

Elements Of Mechanical Engineering By R K Rajput

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, prescribed for the first-year students of all disciplines of engineering. The book develops an intuitive understanding of the basic principles of thermodynamics as well as of the principles governing the conversion of heat into energy. Numerous illustrative examples are provided to fortify these concepts throughout. The book gives the students a feel for how thermodynamics is applied in engineering practice in the areas of heat engines, steam boilers, internal combustion engines, refrigeration and air conditioning, and to devices such as turbines, pumps and compressors. The book also provides a basic understanding of mechanical design, illustrating the principles through a discussion of devices designed for the transmission of motion and power such as couplings, clutches and brakes. No book on basic mechanical engineering is complete without an introduction to materials science. The text covers the treatment of the common engineering materials, highlighting their properties and applications. Finally, the role of lubrication and lubricants in reducing the wear and tear of parts in mechanical systems, is lucidly explained in the concluding chapter. The text features several fully worked-out examples, a fairly large number of numerical problems with answers, end-of-chapter review questions and multiple choice questions, which all enhance the value of the text to the students. Besides the students studying for an engineering degree, this book is also suitable for study by the students of AMIE and the students of diploma level courses.

The book strictly complies with the new syllabus of Gujrat Technological University, Ahmedabad, for B.E. First year of all braches of Engineering. The subject matter is presented in a graded stepwise, easytofollow style. Each chapter includes MulipleChoice Questions,Review Questions and Exercises for easy recapitulation.

This book is essential reading for the students of Mechanical Engineering. It is a rich blend of theoretical concepts and neat illustrations with footnotes and a list of formulae for ready referenceKey Features:" Step-by-Step approach to help students

Mechanical Design Engineering Handbook is a straight-talking and forward-thinking reference covering the design, specification, selection, use and integration of machine elements fundamental to a wide range of engineering applications. Develop or refresh your mechanical design skills in the areas of bearings, shafts, gears, seals, belts and chains, clutches and brakes, springs, fasteners, pneumatics and hydraulics, amongst other core mechanical elements, and dip in for principles, data and calculations as needed to inform and evaluate your on-the-job decisions. Covering the full spectrum of common mechanical and machine components that act as building blocks in the design of mechanical devices, Mechanical Design Engineering Handbook also includes worked design scenarios and essential background on design methodology to help you get started with a problem and repeat selection processes with successful results time and time again. This practical handbook will make an ideal shelf reference for those working in mechanical design across a variety of industries and a valuable learning resource for advanced students undertaking engineering design modules and projects as part of broader mechanical, aerospace, automotive and manufacturing programs. Clear, concise text explains key component technology, with step-by-step procedures, fully worked design scenarios, component images and cross-sectional line drawings all incorporated for ease of understanding Provides essential data, equations and interactive ancillaries, including calculation spreadsheets, to inform decision making, design evaluation and incorporation of components into overall designs Design procedures and methods covered include references to national and international standards where appropriate

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Mechanical Engineer's Reference Book, 12th Edition is a 19-chapter text that covers the basic principles of mechanical engineering. The first chapters discuss the principles of mechanical engineering, electrical and electronics, microprocessors, instrumentation, and control. The succeeding chapters deal with the applications of computers and computer-integrated engineering systems; the design standards; and materials' properties and selection. Considerable chapters are devoted to other basic knowledge in mechanical engineering, including solid mechanics, tribology, power units and transmission, fuels and combustion, and alternative energy sources. The remaining chapters explore other engineering fields related to mechanical engineering, including nuclear, offshore, and plant engineering. These chapters also cover the topics of manufacturing methods, engineering mathematics, health and safety, and units of measurements. This book will be of great value to mechanical engineers.

Highlights of the book: Discussion about all the fields of Computer Aided Engineering, Finite Element Analysis Sharing of worldwide experience by more than 10 working professionals Emphasis on Practical usage and minimum mathematics Simple language, more than 1000 colour images International quality printing on specially imported paper Why this book has been written ... FEA is gaining popularity day by day & is a sought after dream career for mechanical engineers. Enthusiastic engineers and managers who want to refresh or update the knowledge on FEA are encountered with volume of published books. Often professionals realize that they are not in touch with theoretical concepts as being pre-requisite and find it too mathematical and Hi-Fi. Many a times these books just end up being decoration in their book shelves ... All the authors of this book are from IITs & IISc and after joining the industry realized gap between university education and the practical FEA. Over the years they learned it via interaction with experts from international community, sharing experience with each other and hard route of trial & error method. The basic aim of this book is to share the knowledge & practices used in the industry with experienced and in particular beginners so as to reduce the learning curve & avoid reinvention of the cycle. Emphasis is on simple language, practical usage, minimum mathematics & no pre-requisites. All basic concepts of engineering are included as & where it is required. It is hoped that this book would be helpful to beginners,

experienced users, managers, group leaders and as additional reading material for university courses.

The finite element method is widely employed for numerical simulations in engineering and science due to its accuracy and efficiency. This concise introduction to the mathematical theory of the finite element method presents a selection of applications in civil and mechanical engineering including beams, elastic membranes, the wave equation, heat transfer, seepage in embankment, soil consolidation, incompressible fluids, and linear elasticity. Jupyter notebooks containing all Python programs of each chapter can be downloaded from the book's companion website. Arzhang Angoshtari is an assistant professor and Ali Gerami Matin is a graduate student, both in the department of Civil and Environmental Engineering at the George Washington University, USA. Their research interests cover theoretical and computational mechanics and finite element methods. Elements of Mechanical Engineering occupy a prominent position of understanding over view of mechanical engineering. It consists of three units which are basic principals of thermodynamics, basic manufacturing process, simple stress and strain. Throughout the book S.I. units have been followed. Basic principle has been explained in detail by using solved problems. Several unsolved problems, tutorial sheets, objective questions have been provided at the end of each chapter for practice. This book is intended to serve as a textbook for the course of B. Tech. 1st and 2nd semester for the students of Amity University, who find difficulties for finding syllabus of Amity University in a single book, and is written in SI system. Each chapter of the book is written in a simple and logical way and explaining theory with the help of examples.

Taking a failure prevention perspective, this book provides engineers with a balance between analysis and design. The new edition presents a more thorough treatment of stress analysis and fatigue. It integrates the use of computer tools to provide a more current view of the field. Photos or images are included next to descriptions of the types and uses of common materials. The book has been updated with the most comprehensive coverage of possible failure modes and how to design with each in mind. Engineers will also benefit from the consistent approach to problem solving that will help them apply the material on the job.

This work introduces a wide variety of practical approaches to the synthesis and optimization of shapes for mechanical elements and structures. The simplest methods for achieving the best results without mathematical complexity - especially computer solutions - are emphasized. The authors present detailed case studies of structures subjected to different types of static and dynamic loading, including load-bearing structures with arbitrary support conditions, rotating disks, layered structures, pressure vessels, elastic bodies and structural elements subjected to impulsive loading.

Using the most up-to-date information, this book provides a practical approach to designing machine elements in the context of complete mechanical design. Covering some of the primary machine elements such as belt drives, chain drives, gears, shafts, keys, couplings, seals, and rolling contact bearings. It also covers plain surface bearings, linear motion elements, fasteners, springs, machine frames, bolted connections, welded joints, electric motors, controls, clutches, and brakes. This book is for any individual design professional for which a practical approach to mechanical design, based on sound engineering principles, is desired.

From one of the authors of The Unwritten Laws of Engineering and The Unwritten Laws of Business, this concise and readable book is an excellent primer or refresher for any professional interested in the basic principles and practices of good mechanical design. In this handy and unique volume the author uses his own experience, along with input from other expert designers, to explicitly state design principles and practices. Readers will not have to discover these principles on their own and will be able to apply these fundamental concepts throughout their designs.

The present book on Elements of Mechanical Engineering is meant for the engineering students of all branches at their first year level. It covers the new syllabus of panjab Technical University, Jalandhar. However, it shall be useful to students of other Universities also. The book covers the basic principles of Thermodynamics, zeroth law of Thermodynamics and the concept of temperature in the first chapter.

Presents the fundamentals in a simplified manner and in a Lucid, simple language. n A large number of worked examples and diagrams are given to illustrate the subject matter. n The book covers the syllabus of the subject usually taught at the degree and diploma level in all Indian Universities and Technical Institutions Both MKS and SI units are adopted throughout the text n Methods to find out Dryness Fraction of Steam added in the existing Properties of Steam n Chapter on Methods of Lubrication added. n Chapter on Fuels and Combustion included n Chapters on Pumps, Steam Engines and Steam Turbines have been included.

Assuming only basic knowledge of mathematics and engineering mechanics, this lucid reference introduces the fundamentals of finite element theory using easy-to-understand terms and simple problems - systematically grounding the practitioner in the basic principles then suggesting applications to more general cases. Furnishes a wealth of practical insights drawn from the extensive experience of a specialist in the field! Generously illustrated with over 200 detailed drawings to clarify discussions and containing key literature citations for more in-depth study of particular topics, this clearly written resource is an exceptional guide for mechanical, civil, aeronautic, automotive, electrical and electronics, and design engineers; engineering managers; and upper-level undergraduate, graduate, and continuing-education students in these disciplines.

The Characteristics of Mechanical Engineering Systems focuses on the characteristics that must be considered when designing a mechanical engineering system. Mechanical systems are presented on the basis of component input-output relationships, paying particular attention to lumped-parameter problems and the interrelationships between lumped components or "black-boxes" in an engineering system. Electric motors and generators are treated in an elementary manner, and the principles involved are explained as far as possible from physical and qualitative reasoning. This book is comprised of five chapters and begins with an introduction to the engineering system and how it works, citing a number of examples such as internal combustion engines, electric generators, and power converters in series. The discussion then turns to power conversion, with emphasis on general forms of converter output characteristic, demand characteristic, and efficiency characteristic. Power transmission is also considered, along with dynamic performance and energy storage. The final chapter examines the linear dynamics of mechanical systems and covers topics such as small excursion dynamics, integral control, and sinusoidal disturbance. Examples of control systems are given. This monograph should be of interest to mechanical engineers.

An Introduction to Mechanical Engineering is an essential text for all first-year undergraduate students as well as those studying for foundation degrees and HNDs. The text gives a thorough

grounding in the following core engineering topics: thermodynamics, fluid mechanics, solid mechanics, dynamics, electricals and electronics, and materials science. In this work, MacNeal examines why finite elements sometimes fail and how element designers have corrected their failures. It includes quantitative analyses of failure modes and illustrations of possible side effects found in proposed remedies, providing a practical understanding of finite element performance. The book is designed to enable users and practitioners to identify and circumvent the major flaws of finite elements, such as locking, patch-test failure, spurious models, rigid-body failure, induced anisotropy and shape sensitivity.

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