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 ($\lor$, $\land$, -, 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)

Specification Grid

Subject: Mathematics   **Level: Lower Secondary**

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