

Problem #1

Determine the forces in the members of the roof truss shown.

Figure:



Reqd: F_{AB}
 F_{BC}
 F_{BD}
 F_{AC}
 F_{CD}

Solution w/ FBD:

Joint C



$$\sum F_V = 0$$

$$0 = -100 + F_{BC}$$

$$F_{BC} = 100 \text{ kN (1)}$$

$$\sum F_H = 0$$

$$0 = F_{BD} - F_{AC} \text{ (2)}$$

Joint A



$$\sum F_H = 0$$

$$0 = F_{AC} - F_{AB} \cos 30$$

$$F_{AC} = 100 \cos 30$$

$$F_{AC} = 50\sqrt{3} \text{ kN (3)}$$

$$\sum F_V = 0$$

$$0 = R_A - F_{AB} \sin 30$$

$$R_A = 50 \text{ kN}$$

Joint B



$$\sum F_V = 0$$

$$0 = F_{BD} \sin 30 + F_{AB} \sin 30 - 100 \sin 30 - 100$$

$$F_{BD} + F_{AB} = 200 \text{ (4)}$$

$$\sum F_H = 0$$

$$0 = F_{AB} \cos 30 - F_{BD} \cos 30 + 100 \cos 30$$

$$-F_{AB} + F_{BD} = 100 \text{ (5)}$$

$$F_{AB} = F_{BD} - 100$$

Eq. (1)

$$F_{CD} = F_{AC}$$

$$F_{CD} = 50\sqrt{3} \text{ kN (6)}$$

Eq. 2 & (3)

$$F_{BD} + (F_{BD} - 100) = 200 \text{ (4)}$$

$$2F_{BD} = 200 \text{ (4)} + 100$$

$$2F_{BD} = 300$$

$$F_{BD} = 150 \text{ kN (c)}$$

$$F_{AB} = 150 - 100$$

$$F_{AB} = 50 \text{ kN (c)}$$

Static Mechanics Solution

Xiaolong Qi



Static Mechanics Solution:

Solution Manual to Statics and Mechanics of Materials an Integrated Approach (Second Edition) , This book is the solution manual to Statics and Mechanics of Materials an Integrated Approach Second Edition which is written by below persons William F Riley Leroy D Sturges Don H Morris **Mechanics: Statics & Dynamics Problem Solver** The Editors of REA,2012-11-22 The Problem Solvers are an exceptional series of books that are thorough unusually well organized and structured in such a way that they can be used with any text No other series of study and solution guides has come close to the Problem Solvers in usefulness quality and effectiveness Educators consider the Problem Solvers the most effective series of study aids on the market Students regard them as most helpful for their school work and studies With these books students do not merely memorize the subject matter they really get to understand it Each Problem Solver is over 1 000 pages yet each saves hours of time in studying and finding solutions to problems These solutions are worked out in step by step detail thoroughly and clearly Each book is fully indexed for locating specific problems rapidly Detailed treatment of topics in statics friction kinematics dynamics energy relations impulse and momentum systems of particles variable mass systems and three dimensional rigid body analysis Among the advanced topics are moving coordinate frames special relativity vibrations deformable media and variational methods **Solutions Manual for Engineering Mechanics** Davinder K. Anand,Patrick F. Cunniff,1973 **Solutions Manual Accompanying "Engineering Mechanics: Statics 10th Edition"** Russell C. Hibbeler,2003-10 **Solutions Manual, Engineering Mechanics** R. C. Hibbeler,1998 **Solutions Manual for Engineering Mechanics** R. C. Hibbeler,1974 *Solutions Manual* R. C. Hibbeler,1983 Engineering Mechanics, Statics and Dynamics Bela Imre Sandor,Karen J. Richter,1983 Instructor's Solutions Manual for Engineering Mechanics: Statics and Dynamics for Engineers Bichara B. Muvdi,Amir W. Al-Khafaji,John W. McNabb,1997-06-26 Mechanics is one of the branches of physics in which the number of principles is at once very few and very rich in useful consequences On the other hand there are few sciences which have required so much thought the conquest of a few axioms has taken more than 2000 years Rene Dugas A History of Mechanics Introductory courses in engineering mechanics statics and dynamics are generally found very early in engineering curricula As such they should provide the student with a thorough background in the basic fundamentals that form the foundation for subsequent work in engineering analysis and design Consequently our primary goal in writing *Statics for Engineers and Dynamics for Engineers* has been to develop the fundamental principles of engineering mechanics in a manner that the student can readily comprehend With this comprehension the student thus acquires the tools that would enable him/her to think through the solution of many types of engineering problems using logic and sound judgment based upon fundamental principles Approach We have made every effort to present the material in a concise but clear manner Each subject is presented in one or more sections followed by one or more examples the solutions for which are presented in a detailed fashion with frequent

reference to the basic underlying principles A set of problems is provided for use in homework assignments

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Damage Mechanics in Metal Forming Khemais Saanouni,2013-02-04 The aim of this book is to summarize the current most effective methods for modeling simulating and optimizing metal forming processes and to present the main features of new innovative methods currently being developed which will no doubt be the industrial tools of tomorrow It discusses damage or defect prediction in virtual metal forming using advanced multiphysical and multiscale fully coupled constitutive equations Theoretical formulation numerical aspects as well as application to various sheet and bulk metal forming are presented in detail Virtual metal forming is nowadays inescapable when looking to optimize numerically various metal forming processes in order to design advanced mechanical components To do this highly predictive constitutive equations accounting for the full coupling between various physical phenomena at various scales under large deformation including the ductile damage occurrence are required In addition fully 3D adaptive numerical methods related to time and space discretization are required in order to solve accurately the associated initial and boundary value problems This book focuses on these two main and complementary aspects with application to a wide range of metal forming and machining processes

Instructor's Solutions Manual for Engineering Mechanics, Statics Second Edition Andrew Pytel,1999

Mechanics for Engineers ,1985 *Statics and Mechanics of Materials* William F. Riley,Leroy D. Sturges,Don H. Morris,2001-10-30 The second edition of *Statics and Mechanics of Materials An Integrated Approach* continues to present students with an emphasis on the fundamental principles with numerous applications to demonstrate and develop logical orderly methods of procedure Furthermore the authors have taken measure to ensure clarity of the material for the student Instead of deriving numerous formulas for all types of problems the authors stress the use of free body diagrams and the equations of equilibrium together with the geometry of the deformed body and the observed relations between stress and strain for the analysis of the force system action of a body *An elementary text-book of mechanics. [With] Solutions of problems* Richard Wormell (Science teacher),1892 *Applied Mechanics Reviews* ,1980

Engineering Mechanics: Dynamics Francesco Costanzo,Michael Plesha,Gary Gray,2012-01-19 Gray Costanzo Plesha s *Engineering Mechanics 2e* is the Problem Solver s Approach for Tomorrow s Engineers Based upon a great deal of classroom teaching experience Gray Costanzo Plesha provide a visually appealing learning framework to your students The look of the presentation is modern like

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