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in a simple and systematic manner this book presents an exhaustive account of various mass transfer operations involved in chemical engineering emphasising the basic concepts and techniques the book discusses in detail material and energy balances distillation absorption and stripping and extraction the book also explains the relevant aspects of equipment design recent developments like permeation ion exchange and froth floatation have also been discussed a large number of digital computer programs are included to illustrate computer aided techniques several solved examples and practice problems are presented in each chapter to illustrate the theory with all these features this is an ideal text for undergraduate chemical engineering students practising engineers and students of pharmacy and metallurgy would also find the book a useful reference source

an invaluable guide for problem solving in mass transfer operations this book takes a highly pragmatic approach to providing the principles and applications of mass transfer operations by offering a valuable easily accessible guide to solving engineering problems both traditional and novel mass transfer processes receive treatment as with all of the books in this series emphasis is placed on an example based approach to illustrating key engineering concepts the book is divided into two major parts it starts with the principles underlying engineering problems showing readers how to apply general engineering principles to the topic of mass transfer operations it then goes on to provide step by step guidance for traditional mass transfer operations including distillation absorption and stripping and

adsorption plus novel mass transfer processes essential topics for professional engineering exams are also covered geared towards chemical environmental civil and mechanical engineers working on real world industrial applications mass transfer operations for the practicing engineer features numerous sample problems and solutions with real world applications clear precise explanations on how to carry out the basic calculations associated with mass transfer operations coverage of topics from the ground up for readers without prior knowledge of the subject overview of topics relevant to the abet accreditation board for engineering and technology for those taking the professional engineering pe exams appendix containing relevant mass transfer operation charts and tables

this book introduces the fundamental principles of the mass transfer phenomenon and its diverse applications in process industry it covers the full spectrum of techniques for chemical separations and extraction beginning with molecular diffusion in gases liquids and solids within a single phase the mechanism of inter phase mass transfer is explained with the help of several theories the separation operations are explained comprehensively in two distinct ways stage wise contact and continuous differential contact the primary design requirements of gas liquid equipment are discussed the book provides a detailed discussion on all individual gas liquid liquid solid gas and solid liquid separation processes the students are also exposed to the underlying principles of the membrane based separation processes the book is replete with real applications of separation processes and equipment problems are worked out in each chapter besides problems with answers short questions multiple choice questions with answers are given at the end of each chapter the text is intended for a course on mass transfer transport and separation processes prescribed for the undergraduate and postgraduate students of chemical engineering

mass transfer operations are of great importance in a process industry as it has a direct impact on the cost of the final product a chemical process engineer therefore should have sound knowledge of the basics of mass transfer and its applications this book is designed to equip the reader with sufficient knowledge of mass transfer operations and face the challenges ahead the objective of this textbook is to teach a budding chemical engineer the principles involved in analyzing a process and apply the desired mass transfer operation to separate the components involved it deals with operations involving diffusion interphase mass transfer humidification drying crystallization absorption distillation extraction leaching and adsorption the principles and equipment used for different mass transfer operations have been lucidly explained designed for a two semester course this text is primarily intended for the undergraduate students of chemical pharmaceutical petrochemical engineering as well as biotechnology and industrial biotechnology it will also be useful to plant engineers and design professionals key features 1 explains the theoretical concepts with full derivation of equations 2 illustrates the application of theory through worked out numerical examples 3 provides exercise problems with answers at the end of each chapter for practice

emphasizes common fundamentals and interrelationships covering fluid mechanics heat transfer and mass transfer update includes new technology new analyses new concepts plus a mixture of si and english systems

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

book presents mass transfer fundamentals in easily understandable form using worked examples to illustrate basic concepts and calculations

principles and applications of mass transfer core textbook teaching mass transfer fundamentals and applications for the design of separation processes in chemical biochemical and environmental engineering principles and applications of mass transfer teaches the subject of mass transfer fundamentals and their applications to the design of separation processes with enough depth of coverage to guarantee that students using the book will at the end of the course be able to specify preliminary designs of the most common separation process equipment reflecting the growth of biochemical applications in the field of chemical engineering the fourth edition expands biochemical coverage including transient diffusion environmental applications electrophoresis and bioseparations also new to the fourth edition is the integration of python programs which complement the mathcad programs of the previous edition on the accompanying instructor s website the online appendices contain a downloadable library of python and mathcad programs for the example problems in each chapter a complete solution manual for all end of chapter problems both in mathcad and python is also provided some of the topics covered in principles and applications of mass transfer include molecular mass transfer covering concentrations velocities and fluxes the maxwell stefan relations and fick s first law for binary mixtures the diffusion coefficient covering diffusion coefficients for binary ideal gas systems dilute liquids and concentrated liquids convective mass transfer covering mass transfer coefficients dimensional analysis boundary layer theory and mass and heat transfer analogies interphase mass transfer covering diffusion between phases material balances and equilibrium stage operations gas dispersed gas liquid operations covering sparged vessels tray towers diameter and gas pressure drop and weeping and entrainment principles and applications of mass transfer is an essential textbook for undergraduate chemical biochemical mechanical and environmental engineering students taking a core course on separation processes or mass transfer operations along with mechanical engineers and mechanical engineering students starting to get involved in combined heat and mass transfer applications

this new third edition provides a modern unified treatment of the basic transport processes of momentum heat and mass transfer as well as a broad treatment of the unit operations of chemical engineering coverage includes the latest membrane separation processes discussion of bioprocesses comprehensive treatment of the transport processes of momentum heat and mass transfer adsorption processes and more a useful up to date reference for practicing chemical engineers agricultural engineers food scientists environmental engineers biochemical engineers and others who work in the process industries

mass transfer involves the net movement of mass from one location to another due to a driving force such as a difference in concentration gradient it finds extensive application in chemical engineering due to its application in crude oil refining petrochemical separation and extraction processes in general the random motion of molecules causes a net transfer of mass from an area of high concentration to an area of low concentration for separation processes thermodynamics determines the extent of separation while mass transfer determines the rate at which the separation will occur

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