1. **LIMIT AND CONTINUITY**

1.1 Concept of Limit 1.1
1.2 Theorems on Limit 1.2
1.3 Methods of Finding Limit 1.3
1.4 Some Standard Limits 1.8
1.5 Continuity of A function 1.13
1.6 Analytical Method 1.14

2. **DIFFERENTIATION**

2.1 Meaning of Derivative 2.1
2.2 Geometrical Interpretation of Derivative 2.2
2.3 Derivatives from first Principle 2.3
2.4 Standard forms 2.7
2.5 Rule of Addition and Subtraction 2.9
2.6 Product Rule 2.11
2.7 Division Rule 2.12
2.8 Derivative of the Function of A Function (Chain Rule) 2.18
2.9 Implicit Differentiation 2.24
2.10 Derivative of Parametric function 2.27
2.11 Logarithmic Differentiation 2.29
2.12 Derivative of One Function w.r.t. Another Function 2.35
2.13 Derivative of Higher Order / Successive differentiation 2.36

3. **MAXIMA AND MINIMA**

3.1 Increasing function and decreasing function 3.1
3.2 Relative Maxima and Minima 3.1
3.3 Point of Inflexion 3.3
3.4 Methods of Finding Maxima and Minima 3.3
3.5 Application of Maxima and Minima 3.8

4. **PARTIAL DERIVATIVE**

4.1 Introduction 4.1
4.2 Meaning of Partial Derivative 4.1
4.3 Partial Derivative of Higher Order 4.4
4.4 Homogeneous function and Euler's theorem 4.5

4.5 Total Differentials 4.14
4.6 Derivative of implicit function 4.15
4.7 Maxima and Minima with application 4.15
4.8 Elasticity of Demand 4.20
4.9 Production Function 4.22
4.10 Nature of Products 4.24

5. INTEGRATION

5.1 Meaning, theorem and Standard Formulae 5.1
5.2 Integration by Substitution 5.13
5.3 Integration by Parts 5.20
5.4 Integral in the form of $\int e^x[f(x)+f'(x)]dx$ 5.30
5.5 Some standard Integrals 5.31
5.6 Integration of quadratic form 5.34
5.7 Integration by Partial Fractions 5.37
5.8 Definite Integrals 5.47
5.9 Area under a Curve 5.48
5.10 Managerial Application of Integration 5.50
5.11 Consumer Surplus 5.56
5.12 Producer's Surplus 5.60
5.13 Capital formation 5.65

6. LEARNING CURVE

6.1 Meaning and causes of learning curve 6.1
6.2 Learning Curve Ratio 6.1
6.3 Learning Curve Model 6.4
6.4 Graphical presentation of LC 6.6
6.5 Applications (uses) of Learning Curve 6.6
6.6 Limitations of Learning Curve 6.7

7. MATRIX

7.1 Meaning 7.1
7.2 Types of Matrices 7.1
7.3 Algebra of Matrices 7.4
7.4 Transpose of a Matrix 7.18
7.5 Determinant of a Square Matrix 7.19
7.6 Adjoint of a Square Matrix 7.19

7.7 Inverse of a Matrix 7.20
7.8 System of Linear Equation 7.24
7.9 Rank of a Matrix 7.29
7.10 Input-Output Analysis (Leontief's Model) 7.35
7.11 Types of Model 7.36
7.12 Procedure of Solving an Open Model 7.36
7.13 Solution of Closed Model 7.40
7.14 Advantages of Input-output Analysis 7.42
7.15 Limitations of input-output analysis 7.42

8. **DETERMINANT**

8.1 Meaning
8.2 Determinant of order three
8.3 Higher Order Determinant
8.4 Minors and Cofactors
8.5 Adjugate (Adjoint) of a Determinant
8.6 Alternative Methods (For determining the value of determinant)
8.7 Properties of Determinant
8.8 Multiplication of Determinants (row by row) 8.33
8.9 Solution of Linear Equation (Cramer's Rule) 8.35

9. **COMPOUND INTEREST**

9.1 Introduction
9.2 Simple Interest
9.3 Compound Interest
9.4 Formulae for amount, CI and Principal and Effective rate
9.5 Worked Out Illustrations

10. **ANNUITY**

10.1 Introduction 10.1
10.2 Terms used 10.1
10.3 Types of Annuities 10.2
10.4 Symbols used 10.2
10.5 Formulae used 10.2
10.6 Application of Annuity 10.4
10.7 Worked out Illustration 10.6

11. ARITHMETIC AND GEOMETRIC PROGRESSION

11.1 Meaning 11.1
11.2 Finding $n^{th}$ Term 11.1
11.3 Sum of Finite Number of Terms of an AP 11.5
11.4 Arithmetic Mean 11.10
11.5 Inserting $n$ AMs Between two Numbers and Finding Their Sum 11.10
11.6 Application of AP 11.13
11.7 Geometric Progression 11.20
11.8 Finding $n^{th}$ Term of a GP 11.20
11.9 Finding the Sum of $n^{th}$ term of a finite series 11.20
11.10 Finding the Sum of an infinite GP Series where $r < 1$. 11.20
11.11 Geometric Mean 11.27
11.12 Applications of GP 11.32

12. PERMUTATION AND COMBINATION

12.1 Meaning 12.1
12.2 Principle of counting 12.1
12.3 Permutation of '$r$' things chosen out of '$n$' dissimilar things 12.2
12.4 Permutation when some of the objects are alike 12.6
12.5 Permutation with Repetition 12.7
12.6 Circular Permutation 12.8
12.7 Restricted Permutations 12.8
12.8 Combination 12.15
12.9 Combination of things all different 12.15
12.10 Restricted Combination 12.19
12.11 Multiplication Rule 12.20
12.12 Total number of combinations taking one or more at a time from $n$ different things 12.21
12.13 Division into Groups 12.21
12.14 Combination for $p$ like things are of one kind, $q$ like things are of second kind and $r$ like things are of a third kind 12.22

13. QUANTITATIVE TECHNIQUES - A THEORETICAL REVIEW

13.1 Introduction 13.1
13.2 Types of Quantitative Technique 13.1
13.3 Aspects/PhasEs/Methodology of QT 13.7
13.4 Scope of Quantitative Technique 13.8

| Chapter | Subject |
|---|---|

13.5 Functions of Quantitative techniques 13.10
13.6 Uses of Quantitative techniques 10.12
13.7 Advantages of Quantitative Technique 13.13
13.8 Disadvantages of Quantitative Technique 13.14

**14. LINEAR PROGRAMMING**

14.1 Introduction 14.1
14.2 Requirements of LP 14.1
14.3 Advantages of LP 14.2
14.4 Disadvantages of LP 14.4
14.5 Applications of LP 14.4
14.6 Formulation of LP Model 14.5
14.7 Solution of LP Problem 14.20
14.8 Method of Solution 14.20
14.9 Procedure Under Graphic Method 14.20
14.10 Some Exceptional Cases 14.35
14.11 LPP : Simplex Method 14.40
14.12 Computational Procedure for Maximization 14.40
14.13 Computational Procedure for Minimization
14.14 Problem with constraints having = sign
14.15 Maximization with Mixed Constraint
14.16 Minimization with Mixed Constraint
14.17 Typical Cases 14.58
14.18 Illustration on Degeneracy 14.58
14.19 Duality in Linear Programming 14.65
14.20 Advantages of Duality 14.65
14.21 Linear programming Vrs. Duality 14.66
14.22 Conversion of LLP into Duality 14.66
14.23 Solution Under Duality 14.70
14.24 Solution by LP method and deriving the result under duality 14.73

**15. TRANSPORTATION PROBLEM**

15.1 Introduction 15.1
15.2 Transportation Model 15.1
15.3 Applications 15.2
15.4 Types of Solutions 15.2

15.5 Methods of Basic Feasible Solution 15.3
15.6 Different types of Transportation Problem 15.10
15.7 Optimality Test 15.26
15.8 Method of Optimal Solution 15.27

**16. ASSIGNMENT PROBLEM**

16.1 Introduction 16.1
16.2 The Assignment Model 16.1
16.3 Theorems on Assignment 16.2
16.4 The Genesis 16.2
16.5 The Hungarian Method of Solution 16.3
16.6 Types of Assignment Problems 16.7
16.7 Some Typical Problems 16.16

**17. NETWORK ANALYSIS (CPM, PERT)**

17.1 Introduction 17.1
17.2 Network Technique 17.1
17.3 Numbering of Events 17.4
17.4 Time Estimates in Network Analysis 17.7
17.5 Scheduling Computation 17.7
17.6 Critical Path Determination 17.10
17.7 Float 17.11
17.8 Time-Cost Trade-Off : Crashing 17.16
17.9 Resource Scheduling 17.22
17.10 Advantages of CPM 17.23
17.11 Disadvantages of CPM 17.24
17.12 Programme Evaluation and Review Technique (Pert) 17.24
17.13 Probability of achieving Completion time 17.26
17.14 Application of Pert 17.29
17.15 Advantages of PERT 17.29
17.16 Disadvantages of PERT 17.30
17.17 Distinction between CPM and PERT 17.30

**Table** 1.1 - 1.16