

Applied Mathematics

Grade XI

One Paper
Three Hours
Total Period–210 (35 Minutes Each)
Max Marks: 80

No.	Units	No. of Periods	Marks
I.	Numbers, Quantification and Numerical Applications	15	09
II.	Algebra	29	10
III.	Mathematical Reasoning	15	06
IV.	Calculus	25	10
V.	Probability	30	10
VI.	Descriptive Statistics	29	12
VII	Basics of Financial Mathematics	55	18
VIII	Coordinate Geometry	12	05
	Total	210	80
	Internal Assessment		20

Unit I Numbers, Quantification and Numerical Applications

- Binary Numbers
- Indices, Logarithm and Antilogarithm
- Laws and properties of logarithms
- Simple applications of logarithm and antilogarithm
- Numerical problems on averages, calendar, clock, time, work and distance, mensuration, seating arrangement

Unit II Algebra

- Sets
- Types of sets
- Venn diagram
- De Morgan's laws
- Problem solving using Venn diagram
- Relations and types of relations
- Introduction of Sequences, Series
- Arithmetic and Geometric progression
- Relationship between AM and GM
- Basic concepts of Permutations and Combinations
- Permutations

- Combinations with standard results

Unit III Mathematical and Logical Reasoning

- Mathematically acceptable statements
- Connecting words/ phrases in Mathematical statement consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics
- Problems based on logical reasoning (coding-decoding, odd man out, blood relation, syllogism etc)

Unit IV Calculus

- Introducing functions
- Domain and Range of a function
- Types of functions (Polynomial function; Rational function; Logarithm function; Exponential function; Modulus function; Greatest Integer function, Signum function)
- Graphical representation of functions
- Concept of limits and continuity of a function
- Instantaneous rates of change
- Differentiation as a process of finding derivative
- Derivatives of algebraic functions using Chain rule

Unit V Probability

- Random experiment, sample space, events, mutually exclusive events
- Independent and Dependent Events
- Law of Total Probability
- Bayes' Theorem

Unit VI Descriptive Statistics

- Data on various scales (nominal, ordinal, interval and ratio scale)
- Data representation and visualization
- Data interpretation (dispersion, deviation, variance, skewness and kurtosis)
- Percentile rank and quartile rank
- Correlation (Pearson and Spearman method of correlation)
- Applications of descriptive statistics using real time data

Unit VII Basics of Financial Mathematics

- Interest and interest rate
- Accumulation with simple and compound interest
- Simple and compound interest rates with equivalency
- Effective rate of interest
- Present value, net present value and future value
- Annuities, calculating value of regular annuity
- Simple applications of regular annuities (up to 3 period)
- Tax, calculation of tax and simple applications of tax calculation in Goods and service tax, Income Tax
- Bills, tariff rates, fixed charge, surcharge, service charge

- Calculation and interpretation of electricity bill, water supply bill and other supply bills

(Comparing interest rates on various types of savings; calculating income tax; electricity bills, water bill; service surcharge using realistic data)

Unit VIII Coordinate Geometry

- Straight Line
- Circles

Practical: Use of spread sheet

Calculating average, interest (simple and compound), creating pictographs, drawing pie chart, bar graphs, calculating central tendency; visualizing graphs (straight line, circles and parabola using real time data)

Suggested practical using spread sheet

1. Plot the graph of functions on excel; study the nature of function at various points, drawing lines of tangents;
2. Create budget of income and spending;
3. Create compare sheet of price, features to buy a product;
4. Prepare best option plan to buy a product by comparing cost, shipping charges, tax and other hidden cost;
5. Smart purchasing during sale season;
6. Prepare a report card using scores of last four exams and compare the performance;
7. Collect the data on weather, price, inflation, and pollution. Sketch different types of graphs.