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Advances in IC Engines and Combustion Technology [Nano-Energetic Materials](#) Principles of MECHANICAL ENGINEERING Recent Trends in Mechanical Engineering Innovation and IPRs in China and India Tribology and Dynamics of Engine and Powertrain Nanomaterials and Nanotechnology Sustainability in Biofuel Production Technology Novel Applications of Carbon Based Nano-materials Recent Trends in Product Design and Intelligent Manufacturing System [Proceedings of the First International Conference on Recent Advances in Bioenergy Research](#) Biomass and Bioenergy Solutions for Climate Change Mitigation and Sustainability Advances in Material Science and Engineering Recent Technologies for Enhancing Performance and Reducing Emissions in Diesel Engines [Modern Electrochemical Methods in Nano, Surface and Corrosion Science](#) Bio-Nano Interface Proceedings of the Third International Conference on Microelectronics, Computing and Communication Systems [Emerging Trends of Nanotechnology in Environment and Sustainability](#) [Sensors and Microsystems](#) [Tribological Study of Nanoparticles Enriched Bio-based Lubricants for Piston Ring-Cylinder Interaction](#) [Green Nanotechnology for Biofuel Production](#) Emerging Trends in Mechanical Engineering [Smart Sensors Measurement and Instrumentation](#) Polymer-Based Nanoscale Materials for Surface Coatings ALTERNATIVE FUELS AND ADVANCED VEHICLE TECHNOLOGIES. New Advances in Vehicular Technology and Automotive Engineering [Innovations in Mechanical Engineering Techno-Societal 2018](#) Nanoscience Proceedings of Asia International Conference on Tribology 2018 Energy Systems Design for Low-Power Computing Advances in Engine Tribology Energy and Exergy for Sustainable and Clean Environment, Volume 1 [Current Advances in Mechanical Engineering](#) Prospects of Alternative Transportation Fuels NOx Emission Control Technologies in Stationary and Automotive Internal Combustion Engines Biotechnology for Biofuels: A Sustainable Green Energy Solution [ALTERNATIVE FUELS AND ADVANCED VEHICLE TECHNOLOGIES](#) Greener and Scalable E-fuels for Decarbonization of Transport [Proceedings of International Conference on Advances in Tribology and Engineering Systems](#)

This ebook is a compilation of 234 papers presented at the 6th Asia International Conference on Tribology (ASIATRIB2018): Kuching, Sarawak - Malaysia from 17 to 20 September 2018. Polymer-Based Nanoscale Materials for Surface Coatings presents the latest advances and emerging technologies in polymer-based nanomaterials for coatings, focusing on novel materials, characterization techniques, and cutting-edge applications. Sections present the fundamentals of surface preparation and nanocoatings, linking materials and properties, explaining the correlation between morphology, surface phenomena, and surface protection mechanism, and covering theory, modeling and simulation. Other presented topics cover characterization methods, with an emphasis on the latest developments in techniques and approaches. Aging and lifecycle assessment of coated surfaces and coatings are also discussed. Final sections explore advanced applications across a range of fields, including intelligent coatings for biomedical implants, self-healing coatings, super-hydrophobicity, electroluminescence, sustainable edible coatings, marine antifouling, corrosion resistance, and photocatalytic coatings. Explains the fundamentals of coatings and surface protection, mechanisms, materials and properties, and modeling and simulation Presents detailed information on the latest characterization techniques to prepare nanoscale polymer coatings with enhanced properties Explores a broad range of state-of-the-art applications and considers aging and lifecycle assessments of coatings The book presents high-quality papers from the Third International Conference on Microelectronics, Computing & Communication Systems (MCCS 2018). It discusses the latest technological trends and advances in MEMS and nanoelectronics, wireless communications, optical communication, instrumentation, signal processing, image processing, bioengineering, green energy, hybrid vehicles, environmental science, weather forecasting, cloud computing, renewable energy, RFID, CMOS sensors, actuators, transducers, telemetry systems, embedded systems, and sensor network applications. It includes papers based on original theoretical, practical and experimental simulations, development, applications, measurements, and testing. The applications and solutions discussed in the book provide excellent reference material for future product development. This book comprises select proceedings of the International Conference on Emerging Trends in Mechanical Engineering (ICETME 2018). The book covers various topics of mechanical engineering like computational fluid dynamics, heat transfer, machine dynamics, tribology,

and composite materials. In addition, relevant studies in the allied fields of manufacturing, industrial and production engineering are also covered. The applications of latest tools and techniques in the context of mechanical engineering problems are discussed in this book. The contents of this book will be useful for students, researchers as well as industry professionals. The depletion of fossil fuels is a major issue in energy generation; hence, biomass and renewable energy sources, especially bioenergy, are the solution. The dependence on bioenergy has many benefits to mitigate environmental pollution. It is imperative that the global society adopts these alternative, sustainable energy sources in order to mitigate the constant growth of climate change. Biomass and Bioenergy Solutions for Climate Change Mitigation and Sustainability highlights the challenges of energy conservation and current scenarios of existing fossil fuel uses along with pollution potential of burning fossil fuel. It further promotes the inventory, assessment, and use of biomass, pollution control, and techniques. This book provides the solution for climate change, mitigation, and sustainability. Covering topics such as biofuel policies, economic considerations, and microalgae biofuels, this premier reference source is an essential resource for environmental scientists, environmental engineers, government officials, business leaders, politicians, librarians, students and faculty of higher education, researchers, and academicians. This book discusses different types of alternative fuels, including biodiesel, alcohol, synthetic fuels, compressed natural gas (CNG) and its blend with hydrogen, HCNG, and provides detailed information on the utilization of these alternative fuels in internal combustion (IC) engines. Further, it presents methods for production of these alternative fuels and explores advanced combustion techniques, such as low-temperature and dual-fuel combustion, using alternative fuels. It includes a chapter on the soot morphology of biodiesel, which focuses on the toxicity. There are also four chapters on hydrogen-fueled engines, which discuss use of hydrogen in IC engines and also provide important information on the methodologies. This book is a valuable resource for researchers and practicing engineers alike. The depletion of petroleum-derived fuel and environmental concerns have prompted many millennials to consider biofuels as alternative fuel sources. But completely replacing petroleum-derived fuels with biofuels is currently impossible in terms of production capacity and engine compatibility. Nevertheless, the marginal replacement of diesel with biofuel could delay the depletion of petroleum resources and abate the radical climate change caused by automotive pollutants. Energy security and climate change are the two major driving forces for worldwide biofuel development, and also have the potential to stimulate the agro-industry. The development of biofuels as alternative and renewable sources of energy has become critical in national efforts towards maximum self-reliance, the cornerstone of our energy security strategy. At the same time, the production of biofuels from various types of biomass such as plants, microbes, algae and fungi is now an ecologically viable and sustainable option. This book describes the biotechnological advances in biofuel production from various sources, while also providing essential information on the genetic improvement of biofuel sources at both the conventional and genomic level. These innovations and the corresponding methodologies are explained in detail. This contributed volume aims to provide latest updates in the area of bioenergy including biodiesel, bioethanol, biomethanation, biomass gasification, and biomass cook-stove. The proceedings of ICRABR 2015 include cutting edge research vital to R&D organizations, academics, and the industry to promote and document the recent developments in the area of bioenergy for all types of stakeholders. The volume highlights the needs of biofuels and their market, the barriers and challenges faced by biofuels and bioenergy and future strategies required to foster new ideas for research, collaboration and commercialization of bioenergy. The major themes of this contributed volume are: Biomass and Energy Management ;Thermochemical Conversion Processes; Biochemical Conversion Processes; Catalytic Conversion Processes; Electrochemical Processes; Waste Treatment to Harvest Energy; and Integrated Processes. The contents of the volume will appeal to students, researchers, professionals, and policymakers in the field of bifuels and bioenergy. This book collects a number of papers presented at the 13th Italian Conference on Sensors and Microsystems. It provides a unique perspective on the research and development of sensors, microsystems and related technologies in Italy. Besides the scientific value of the papers, this book offers a unique source of data to analysts that intend to survey the Italian situation on sensors and microsystems. This book focuses on novel materials for advanced engine design including the study of friction, wear, lubrication, suitable lubricant additives, and durability of different engine components of alcohol/biodiesel fueled engines. The contents highlight different lubrication systems to overcome friction and wear problems of automotive transportation systems. It also discusses different materials for future applications, wear of wheels and axles of locomotives, friction-induced noise and vibration and tribological behavior of texture surfaces in the

automotive transport sector. This book will be of interest to those in academia and industry involved in alternative fuels application in IC engines, friction and wear study of various engine components, lubrication approaches and different additives of lubricants, and novel materials for advanced engine design. Sustainability in Biofuel Production Technology Explore current challenges and the latest technologies in biofuel production In Sustainability in Biofuel Production Technology, a team of engineers and chemists delivers a thorough and accessible exploration of the source of renewable energy biofuels poised to help conserve natural resources and limit the impact of fossil fuel use. The book offers detailed information about the challenges and trends in biodiesel production and includes contributions from leading researchers in the field of biodiesel production. Readers will explore aviation biofuels, biofuel production technologies, reactor design and safety considerations, and the modelling and simulation of biofuel production as they move through the book's 14 chapters. The authors also analyze the performance of biofuels along with cost estimations and mathematical modeling of various process parameters. Readers will also find: A thorough introduction to biofuels, including their history, generation, classification, and relevant technologies In-depth presentations of the production technologies of biofuels, including chemical and biological production processes Comprehensive explorations of the utilization of biofuels in aviation, including performance analyses and safety considerations Fulsome discussions of key issues and challenges in biofuels production pathways and the environmental effects of biofuels Perfect for academic researchers and industrial scientists working in the biofuels, bioenergy, catalysis, and materials science sectors, Sustainability in Biofuel Production Technology will also be suitable for members of regulatory bodies in the bioenergy sector. NOx Emission Control Technologies in Stationary and Automotive Internal Combustion Engines: Approaches Toward NOx Free Automobiles presents the fundamental theory of emission formation, particularly the oxides of nitrogen (NOx) and its chemical reactions and control techniques. The book provides a simplified framework for technical literature on NOx reduction strategies in IC engines, highlighting thermodynamics, combustion science, automotive emissions and environmental pollution control. Sections cover the toxicity and roots of emissions for both SI and CI engines and the formation of various emissions such as CO, SO<sub>2</sub>, HC, NOx, soot, and PM from internal combustion engines, along with various methods of NOx formation. Topics cover the combustion process, engine design parameters, and the application of exhaust gas recirculation for NOx reduction, making this book ideal for researchers and students in automotive, mechanical, mechatronics and chemical engineering students working in the field of emission control techniques. Covers advanced and recent technologies and emerging new trends in NOx reduction for emission control Highlights the effects of exhaust gas recirculation (EGR) on engine performance parameters Discusses emission norms such as EURO VI and Bharat stage VI in reducing global air pollution due to engine emissions The basics and principles of new electrochemical methods and also their usage for fabrication and analysis of different nanostructures were discussed in this book. These methods consist of electrochemical methods in nanoscale (e.g. electrochemical atomic force microscopy and electrochemical scanning tunneling microscopy) and also electrochemical methods for fabrication of nanomaterials. This multi-disciplinary book presents the most recent advances in exergy, energy, and environmental issues. Volume 1 focuses on fundamentals in the field and covers current problems, future needs, and prospects in the area of energy and environment from researchers worldwide. Based on some selected lectures from the Eleventh International Exergy, Energy and Environmental Symposium (IEEES-11) and complemented by further invited contributions, this comprehensive set of contributions promote the exchange of new ideas and techniques in energy conversion and conservation in order to exchange best practices in "energetic efficiency." Included are fundamental and historical coverage of the green transportation and sustainable mobility sectors, especially regarding the development of sustainable technologies for thermal comforts and green transportation vehicles. Furthermore, contributions on renewable and sustainable energy sources, strategies for energy production, and the carbon-free society constitute an important part of this book. Friction force microscopy is an important analytical tool in the field of tribology on the nanometer-scale. The contact area between the probing tip and the sample is reduced to some square nanometers, corresponding to the ideal of a single asperity contact. Traditional concepts, such as friction coefficients, adhesion and elasticity and stick-slip are re-examined with this novel technique. New concepts based upon classical and quantum mechanics are investigated. This book highlights ways of using gaseous and liquid e-fuels like hydrogen (H<sub>2</sub>), methane (CH<sub>4</sub>), methanol (CH<sub>3</sub>OH), DME (CH<sub>3</sub>-O-CH<sub>3</sub>), Ammonia (NH<sub>3</sub>), synthetic petrol and diesel, etc in existing engines and their effects on tailpipe emissions. The contents

also cover calibration and optimization procedure for adaptation of these fuels. The volume also discusses the economical aspect of these fuels. Chapters include recent results and are focused on current trends of automotive sector. This book will be of interest to those in academia and industry involved in fuels, IC engines, engine instrumentation, and environmental research. The Handbook of Mechanical Engineering is a complete work for B.E./B.Tech. students as well as applicants preparing for competitive examinations such as the IES/IFS/GATE State Services and competitive tests held by public and private sector businesses to choose apprentice engineers. The third edition of this well-designed textbook presents the principles of mechanical engineering in the areas of thermodynamics, mechanics, machine theory, material strength, and fluid dynamics. This work is well adapted to meet the needs of the common course in mechanical engineering specified in the curriculum of practically all areas of engineering, as these courses are a fundamental aspect of an engineer's education. To match the course requirement, this revised "THIRD EDITION" includes a new chapter on 'Hydraulic and Pneumatic System.' With the world's finest engineering manual, you can solve any mechanical engineering problem fast and easily. Nearly 2400 pages of mechanical engineering facts, figures, standards, and practices, 2000 illustrations, and 900 tables clarifying important mathematical and engineering principles, as well as the collective wisdom of 160 experts, will help you answer any analytical, design, or application question you may have. Covers the important aspects of mechanical engineering in a concise manner, including definitions, equations, examples, theory, proofs, and explanations for all major topic areas. The purpose of the third edition of the Handbook of Principle of Mechanical Engineering is to continue providing practicing engineers in industry, government, and academia with up-to-date information on the most important topics of modern mechanical engineering. ? This book provides a comprehensive and wide-ranging introduction to the fundamental principles of mechanical engineering in a distinct and clear manner. The book is intended for a core introductory course in the area of foundations and applications of mechanical engineering, ? This book contains advanced-level research material in the area of lubrication theory and related aspects, presented by eminent researchers during the International Conference on Advances in Tribology and Engineering Systems (ICATES 2013) held at Gujarat Technological University, Ahmedabad, India during October 15-17, 2013. The material in this book represents the advanced field of tribology and reflects the work of many eminent researchers from both India and abroad. The treatment of the presentations is the result of the contributions of several professionals working in the industry and academia. This book will be useful for students, researchers, academicians, and professionals working in the area of tribology, in general, and bearing performance characteristics, in particular, especially from the point-of-view of design. This book will also appeal to researchers and professionals working in fluid-film lubrication and other practical applications of tribology. A wide range of topics has been included despite space and time constraints. Basic concepts and fundamentals techniques have been emphasized upon, while also including highly specialized topics and methods (such as nanotribology, bio-nanotribology). Care has been taken to generate interest for a wide range of readers, considering the interdisciplinary nature of the subject. Primarily intended for the undergraduate students of Automobile, Mechanical, Electrical, Aerospace engineering, and postgraduate students of Thermal Engineering and Energy Systems, the book presents the topics as per the outcome-based education system. In addition to the coverage of various alternative fuels considered for IC engines, special focus is emphasized on research findings in the field of alternative fuels and fuel additives including nano-additives. The stress is also given towards the exclusive coverage of advanced engine technologies such as CRDI engines, MPFI engines, GDI, HCCI and advanced energy technologies such as Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEVs), Battery Electric Vehicles (BEVs), Fuel Cell Vehicles (FCVs), Solar Powered Vehicles. KEY FEATURES • A detailed discussion of the research findings in alternatives fuels for IC engines • 150+ Review questions • 200+ Multiple choice questions • PowerPoint slides for the instructors Target Audience • Undergraduate students of Automobile, Mechanical, Electrical, Aerospace engineering • Postgraduate students of Thermal engineering and Energy systems This book focuses on the use of nanotechnology and nanomaterials in the production of biofuels. It describes the current production technologies for different biofuels and their limitations for commercialization, and discusses in detail how nanomaterials could reduce biofuel production costs. After an introduction to biofuels, the book examines biofuels economics and policy; biofuel production processes – advances and limitations; nanotechnology and its energy applications; nanotechnology in biohydrogen production – for cellulases, in algal fuel, and in bioethanol/biobutanol and biodiesel production. It is a valuable resource for researchers and engineers.

This book presents select proceedings of the International Conference on Recent Advances in Mechanical Engineering Research and Development (ICRAMERD 2020). The contents focus on latest research and current problems in various branches of mechanical engineering. Some of the topics discussed here include fracture and failure analysis, fuels and alternative fuels, combustion and IC engines, advanced manufacturing technologies, powder metallurgy and rapid prototyping, industrial engineering and automation, supply chain management, design of mechanical systems, vibrations and control engineering, automobile engineering, fluid mechanics and machines, heat transfer, composite materials, micro and nano-engineering for energy storage and conversion, and modeling and simulations. The wide range of topics presented in this book can make it useful for beginners, researchers as well as professionals in mechanical engineering. This book, divided in two volumes, originates from Techno-Societal 2018: the 2nd International Conference on Advanced Technologies for Societal Applications, Maharashtra, India, that brings together faculty members of various engineering colleges to solve Indian regional relevant problems under the guidance of eminent researchers from various reputed organizations. The focus is on technologies that help develop and improve society, in particular on issues such as the betterment of differently abled people, environment impact, livelihood, rural employment, agriculture, healthcare, energy, transport, sanitation, water, education. This conference aims to help innovators to share their best practices or products developed to solve specific local problems which in turn may help the other researchers to take inspiration to solve problems in their region. On the other hand, technologies proposed by expert researchers may find applications in different regions. This offers a multidisciplinary platform for researchers from a broad range of disciplines of Science, Engineering and Technology for reporting innovations at different levels. This book comprises select proceedings of the International Conference on Innovations in Mechanical Engineering (ICIME 2021). It presents innovative ideas and new findings in the field of mechanical engineering. Various topics covered in this book are aerospace engineering, automobile engineering, thermal engineering, renewable energy sources, bio-mechanics, fluid mechanics, MEMS, mechatronics, robotics, CAD/CAM, CAE, CFD, design and optimization, tribology, materials engineering and metallurgy, mimics, surface engineering, nanotechnology, polymer science, manufacturing, production management, industrial engineering and rapid prototyping. This book will be useful for the students, researchers and professionals working in the various areas of mechanical engineering. This book consists of peer-reviewed proceedings from the International Conference on Innovations in Mechanical Engineering (ICIME 2020). The contents cover latest research in all major areas of mechanical engineering, and are broadly divided into five parts: (i) thermal engineering, (ii) design and optimization, (iii) production and industrial engineering, (iv) materials science and metallurgy, and (v) multidisciplinary topics. Different aspects of designing, modeling, manufacturing, optimizing, and processing are discussed in the context of emerging applications. Given the range of topics covered, this book can be useful for students, researchers as well as professionals. This book provides a complete overview of a wide range of nanomaterials from their synthesis and characterization to current and potential applications with special focus on the use of such nano-based products as functional agents in biomedical, environmental and industrial applications. It addresses the intrinsic relationship between aspects involving the synthesis of nanocompounds, their bio-physico-chemical properties and their interactions occurring in biomedical, environmental and industrial matrix. This book is of interest to engineers, academics and research scholars working in these fields. With the advancement in computing technologies, the need for power is also increasing. Approximately 3% of the total power consumption is spent by data centers and computing devices. This percentage will rise when more internet of things (IoT) devices are connected to the web. The handling of this data requires immense power. Energy Systems Design for Low-Power Computing disseminates the current research and the state-of-the-art technologies, topologies, standards, and techniques for the deployment of energy intelligence in edge computing, distributed computing, and centralized computing infrastructure. Covering topics such as electronic cooling, stochastic data analysis, and energy consumption, this premier reference source is an excellent resource for data center designers, VLSI designers, network developers, students and teachers of higher education, librarians, researchers, and academicians. This thesis investigates the tribological viability of bio-based base stock to which different nanoparticles were incorporated for engine piston-ring-cylinder-liner interaction. It determines experimentally the effects of lubricating oil conditions (new and engine-aged) on the friction and wear of the materials used for piston rings and cylinder liners. The specific base stock examined was a trimethylolpropane (TMP) ester derived from palm oil, and the nanoparticles were used as additives to obtain tribologically enhanced bio-based

lubricants. The overall analysis of the results demonstrated the potential of nanoparticles to improve the tribological behavior of bio-based base stock for piston-ring-cylinder-liner interaction. This book presents the latest research on the area of nano-energetic materials, their synthesis, fabrication, patterning, application and integration with various MEMS systems and platforms. Keeping in mind the applications for this field in aerospace and defense sectors, the articles in this volume contain contributions by leading researchers in the field, who discuss the current challenges and future perspectives. This volume will be of use to researchers working on various applications of high-energy research. This book discusses nanotechnology, its benefits and risks affecting the environment we live in today, and is divided into three parts: Part-I dealing with Sustainability, Part-II describing Toxicological Impacts, and Part-III discussing Nanomaterial-based Adsorbents. The crucial challenge of sustainability in various environmental elements is a global problem. This draws upon various issues of nanotechnology which impact sustainability of food, clean environment, green house gases, raw materials extraction, manufacturing and automobile industry. Growth in the production of nanomaterials to suit any of these applications is commendable. However, this does not negate the growth in their toxic effects. The nanotoxicity research in areas like medicine and agriculture industry is reviewed in detail in this book. Part-II discusses the toxic nature of widely used nanomaterials. Nanomaterials are enormously used in environmental remediation due to some of their distinct properties. These properties are described and discussed. Part-III of the book highlights the highly reactive and adsorbent properties of nanomaterials that enable them to be a competent agent in water and pollutant remediation. This book is mainly intended for researchers and students to acquire fairly comprehensive understanding and appreciation of nanotechnology dominance in sustainability challenges, with the aim to give the anticipatory governance of nanomaterials in our society and environment. Tribology, the science of friction, wear and lubrication, is one of the cornerstones of engineering's quest for efficiency and conservation of resources. Tribology and dynamics of engine and powertrain: fundamentals, applications and future trends provides an authoritative and comprehensive overview of the disciplines of dynamics and tribology using a multi-physics and multi-scale approach to improve automotive engine and powertrain technology. Part one reviews the fundamental aspects of the physics of motion, particularly the multi-body approach to multi-physics, multi-scale problem solving in tribology. Fundamental issues in tribology are then described in detail, from surface phenomena in thin-film tribology, to impact dynamics, fluid film and elasto-hydrodynamic lubrication means of measurement and evaluation. These chapters provide an understanding of the theoretical foundation for Part II which includes many aspects of the physics of motion at a multitude of interaction scales from large displacement dynamics to noise and vibration tribology, all of which affect engines and powertrains. Many chapters are contributed by well-established practitioners disseminating their valuable knowledge and expertise on specific engine and powertrain sub-systems. These include overviews of engine and powertrain issues, engine bearings, piston systems, valve trains, transmission and many aspects of drivetrain systems. The final part of the book considers the emerging areas of microengines and gears as well as nano-scale surface engineering. With its distinguished editor and international team of academic and industry contributors, Tribology and dynamics of engine and powertrain is a standard work for automotive engineers and all those researching NVH and tribological issues in engineering. Reviews fundamental aspects of physics in motion, specifically the multi-body approach to multi physics Describes essential issues in tribology from surface phenomena in thin film tribology to impact dynamics Examines specific engine and powertrain sub-systems including engine bearings, piston systems and value trains This book comprises the proceedings of the select peer-reviewed papers presented during the 18th Control Instrumentation System Conference (CISCON 2021). This book highlights the latest trends in instrumentation, sensors and systems, industrial automation and control, image and signal processing, robotics, renewable energy, power systems, and power drives. The research works covered in the book are of high quality and contributed by experts in academia and industry to provide meaningful direction for prolific growth. The book also features a few chapters contributed by the leading policymakers, technologists, farmers, and doctors who help outline the roadmap from the need for technology to policy-making to effect and implement technological advancements for the nation-building process. The book will serve as a valuable reference resource for academics and researchers across the globe. "There's plenty of room at the bottom" - Richard Feynman's legendary sentence has practically teleported the world into the age of Nano-technology over the last couple of decades. As nano-materials started drawing extensive attention, the use of nano-technology has opened many possibilities for humans. Carbon based nano-materials are

an example of such prominent class of materials, which have an enormous potential to fit a wide range of applications, ranging from the energy sector to aircraft and automotive sector to bio-medical sector, etc. The book *Novel Applications of Carbon Based Nano-Materials* summarizes state-of-the-art studies focusing on various applications of carbon allotropes, considering the energy and environmental benefits and the socio-economic impact of the developed systems, all at the same time. This book comprises select peer-reviewed proceedings of the 26th National Conference on IC Engines and Combustion (NCICEC) 2019 which was organised by the Department of Mechanical Engineering, National Institute of Technology Kurukshetra under the aegis of The Combustion Institute-Indian Section (CIIS). The book covers latest research and developments in the areas of combustion and propulsion, exhaust emissions, gas turbines, hybrid vehicles, IC engines, and alternative fuels. The contents include theoretical and numerical tools applied to a wide range of combustion problems, and also discusses their applications. This book can be a good reference for engineers, educators and researchers working in the area of IC engines and combustion. In today's global context, there has been extensive research conducted in reducing harmful emissions to conserve and protect our environment. In the automobile and power generation industries, diesel engines are being utilized due to their high level of performance and fuel economy. However, these engines are producing harmful pollutants that contribute to several global threats including greenhouse gases and ozone layer depletion. Professionals have begun developing techniques to improve the performance and reduce emissions of diesel engines, but significant research is lacking in this area. *Recent Technologies for Enhancing Performance and Reducing Emissions in Diesel Engines* is a pivotal reference source that provides vital research on technical and environmental enhancements to the emission and combustion characteristics of diesel engines. While highlighting topics such as biodiesel emulsions, nanoparticle additives, and mathematical modeling, this publication explores the potential additives that have been incorporated into the performance of diesel engines in order to positively affect the environment. This book is ideally designed for chemical and electrical engineers, developers, researchers, power generation professionals, mechanical practitioners, scholars, ecologists, scientists, graduate students, and academicians seeking current research on modern innovations in fuel processing and environmental pollution control. This book discusses the unique interactions of nanoparticles with various biomolecules under different environmental conditions. It describes the consequences of these interactions on other biological aspects like flora and fauna of the niche, cell proliferation, etc. The book provides information about the novel and eco-friendly nanoparticle synthesis methods, such as continuous synthesis of nanoparticles using microbial cells. Additionally, the book discusses nanoparticles' potential impact in different areas of biological sciences like food, medicine, agriculture, and the environment. Due to their advanced physicochemical properties, nanoparticles have revolutionized biomedical and pharmaceutical sciences. Inside the biological milieu, nanoparticles interact with different moieties to adopt stable shape, size, and surface functionalities and form nano-biomolecular complexes. The interaction pattern at the interface form complexes determines the fate of interacting biomolecules and nanoparticles inside the biological system. Understanding the interaction pattern at the nano-bio interface is crucial for the safe use of nanoparticles in natural sciences. This book rightly addresses all questions about the interaction and the ensuing structure and function of these nano-biomolecular complexes. This book caters to students and researchers in the area of biotechnology, microbiology, and pharmaceutical sciences. This book highlights the recent research works on mechanical, manufacturing and plant engineering presented during the 7th International Conference on Mechanical, Manufacturing and Plant Engineering (ICMMPE 2021) held on 29th November 2021. It highlights the latest advances in the emerging areas, brings together researchers and professionals in the field and provides a valuable platform for exchanging ideas and fostering collaboration. Addressing real-world problems concerning joining technologies that are at the heart of various manufacturing sectors, the respective papers present the outcomes of the latest experimental and numerical work on problems in soldering, arc welding and solid-state joining technologies. This book presents select proceedings of the 3rd Innovative Product Design and Intelligent Manufacturing System (IPDIMS 2020), held at National Institute of Technology (NIT) Rourkela, 30–31 December 2021. This volume covers the latest research topics in design and manufacturing fields of engineering. Some of the themes covered include Industry 4.0, smart manufacturing, advanced robotics and CAD/CAM/CIM. This book will be useful for students, researchers and professionals in the disciplines of mechatronics, mechanical, manufacturing, production and industrial engineering, especially those working on improvements in manufacturing technologies and development of resilient infrastructure in industry. This book examines

the two most populous nations on earth – India and China – in an effort to demystify the interaction between intellectual property rights (IPR) regimes, innovation and economic growth by critically looking at the economic and legal realities. In addition, it analyzes the question of how innovation can best be transformed into IPR, and how IPR can best be exploited to encourage innovation. Comparing and contrasting these two giant nations can be highly beneficial as China and India were the two fastest-growing economies in the last three decades, and together their populations make up one third of the world's total population; as such, exploring how to sustain their growth via innovation and commercialization of IPR could have a tremendous positive impact on global well-being. While a study of these two mega countries with such diverse dimensions and magnitudes can never be truly comprehensive, this joint effort by scholars from law, business management and economics disciplines that pursues an empirical approach makes a valuable contribution. Divided into three parts, the first offers an in-depth doctrinal and empirical analysis. The second part exclusively focuses on India, while the last is dedicated to China. An automobile was seen as a simple accessory of luxury in the early years of the past century. However, in the present days it's undeniable the amount of technology and human effort applied by the vehicular industry for developing high-quality vehicles, but still, cheap for the common person. In this context, this book tries not only to fill a gap by presenting new and updated subjects related to the vehicular technology and to the automotive engineering but also to provide guidelines for future research. This book is a result of many valuable contributions from worldwide experts of automotive's field. The amount and type of contributions were judiciously selected to cover as possible the widest range of research. The most recent and cutting-edge subjects can be found in this book, e.g., electronics, mechanics, materials, and manufacturing.

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