

Separation Process Principles 3rd Edition Solution

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Elements of Information Theory -
Thomas M. Cover 2012-11-28
The latest edition of this classic is
updated with new problem sets and

material The Second Edition of this
fundamental textbook maintains the
book's tradition of clear, thought-
provoking instruction. Readers are

provided once again with an instructive mix of mathematics, physics, statistics, and information theory. All the essential topics in information theory are covered in detail, including entropy, data compression, channel capacity, rate distortion, network information theory, and hypothesis testing. The authors provide readers with a solid understanding of the underlying theory and applications. Problem sets and a telegraphic summary at the end of each chapter further assist readers. The historical notes that follow each chapter recap the main points. The Second Edition features:

- * Chapters reorganized to improve teaching
- * 200 new problems
- * New material on source coding, portfolio theory, and feedback capacity
- * Updated references

Now current and

enhanced, the Second Edition of *Elements of Information Theory* remains the ideal textbook for upper-level undergraduate and graduate courses in electrical engineering, statistics, and telecommunications.

Osmosis Engineering - Nidal Hilal
2021-04-23

Osmosis Engineering provides a comprehensive overview of the state-of-the-art surrounding osmosis-based research and industrial applications. The book covers the underpinning theories, technology developments and commercial applications. Sections discuss innovative and advanced membranes and modules for osmosis separation processes (e.g., reverse osmosis, forward osmosis, pressure retarded osmosis, osmotic membrane distillation), different application of these osmosis separation processes

for energy and water separation, such as the treatment of radioactive waste, oily wastewater and heavy metal removal, draw solutions, pretreatment technologies, fouling effects, the use of renewable energy driven osmotic processes, computational, environmental and economic studies, and more. Covers state-of-the-art osmotic engineering technologies and applications
Presents multidisciplinary topics in engineered osmosis, including both fundamental and applied EO concepts
Includes major challenges such as fouling mitigation, membrane development, pre-treatment and energy usage

Introduction to Chemical Engineering: Tools for Today and Tomorrow, 5th Edition - Kenneth A. Solen 2010-08-04
This concise book is a broad and

highly motivational introduction for first-year engineering students to the exciting of field of chemical engineering. The material in the text is meant to precede the traditional second-year topics. It provides students with, 1) materials to assist them in deciding whether to major in chemical engineering; and 2) help for future chemical engineering majors to recognize in later courses the connections between advanced topics and relationships to the whole discipline. This text, or portions of it, may be useful for the chemical engineering portion of a broader freshman level introduction to engineering course that examines multiple engineering fields.
Elementary Principles of Chemical Processes, 3rd Edition 2005 Edition Integrated Media and Study Tools,

with Student Workbook - Richard M. Felder 2005-02-02

This best selling text prepares students to formulate and solve material and energy balances in chemical process systems and lays the foundation for subsequent courses in chemical engineering. The text provides a realistic, informative, and positive introduction to the practice of chemical engineering. The Integrated Media Edition update provides a stronger link between the text, media supplements, and new student workbook.

Separation Process Engineering - Phillip C. Wankat 2012

The Definitive, Fully Updated Guide to Separation Process Engineering-Now with a Thorough Introduction to Mass Transfer Analysis Separation Process Engineering, Third Edition, is the

most comprehensive, accessible guide available on modern separation processes and the fundamentals of mass transfer. Phillip C. Wankat teaches each key concept through detailed, realistic examples using real data-including up-to-date simulation practice and new spreadsheet-based exercises. Wankat thoroughly covers each of today's leading approaches, including flash, column, and batch distillation; exact calculations and shortcut methods for multicomponent distillation; staged and packed column design; absorption; stripping; and more. In this edition, he also presents the latest design methods for liquid-liquid extraction. This edition contains the most detailed coverage available of membrane separations and of sorption separations (adsorption,

chromatography, and ion exchange). Updated with new techniques and references throughout, Separation Process Engineering, Third Edition, also contains more than 300 new homework problems, each tested in the author's Purdue University classes. Coverage includes Modular, up-to-date process simulation examples and homework problems, based on Aspen Plus and easily adaptable to any simulator Extensive new coverage of mass transfer and diffusion, including both Fickian and Maxwell-Stefan approaches Detailed discussions of liquid-liquid extraction, including McCabe-Thiele, triangle and computer simulation analyses; mixer-settler design; Karr columns; and related mass transfer analyses Thorough introductions to adsorption, chromatography, and ion

exchange-designed to prepare students for advanced work in these areas Complete coverage of membrane separations, including gas permeation, reverse osmosis, ultrafiltration, pervaporation, and key applications A full chapter on economics and energy conservation in distillation Excel spreadsheets offering additional practice with problems in distillation, diffusion, mass transfer, and membrane separation

Advances in Oil-Water Separation -
Papita Das 2022-02-25

Advances in Oil-Water Separation: A Complete Guide for Physical, Chemical, and Biochemical Processes discusses a broad variety of chemical, physical and biochemical processes, including skimming, membrane separation, adsorption,

onsite chemical reactions, burning and usage of suitable microbial strains for onsite degradation of oil. It critically reviews all current developments in oil-water separation processes and technologies, identifies gaps and illuminates the scope for future research and development in the field. This book provides researchers, engineers and environmental professionals working in oil recovery, storage and refineries with solutions for disposal of waste oil and separation of oil from water in a sustainable, environmentally-friendly way. As the book provides a complete state-of-art overview on oil-water separation technologies, it will also ease literature searches on oil-water separation technologies. Provides a

comprehensive overview of state-of-the-art developments in oil-water separation methods Discusses the pros and cons of established processes Guides the reader towards the selection of the right technique/process for each oil-water separation problem Presents current developments on adsorbent based oil-water separation

Principles and Modern Applications of Mass Transfer Operations - Jaime Benitez 2016-12-16

A staple in any chemical engineering curriculum New edition has a stronger emphasis on membrane separations, chromatography and other adsorptive processes, ion exchange Discusses many developing topics in more depth in mass transfer operations, especially in the biological engineering area Covers in more

detail phase equilibrium since distillation calculations are completely dependent on this principle Integrates computational software and problems using Mathcad Features 25-30 problems per chapter *Transport Processes and Unit Operations* - Christie J. Geankoplis 1992

MWH's Water Treatment - John C. Crittenden 2012-06-14
the definitive guide to the theory and practice of water treatment engineering THIS NEWLY REVISED EDITION of the classic reference provides complete, up-to-date coverage of both theory and practice of water treatment system design. The Third Edition brings the field up to date, addressing new regulatory requirements, ongoing environmental

concerns, and the emergence of pharmacological agents and other new chemical constituents in water. Written by some of the foremost experts in the field of public water supply, *Water Treatment, Third Edition* maintains the book's broad scope and reach, while reorganizing the material for even greater clarity and readability. Topics span from the fundamentals of water chemistry and microbiology to the latest methods for detecting constituents in water, leading-edge technologies for implementing water treatment processes, and the increasingly important topic of managing residuals from water treatment plants. Along with hundreds of illustrations, photographs, and extensive tables listing chemical properties and design data, this volume: Introduces

a number of new topics such as advanced oxidation and enhanced coagulation Discusses treatment strategies for removing pharmaceuticals and personal care products Examines advanced treatment technologies such as membrane filtration, reverse osmosis, and ozone addition Details reverse osmosis applications for brackish groundwater, wastewater, and other water sources Provides new case studies demonstrating the synthesis of full-scale treatment trains A must-have resource for engineers designing or operating water treatment plants, *Water Treatment, Third Edition* is also useful for students of civil, environmental, and water resources engineering. *Physical Chemistry* - David S. Eisenberg 1979

Chemical Engineering Volume 2 - J H Harker 2013-10-22
Chemical Engineering Volume 2 covers the properties of particulate systems, including the character of individual particles and their behaviour in fluids. Sedimentation of particles, both singly and at high concentrations, flow in packed and fluidised beds and filtration are then examined. The latter part of the book deals with separation processes, such as distillation and gas absorption, which illustrate applications of the fundamental principles of mass transfer introduced in *Chemical Engineering Volume 1*. In conclusion, several techniques of growing importance - adsorption, ion exchange, chromatographic and membrane separations, and process

intensification - are described. A logical progression of chemical engineering concepts, volume 2 builds on fundamental principles contained in Chemical Engineering volume 1 and these volumes are fully cross-referenced. Reflects the growth in complexity and stature of chemical engineering over the last few years. Supported with further reading at the end of each chapter and graded problems at the end of the book.

Separation Process Principles with Applications Using Process Simulators

- J. D. Seader 2016

Separation of Molecules, Macromolecules and Particles -

Kamlesh Sirkar 2014-01-16

A modern separation process textbook written for advanced undergraduate and graduate level courses in

chemical engineering.

Bioprocess Engineering Principles -

Pauline M. Doran 1995-04-03

The emergence and refinement of techniques in molecular biology has changed our perceptions of medicine, agriculture and environmental management. Scientific breakthroughs in gene expression, protein engineering and cell fusion are being translated by a strengthening biotechnology industry into revolutionary new products and services. Many a student has been enticed by the promise of biotechnology and the excitement of being near the cutting edge of scientific advancement. However, graduates trained in molecular biology and cell manipulation soon realise that these techniques are only part of the picture. Reaping the

full benefits of biotechnology requires manufacturing capability involving the large-scale processing of biological material. Increasingly, biotechnologists are being employed by companies to work in co-operation with chemical engineers to achieve pragmatic commercial goals. For many years aspects of biochemistry and molecular genetics have been included in chemical engineering curricula, yet there has been little attempt until recently to teach aspects of engineering applicable to process design to biotechnologists. This textbook is the first to present the principles of bioprocess engineering in a way that is accessible to biological scientists. Other texts on bioprocess engineering currently available assume that the reader already has engineering training. On

the other hand, chemical engineering textbooks do not consider examples from bioprocessing, and are written almost exclusively with the petroleum and chemical industries in mind. This publication explains process analysis from an engineering point of view, but refers exclusively to the treatment of biological systems. Over 170 problems and worked examples encompass a wide range of applications, including recombinant cells, plant and animal cell cultures, immobilised catalysts as well as traditional fermentation systems. * * First book to present the principles of bioprocess engineering in a way that is accessible to biological scientists * Explains process analysis from an engineering point of view, but uses worked examples relating to

biological systems * Comprehensive, single-authored * 170 problems and worked examples encompass a wide range of applications, involving recombinant plant and animal cell cultures, immobilized catalysts, and traditional fermentation systems * 13 chapters, organized according to engineering sub-disciplines, are grouped in four sections - Introduction, Material and Energy Balances, Physical Processes, and Reactions and Reactors * Each chapter includes a set of problems and exercises for the student, key references, and a list of suggestions for further reading * Includes useful appendices, detailing conversion factors, physical and chemical property data, steam tables, mathematical rules, and a list of symbols used * Suitable for course

adoption - follows closely curricula used on most bioprocessing and process biotechnology courses at senior undergraduate and graduate levels.

Membrane Separations Technology - R.D. Noble 1995-01-17

The field of membrane separation technology is presently in a state of rapid growth and innovation. Many different membrane separation processes have been developed during the past half century and new processes are constantly emerging from academic, industrial, and governmental laboratories. While new membrane separation processes are being conceived with remarkable frequency, existing processes are also being constantly improved in order to enhance their economic competitiveness. Significant

improvements are currently being made in many aspects of membrane separation technology: in the development of new membrane materials with higher selectivity and/or permeability, in the fabrication methods for high-flux asymmetric or composite membranes, in membrane module construction and in process design. Membrane separation technology is presently being used in an impressive variety of applications and has generated businesses totalling over one billion U.S. dollars annually. The main objective of this book is to present the principles and applications of a variety of membrane separation processes from the unique perspectives of investigators who have made important contributions to their fields. Another objective is to

provide the reader with an authoritative resource on various aspects of this rapidly growing technology. The text can be used by someone who wishes to learn about a general area of application as well as by the knowledgeable person seeking more detailed information.

SEPARATION PROCESS PRINCIPLES, 2ND ED

- Seader 2006-08

Market_Desc: · Chemical Engineers · Students of Engineering Special

Features: · A new section on Dimensions and Units to facilitate the use of the SI, AE, and CGS systems, which permeate applications to separation processes. · Increased emphasis on the many ways used to express the composition of chemical mixtures. · New material on the thermodynamics of difficult mixtures, including electrolytes, polymer

solutions, and mixtures of light gases and polar organic compounds.· New sections on the hybrid systems and membrane cascades.· New section on optimal control as a third mode of operation for batch distillation.· New discussion on concentration polarization and fouling. About The Book: Updated to reflect advances in the field, the second edition of this highly respected text examines rate-based and equilibrium-based approaches to separation operations. It describes the fundamentals of all separation operations of commercial interest, and includes theory and application examples in each chapter, as well as over 600 exercises.

Principles of Water Treatment - Kerry J. Howe 2012-11-06
Principles of Water Treatment has been developed from the best selling

reference work Water Treatment, 3rd edition by the same author team. It maintains the same quality writing, illustrations, and worked examples as the larger book, but in a smaller format which focuses on the treatment processes and not on the design of the facilities.

Multistage Separation Processes - Fouad M. Khoury 2004-12-28

The development of computer-aided simulation programs for separation processes provides engineers with valuable tools to make more reliable qualitative and quantitative decisions in plant design and operation. Written by a specialist in modeling and optimization, *Multistage Separation Processes*, Third Edition clarifies the effective use of simulators

Mass Transfer and Separation

Processes - Diran Basmadjian

2007-04-25

Mass transfer along with separation processes is an area that is often quite challenging to master, as most volumes currently available complicate the learning by teaching mass transfer linked with heat transfer, rather than focusing on more relevant techniques. With this thoroughly updated second edition, *Mass Transfer and Separation Processes: Principles and Applications* presents a highly thoughtful and instructive introduction to this sophisticated material by teaching mass transfer and separation processes as unique though related entities. In an ever increasing effort to demystify the subject, with this edition, the author— Avoids more complex

separation processes Places a greater emphasis on the art of simplifying assumptions Conveys a greater sense of scale with the inclusion of numerous photos of actual installations Makes the math only as complicated as necessary while reviewing fundamental principles that may have been forgotten The book explores essential principles and reinforces the concepts with classical and contemporary illustrations drawn from the engineering, environmental, and biological sciences. The theories of heat conduction and transfer are utilized not so much to draw analogies but rather to make fruitful use of existing solutions not seen in other texts on the subject. Both an introductory resource and a reference, this important text serves

environmental, biomedical, and engineering professionals, as well as anyone wishing to gain a grasp on this subject and its increasing relevance across a number of fields. It fills a void in traditional chemical engineering literature by providing access to the principles and working practices that allow mass transfer theory to be applied to separation processes.

Introduction to Electrodynamics -

David J. Griffiths 2017-06-29

This is a re-issued and affordable printing of the widely used undergraduate electrodynamics textbook.

Handbook of Industrial

Crystallization - Allan Myerson

2002-01-08

Crystallization is an important separation and purification process

used in industries ranging from bulk commodity chemicals to specialty chemicals and pharmaceuticals. In recent years, a number of environmental applications have also come to rely on crystallization in waste treatment and recycling processes. The authors provide an introduction to the field of newcomers and a reference to those involved in the various aspects of industrial crystallization. It is a complete volume covering all aspects of industrial crystallization, including material related to both fundamentals and applications. This new edition presents detailed material on crystallization of biomolecules, precipitation, impurity-crystal interactions, solubility, and design. Provides an ideal introduction for industrial

crystallization newcomers Serves as a worthwhile reference to anyone involved in the field Covers all aspects of industrial crystallization in a single, complete volume

Chemical Engineering Design - Gavin Towler 2012-01-25

Chemical Engineering Design, Second Edition, deals with the application of chemical engineering principles to the design of chemical processes and equipment. Revised throughout, this edition has been specifically developed for the U.S. market. It provides the latest US codes and standards, including API, ASME and ISA design codes and ANSI standards. It contains new discussions of conceptual plant design, flowsheet development, and revamp design; extended coverage of capital cost estimation, process costing, and

economics; and new chapters on equipment selection, reactor design, and solids handling processes. A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data, and Excel spreadsheet calculations, plus over 150 Patent References for downloading from the companion website. Extensive instructor resources, including 1170 lecture slides and a fully worked solutions manual are available to adopting instructors. This text is designed for chemical and biochemical engineering students (senior undergraduate year, plus appropriate for capstone design courses where taken, plus graduates) and lecturers/tutors, and professionals in industry (chemical process, biochemical, pharmaceutical,

petrochemical sectors). New to this edition: Revised organization into Part I: Process Design, and Part II: Plant Design. The broad themes of Part I are flowsheet development, economic analysis, safety and environmental impact and optimization. Part II contains chapters on equipment design and selection that can be used as supplements to a lecture course or as essential references for students or practicing engineers working on design projects. New discussion of conceptual plant design, flowsheet development and revamp design. Significantly increased coverage of capital cost estimation, process costing and economics. New chapters on equipment selection, reactor design and solids handling processes. New sections on fermentation, adsorption,

membrane separations, ion exchange and chromatography. Increased coverage of batch processing, food, pharmaceutical and biological processes. All equipment chapters in Part II revised and updated with current information. Updated throughout for latest US codes and standards, including API, ASME and ISA design codes and ANSI standards. Additional worked examples and homework problems. The most complete and up to date coverage of equipment selection. 108 realistic commercial design projects from diverse industries. A rigorous pedagogy assists learning, with detailed worked examples, end of chapter exercises, plus supporting data and Excel spreadsheet calculations plus over 150 Patent References, for downloading from the companion

website Extensive instructor resources: 1170 lecture slides plus fully worked solutions manual available to adopting instructors
Coulson and Richardson's Chemical Engineering - Ajay Kumar Ray
2022-07-01

Coulson and Richardson's Chemical Engineering: Volume 2B, Separation Processes, Sixth Edition, covers distillation and gas absorption, illustrating applications of the fundamental principles of mass transfer. Several techniques, including adsorption, ion exchange, chromatographic membrane separations and process intensification are comprehensively covered and explored. Presents content converted from textbooks into fully revised reference material Provides content that ranges from foundational to

technical Includes new additions, such as emerging applications, numerical methods, and computational tools

Fundamentals of Chemical Engineering Thermodynamics - Themis Matsoukas
2013

Fundamentals of Chemical Engineering Thermodynamics is the clearest and most well-organized introduction to thermodynamics theory and calculations for all chemical engineering undergraduates. This brand-new text makes thermodynamics far easier to teach and learn. Drawing on his award-winning courses at Penn State, Dr. Themis Matsoukas organizes the text for more effective learning, focuses on why as well as how, offers imagery that helps students conceptualize the equations, and illuminates thermodynamics with

relevant examples from within and beyond the chemical engineering discipline. Matsoukas presents solved problems in every chapter, ranging from basic calculations to realistic safety and environmental applications.

Principles of Chemical Engineering Processes - Nayef Ghasem 2014-11-10
Principles of Chemical Engineering Processes: Material and Energy Balances introduces the basic principles and calculation techniques used in the field of chemical engineering, providing a solid understanding of the fundamentals of the application of material and energy balances. Packed with illustrative examples and case studies, this book: Discusses problems in material and energy balances related to chemical reactors

Explains the concepts of dimensions, units, psychrometry, steam properties, and conservation of mass and energy Demonstrates how MATLAB® and Simulink® can be used to solve complicated problems of material and energy balances Shows how to solve steady-state and transient mass and energy balance problems involving multiple-unit processes and recycle, bypass, and purge streams Develops quantitative problem-solving skills, specifically the ability to think quantitatively (including numbers and units), the ability to translate words into diagrams and mathematical expressions, the ability to use common sense to interpret vague and ambiguous language in problem statements, and the ability to make judicious use of approximations and reasonable assumptions to simplify

problems This Second Edition has been updated based upon feedback from professors and students. It features a new chapter related to single- and multiphase systems and contains additional solved examples and homework problems. Educational software, downloadable exercises, and a solutions manual are available with qualifying course adoption.

Equilibrium-Stage Separation Operations in Chemical Engineering - Ernest J. Henley 1981

Uses a large number of industrially-significant problems to convey an in-depth understanding of modern calculation procedures. Includes numerous topical examples and problems, and both conventional and SI units.

Product and Process Design Principles - Warren D. Seider 2019-03-18

Handbook of Separation Process Technology - Ronald W. Rousseau 1987-05-13

Surveys the selection, design, and operation of most of the industrially important separation processes. Discusses the underlying principles on which the processes are based, and provides illustrative examples of the use of the processes in a modern context. Features thorough treatment of newer separation processes based on membranes, adsorption, chromatography, ion exchange, and chemical complexation. Includes a review of historically important separation processes such as distillation, absorption, extraction, leaching, and crystallization and considers these techniques in light of recent developments affecting them.

Equilibrium Staged Separations -
Phillip C. Wankat 2007

Green Separation Processes - Carlos
A. M. Afonso 2006-05-12

This timely book is the first to provide a comprehensive overview of all important aspects of this modern technology with the focus on the "green aspect". The expert authors present everything from reactions without solvents to nanostructures for separation methods, from combinatorial chemistry on solid phase to dendrimers. The result is a ready reference packed full of valuable facts on the latest developments in the field - high-quality information otherwise widely spread throughout articles and reviews. From the contents: * Green chemistry for sustainable development

* New synthetic methodologies and the demand for adequate separation processes * New developments in separation processes * Future trends and needs It is a "must-have" for every researcher in the field.

Ion-Exchange Membrane Separation Processes - H Strathmann 2004-01-29
Today, membranes and membrane processes are used as efficient tools for the separation of liquid mixtures or gases in the chemical and biomedical industry, in water desalination and wastewater purification. Despite the fact that various membrane processes, like reverse osmosis, are described in great detail in a number of books, processes involving ion-exchange membranes are only described in a fragmented way in scientific journals and patents; even though large

industrial applications, like electrodialysis, have been around for over half a century. Therefore, this book is emphasizing on the most relevant aspects of ion-exchange membranes. This book provides a comprehensive overview of ion-exchange membrane separation processes covering the fundamentals as well as recent developments of the different products and processes and their applications. The audience for this book is heterogeneous, as it includes plant managers and process engineers as well as research scientists and graduate students. The separate chapters are based on different topics. The first chapter describes the relevant Electromembrane processes in a general overview. The second chapter explains thermodynamic and

physicochemical fundamentals. The third chapter gives information about ion-exchange membrane preparation techniques, while the fourth and fifth chapter discusses the processes as unit operations giving examples for the design of specific plants. First work on the principles and applications of electrodialysis and related separation processes Presently no other comprehensive work that can serve as both reference work and text book is available Book is suited for teaching students and as source for detailed information Separation Process Principles - Ernest J. Henley 2011 Completely rewritten to enhance clarity, this third edition provides engineers with a strong understanding of the field. With the help of an additional co-author, the text

presents new information on bioseparations throughout the chapters. A new chapter on mechanical separations covers settling, filtration, and centrifugation, including mechanical separations in biotechnology and cell lysis. Boxes help highlight fundamental equations. Numerous new examples and exercises are integrated throughout as well. In addition, frequent references are made to the software products and simulators that will help engineers find the solutions they need.

Chemical Process Design and Integration - Robin Smith 2016-08-02

Written by a highly regarded author with industrial and academic experience, this new edition of an established bestselling book provides practical guidance for students, researchers, and those in chemical

engineering. The book includes a new section on sustainable energy, with sections on carbon capture and sequestration, as a result of increasing environmental awareness; and a companion website that includes problems, worked solutions, and Excel spreadsheets to enable students to carry out complex calculations.

Chemical Reactions and Chemical Reactors - George W. Roberts

2008-03-14

Focused on the undergraduate audience, Chemical Reaction Engineering provides students with complete coverage of the fundamentals, including in-depth coverage of chemical kinetics. By introducing heterogeneous chemistry early in the book, the text gives students the knowledge they need to solve real chemistry and industrial

problems. An emphasis on problem-solving and numerical techniques ensures students learn and practice the skills they will need later on, whether for industry or graduate work.

Transport Processes and Separation Process Principles (includes Unit Operations) - Christie John

Geankoplis 2013-07-25

Appropriate for one-year transport phenomena (also called transport processes) and separation processes course. First semester covers fluid mechanics, heat and mass transfer; second semester covers separation process principles (includes unit operations). The title of this Fourth Edition has been changed from Transport Processes and Unit Operations to Transport Processes and Separation Process Principles

(Includes Unit Operations). This was done because the term Unit Operations has been largely superseded by the term Separation Processes which better reflects the present modern nomenclature being used. The main objectives and the format of the Fourth Edition remain the same. The sections on momentum transfer have been greatly expanded, especially in the sections on fluidized beds, flow meters, mixing, and non-Newtonian fluids. Material has been added to the chapter on mass transfer. The chapters on absorption, distillation, and liquid-liquid extraction have also been enlarged. More new material has been added to the sections on ion exchange and crystallization. The chapter on membrane separation processes has been greatly expanded especially for gas-membrane theory.

PRINCIPLES OF MASS TRANSFER AND SEPERATION PROCESSES - BINAY K. DUTTA
2007-01-21

This textbook is targetted to undergraduate students in chemical engineering, chemical technology, and biochemical engineering for courses in mass transfer, separation processes, transport processes, and unit operations. The principles of mass transfer, both diffusional and convective have been comprehensively discussed. The application of these principles to separation processes is explained. The more common separation processes used in the chemical industries are individually described in separate chapters. The book also provides a good understanding of the construction, the operating principles, and the selection criteria of separation equipment.

Recent developments in equipment have been included as far as possible. The procedure of equipment design and sizing has been illustrated by simple examples. An overview of different applications and aspects of membrane separation has also been provided. 'Humidification and water cooling', necessary in every process indus-try, is also described. Finally, elementary principles of 'unsteady state diffusion' and mass transfer accompanied by a chemical reaction are covered. SALIENT FEATURES : • A balanced coverage of theoretical principles and applications. • Important recent developments in mass transfer equipment and practice are included. • A large number of solved problems of varying levels of complexities showing the applications of the theory are included. • Many

end-chapter exercises. • Chapter-wise multiple choice questions. • An Instructors manual for the teachers. Basic Principles and Calculations in Chemical Engineering - David Mautner Himmelblau 2012

Best-selling introductory chemical engineering book - now updated with far more coverage of biotech, nanotech, and green engineering Thoroughly covers material balances, gases, liquids, and energy balances. Contains new biotech and bioengineering problems throughout.

Separation Process Principles - J. D. Seader 1998-01-23

This book examines rate-based and equilibrium-based approaches to separation operations. It describes the fundamentals of all separation operations of commercial interest, and includes theory and application

examples in each chapter, as well as over 600 exercises.

Separation Process Principles - J. D. Seader 2016-01-20

Separation Process Principles with Applications Using Process Simulator, 4th Edition is the most comprehensive and up-to-date treatment of the major separation operations in the chemical industry. The 4th edition focuses on using process simulators to design separation processes and prepares readers for professional practice. Completely rewritten to enhance clarity, this fourth edition provides engineers with a strong understanding of the field. With the help of an additional co-author, the text presents new information on bioseparations throughout the chapters. A new chapter on mechanical separations covers settling,

filtration and centrifugation including mechanical separations in biotechnology and cell lysis. Boxes help highlight fundamental equations. Numerous new examples and exercises are integrated throughout as well.

Industrial Separation Processes -
André B de Haan 2013-07-15

Separation operations are crucial throughout the process industry with respect to energy consumption, contribution to investments and ability to achieve the desired product with the right specifications. Our main objective in creating this graduate level textbook is to present an overview of the fundamentals underlying the most frequently used industrial separation methods. We focus on their physical principles and the basic computation methods that are required to assess

their technical and economical feasibility. The textbook is organized into three main parts. Separation processes for homogeneous mixtures are treated in the parts on equilibrium based molecular separations and rate-controlled molecular separations. The part on mechanical separation technology presents an overview of the most important techniques for heterogeneous mixture separation. Each chapter provides a condensed overview of the most commonly used equipment types. The textbook is concluded with a final chapter on the main considerations in selecting an appropriate separation process for a separation task. As the design of separation processes can only be learned by doing, we have included exercises at the end of each chapter.

Short answers are given at the end of this book; detailed solutions are given in a separate solution manual.