Engineering Physics A Singh Malik  

The Glycome: Petro-physics and Rock Physics of Carbonate Reservoirs
Infrared Detectors
A Textbook of Engineering Mechanics
In Search of the Cradle of Civilization
Engineering Physics
Volume IV: Wave Motion and Sound
Thermophysical Properties of Complex Materials
Unconventional Liquid Crystals and Their Applications
Nanotechnology
Indian Journal of Pure & Applied Physics
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Engineering Physics
Wide Band Gap Semiconductor Nanowires
Engineering Physics
Lasers and Non-Linear Optics
Bionanocomposites in Tissue Engineering and Regenerative Medicine
Light Metals
Cold Atmospheric Plasma (CAP) Technology and Applications
Innovations in Electrical and Electronic Engineering
Mathematics for Machine Learning
Advancements and Applications in Electroceramics
The Physics of Semiconductor Devices
Krishna's Engineering Physics
Volume III: Optics
2001 Nanoscale Compound Semiconductors and their Optoelectronics
Applications in Digital Image Processing
A Textbook of Engineering Physics
Selected Topics in Plasma Physics
Japanese Journal of Applied Physics
Engg Physics
Laser-Matter Interaction for Radiation and Energy
Thermoelectricity and Advanced Thermoelectric Materials
Engineering Physics
Metal and Alloy Bonding - An Experimental Analysis
Novel Catalysts in Advanced Oxidation of Organic Pollutants

This volume provides a comprehensive understanding of the enigmatic identity of the glycome, a complex but important area of research that has been largely ignored due to its complexity. The authors thoroughly deal with almost all aspects of the glycome, i.e., elucidation of the glycan identity enigma and its role in regulation of the cellular process, and in disease etiology. The book bridges the knowledge gap in understanding the glycome, from being a cell signature to its applications in disease etiology. In addition, it details many of the major insights regarding the possible role of the glycome in various diseases as a therapeutic marker. The book systematically covers the major aspects of the glycome, including the significance of substituting the diverse monosaccharide units to glycoproteins, the role of glycans in disease pathologies, and the challenges and advances in glycobiology. The authors stress the significance and huge encoding power of carbohydrates as well as provide helpful insights in framing the bigger picture. The Glycome: Understanding the Diversity and Complexity of Glycobiology details state-of-the-art developments and emerging challenges of glycome biology, which are going to be key areas of future research, not only in the glycobio field but also in pharmaceutics. Almost all animals move around frequently in space. Their aim is to walk and fly in search of food or to propagate their species. Thus, changing positions is important for creatures’ survival and maintaining the environment. As such, this book examines movement with a focus on force and propulsion. Chapters cover topics including rocket engines, electric propulsion, mechanisms of force, and more. Completely revised and reorganized while retaining the approachable style of the first edition, Infrared Detectors, Second Edition addresses the latest developments in the science and technology of infrared (IR) detection. Antoni Rogalski, an internationally recognized pioneer in the field, covers the comprehensive range of subjects necessary to understand the IR field, from the principles of operation to practical applications. The book is divided into two parts: Part I covers the fundamentals of infrared detection, including the physics of radiation and the properties of infrared materials. Part II focuses on the practical aspects of infrared detection, including the design and use of infrared detectors. The book is intended for students and professionals in the fields of physics, electrical engineering, and materials science, as well as for researchers and engineers working in the development of infrared detection systems. The topics covered in the book include the properties of infrared materials, the principles of infrared detection, the design of infrared detectors, and the applications of infrared detection. The book is written in a clear and concise manner, with numerous examples and illustrations to aid understanding. It is an excellent resource for anyone involved in the field of infrared detection.
VUV to XUV domain. The duration of XUV pulses can be confined down to the isolated attosecond pulse levels, required to study the electronic re-arrangement and ultrafast processes. Another important aspect of laser-matter interaction is the laser thermonuclear fusion control where accelerated particles also find an efficient use. This book provides comprehensive coverage of the most essential topics, including Electromagnetic waves and lasers THz radiation using semiconducting materials / nanostructures / gases / plasmas Surface plasmon resonance THz radiation detection Particle acceleration technologies X-ray lasers High harmonics and attosecond lasers Laser based techniques of thermonuclear fusion Controlled fusion devices including NIF and ITER The book comprises of 11 chapters and every chapter starts with a lucid introduction to the main topic. Then sub-topics are serially discussed keeping in mind their basics, methodology, state-of-the-art and future perspective that will prove to be salutary for readers. High quality solved examples are appended to the chapters for their deep understanding and relevant applications. In view of the nature of the topics and their level of discussion, this book is expected to have pre-eminent potential for researchers along with postgraduate and undergraduate students all over the world. This book discusses advances in remote sensing pertaining to urbanization, disasters, and planning, through available geospatial data supported by various case studies. It covers urbanization and its impact, geospatial technology for disasters and urban management, and natural disasters, models, and planning applications including GPS devices. A well-prepared student takes the initiative to create learning opportunities and propel themselves towards qualification; we find that the better prepared you are, the luckier you become. From the Preface The key to passing clinical finals is not a secret; adequate preparation and the ability to think logically and speak clearly are all hallmarks of a successful candidate. This unique guide gives final year students the knowledge and confidence required to pass their examinations with insiders' tips on particular information and skills required to be a top candidate. It is ideal as both a revision aid in the weeks leading up to the examination, and as an aide-memoire the night before. Thermoelectricity and Advanced Thermoelectric Materials reviews emerging thermoelectric materials, including skutterudites, clathrates, and half-Heusler alloys. In addition, the book discusses a number of oxides and silicides that have promising thermoelectric properties. Because 2D materials with high figures of merit have emerged as promising candidates for thermoelectric applications, this book presents an updated introduction to the field of thermoelectric materials, including recent advances in materials synthesis, device modeling, and design. Finally, the book addresses the theoretical challenges and methodologies of computing the thermoelectric properties of materials that can be used to understand and predict highly efficient thermoelectric materials. This book is a key reference for materials scientists, physicists, and engineers in energy. Reviews the most relevant, emerging thermoelectric materials, including 2D materials, skutterudites, clathrates and half-Heusler alloys. Focuses on how electronic structure engineering can lead to improved materials performance for thermoelectric energy conversion applications Includes the latest advances in the synthesis, modeling and design of advanced thermoelectric materials Fluid-Structure Interaction (FSI), also known as engineering fluid mechanics, deals with mutual interaction between fluid and structural components. Fluid flow depending on the structural shape, motion, surface, and structural roughness, acts as mechanical forces on the structure. FSI can be seen everywhere in medicine, engineering, aerospace, the sciences, and even our daily life. This book provides the basic concept of fluid flow behavior in interaction with structures, which is crucial for almost all engineering disciplines. Along with the fundamental principles, the book covers a variety of FSI problems ranging from fundamentals of fluid mechanics to plasma physics, wind turbines and their turbulence, heat transfer, magnetohydrodynamics, and dam-reservoir systems. This book gives a summary of the rapidly growing field of nanotechnology and includes materials and technologies that help in developing particles of various sizes, which can be utilized in different areas of research. It discusses the role of nanotechnology in different aspects, such as healthcare, especially in target-specific drug therapy for managing a number of medical disorders; agriculture, for developing smart field systems; and food industry, for improving and stabilizing the quality, healthiness, and shelf life of food. Being multidisciplinary, this book brings together the principles, theory, practices, and applications of not only nanotechnology but also those of nanobiotechnology, pharmaceuticals, food packaging, biosensors, and electronic devices. The book will be an exhilarating read for advanced undergraduate- and graduate-level students, general readers interested in nanotechnology, and researchers in chemistry, biology, and engineering. The scope of the book extends from basic research in physics, chemistry, and biology, including computational work and simulations, through to the development of new devices and technologies for applications in a wide range of industrial sectors (including information technology, medicine, manufacturing, high-performance materials, and energy and environmental technologies). It covers organic, inorganic, and hybrid materials and is an interdisciplinary book. This edition encompasses the wide area joining laser physics and non-linear optics. It gives a concise account of basic physics, optical processes and a quantum mechanical treatment of the interaction of radiation with matter preparing the way for the formal development of laser. Original experiments are described in detail to give an understanding of the physical principles of laser devices. Extensively referenced. This brief summarizes the role of certain catalysts and associated processes that are involved in the reduction or elimination of hazardous substances from wastewater and the exploitation of renewable raw materials. The authors begin by providing a summary of the most recent developments in catalysts used in the advanced oxidation of organic pollutants in aqueous phase. Advanced Oxidation Processes (AOPS)
are described in terms of homogeneous and heterogeneous catalysts. Some emphasis is placed on the role nanocatalysts, perovskite-type catalysts, and green catalysts play in several AOPs such as Fenton Chemistry, photocatalytic oxidation, and the hybrid technologies that combine different processes. Catalyst preparation, characterization, reaction chemistry, and process technology are described. Specific wastewater case studies which illustrate the role of these catalysts in AOPs completes the brief.

Nanoscale Compound Semiconductors and their Optoelectronics Applications provides the basic and fundamental properties of nanoscale compound semiconductors and their role in modern technological products. The book discusses all important properties of this important category of materials such as their optical properties, size-dependent properties, and tunable properties. Key methods are reviewed, including synthesis techniques and characterization strategies. The role of compound semiconductors in the advancement of energy efficient optoelectronics and solar cell devices is also discussed. The book also touches on the photocatalytic property of the materials by doping with graphene oxides—an emerging and new pathway. Covers all relevant types of nanoscale compound semiconductors for optoelectronics, including their synthesis, properties and applications. The book offers historical context and review of emerging trends in semiconductor technology, particularly emphasizing advances in non-toxic semiconductor materials for green technologies. Reviews emerging applications of nanoscale compound semiconductor-based devices in optoelectronics, energy and environmental sustainability.

A textbook of Engineering Physics is written with two distinct objectives: to provide a single source of information for engineering undergraduates of different specializations and provided them a solid base in physics. Successive editions of the book incorporated topics as required by students pursuing their studies in various universities. In this new edition the contents are fine-tuned, modernized and updated at various stages. This book disseminates the current knowledge of semiconductor physics and its applications across the scientific community. It is based on a biennial workshop that provides the participating research groups with a stimulating platform for interaction and collaboration with colleagues from the same scientific community. The book discusses the latest developments in the field of III-nitrides, materials & devices, compound semiconductors, VLSI technology, optoelectronics, sensors, photovoltaics, crystal growth, epitaxy and characterization, graphene and other 2D materials and organic semiconductors. The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book’s web site.

This book assists in the exchange of research and progress outcomes concerned with the latest issues in thermophysical properties (TPPs) of complex liquids research, development, and production. Topics cover the control of transport properties of metallic alloys, thermal analysis of complex plasmas and instabilities in plasma devices, thermophysical properties at nanolevel, theoretical background of viscosities of hydrocarbons at varying temperature and pressure ranges, molecular modeling, and experimental investigations based on nanofluids and ionic conduction in solid-state electrolytes for thermodynamic data. This book enables global researchers to tackle the challenges that continue to generate cost-effective TPPs and the latest understanding in the development of complex materials and the collaboration of modern thermophysical generating technologies. Moreover, it provides a platform for different regional authors to exchange scientific knowledge and generate enthusiasm for science and technology.

The Light Metals symposia at the TMS Annual Meeting & Exhibition present the most recent developments, discoveries, and practices in primary aluminum science and technology. The annual Light Metals volume has become the definitive reference in the field of aluminum production and related light metal technologies. The 2020 collection includes papers from the following symposia: •Alumina and Bauxite• Aluminum Alloys, Processing and Characterization• Aluminum Reduction Technology• Cast Shop Technology• Cast Shop Technology: Recycling and Sustainability Joint Session• Electrode Technology for Aluminum Production

Arguing that India, not Sumer, was the cradle of civilization, looks at India's ancient history by examining the symbols and myths contained in the Rig-Veda and exploring the mathematical and astronomical data contained in the Vedic hymns.

Nuclear structure Physics connects to some of our fundamental questions about the creation of universe and its basic constituents. At the same time, precise knowledge on the subject has lead to develop many important tools of human kind such as proton therapy, radioactive dating etc. This book contains chapters on some of the crucial and trending research topics in nuclear structure, including the nuclei lying on the extremes of spin, isospin and mass. A better theoretical understanding of these topics is important beyond the confines of the nuclear structure community. Additionally, the book will showcase the applicability and success of the different nuclear effective interaction parameters near the drip line, where hints for level reordering have already been seen, and where one can test the isospin-dependence of the interaction. The book offers comprehensive coverage of
the most essential topics, including: • Nuclear Structure of Nuclei at or Near Drip-Lines • Synthesis challenges and properties of Superheavy nuclei • Nuclear Structure and Nuclear models - Ab-initio calculations, cluster models, Shell-model/DSM, RMF, Skyrme • Shell Closure, Magicity and other novel features of nuclei at extremes • Structure of Toroidal, Bubble Nuclei, halo and other exotic nuclei These topics are not only very interesting from theoretical nuclear physics perspective but are also quite complimentary for ongoing nuclear physics experimental program worldwide. It is hoped that the book chapters written by experienced and well known researchers/experts will be helpful for the master students, graduate students and researchers and serve as a standard & up-to-date research reference book on the topics covered. Charge density analysis of materials provides a firm basis for the evaluation of the properties of materials. The design and engineering of a new combination of metals requires a firm knowledge of intermolecular features. Recent advances in technology and high-speed computation have made the crystal X-ray diffraction technique a unique tool for the determination of charge density distribution in molecular crystal. Methods have been developed to make experimental probes capable of unraveling the features of charge densities in the intra- and intermolecular regions of crystal structures. In Metal and Alloy Bonding - An Experimental Analysis, the structural details of materials are elucidated with the X-ray diffraction technique. Analyses of the charge density and the local and average structure are given to reveal the structural properties of technologically important materials. Readers will gain a new understanding of the local and average structure of existing materials. The electron density, bonding, and charge transfer studies in Metal and Alloy Bonding - An Experimental Analysis contain useful information for researchers in the fields of physics, chemistry, materials science, and metallurgy. The properties described in these studies can contribute to the successful engineering of these technologically important materials. Bionanocomposites in Tissue Engineering and Regenerative Medicine explores novel uses of these in tissue engineering and regenerative medicine. This book offers an interdisiplinary approach, combining chemical, biomedical engineering, materials science and pharmacological aspects of the characterization, synthesis and application of bionanocomposites. Chapters cover a broad selection of bionanocomposites including chitosan, alginate and more, which are utilized in tissue engineering, wound healing, bone repair, drug formulation, cancer therapy, drug delivery, cartilage regeneration and dental implants. Additional sections of Bionanocomposites in Tissue Engineering and Regenerative Medicine discuss, in detail, the safety aspects and circular economy of bionanocomposites — offering an insight into the commercial and industrial aspects of these important materials. Bionanocomposites in Tissue Engineering and Regenerative Medicine will prove a highly useful text for those in the fields of biomedical engineering, chemistry, pharmaceutics and materials science, both in academia and industrial R&D groups. Each bionanocomposite type is covered individually, providing specific and detailed information for each material. Covers a range of tissue engineering and regenerative medicine applications, from dental and bone engineering to cancer therapy. Offers an integrated approach, with contributions from authors across a variety of related disciplines, including biomedical engineering, chemistry and materials science. This book is planned to introduce the advances topics of plasma physics for research scholars and postgraduate students. This book deals with basic concepts in plasma physics, non-equilibrium plasma modeling, space plasma applications, and plasma diagnostics. It also provides an overview of the linear and nonlinear aspects of plasma physics. Chapters cover such topics as plasma application in space propulsion, microwave–plasma interaction, plasma antennas, solitary waves, and plasma diagnostic techniques. This book contains 26 papers from the Magnetolectric Multiferroic Thin Films and Multilayers: Dielectric Ceramic Materials and Electronic Devices; Recent Developments in High-Temperature Superconductivity; and Multifunctional Oxides symposia held during the 2010 Materials Science and Technology (MS&T'10) meeting, October 17-21, 2010, Houston, Texas. Topics include: Properties; Structures; Synthesis; Characterization; Device Applications; Multiferroics and Magnetoelctrics; YBCO Pinning Methods and Properties; YBCO Processing and Reliability Related Issues; New Superconductors and MgB2. Meant for students and practicing engineers, this book provides a clear, comprehensive and up-to-date introduction to Digital Image Processing in a pragmatic style. An illustrative approach, practical examples and MATLAB applications given in the book help in bringing the theory to life. The work focuses on recent developments of the rapidly evolving field of Non-conventional Liquid Crystals. After a concise introduction it discusses the most promising research such as biosensing, elastomers, polymer films, photoresponsive properties and energy harvesting. Besides future applications it discusses as well potential frontiers in LC science and technology. Engineering Physics, 2e, provides a comprehensive overview of the subject for first year engineering students. It provides an excellent coverage of the syllabus for all major universities. The book emphasizes on tutorial approach (teach-by-example) towards the subject. Ample solved examples and rich pedagogical pool will help the students understand the subject matter and prepare them for the questions asked in examination. Salient Features: - Revised chapter on Nanoscience and Nanotechnology in view of recent advances in the field - New chapter on Simple Harmonic Motion and Sound Waves - Revised and updated topics like Sound Waves and Acoustics of Buildings, Applied Nuclear Physics and Quantum Mechanics - New topics on Ultrasonic Waves and Their Absorption, Length Contraction and Time Dilation - Rich pool of pedagogy -- Solved Examples : 540 -- Objective Type Questions : 480+ -- Short Answer Questions : 222 -- Practice Problems : 560 -- Unsolved Questions : 132This book presents selected papers from the 2021 International Conference on Electrical and
Electronics Engineering (ICEEE 2020), held on January 2–3, 2021. The book focuses on the current developments in various fields of electrical and electronics engineering, such as power generation, transmission and distribution; renewable energy sources and technologies; power electronics and applications; robotics; artificial intelligence and IoT; control, automation and instrumentation; electronics devices, circuits and systems; wireless and optical communication; RF and microwaves; VLSI; and signal processing. The book is a valuable resource for academics and industry professionals alike. From the Introduction: Nanotechnology and its underpinning sciences are progressing with unprecedented rapidity. With technical advances in a variety of nanoscale fabrication and manipulation technologies, the whole topical area is maturing into a vibrant field that is generating new scientific research and a burgeoning range of commercial applications, with an annual market already at the trillion dollar threshold. The means of fabricating and controlling matter on the nanoscale afford striking and unprecedented opportunities to exploit a variety of exotic phenomena such as quantum, nanophotonic and nanoelectromechanical effects. Moreover, researchers are elucidating new perspectives on the electronic and optical properties of matter because of the way that nanoscale materials bridge the disparate theories describing molecules and bulk matter. Surface phenomena also gain a greatly increased significance; even the well-known link between chemical reactivity and surface-to-volume ratio becomes a major determinant of physical properties, when it operates over nanoscale dimensions. Against this background, this comprehensive work is designed to address the need for a dynamic, authoritative and readily accessible source of information, capturing the full breadth of the subject. Its six volumes, covering a broad spectrum of disciplines including material sciences, chemistry, physics and life sciences, have been written and edited by an outstanding team of international experts. Addressing an extensive, cross-disciplinary audience, each chapter aims to cover key developments in a scholarly, readable and critical style, providing an indispensable first point of entry to the literature for scientists and technologists from interdisciplinary fields. The work focuses on the major classes of nanomaterials in terms of their synthesis, structure and applications, reviewing nanomaterials and their respective technologies in well-structured and comprehensive articles with extensive cross-references. It has been a constant surprise and delight to have found, amongst the rapidly escalating number who work in nanoscience and technology, so many highly esteemed authors willing to contribute. Sharing our anticipation of a major addition to the literature, they have also captured the excitement of the field itself in each carefully crafted chapter. Along with our painstaking and meticulous volume editors, full credit for the success of this enterprise must go to these individuals, together with our thanks for (largely) adhering to the given deadlines. Lastly, we record our sincere thanks and appreciation for the skills and professionalism of the numerous Elsevier staff who have been involved in this project, notably Fiona Geraghty, Megan Palmer and Greg Harris, and especially Donna De Weerd-Wilson who has steered it through from its inception. We have greatly enjoyed working with them all, as we have with each other. This book presents selected articles from the workshop on “Challenges in Petrophysical Evaluation and Rock Physics Modeling of Carbonate Reservoirs” held at IIT Bombay in November 2017. The articles included explore the challenges associated with using well-log data, core data analysis, and their integration in the qualitative and quantitative assessment of petrophysical and elastic properties in carbonate reservoirs. The book also discusses the recent trends and advances in the area of research and development of carbonate reservoir characterization, both in industry and academia. Further, it addresses the challenging concept of porosity portioning, which has huge implications for exploration and development success in these complex reservoirs, enabling readers to understand the varying orders of deposition and diagenesis and also to model the flow and elastic properties.