

Contents

PART I

Foreword

Preface

1. Relations and Functions

- 1.1 Introduction
- 1.2 Types of Relations
- 1.3 Types of Functions
- 1.4 Composition of Functions and Invertible Function
- 1.5 Binary Operations

2. Inverse Trigonometric Functions

- 2.1 Introduction
- 2.2 Basic Concepts
- 2.3 Properties of Inverse Trigonometric Functions

3. Matrices

- 3.1 Introduction
- 3.2 Matrix
- 3.3 Types of Matrices
- 3.4 Operations on Matrices
- 3.5 Transpose of a Matrix
- 3.6 Symmetric and Skew Symmetric Matrices
- 3.7 Elementary Operation (Transformation) of a Matrix
- 3.8 Invertible Matrices

4. Determinants

- 4.1 Introduction
- 4.2 Determinant
- 4.3 Properties of Determinants
- 4.4 Area of a Triangle
- 4.5 Minors and Cofactors
- 4.6 Adjoint and Inverse of a Matrix
- 4.7 Applications of Determinants and Matrices

5. Continuity and Differentiability

- 5.1 Introduction
- 5.2 Continuity
- 5.3 Differentiability
- 5.4 Exponential and Logarithmic Functions
- 5.5 Logarithmic Differentiation
- 5.6 Derivatives of Functions in Parametric Forms
- 5.7 Second Order Derivative
- 5.8 Mean Value Theorem

6. Application of Derivatives

- 6.1 Introduction
- 6.2 Rate of Change of Quantities
- 6.3 Increasing and Decreasing Functions
- 6.4 Tangents and Normals
- 6.5 Approximations
- 6.6 Maxima and Minima

Appendix 1: Proofs in Mathematics

- A.1.1 Introduction
- A.1.2 What is a Proof?

Appendix 2: Mathematical Modelling

- A.2.1 Introduction
- A.2.2 Why Mathematical Modelling?
- A.2.3 Principles of Mathematical Modelling

Answers

Contents

PART II

Foreword

Preface

7. Integrals

- 7.1 Introduction
- 7.2 Integration as an Inverse Process of Differentiation
- 7.3 Methods of Integration
- 7.4 Integrals of some Particular Functions
- 7.5 Integration by Partial Fractions
- 7.6 Integration by Parts
- 7.7 Definite Integral
- 7.8 Fundamental Theorem of Calculus
- 7.9 Evaluation of Definite Integrals by Substitution
- 7.10 Some Properties of Definite Integrals

8. Application of Integrals

- 8.1 Introduction
- 8.2 Area under Simple Curves
- 8.3 Area between Two Curves

9. Differential Equations

- 9.1 Introduction
- 9.2 Basic Concepts
- 9.3 General and Particular Solutions of a Differential Equation
- 9.4 Formation of a Differential Equation whose General Solution is given
- 9.5 Methods of Solving First order, First Degree Differential Equations

10. Vector Algebra

- 10.1 Introduction
- 10.2 Some Basic Concepts
- 10.3 Types of Vectors
- 10.4 Addition of Vectors

- 10.5 Multiplication of a Vector by a Scalar
- 10.6 Product of Two Vectors

~~11.~~ **Three Dimensional Geometry**

- 11.1 Introduction
- 11.2 Direction Cosines and Direction Ratios of a Line
- 11.3 Equation of a Line in Space
- 11.4 Angle between Two Lines
- 11.5 Shortest Distance between Two Lines
- 11.6 Plane
- 11.7 Coplanarity of Two Lines
- 11.8 Angle between Two Planes
- 11.9 Distance of a Point from a Plane
- 11.10 Angle between a Line and a Plane

~~12.~~ **Linear Programming**

- 12.1 Introduction
- 12.2 Linear Programming Problem and its Mathematical Formulation
- 12.3 Different Types of Linear Programming Problems

~~13.~~ **Probability**

- 13.1 Introduction
- 13.2 Conditional Probability
- 13.3 Multiplication Theorem on Probability
- 13.4 Independent Events
- 13.5 Bayes' Theorem
- 13.6 Random Variables and its Probability Distributions
- 13.7 Bernoulli Trials and Binomial Distribution

Answers