

# Content

---

## CHAPTER - 1

### Sustained Release (SR) and Controlled Release (CR)

*Dr. DK Tripathi, Dr. Deependra Singh, and Dr. Manju Rawat Singh*

Introduction	1
Basic Concept	4
Biopharmaceutical Classification System of Drugs	7
Classification of Sustained Release Products	9
Factors Influencing	10
Approaches for SR/CR Formulation	29
Mechanism of Drug Release From SR/CR Formulation	29
<i>References</i>	47
<i>Multiple Choice Questions</i>	51
<i>MCQ Answers</i>	55

## CHAPTER - 2

### Polymers

*Dr. DK Tripathi, Dr. Amber Vyas, Dr. Bina Gidwani, Dr. Vishal Jain,  
Dr. Shiv Shankar Shukla, and Dr. Ravindra Pandey*

Introduction	56
Polymers	57
Identification	59
Definition	62
Classification	63
Properties	65
Applications	72
<i>References</i>	75
<i>Multiple Choice Questions</i>	77
<i>MCQ Answers</i>	80

## CHAPTER - 3

### Dosage Forms for Personalized Medicine

*Dr. Deependra Singh, Dr. Manju Rawat Singh, and Dr. D.K. Tripathi*

Introduction	81
Definition	81
Classification	84
Pharmacogenetics	85
Categories of Patients for Personalised Medicines	87
Customized Drug Delivery Systems	89
Bioelectronic Medicines	91
3D Printing of Pharmaceuticals	94
Tele Pharmacy	99
<i>References</i>	102
<i>Multiple Choice Questions</i>	108
<i>MCQ Answers</i>	112

## CHAPTER - 4

### Rate Controlled Drug Delivery Systems

*Dr. Bina Gidwani, Dr. Vishal Jain, Dr. Shiv Shankar Shukla, and Dr. Ravindra Pandey*

Principles	113
Fundamentals	114
Types <sup>6-9</sup>	115
Activation Modulated Drug Delivery Systems	120
Mechanically Activated Drug Delivery	122
pH Activated Drug Delivery System	126
Enzyme Activated Drug Delivery	132
Osmotic Pressure Activated Drug Delivery Systems	138
Feedback Regulated Drug Delivery Systems	140
<i>References</i>	141
<i>Multiple Choice Questions</i>	148
<i>MCQ Answers</i>	151

## CHAPTER - 5

### Gasto-Retentive Drug Delivery Systems

*Dr. Kapil Agrawal, Dr. Deependra Singh, Dr. Manju Rawat Singh, and Dr. Amber Vyas*

Principle	152
Factors Controlling Gastric Retention of Dosage Forms	154
Advantages	156
Disadvantages	156
Physiology of Stomach	157
Approaches to Extend GI Transit Time	158
<i>References</i>	164
<i>Multiple Choice Questions</i>	167
<i>MCQ Answers</i>	171

## CHAPTER - 6

### Buccal Drug Delivery Systems

*Dr. Kapil Agrawal, Dr. Bina Gidwani, Dr. Vishal Jain, Dr. Shiv Shankar Shukla, Dr. Ravindra Pandey, and Dr. Amber Vyas*

Introduction	172
Mucoadhesive Dosage Forms	176
Future Prospects and Challenges	182
Conclusion	183
<i>References</i>	183
<i>Multiple Choice Questions</i>	187
<i>MCQ Answers</i>	191

## CHAPTER - 7

### Ocular Drug Delivery Systems

*Priya Namdev, Sakshi Tiwari, Dr. Kapil Agrawal and Dr. Amber Vyas*

Introduction	192
Barriers of Drug Permeation	193
Methods to Overcome	197

<i>References</i>	205
<i>Multiple Choice Questions</i>	212
<i>MCQ Answers</i>	215

## **CHAPTER - 8**

### **Transdermal Drug Delivery Systems**

***Priya Namdev, Sakshi Tiwari, Dr. Sanjib Bahadur, Dr. Amber Vyas***

Introduction	216
History of TDDS	218
Structure and Physiology of Skin	219
Preparation of TDDS <sup>7</sup>	249
Evaluation Parameters of Transdermal Patches <sup>7,22,98</sup>	251
Conclusion	259
<i>References</i>	259
<i>Multiple Choice Questions</i>	266
<i>MCQ Answers</i>	269

## **CHAPTER - 9**

### **Protein and Peptide Delivery**

***Dr. Vishal Jain, Dr. Bina Gidwanim, Dr. Sanjib Bahadur and Dr. Kapil Agrawal***

Introduction	270
Barriers to Peptide and Protein Delivery <sup>31</sup>	279
Strategies for Protein Formulation <sup>27</sup>	280
Evaluation <sup>53</sup>	285
Depo-Foam Technology	287
Conclusion	289
<i>References</i>	289
<i>Multiple Choice Questions</i>	295
<i>MCQ Answers</i>	298

## CHAPTER - 10

### Vaccine Delivery Systems

*Dr. Sanjib Bahadur, Dr. Deependra Singh, Dr. Manju Rawat Singh, and  
Dr. DK Tripathi*

Introduction	299
Uptake of Antigens	304
1. Exogenous Antigen Processing	304
2. Endogenous Antigen Processing-	305
The Single-Shot Vaccine Concept	305
Mucosal Delivery of Vaccines	306
Transdermal Delivery of Vaccine	313
<i>References</i>	315
<i>Multiple Choice Questions</i>	321
<i>MCQ Answers</i>	324