CONTENTS

Prefac	e	III
Ch. 1.	PARTIAL FRACTIONS	1-14
1.1	Introduction	1
1.2	Basic Definitions	1
1.3	Partial Fractions	2
1.4	Methods of Resolution into Partial Fractions	2
1.5	Applications of Partial Fractions in Chemical Kinetic and Pharm	nacokinetics 9
Ch. 2	LOGARITHMS	15-32
2.1	Introduction	15
2.2	Properties of Logarithms	15
2.3	System of Logarithms	16
2.4	Standard Form of Decimal	16
2.5	Characteristic and Mantissa	17
2.6	Method to determine the Characteristic and Mantissa	19
2.7	Antilogarithm	22
2.8	Application of Logarithms in Pharmaceutical Problems	23
Ch. 3	FUNCTIONS	33-44
3.1	Introduction	33
3.2	Type of Functions	34
3.3	Some Special Mapping or Functions	37
Ch. 4.	LIMIT AND CONTINUITY	45-60
4.1	Introduction	45
4.2	Limit of the Function	46
4.3	Theorems related to Limits	46
4.4	Method of finding the Limit of a Function	46
4.5	Right and Left Hand Limit of a Function	49
4.6	Existence of the Limit of a Function	50
4.7	Concepts of Continuity	53
4.8	Continuity of a Function at a point	54
	DETERMINANTS	61-84
5.1	Introduction	61
5.2	Determinant of Order Two	61
	Determinant of Order Three	61
	Co-factors and Minors of an Element	63
5.5	Properties of Determinants	65

5.6	Applications of Determinants	77
5.7	Cramer's Rule	78
5.8	Product of Determinants	82
Ch. 6.	MATRICES	85-136
6.1	Introduction	85
6.2	Matrix	85
6.3	Types of Matrices	85
6.4	Operations on Matrices	88
6.5	Properties of Matrices Addition	88
6.6	Multiplication of a Matrix by a Scalar	89
6.7	Multiplication of Matrices	92
6.8	Properties of Matrix Multiplication	93
6.9	Transpose of a Matrix	98
6.10	Symmetric, Skew-Symmetric and Orthogonal Matrices	98
6.11	Elementary Operations (or Transformation) on Matrices	102
6.12	Equivalent Matrices and Elementary Matrix	102
6.13	Singular and Non-Singular Matrix	103
6.14	Inverse Matrix or Inverse of a Matrix	103
6.15	Inverse of a Matrix by Elementary Operations	103
6.16	Adjoint of a Matrix	106
6.17	Homogeneous Linear Equations	112
6.18	Nature of the Solution of the Equation $AX = O$	113
6.19	Non-Homogeneous Equations	117
6.20	Condition for Consistency	118
6.21	Eigenvalue and Eigenvectors of a Matrix	123
6.22	The Characteristic Equation of a Matrix	123
6.23	The Cayley-Hamilton Theorem	124
6.24	Applications of Matrices in solving Pharmacokinetics Equations	129
Ch. 7.	DIFFERENTIATIONS	137-178
7.1	Introduction	137
7.2	Method for Finding the Derivative using First Principles	137
7.3	Derivative of the Sum of Two Functions	141
7.4	Derivative of the Difference of Two Functions	141
7.5	Derivative of the Product of Two Functions	144
7.6	Derivative of the Quotient of Two Functions	144
7.7	Derivative of Functions of a Function (Chain Rule)	147
7.8	Differentiation of Implicit Functions	149
7.9	Logarithmic Differentiation	153
7.10	Differentiation of a Function w.r.t. another Function	161
7.11	Second and Higher Order Derivatives : Successive Differentiation	165
	Maxima and Minima	160

Ch. 8.	ANALYTICAL GEOMETRY	179-188
8.1	Introduction	179
8.2	Distance between Two Points	181
8.3	Collinear Points	184
8.4	Section Formula	185
8.5	Mid Point Formula	186
Ch. 9.	STRAIGHT LINES	189-212
9.1	Introduction	189
9.2	Slope or Gradient of a Line	189
9.3	Slope of a Line through Two Points	189
9.4	Equation of Lines in Standard Form	193
9.5	Transformation of General Equation in Different Standard Forms	203
9.6	Point of Intersection of Two Lines	205
9.7	Angle between Two Intersecting Lines	206
Ch. 10.	INTEGRATIONS	213-258
10.1	Introduction	213
10.2	Indefinite Integral	213
10.3	Method of Integration	216
10.4	Integration by Parts	223
10.5	Integration by Partial Fractions	226
10.6	More Problems based on Integration by Substitution	230
10.7	Definite Integral	239
10.8	Properties of Definite Integrals	240
10.9	Some More Solved Problems Related to Definite Integrals	247
10.10	Definite Integral as the Limit of the Sum	249
10.11	Summation of Series with the help of Definite Integral	251
10.12	Applications of Integrations	254
	DIFFERENTIAL EQUATIONS	259-306
11.1	Introduction	259
11.2	Differential Equation	259
11.3	Types of Differential Equations	259
11.4	Order of a Differential Equation	260
11.5	Solution of a Differential Equation	260
11.6	Formation of a Differential Equation	260
11.7	Method of forming a Differential Equation	261
11.8	General and Particular Solutions of a Differential Equation	261
11.9	Solution of Differential Equations: Variable Separable Method	263
11.10	Homogeneous Differential Equations	272
11.11	Equation Reducible to the Homogeneous Form	284
11.12	Linear Differential Equations	286

11.13	Equation Reducible to Linear Form (Bernoulli's Equation)	294
11.14	Exact Differential Equation	297
11.15	Applications of Differential Equations in Solving Pharmacokinetics P	roblems
		300
Ch. 12.	THE LAPLACE TRANSFORMS	307-342
12.1	Introduction	307
12.2	Linearity Property	307
12.3	Existence of Laplace Transform	308
12.4	Laplace Transform of Some Elementary Functions	308
12.5	Translation or Shifting Theorems	312
12.6	Laplace Transform of Derivatives	314
12.7	The Inverse Laplace Transforms	319
12.8	Some Inverse Laplace Transforms	320
12.9	Important Properties of Inverse Laplace Transform	320
12.10	Inverse Laplace Transforms of Derivatives	326
12.11	Division By p	326
12.12	Multiplication by Powers of p	327
12.13	Inverse Laplace Transforms of Integrals	327
12.14	Solution of Ordinary Differential Equation with Constant Coefficients	330
12.15	Solution of Ordinary Differential Equation with Variable Coefficients	335
12.16	Applications of Laplace Transforms in Chemical Kinetics and	
	Pharmacokinetics	336
	APPENDIX: SELECTED TABLES	343-348
	BIBLIOGRAPHY	349-350
	INDEX	351-352