The reader will be introduced to various aspects of the fundamentals of nanotechnology-based drug delivery systems and the application of these systems for the delivery of small molecules, proteins, peptides, oligonucleotides and genes. How these systems overcome challenges offered by biological barriers to drug absorption and drug targeting will also be described. The Quality Control of Medicines documents the proceedings of the 35th International Congress of Pharmaceutical Sciences, organized by the Pharmaceutical Society of Ireland on behalf of the Federation Internationale Pharmaceutique, held in Dublin, on 1–5 September 1975. The theme chosen for the Congress was “the basis for the quality control of medicines”, because of the importance and relevance of quality control in the production and distribution of medicines at national and international levels. This volume is arranged according to the manner in which the theme of the Congress was developed by the eminent invited speakers. Following the inaugural symposium invited main symposium, a final symposium on submissions to regulatory bodies and international aspects of drug control covered aspects of politics in submissions, regulatory problems in small countries, and various pharmaceutical problems. Drug therapy via inhalation route is at the cutting edge of modern drug delivery research. There has been significant progress on the understanding of drug therapy via inhalation products. However, there are still problems associated with their formulation design, including the interaction between the active pharmaceutical ingredient(s) (APIs), excipients and devices. This book seeks to cover some of the most pertinent issues and challenges of such formulation design associated with industrial production and desirable clinical outcome. The chapter topics have been selected with a view to integrating the factors that require consideration in the selection and design of device and formulation components which impact upon patient usability and clinical effectiveness. The challenges involved with the delivery of macromolecules by inhalation to both adult and pediatric patients are also covered. Written by leading international experts from both academia and industry, the book will help readers (formulation design scientists, researchers and post-graduate and specialized undergraduate students) develop a deep understanding of key aspects of inhalation formulations as well as detail ongoing challenges and advances associated with their development. Guides readers on the proper use of in vitro drug release methodologies in order to evaluate the performance of special dosage forms. In the last decade, the application of drug release testing has widened to a variety of novel/special dosage forms. In order to predict the in vivo behavior of such dosage forms, the design and development of the in vitro test methods need to take into account various aspects, including the dosage form design and the conditions at the site of application and the site of drug release. This unique book is the first to cover the field of in vitro release testing of special dosage forms in one volume. Featuring contributions from an international team of experts, it presents the state of the art of the use of in vitro drug release methodologies for assessing special dosage forms’ performances and describes the different techniques required for each one. In Vitro Drug Release Testing of Special Dosage Forms covers the in vitro release testing of: lipid-based oral formulations; chews/leval oral products; injectables; drug eluting stents; inhalation products; transdermal formulations; topical formulations; vaginal and rectal delivery systems and ophthalmics. The book concludes with a look at regulatory aspects. Covers both oral and non-oral dosage forms. Describes current regulatory conditions for in vitro drug release testing. Features contributions from well respected global experts in dissolution testing. In Vitro Drug Release Testing of Special Dosage Forms will find a place on the bookshelves of anyone working with special dosage forms, dissolution testing, drug formulation and delivery, pharmaceutics, and regulatory affairs. Oral Drug Delivery: Second Edition thoroughly examines the special equipment and methods used to test whether drugs are released adequately when administered orally. The contributors discuss methods for accurately establishing and validating in vitro/in vivo correlations for both MR and IR formulations, as well as alternative approaches for MR and IR formulations. The Japanese Pharmacopia: Generic Drug Product Development Biopharmaceutics: Applications in Drug Development Pharmaceutical Dissolution Testing, Bioavailability, and Bioequivalence Forecasting the in Vivo Performance of Modified Release (MR) Dosage Forms Using Biorelevant Dissolution Test Handbook of Bioequivalence Testing in Vitro Drug Release Testing of Special Dosage Forms Pulmonary Drug Delivery Remington: Education Pharmacists CH Quality Guidelines Long Acting Animal Health Drug Products.
descriptions of current and emerging controlled release delivery systems for a variety of routes for drug delivery, and present overviews on the physical and chemical assessment of veterinary controlled release delivery systems. The veterinary area is abound with opportunities for the development of controlled release drug delivery technologies. It is an area of medicine that is open to the acceptance of novel drug delivery devices, and which readily encompasses the use of novel routes of administration. It is an area of many unmet needs, most of which offer opportunities and unique challenges for the innovative formulation scientist to provide solutions. This book will provide an insight into the biological, clinical and pharmaceutical challenges that face the formulation scientist in this interesting and diverse area of research. Written for practitioners in both the drug and biotechnology industries, the Handbook of Analytical Validation carefully compiles current regulatory requirements on the validation of new or modified analytical methods. Shedding light on the validation of analytical methods from a practical standpoint, the handbook: Contains practical, up-to-date guidelines for analytical method validation Summarizes the latest regulatory requirements for all aspects of method validation, even those coming from the USP, but undergoing modifications Covers development, optimization, validation, and transfer of many different types of methods used in the regulatory environment Simplifying the overall process of method development, optimization and validation, the guidelines in the Handbook apply to both small molecules in the conventional pharmaceutical industry, as well as the biotech industry. The word pharmacy is derived from the Greek word “Pharmakon”, meaning medicine or drug. According to the dictionary pharmacy is defined as “the art and science of preparing and dispensing drug” pharmacy is a health profession concerned specifically with the knowledge of drugs and wisdom in their use. This profession links the health with chemical sciences. Modern pharmacy services include patient care, clinical services, ensuring safety and efficacy of medications, and providing patients counseling and drug information. Today, the pharmacists are also considered as. This book is the first to provide a comprehensive assessment of the application of fundamental principles of dissolution and drug release testing to poorly soluble compounds and formulations. Such drug products are, vis-à-vis their physical and chemical properties, inherently incompatible with aqueous dissolution. However, dissolution methods are required for product development and selection, as well as for the fulfillment of regulatory obligations with respect to biopharmaceutical assessment and product quality understanding. The percentage of poorly soluble drugs, defined in classes 2 and 4 of the Biopharmaceutics Classification System (BCS), has significantly increased in the modern pharmaceutical development pipelines. This book provides a thorough exposition of general method development strategies for such drugs, including instrumentation and media selection, the uniaxial and non-compartmental non-compartmental and compartmental methods, and phase appropriate methods to dissolution development. Emerging topics in the field of dissolution are also discussed, including biorelevant and biphasic dissolution, the use on enzymes in dissolution testing, dissolution of suspensions, and drug release of non-oral products. Of particular interest to the industrial pharmaceutical professional, a brief overview of the formulation and solubilization techniques employed in the development of BCS class 2 and 4 drugs to overcome solubility challenges is provided and is complemented by a collection of chapters that survey the approaches and considerations in developing dissolution methodologies for enabling drug delivery technologies, including nanosuspensions, lipid-based formulations, and stabilized amorphous drug formulations. Due to a worldwide need for lower cost drug therapy, use of generic and multi-source drug products have been increasing. To meet international patent and trade agreements, the development and sale of these products must conform to national and international laws, and generic products must prove that they are of the same quality and are therapeutically equivalent to the brand name alternative. However, many countries have limited resources to inspect and verify the quality of all drug products for sale in their country. This title discusses the worldwide legislative and regulatory requirements for the registration of generic and multi-source drug products. Till date, pursuit for cost effective and animal sparing colon specific bio-relevant dissolution media has been a forefront challenge facing pharmaceutical scientists over many decades. It is problematic to mimic the dynamic and ecologically diverse features of the colon in dissolution vessel. With the knowledge of enormous colonic microflora, the predominant species Bacteroides, Bifidobacterium, Eubacterium, Streptococcus and Lactobacillus species were cultured in 12% w/w skimmed milk powder and 5% w/v grade “A” honey. Probiotic culture was added to the dissolution media in order to test the drug release of polyacrylaldehyde based formulations. USP dissolution apparatuses I/II with gradient pH dissolution method were used to evaluate the drug release from formulations meant for colon drug delivery. Drug release from 5-fluorouracil granules and metronidazole tablets were assayed under gastric, small intestine conditions and also within a simulated colonic environment involving existing rat caecal, human fecal media and compared with novel probiotic media. The present method can be successfully applied for the drug release testing of any oral formulations meant for colon drug delivery. Dissolution testing is a critical step in quality control of manufactured final products in the pharmaceutical industry. The United States Pharmacopeia (USP) Dissolution Testing Apparatus 2 (paddle) is the most widely used dissolution test devices in the pharmaceutical industry to formulate solid drug dosage forms and to develop quality control specifications for its manufacturing process. Mini vessels and mini paddle dissolution testing systems are smaller versions of the USP 2A apparatus. The concept of the mini paddle apparatus is similar to that of the USP 2 setup but it is scaled down about 1/5 of the volume and 40% with respect to vessel and impeller sizes. Mini vessel systems, requiring a small volume (200 mL) and a mini paddle impeller, are becoming increasing common in the pharmaceutical industry to overcome the limitations associated with the USP 2 dissolution testing method, especially for dissolution testing involving very small tablets. Mini apparatuses can be useful tools in characterizing drug release profiles since smaller sample sizes and smaller volumes of media are needed, thus offering several advantages in terms of substance, analytical, and material cost savings when evaluating release properties of drug candidates. Despite their increasing importance in dissolution testing, little information is currently available on mini vessels, and especially on the agitation speed needed to prevent “coning” effects. Typically during dissolution testing, a disintegrating tablet becomes rapidly fragmented, and the resulting solid particles may or may not become suspended depending on the agitation speed of the paddle and other geometric and operating parameters. “Coning” (the accumulation of particle fragments from a disintegrating tablet) often appears in dissolution testing but can be eliminated by increasing the agitation speed N. Therefore, it is important to be able to predict the minimum rotation speed at which coning phenomena disappears in a disintegration testing system and especially in mini vessels systems. The focus of this work was the determination of the minimum agitation speed, Nj_s, at which the just suspended state by dispersed particles is achieved in a mini paddle system (thus removing “coning” effects). In the past, Nj_s has been experimentally obtained in mixing systems by determining the agitation speed at which no particles are visually observed to be at rest on the vessel bottom for more than one to two seconds. Therefore, the first objective of this work was develop an observer-independent method to measure experimentally Nj_s. This was achieved by extending to mini vessel a method that was recently developed in our laboratory and that is based on the determination of the fraction of unsuspended solids in the vessel at different agitation speed (N_j_s = Ds method). The results of this method agree well the visually observable values of Nj_s (visual). Once new method was validated in mini vessels, Nj_s was experimentally measured using well characterized solid particles under a number of operating conditions, such as liquid level-to-vessel diameter ratio (H/T), particle size (dp), and paddle clearance-to-vessel diameter ratio (C_b/T). The results could be interpreted using the Zwiewicz Equation originally developed for solids suspension in baffled stirred tanks. The Zwiewicz “S” parameter was obtained for the mini vessel system thus enabling the use of this equation to predict when “coning” effects can be eliminated in mini vessel systems during tablet dissolution testing.
highly experienced authors here present readers with step-wise, detail-conscious information to develop quality pharmaceuticals. The book is made up of carefully crafted sections introducing key concepts and advances in the areas of dissolution, BA/BE, BCIS, IVIVC, and product quality. It provides a specific focus on the integration of regulatory considerations and includes case histories highlighting the biopharmaceutics strategies adopted in development of successful drugs. A core subject in pharmaceutics, physical pharmacy is taught in the initial semesters of B. Pharm. The methodical knowledge of the subject is required, and is essential, to understand the principles pertaining to design and development of drug and drug products. Theory and Practice of Physical Pharmacy is unique as it fulfills the twin requirements of physical pharmacy students: the authentic text on theoretical concepts and its application including illustrative exercises in the form of practicals. Covers all the topics included in varied syllabi of physical pharmacy. Provides an integrated understanding of theory and practical applications associated with physicochemical concepts. Explore the latest developments in the field of pharmaceutics. Reviews the relevance of physicochemical principles in the design of dosage form Ensures proper recapitulation through sufficient end-of-chapter questions Provides valuable learning tool in the form of multiple choice questions Multiple choice questions section especially useful for GPAT aspirantsExplore the cutting-edge of dissolution testing in an authoritative, one-stop resource In Pharmaceutical Dissolution Testing, Bioavailability, and Bioequivalence: Science, Applications, and Beyond, distinguished pharmaceutical advisor and consultant Dr. Umesh Banakar delivers a comprehensive and up-to-date reference covering the established and emerging roles of dissolution testing in pharmaceutical drug development. After discussing the fundamentals of the subject, the included resources go on to explore common testing practices and methods, along with their associated challenges and issues, in the drug development lifecycle. Over 19 chapters and 1,100 references allow practicing scientists to fully understand the role of dissolution, apart from mere quality control. Readers will discover a wide range of topics, including automation, generic and biosimilar drug development, patents, and clinical safety. This edited volume offers a one-stop resource for information otherwise scattered amongst several different regulatory regimes. It also includes: A thorough introduction to the fundamentals and essential applications of pharmaceutical dissolution testing Comprehensive explorations of the foundations and drug development applications of bioavailability and bioequivalence Practical discussions about solubility, dissolution, permeability, and classification systems in drug development In-depth examinations of the mechanics of dissolution, including mathematical models and simulations An elaborate assessment of biophysiologically relevant dissolution testing and IVIVCs, and their unique applications A complete understanding of the methods, requirements, and expectations pertaining to dissolution testing of generic products I deal for drug product development and formulation scientists, quality control and assurance professionals, and regulators. Pharmaceutical Dissolution Testing, Bioavailability, and Bioequivalence is also the perfect resource for intellectual property assessors. There are unique challenges in the formulation, manufacture, analytical chemistry, and regulatory requirements of low-dose drugs. This book provides an overview of this specialized field and combines formulation, analytical, and regulatory aspects of dose development into a single reference book. It describes analytical methodologies like dissolution testing, solid state NMR, Raman microscopy, and LC-MS and presents manufacturing techniques such as granulation, compaction, and compression. Complete with case studies and a discussion of regulatory requirements, this is a core reference for pharmaceutical scientists, regulators, and graduate students. Pharmacokinetics is one of the most diverse subject areas in all of pharmaceutical science. In brief, it is concerned with the scientific and technological aspects of the design and manufacture of dosage forms or medicines. An understanding of pharmacokinetics is therefore vital for all pharmacists and those pharmaceutical scientists who are involved in converting a drug or a potential drug into a medicine that can be delivered safely, effectively, and conveniently to the patient. Now in its fourth edition, this best-selling textbook in pharmacokinetics has been brought completely up to date to reflect the rapid advances in delivery methodologies by eye and injection, advances in drug formulations and delivery methods for special groups (such as children and the elderly, nanomedicine, and pharmacology). At the same time the editors have striven to maintain the accessibility of the text for students of pharmacy, preserving the balance between being a suitably pitched introductory text and a clear reflection of the state of the art. Provides a logical, comprehensive account of drug design and manufacture including the science of formulation and delivery designed and written for newcomers to the design of dosage forms New to this edition New editor: Kevin Taylor, Professor of Clinical Pharmaceutics, School of Pharmacy, University of London. Twenty-two new contributors. Six new chapters covering parenteral and oral delivery; design and administration of medicines for the children and elderly; the latest in plant medicines; nanotechnology and nanomedicines, and the delivery of biopharmaceuticals. Thoroughly revised and updated throughout. This book represents the invited presentations and some of the posters presented at the conference entitled “In Vitro-In Vivo Relationship (IVIVR) Workshop” held in September, 1996. The workshop was organized by the IVIVR Cooperative Working Group which has drawn together scientists from a number of organizations and institutions, both academic and industrial. In addition to Elian Corporation, which is a drug delivery company specializing in the development of ER (Extended Release) dosage forms, the IVIVR Cooperative Working Group consists of collaborators from the University of Maryland at Baltimore, University College Dublin, Trinity College Dublin, and the University of Nottingham in the UK. The principal collaborators are Dr. Jackie Butler, Elian Corporation Prof. Owen Corrigan, Trinity College Dublin Dr. Iain Cumming, Elian Corporation Dr. John Devane, Elian Corporation Dr. Adrian Dunn, University College Dublin Dr. Stuart Maddon, Elian Corporation Dr. Colin Mulia, University of Nottingham Mr. Tom O’Hara, Elian Corporation Dr. Deborah Picciotti, University of Maryland at Baltimore Dr. Araz Raoof, Elian Corporation Mr. Paul Stark, Elian Corporation Dr. David Young. University of Maryland at Baltimore The purpose of the workshop was to discuss new concepts and methods in the development of in vitro-in vivo relationships for ER products. The original idea went back approximately 15 months prior to the workshop itself. For sometime, the principal collaborators had been working together on various aspects of dosage form development. This book covers the essentials of drug delivery research and provides a unique forum for scientific experimental methods that are exclusively focused by the in-vitro, ex-vivo, and in-vivo methodologies of drug delivery research and facilitates translational research. The book includes recent and novel approaches in evaluation methods of transdermal, nasal, ocular, oral and intraoral, gastro-retentive, colon-targeted, and brain-targeted drug delivery systems. Providing up to date and comprehensive information, this text is invaluable to students, teachers, scientists, and others employed in the field of drug delivery. A collection of recommended procedures for analysis and specifications for the determination of pharmaceutical substances, excipients and dosage forms intended to serve as source material for reference by any WHO member state. Thoroughly updated, this second edition is the most comprehensive reference on the methods available for the enhancement of percutaneous penetration. The book examines a broad scope of chemical enhancers and various physical methods of enhancement. The range of chemicals discussed is, arguably, unsurpassed anywhere in the literature. This edition contains comprehensive descriptions of the latest techniques and several chapters cover the modern analytical techniques adapted to assess and measure penetration enhancement. New to this volume are chapters addressing penetration retardation, important for substances such as sunscreen agents, for which skin penetration is not desirable. Examining the implications and practical implementation of multi-disciplinary International Conference on Harmonization (ICH) topics, this book gives an integrated view of how the guidelines inform drug development.
guidelines via case studies. Offers a primary reference point for practitioners addressing the dual challenge of interpretation and practical implementation of ICH guidelines. Uses case studies to help readers understand and apply ICH guidelines. Provides valuable insights into guidelines development, with chapters by authors involved in generating or with experience implementing the guidelines. Includes coverage of stability testing, analytical method validation, impurities, biotechnology drugs and products, and good manufacturing practice (GMP). Introduction, Historical Highlights, and the Need for Dissolution Testing. Theories of Dissolution Testing Devices. Automation in Dissolution Testing, by William A. Hanson and Alberto M. Paul. Factors That Influence Dissolution Testing Interpretation of Dissolution Rate Data Techniques and of In Vivo Dissolution, by Umesh V. Banakar, Chetan D. Lathia, and John H. Wood. Dissolution of Dosage Forms: Dissolution of Modified-Release Dosage Forms, Dissolution and Bioavailability: Dissolution Testing and the Assessment of Bioavailability/Bioequivalence, by Sontino J. Vetticaden. Dissolution Rediscovered, by John H. Wood. Appendix: USP/NF Dissolution Testing As the generic pharmaceutical industry continues to grow and thrive, so does the need to conduct adequate, efficient bioequivalence studies. In recent years, there have been significant changes to the statistical models for evaluating bioequivalence. In addition, advances in the analytical technology used to detect drug and metabolite levels have been authored by leading experts from academia, users and manufacturers, this book provides an authoritative account of the science and technology involved in multi-particle drug delivery systems which offer superior clinical and technical advantages over many other specialized approaches in drug delivery. The book will cover market trends, potential benefits and formulation challenges for various types of multi-particle systems. Drug solubility, dose, chemistry and therapeutic indications as well as excipient suitability coupled with manufacturing methods will be fully covered. Key approaches for taste masking, delayed release and extended release of multi-particle systems are of significant interest, especially their in-vivo and in-vitro performance. In addition, the principles of scale up, QbD, and regulatory aspects of common materials used in this technology will be explained, as well as recent advances in materials and equipment enabling robust, flexible and cost-effective manufacture. Case studies illustrating best practices will also make the book a valuable resource to pharmaceutical scientists in industry and academia. Basic Physical Pharmacy provides a thorough, yet accessible overview of the principles of physical pharmacy and their application in drug formulation and administration. This definitive guide to physical pharmacy covers all types of pharmaceuticals, from traditional forms and dosages to nanotechnology-based novel dosage design. Authored by two nationally recognized pharmaceutical scientists and active pharmacy faculty, Basic Physical Pharmacy is truly comprehensive. The book introduces topics such as Dosage Forms, Polymeric Systems in Solutions and Drug Delivery Systems. Students can build upon their chemistry education to learn the physical-chemical properties of drugs and their therapeutic effects on the body. With a highly approachable approach, Basic Physical Pharmacy will help students comprehend and apply the principles of physical pharmacy in clinical practice. Covers major drug products and delivery systems. Features current trends in pharmaceutical research and development, including nanotechnology-based dosage design. Includes many examples of useful equations and formulation methods. Contains over 200 illustrations, photos, and tables. Topics include: Solutions, Ionization of Drugs in Solutions, Buffers and Buffered Solutions, Drug Solubility Diffusion and Dissolution Distribution Phenomena, Protein Binding, Interfacial Phenomena, Rheology, Colloids, Suspensions and Emulsions, Semisolid Dosage Forms, Dermatological Powders, Capsules, Tablets, Aerosols, Sterile Dosage Forms, Ophthalmic Formulations, Radiopharmaceuticals, Modified Release Drug Delivery Systems. Product Stability. Each new print textbook includes an access code for the online Companion Website. Ebooks do not include access to the Companion Website. Access to the Companion Website may also be purchased separately under the RESOURCES tab. For Students. Student Companion Website includes: Cross Words, Flash Cards, Interactive Glossary, Matching Questions, Instructor Resources Answers to End of Chapter Questions, Image Bank, Power Point Presentations, Test Bank. Topics include: Solutions, Ionization of Drugs in Solutions, Buffers and Buffered Solutions, Drug Solubility Diffusion and Dissolution Distribution Phenomena, Protein Binding, Interfacial Phenomena, Rheology, Colloids, Suspensions and Emulsions, Semisolid Dosage Forms, Dermatological Powders, Capsules, Tablets, Aerosols, Sterile Dosage Forms, Ophthalmic Formulations, Radiopharmaceuticals, Modified Release Drug Delivery Systems. Biotechnology. Designed as the core textbook for the required physical pharmacy or pharmaceutics course within the pharmacy school curriculum. With a focus on examples from pharmacy practice, this book presents the chemical and physical chemical principles fundamental to the development of medication dosage forms. Numerous case studies present relevant examples of physical chemical principles in current pharmacy practice. This detailed volume addresses key issues and subtle nuances involved in developing hydrophilic matrix tablets as an approach to oral controlled release. It brings together information from more than five decades of research and development on hydrophilic matrix tablets and provides perspective on contemporary issues. Twelve comprehensive chapters explore a variety of topics including polymers (hypromellose, natural polysaccharides and polyethylene oxide) and their utilization in hydrophilic matrices, critical interactions impacting tablet performance, in vitro physical and imaging techniques, and micro-environmental pH control and mixed polymer approaches, among others. In one collective volume, Hydrophilic Matrix Tablets for Oral Controlled Release provides a single source of current knowledge, including sections of previously unpublished data. It is an important resource for industrial and academic scientists investigating and developing these oral controlled release formulations. First published in 1987, this book offers a full, comprehensive guide to the process of administering the correct dosage in medicine. Carefully compiled and filled with a vast repertoire of notes, diagrams, and references, this book serves as a useful reference for students of medicine, and other practitioners in their respective fields. Biocompatibility and Performance of Medical Devices. Second Edition, provides an understanding of the biocompatibility and performance tests for ensuring that biomaterials and medical devices are safe and will perform as expected in the biological environment. Sections cover key concepts and challenges faced in relation to biocompatibility in medical devices, discuss the evaluation and characterization of biocompatibility in medical devices, describe preclinical performance studies for bone, dental and soft tissue implants, and provide information on the regulation of medical devices in the European Union, Japan and China. The book concludes with a review of histopathology principles for biocompatibility and performance studies. Presents diverse insights from experts in government, industry and academia. Delivers a comprehensive overview of testing and interpreting medical device performance. Expanded to include new information, including sections on managing extractables, accelerating and simplifying medical device development through screening and alternative biocompatibility methods, and quality strategies which hasten device access to market. This adaptation of Bentley’s Textbook of Pharmaceutics follows the same goals as those of the previous edition, albeit in a new look. The content of the old edition has been updated and expanded and several new chapters, viz. Complexation, Stability Testing as per ICH Guidelines, Parenteral Formulations, New Drug Delivery Systems and Pilot Plant Manufacturing, have been included, with an intention to make the book more informative for the modern pharmacists. The book has six sections: Section I deals with the physicochemical principles. Two new chapters: Complexations and ICH Guidelines for Stability Testing, have been added to make it more informative. Section II conveys the information regarding pharmaceutical unit operations and processes. Section III describes the areas of pharmaceutical practice. Extensive recent updates have been included in many chapters of this section. Two new chapters: Parenteral Formulations and New Drug Delivery Systems, have been added. Section IV contains radiopharmaceutical principles and applications. Section V deals with microbiology and.
animal products. Section VI contains the formulation and packaging aspects of pharmaceuticals. Pilot Plant Manufacturing concepts are added as a new chapter, which may be beneficial to readers to understand the art of designing of a plant from the pilot plant model. The ultimate goal of drug product development is to design a system that maximizes the therapeutic potential of the drug substance and facilitates its access to patients. Pharmaceutical Dosage Forms: Tablets, Third Edition is a comprehensive resource of the design, formulation, manufacture, and evaluation of the tablet dosage form, and long acting veterinary formulations play a significant role in animal health, production and reproduction within the animal health industry. Such technologies offer beneficial advantages to the veterinarian, farmer and pet owner. These advantages have resulted in them growing in popularity in recent years. The pharmaceutical scientist is faced with many challenges when innovating new products in this demanding field of controlled release. This book provides the reader with a comprehensive guide on the theories, applications, and challenges associated with the design and development of long acting veterinary formulations. The authoritative chapters of the book are written by some of the leading experts in the field. The book covers a wide scope of areas including the market influences, preformulation, biopharmaceutics, in vitro drug release testing and specification setting to name but a few. It also provides a detailed overview of the major technological advances made in this area. As a result this book covers everything a formulation scientist in industry or academia, or a student needs to know about this unique drug delivery field to advance health, production and reproduction treatment options and benefits for animals worldwide.