Class : 10
Subject : Mathematics

As the regular teaching – learning in schools, during the session 2020-21, has widely been affected due to the Covid – 19 pandemic, the subject experts committee, after due consideration, has recommended to reduce the syllabus by 30% in the following manner :

Almost 30% reduced syllabus :-

UNIT II: ALGEBRA

1. Polynomials
Zeros of a polynomial. Relationship between zeros and coefficients of quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients.

4. Arithmetic Progressions
Motivation for studying Arithmetic Progression Derivation of the nth term and sum of the first n terms of an A.P. and their application in solving daily life problems.

UNIT IV: GEOMETRY

2. Circles
Tangent to a circle at, point of contact.

1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.

2. (Prove) The lengths of tangents drawn from an external point to a circle are equal.

UNIT V: TRIGONOMETRY

2. Trigonometric Identities
 Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$. Only simple identities to be given.

UNIT VII: STATISTICS AND PROBABILITY

2. Probability :
Classical definition of probability. Simple problems on finding the probability of an event.

Class : 10
Subject : Mathematics
Only Paper

Time : 3 hours   **Marks : 70**

Unit	Name of Unit	Marks
I	Number System	05
II	Algebra	18
III	Co-ordinate Geometry	05
IV	Geometry	12
V	Trigonometry	10
VI	Mensuration	10
VII	Statistics and Probability	10
	Total	70
	Project Work	30
	(Written 70marks + project work 30marks)	100

Approximately 70% Syllabus :

UNIT I: NUMBER SYSTEMS   05 Marks

1. Real Numbers
Periods Euclid's division lemma, Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples. Proofs of irrationality of $\sqrt{2}, \sqrt{3}, \sqrt{5}$, decimal representation of rational numbers in terms of terminating/non-terminating recurring decimals.

UNIT II: ALGEBRA   18 Marks

2. Pair of Linear Equations in Two Variables
Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency. Solution of a pair of linear equations in two variables

algebraically - by substitution, by elimination and by cross multiplication method. Simple problems on equations reducible to linear equations.

3. Quadratic Equations

Standard form of a quadratic equation $ax^2 + bx + c = 0$, $(a \neq 0)$. Solutions of quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula. Relationship between discriminant and nature of roots. Situation problems based on quadratic equations related to day to day activities to be incorporated.

UNIT III: COORDINATE GEOMETRY   05 Marks

1. Lines (In two-dimensions)

Review: Concepts of coordinate geometry, graphs of linear equations, Distance formula, Section formula (internal division), Area of a triangle.

UNIT IV: GEOMETRY   12 Marks

1. Triangles

Definitions, examples, counter examples of similar triangles.

1. (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.

3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.

4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.

5. (Motivate) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.

6. (Motivate) If a perpendicular is drawn from the vertex of the right angle to the hypotenuse, the triangles on each side of the perpendicular are similar to the whole triangle and to each other.

7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

9. (Prove) In a triangle, if the square on one side is equal to sum of the squares on the other two sides, the angles opposite to the first side is a right angle.

3. Constructions
1. Division of a line segment in a given ratio (internally).
2. Tangents to a circle from a point outside it.
3. Construction of a triangle similar to a given triangle.

UNIT V: TRIGONOMETRY   10 Marks

1. **Introduction to Trigonometry** Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined); motivate the ratios whichever are defined at 0° and 90°. Values of the trigonometric ratios of (30^0, 45^0, 60^0 ,0° and 90°). Relationships between the ratios.

2. **Trigonometric Identities**
   Trigonometric ratios of complementary angles.

3. **Heights and Distances: Angle of elevation, Angle of Depression**
   Simple problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only 30°, 45°, 60°.

UNIT VI: MENSURATION   10 Marks

1. Areas Related to Circles
Periods Motivate the area of a circle; area of sectors and segments of a circle. Problems based on areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of $60°$, $90°$ and 120^0 only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.

2. Surface Areas and Volumes

1. Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones. Frustum of a cone.

2. Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken).

UNIT VII: STATISTICS AND PROBABILITY   10 Marks

1. Statistics

Mean, median and mode of grouped data (bimodal situation to be avoided). Cumulative frequency graph.

PROJECT WORK   30 Marks

  a- **Internal Assessment**   15 Marks
    (Questions should also be asked from the book "Bharat ka Paramparagat Ganit Gyan" – Class 10th)

  b- **Project Work**   15 Marks

Note : Student should prepare any two projects from the following (serial no- 1 to 11), teachers can also give other projects related to the subject from their level and one project from point 12 should be compulsorily prepared by the students.

1- Verification of Pythagoras Theorem by constructing triangles and the squares on a cardboard or chart paper.
2- Use of statistics in demography.
3- To study the role of the different geometrical shapes in architecture and construction.

4- Knowledge of sign of trigonometrical ratio through charts / expressing through diagram in the corresponding ratio of triangles the trigonometric ratio of angles, complementary angles etc.

5- Any one of North Medival Mathematician's (Ramanujan, Narayan Pandit etc.) life and their contributions in Mathematics.

6- Make 2 different cylinders by taking two papers of 24 × 42 cm size and turning them by its length and width direction and calculate whose curved surface and volume will be greater or maximum.

7- To study of different direct and indirect taxes imposed by the Government.

8- Functional analysis of the statement that "Angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle".

9- Making of Sextent (for measuring distance) and its use.

10- Utility of Mathematical Principles in Drawing.

11- Give the detail of different steps for granting the loan from Bank to buy a car or house.

12- Any one project from the following three parts of the recommended book "Bharat ka Paramparagat Ganit Gyan" – Class 10[th.]

   Part a. Bright tradition of Mathematics in India.

   Part b. Traditional methods of calculation.

   Part c. Renowned Mathematicians of India.