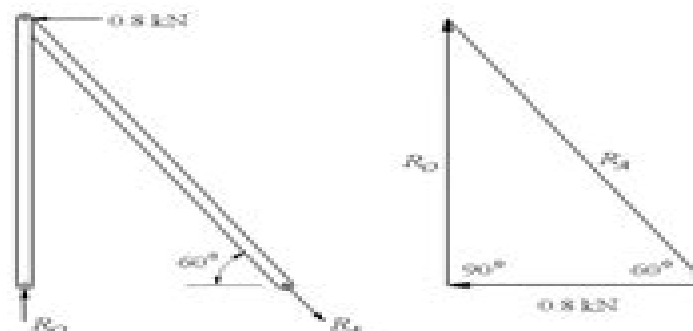


3-3

$$R_O = \frac{0.8}{\tan 30^\circ} = 1.39 \text{ kN} \quad \text{Ans.}$$

$$R_A = \frac{0.8}{\sin 30^\circ} = 1.6 \text{ kN} \quad \text{Ans.}$$



3-4

Step 1: Find R_A & R_E

$$h = \frac{4.5}{\tan 30^\circ} = 7.794 \text{ m}$$

$$\Sigma M_A = 0$$

$$9R_E - 7.794(400 \cos 30^\circ) - 4.5(400 \sin 30^\circ) = 0$$

$$R_E = 400 \text{ N} \quad \text{Ans.}$$

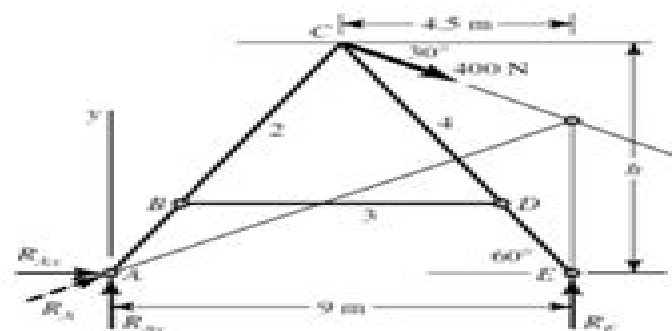
$$\Sigma F_x = 0 \quad R_{Ax} + 400 \cos 30^\circ = 0$$

$$R_{Ax} = -346.4 \text{ N}$$

$$\Sigma F_y = 0 \quad R_{Ay} + 400 - 400 \sin 30^\circ = 0$$

$$R_{Ay} = -200 \text{ N}$$

$$R_A = \sqrt{346.4^2 + 200^2} = 400 \text{ N} \quad \text{Ans.}$$



Step 2: Find components of R_C on link 4 and R_D

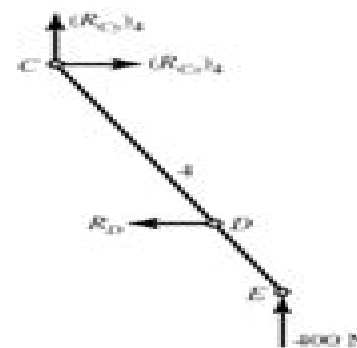
$$\Sigma M_C = 0$$

$$400(4.5) - (7.794 - 1.9)R_D = 0$$

$$R_D = 305.4 \text{ N} \quad \text{Ans.}$$

$$\Sigma F_x = 0 \Rightarrow (R_C)_x = 305.4 \text{ N}$$

$$\Sigma F_y = 0 \Rightarrow (R_C)_y = -400 \text{ N}$$



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Thirumalaisamy P.
Velavancorresponding



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Mechanical Design of Machine Components Ansel C. Ugural, 2018-09-03 Analyze and Solve Real World Machine Design Problems Using SI Units Mechanical Design of Machine Components Second Edition SI Version strikes a balance between method and theory and fills a void in the world of design Relevant to mechanical and related engineering curricula the book is useful in college classes and also serves as a reference for practicing engineers This book combines the needed engineering mechanics concepts analysis of various machine elements design procedures and the application of numerical and computational tools It demonstrates the means by which loads are resisted in mechanical components solves all examples and problems within the book using SI units and helps readers gain valuable insight into the mechanics and design methods of machine components The author presents structured worked examples and problem sets that showcase analysis and design techniques includes case studies that present different aspects of the same design or analysis problem and links together a variety of topics in successive chapters SI units are used exclusively in examples and problems while some selected tables also show U S customary USCS units This book also presumes knowledge of the mechanics of materials and material properties New in the Second Edition Presents a study of two entire real life machines Includes Finite Element Analysis coverage supported by examples and case studies Provides MATLAB solutions of many problem samples and case studies included on the book s website Offers access to additional information on selected topics that includes website addresses and open ended web based problems Class tested and divided into three sections this comprehensive book first focuses on the fundamentals and covers the basics of loading stress strain materials deflection stiffness and stability This includes basic concepts in design and analysis as well as definitions related to properties of engineering materials Also discussed are detailed equilibrium and energy methods of analysis for determining stresses and deformations in variously loaded members The second section deals with fracture mechanics failure criteria fatigue phenomena and surface damage of components The final section is dedicated to machine component design briefly covering entire machines The fundamentals are applied to specific elements such as shafts bearings gears belts chains clutches brakes and springs *Developmental Problems and Their Solution for the Space Shuttle Main Engine Alternate Liquid Oxygen High-pressure Turbopump: Anomaly Or Failure Investigation the Key* R. S. Ryan, 1995 **MATLAB® With Applications in Mechanics and Tribology**

Burstein, Leonid, 2021-02-12 Among the wide range of programming tools available the technical analysis and calculations are realized by MATLAB which is recognized as a convenient and effective tool for modern science and technology Thus mastering its latest versions and practical solutions is increasingly essential for the creation of new products in mechanics electronics chemistry life sciences and modern industry Modern mechanical and tribology sciences specialists widely use computers and some special programs but need a universal tool for solving simulating and modeling specific problems from their area There is plenty of information available on MATLAB for the general engineer but there is a gap in the field for

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PDE Toolbox Primer for Engineering Applications with MATLAB® Basics Leonid Burstein, 2022-06-07 Partial differential equations PDEs describe technological phenomena and processes used for the analysis design and modeling of technical products Solutions of spatial and transient PDEs are realized by using the PDE Toolbox included in the MATLAB software MATLAB is introduced here as an essential foundation for PDE and the Modeler of the PDE Toolbox with appropriate explanatory solutions is applied to engineering problems in mechanics heat mass transfer tribology materials science physics and biotechnology The appendixes contain collections of commands and functions used to solve actual engineering problems FEATURES Includes the PDE Modeler interface with example solutions of two and three dimensional PDEs Presents methodologies for all types of PDEs as representative of any engineering problem Describes the ordinate differential equation ODE solver for initial value and boundary value problems IVP and BVP through practical examples from mechanics and the thermodynamic properties of materials Covers the basics of MATLAB to solve both ODEs and PDEs Reviews spatially the one dimensional PDE solver with actual engineering examples PDE Toolbox Primer for Engineering Applications with MATLAB Basics is aimed at scientists students professionals practitioners self taught readers and researchers who need concise and clear information to study and apply MATLAB software and the PDE Toolbox in engineering

Materials Selection in Mechanical Design Michael F. Ashby, 2024-09-13 Materials Selection in Mechanical Design Sixth Edition winner of a 2018 Textbook Excellence Award Texty describes the procedures for material selection in mechanical design to ensure that the most suitable materials for a given application are identified from the full range of materials and section shapes available Recognized as the world's leading materials selection textbook users will find a unique and innovative resource for students engineers and product industrial designers Selected revisions to this new edition ensure the book will continue to meet the needs of all those whose studies or careers involve selecting the best material for the project at hand Includes new or expanded coverage of materials selection in areas such as additive manufacturing biomedical manufacturing digital manufacturing and cyber manufacturing Includes an update to the hybrid chapter which has been enhanced with expanded hybrid case Presents improved pedagogy including new worked examples throughout the text case studies homework problems and mini projects to aid in student learning Maintains its hallmark

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and related organizations on many industries While this is great for managing an organization it leaves engineers asking questions such as what are the effects of standards on my designs and how can I use standardization to benefit my work
Standards for Engineering Design and Manuf *Using the Engineering Literature, Second Edition* Bonnie A.

Osif, 2011-08-09 With the encroachment of the Internet into nearly all aspects of work and life it seems as though information is everywhere However there is information and then there is correct appropriate and timely information While we might love being able to turn to Wikipedia for encyclopedia like information or search Google for the thousands of links on a topic engineers need the best information information that is evaluated up to date and complete Accurate vetted information is necessary when building new skyscrapers or developing new prosthetics for returning military veterans While the award winning first edition of *Using the Engineering Literature* used a roadmap analogy we now need a three dimensional analysis reflecting the complex and dynamic nature of research in the information age *Using the Engineering Literature Second Edition* provides a guide to the wide range of resources available in all fields of engineering This second edition has been thoroughly revised and features new sections on nanotechnology as well as green engineering The information age has greatly impacted the way engineers find information Engineers have an effect directly and indirectly on almost all aspects of our lives and it is vital that they find the right information at the right time to create better products and processes Comprehensive and up to date with expert chapter authors this book fills a gap in the literature providing critical information in a user friendly format

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