

नेपाल सरकार  
शिक्षक सेवा आयोग  
निम्नमाध्यमिक शिक्षकको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम, २०७५

Section B: Math

60 Marks

**1: Basics of Numbers, its extension and Logics**

- 1.1 Numbers and Numerals, Different Numeration Systems.
- 1.2. Set and set operations(including theorems' proofs)
- 1.3. Mathematical Logics ( $\vee$ ,  $\wedge$ ,  $\neg$ , truth table, basic laws) and writing mathematical language
- 1.4 Counting System: Combination and Permutation
- 1.5 Real Number System and Algebra of complex numbers
- 1.6 Sequence and Series
- 1.7 Sum of finite natural numbers ( $n$ ,  $n^2$ ,  $n^3$ )
- 1.8 Principle of mathematical induction and its applications

**2: Basic Algebra and Its extension**

- 2.1. Transition from arithmetic to algebra
- 2.2. Relations, Equivalence relations, Binary Operation and Group Structure
- 2.3 Function, Graphs and Curve Tracing
- 2.4 Polynomials and Rational Function (Relation between roots and coefficients)
- 2.5 Exponential and Logarithmic Function
- 2.6 Matrix (its inverse) and Determinants (its Properties)
- 2.7 System of Linear (Cramer's rule) and Quadratic Equations
- 2.8 System of inequalities and LPP solutions
- 2.9 Binomial expansions

**3: Fundamental Trigonometry and Extension**

- 3.1 Trigonometric function and Unit Circle
- 3.2 Radian and Degree Measure(circular measure)
- 3.3 Solution of trigonometric equations
- 3.4 Inverse Trigonometric function
- 3.5 Properties of Triangles
- 3.6 Sum, difference, multiple angles and product-sum formulae of trigonometric ratios
- 3.7 DeMoivre's theorem,  $n$ th roots and Euler's formula

**4: Euclidean and Analytic Geometry**

- 4.1 Fundamentals of Euclidean Geometry: History and development, fundamental properties of Euclidean geometry and axiomatic system
- 4.2 Selected theorems on parallel lines, triangles, quadrilaterals and circles.
- 4.3 Construction of triangle and quadrilateral
- 4.4 Area and volume of plane and solid figure
- 4.5 Analytic Geometry: History and development
- 4.6. Distance formula, Equation of st. lines, Pairs of straight lines (Perpendicular and bisectors)
- 4.7 Definitions and graphical representation of conic sections

- 4.8 Circles and related theorems and problems
- 4.9 General concept of Parabola, Ellipse and Hyperbola related

### 5: Descriptive Statistics and Probability

- 5.1 Data generation(discrete and continuous data) and display of data.  
(Frequency Distribution and Graphical Representation)
- 5.2 Cumulative frequency distribution (discrete and continuous data)
- 5.3 Measure of Central tendency (AM, GM, HM)
- 5.4 Measure of Dispersion (Range, MD, SD, Skewness, Kurtosis)
- 5.5 Measure of correlation (Pearson, Spearman) and Regression Line
- 5.6 Simple probability, exclusive and independent events, tree diagram
- 5.6 Compound probabilities
- 5.7 Binomial probability distribution and its properties

### 6: Differential and Integral Calculus

- 6.1 Limit and continuity of functions and related problems
- 6.2 Derivatives of functions and related problems
- 6.3 Relation between derivatives and integration
- 6.4 Integration of given function and related problems
- 6.5 Application of derivatives and integration

### 7: Vector and Its Application

- 7.1 Definition and representation of Vectors and different types of vectors
- 7.2 Operation on vectors: addition, subtraction, and vector product( Scalar and Vector Product) with geometrical representations
- 7.3 Vector Geometry ( Line, triangles, quadrilaterals)
- 7.4 Application of vectors (in Geometry, Trigonometry)

#### Subjective Question Plan (Specification Grid)

Unit	Scope of Curriculum	Contentwise question weight	Full Marks
1.	Basics of Numbers, its extension and Logics	1*10	10
2.	Basic Algebra and Its extension	1*10	10
3.	Fundamental Trigonometry and Extension	1*10	10
4.	Euclidiean and Analytic Geometry	1*10	10
5.	Descriptive Statistics and Probability	1*10	10
6.	Differential and Integral Calculus	1*10	10
7.	Vector and Its Application		
	Total	6*10	60