नेपाल सरकार

शिक्षक सेवा आयोग

निम्न माध्यमिक तह शिक्षकको खुला प्रतियोगितात्मक विषयगत परीक्षाको पाठ्यक्रम-२०७६ विषयः गणित पूर्णाङ्कः १०० समयः १००

Section A

Unit One: Mathematics Instructional Pedagogy

- 1.1. Analytical study of basic level (grade 6-8) mathematics curriculum
- 1.2. Use of learning theories in mathematics teaching (Piaget's theory, Bruner's theory, Robert Gagne's theory)
- 1.3. Instructional materials and teaching methods for teaching basic level (grade 6-8) mathematics
- 1.4. Instructional planning and classroom management
- 1.5. Student assessment

Unit Two: Teaching Arithmetic and Mensuration

- 2.1. Real numbers, fraction, decimal and percentage
- 2.2. Ratio and proportion
- 2.3. Profit and loss, unitary method and simple interest
- 2.4. Perimeter and area of plane figures (triangles, quadrilaterals and circles)
- 2.5. Introduction of face, edge and vertex of solid objects, volume of cube and cuboids, cylinder and cone

Unit Three: Teaching Algebra

- 3.1. Introduction and classification of algebraic expression and polynomials, addition, subtraction, multiplication and division of algebraic expression
- 3.2. Factorization, highest common factor, lowest common multiples and indices
- 3.3. Simplification of rational algebraic expressions
- 3.4. Solution of equations in one variable, solution of inequalities in one variable and solutions of simultaneous equations in two variables by graphical method
- 3.5 Introduction to quadratic equations and solution of quadratic equations by factorization method

Unit Four: Teaching Geometry

- 4.1. Lines and angles (intersecting lines, parallel lines, perpendicular lines, construction of parallel and perpendicular lines, classification and construction of angles, different pairs of angles with experimental verification of their relationship)
- 4.2. Triangles, quadrilaterals and polygons (classification and properties), construction of triangles, quadrilaterals (rectangle, square, parallelogram, rhombus, trapezoid)
- 4.3. Congruency and similarity of triangles
- 4.4. Coordinates in graph, Pythagoras theorem and distance between two points
- 4.5. Transformation (reflection, translation and rotation), symmetry and tessellation

Unit Five: Teaching Set and Statistics

- 5.1. Introduction of sets, types of sets and subsets
- 5.2. Set operations
- 5.3. Words problems using venn diagram
- 5.4. Frequency distribution and graphical representation (bar graphs, line graphs and pi chart) of data
- 5.5. Mean, median, mode and range.

Section B

Unit Six: Number system, Logics and Linear Programming

- 6.1. Characteristics of different numeration systems and bases other than ten (binary, quinary, octal and hexadecimal), real and complex number system.
- 6.2. Symbolic logic (v, Λ , -, truth table, basic laws)
- 6.3. Counting system: Permutation and combination, sequence, series and principle of mathematical induction.
- 6.4. Linear programming: introduction, solution of linear programming problem (graphical method and simplex method)

Unit Seven: Algebra and Binomial Expansions

- 7.1. Relations and functions, binary operation and group structure.
- 7.2. Matrix and its inverse, determinants and its properties.
- 7.3.System of linear equations and their solutions (matrix method, row equivalent method, Cramer's rule).
- 7.4. Quadratic equation (relation between roots and coefficients)
- 7.5. Binomial expansions

Unit Eight: Analytic Geometry

- 8.1. Distance between two points and section formula
- 8.2. Equation of straight lines and angle between two lines
- 8.3. Distance between a point and a line
- 8.4. Pairs of lines and angle between pairs of line
- 8.5. Conic sections (classification, general/standard equation and their parts)

Unit Nine: Euclidean and Transformation Geometry

- 9.1. Fundamentals of Euclidean geometry: History and development, fundamental properties of Euclidean geometry and axiomatic system
- 9.2. Euclid's fifth postulates and its substitute
- 9.3. Theorems on parallel lines, triangles, quadrilaterals and circles
- 9.4. Area and volume of plane and solid figure
- 9.5. Transformation Geometry: Isometric transformations (reflection, translation and rotation) and non-isometric transformations (enlargement and reduction)

Unit Ten: Statistics and Probability

- 10.1. Measures of central tendency: Arithmetic mean, weighted mean, combined mean, median and mode
- 10.2. Measures of dispersion: Range, inter-quartile range, mean deviation, standard deviation and coefficient of variation.
- 10.3. Measures of correlation and regression line.
- 10.4. Probability: Concept and laws of probability.
- 10.5.Random variable and probability distributions (binomial distribution and poisson distribution)

Level: Lower Secondary

Specification Grid

Subject: Mathematics

Unit	Contents	Questions	Marks
Section A			
One	Mathematics Instructional Pedagogy	1	10
Two	Teaching Arithmetic and Mensuration	1	10
Three	Teaching Algebra	1	10
Four	Teaching Geometry	1	10
Five	Teaching Set and Statistics	1	10
Section B			
Six	Number system, Logics and Linear Programming	1	10
Seven	Algebra and Binomial Expansions	1	10
Eight	Analytic Geometry	1	10
Nine	Euclidean and Transformation Geometry	1	10
Ten	Statistics and Probability	1	10
	Total	10	100

Notes:

- 1. This curriculum is divided into sections A & Section B.
- 2. Generally from section A, questions will be asked related to pedagogy.
- 3. From section B questions will be asked covering cognitive level.
- 4. Separate answer sheets will be used for each section.
- 5. This curriculum will be effective from 2077/02 / 29