept of developability involves making rational choices at the pre-clinical stages of biopharmaceutical drug development that could positively impact clinical outcomes. The book also addresses a general lack of awareness of the many different contributions that computation can make to biopharmaceutical drug development. This informative and practical reference is a valuable resource for professionals engaged in industrial research and development, scientists working with regulatory agencies, and pharmacy, medicine, and life science students and educators. It focuses primarily on the developability of monoclonal antibody candidates, but the principles described can also be extended to other modalities such as recombinant proteins, fusion proteins, antibody drug conjugates and vaccines. The book is organized into two sections. The first discusses principles and applications of computational approaches toward discovering and developing biopharmaceutical drugs. The second presents best practices in developability assessments of early-stage biopharmaceutical drug candidates. In addition to raising awareness of the promise of computational research, this book also discusses solutions required to improve the success rate of translating biologic drug candidates into products available in the clinic. As such, it is a rich source of information on current principles and practices as well as a starting point for finding innovative applications of computation towards biopharmaceutical drug development.

Photocatalysts in Advanced Oxidation Processes for Wastewater Treatment comprehensively covers a range of topics aiming to promote the implementation of photocatalysis at large scale through provision of facile and green methods for catalysts synthesis and elucidation of pollutants degradation mechanisms. This book is divided into two main parts

namely “Synthesis of effective photocatalysts” (Part I) and “Mechanisms of the photocatalytic degradation of various pollutants” (Part II). The first part focuses on the exploration of various strategies to synthesize sustainable and effective photocatalysts. The second part of the book provides an insights into the photocatalytic degradation mechanisms and pathways under ultraviolet and visible light irradiation, as well as the challenges faced by this technology and its future prospects.

This book covers the different technologies of Internet, and machine learning capabilities involved in Cognitive Internet of Things (CIoT). Machine learning is explored by covering all the technical issues and various models used for data analytics during decision making at different steps. It initiates with IoT basics, its history, architecture and applications followed by capabilities of CIoT in real world and description of machine learning (ML) in data mining. Further, it explains various ML techniques and paradigms with different phases of data pre-processing and feature engineering. Each chapter includes sample questions to help understand concepts of ML used in different applications. Explains integration of Machine Learning in IoT for building an efficient decision support system Covers IoT, CIoT, machine learning paradigms and models Includes implementation of machine learning models in R Help the analysts and developers to work efficiently with emerging technologies such as data analytics, data processing, Big Data, Robotics Includes programming codes in Python/Matlab/R alongwith practical examples, questions and multiple choice questions

The deterioration of water quality and unavailability of drinkable water are pressing challenges worldwide. The removal of toxic organic and inorganic pollutants from water is vital for a clean environment, as a response to water scarcity. Adsorption-based water technologies are among the most widely used because of their high efficiency and low cost, without relying on a complex infrastructure. In recent years, carbon nanomaterials (CNMs), such as graphene and derivatives, carbon nanotubes, carbon nanofibers, nanoporous carbon, fullerenes, graphitic carbon nitride, and nanodiamonds have been extensively exploited as adsorbents due to their extraordinary surface properties, ease of modification, large surface area, controlled structural varieties, high chemical stability, porosity, low density, ease of regeneration, and reusability. This book provides a thorough overview of the state of the art in carbon nanomaterials as they are used for adsorption applications in water purifications, as well as addressing their toxicological challenges. This volume primarily explores the fundamentals of adsorption, its mechanical aspects, synthesis and properties of CNMs, and adsorption performances of CNMs and their nanocomposites with organic and inorganic materials. Structural engineering and activation processes produce materials with enhanced adsorptive properties and separation efficiencies. Furthermore, the formation of CNMs with 2D and 3D macro-and microstructures and high porosities is a potential approach to improve adsorption performances and extend CNM use at the industrial level. The book also addresses

important issues regarding these adsorbents that potentially affect future research and industrial applications of carbon-based nanoadsorbents in water security. Presents advances in multifunctional 3D superstructures of carbon nanomaterials and their composites for adsorption applications Outlines the fundamentals on synthesis and characterization techniques of carbon-based nanostructures and their composites Assesses the major toxicological challenges in using nanostructured materials as adsorbents for water purification

Gold, considered catalytically inactive for a long time, is now a fascinating partner of modern chemistry, as scientists such as Bond, Teles, Haruta, Hutchings, Ito and Hayashi opened new perspectives for the whole synthetic chemist community. Recently gold has attracted significant attention due to its advantageous characteristics as a catalytic material and since it allows easy functionalization with biologically active molecules. In this context, when gold is prepared as very small particles, it turns out to be a highly active catalyst. However, such a phenomenon completely disappears when the gold particle size grows into the micrometer range. Therefore, the preparation for obtaining an active gold catalyst is so important. The primary objective of this book is to provide a comprehensive overview of gold metal nanoparticles and their application as promising catalysts.

Machine learning approaches has the capability to learn and adapt to the constantly evolving demands of large Internet-of-energy (IoE) network. The focus of this book is on using the machine learning approaches to present various solutions for IoE network in smart cities to solve various research gaps such as demand response management, resource management and effective utilization of the underlying ICT network. It provides in-depth knowledge to build the technical understanding for the reader to pursue various research problems in this field. Moreover, the example problems in smart cities and their solutions using machine learning are provided as relatable to the real-life scenarios. Aimed at Graduate Students, Researchers in Computer Science, Electrical Engineering, Telecommunication Engineering, Internet of Things, Machine Learning, Green computing, Smart Grid, this book: Covers all aspects of Internet of Energy (IoE) and smart cities including research problems and solutions. Points to the solutions provided by machine learning to optimize the grids within a smart city set-up. Discusses relevant IoE design principles and architecture. Helps to automate various services in smart cities for energy management. Includes case studies to show the effectiveness of the discussed schemes.

Hazardous Gases: Risk Assessment on Environment and Human Health examines all relevant routes of exposure, inhalation, skin absorption and ingestion, and control measures of specifics hazardous gases resulting from workplace exposure from industrial processes, traffic fumes, and the degradation of waste materials and how they impacts the health and environment of workers. The book examines the risk assessment and effect of poisonous gases on the

environment human health. It also covers necessary emergency guidelines, safety measures, physiological impact, hazard control measures, handling and storage of hazardous gases. Each chapter is formatted to include an introduction, historical background, physicochemical properties, physiological role discussing mechanisms of toxicity, its effect on human health as well as environment, followed by case studies and recent research on toxic gases. Hazardous Gases: Risk Assessment on Environment and Human Health is a helpful resource for academics and researchers in toxicology, occupational health and safety, and environmental sciences as well as those in the field who work to assess and mitigate the impact of toxic gases on the work environment and the health of the workforce. Emphasizes the environmental monitoring in the workplace of hazardous materials Includes all relevant storage and handling information required for detailing all personnel on the hazards and risks from the substances with which they work Offers practical examples and case studies related to toxic gases and their impact on health

Acclaimed for its clarity and precision, Wade's Organic Chemistry maintains scientific rigor while engaging students at all levels. Wade presents a logical, systematic approach to understanding the principles of organic reactivity and the mechanisms of organic reactions. This approach helps students develop the problem-solving strategies and the scientific intuition they will apply throughout the course and in their future scientific work. The Eighth Edition provides enhanced and proven features in every chapter, including new Chapter Goals, Essential Problem-Solving Skills and Hints that encourage both majors and non-majors to think critically and avoid taking "short cuts" to solve problems. Mechanism Boxes and Key Mechanism Boxes strengthen student understanding of Organic Chemistry as a whole while contemporary applications reinforce the relevance of this science to the real world. NOTE: This is the standalone book Organic Chemistry,8/e if you want the book/access card order the ISBN below: 0321768140 / 9780321768148 Organic Chemistry Plus MasteringChemistry with eText -- Access Card Package Package consists of: 0321768418 / 9780321768414 Organic Chemistry 0321773799 / 9780321773791 MasteringChemistry with Pearson eText -- Valuepack Access Card -- for Organic Chemistry

Green chemistry is chemistry for the environment. It is really a philosophy and way of thinking that can help chemistry in research and production to develop more eco-friendly solutions. Green chemistry is considered an essential piece of a comprehensive program to protect human health and the environment. In its essence, green chemistry is a science-based non-regulatory and economically driven approach to achieving the goals of environmental protection and sustainable development. Combining the technological progress with environmental safety is one of the key challenges of the millennium. In this context, this book describes the environmentally benign approaches for the industries as well as chemical laboratories. In order to provide an insight into step change technologies, this book was edited by green organic

chemists.

This book covers theory and practical knowledge of Probabilistic data structures (PDS) and Blockchain (BC) concepts. It introduces the applicability of PDS in BC to technology practitioners and explains each PDS through code snippets and illustrative examples. Further, it provides references for the applications of PDS to BC along with implementation codes in python language for various PDS so that the readers can gain confidence using hands on experience. Organized into five sections, the book covers IoT technology, fundamental concepts of BC, PDS and algorithms used to estimate membership query, cardinality, similarity and frequency, usage of PDS in BC based IoT and so forth.

This volume focuses on the development and application of fundamental concepts in mechanics and physics of solids as they pertain to the solution of challenging new problems in diverse areas, such as materials science and micro- and nanotechnology. In this volume, emphasis is placed on the development of fundamental concepts of mechanics and novel applications of these concepts based on theoretical, experimental, or computational approaches, drawing upon the various branches of engineering science and the allied areas within applied mathematics, materials science, and applied physics. Materials Physics and Chemistry: Applied Mathematics and Chemo-Mechanical Analysis emphasizes the basics, such as design, equilibrium, material behavior, and geometry of deformation in simple structures or machines. Readers will find a thorough treatment of stress, strain, and the stress-strain relationships. Meanwhile it provides a solid foundation upon which readers can begin work in composite materials science and engineering. Many chapters include theory components with the equations students need to calculate different properties.

This book focuses on biodegradable polymers that are already in clinical use or under clinical development. Synthetic and natural polymers will be included. This excludes polymers that have been investigated and did not reach clinical development. The purpose of this book is to provide updated status of the polymers that are clinical use and those that are now being developed for clinical use and hopefully will reach the clinic during the next 5 years. The book provides information that of interest to academics and practicing researchers including chemists, biologists and bioengineers and users: physicians, pharmacists.