SUBJECT: MATHEMATICS

ALGEBRA

a) **Functions**: Types of functions – Definitions - Inverse functions and Theorems - Domain, Range, Inverse of real valued functions.

b) **Mathematical Induction**: Principle of Mathematical Induction & Theorems - Applications of Mathematical Induction - Problems on divisibility.

c) **Matrices**: Types of matrices - Scalar multiple of a matrix and multiplication of matrices - Transpose of a matrix - Determinants - Adjoint and Inverse of a matrix - Consistency and inconsistency of Equations- Rank of a matrix - Solution of simultaneous linear equations.

d) **Complex Numbers**: Complex number as an ordered pair of real numbers- fundamental operations - Representation of complex numbers in the form a+ib - Modulus and amplitude of complex numbers –Illustrations - Geometrical and Polar Representation of complex numbers in Argand plane-Argand diagram.

e) **DeMoivre's Theorem**: De Moivre's theorem- Integral and Rational indices - n^{th} roots of unity- Geometrical Interpretations –Illustrations.

f) **Quadratic Expressions**: Quadratic expressions, equations in one variable - Sign of quadratic expressions – Change in signs – Maximum and minimum values – Quadratic inequations.

g) **Theory of Equations**: The relation between the roots and coefficients in an equation - Solving the equations when two or more roots of it are connected by certain relation - Equation with real coefficients, occurrence of complex roots in conjugate pairs and its consequences-Transformation of equations- Reciprocal Equations.

h) **Permutations and Combinations**: Fundamental Principle of counting – linear and circular permutations- Permutations of 'n' dissimilar things taken 'r' at a time - Permutations when repetitions allowed - Circular permutations - Permutations with constraint repetitions - Combinations-definitions, certain theorems and their applications.

i) **BinomialTheorem**:Binomial theorem for positive integral index-Binomial theorem for rational Index(without proof) - Approximations using Binomial theorem.

j) **Partial fractions**: Partial fractions of f(x)/g(x) when g(x) contains non –repeated linear factors - Partial fractions of f(x)/g(x) where both f(x) and g(x) are polynomials and when g(x) contains repeated and/or non-repeated linear factors - Partial fractions of f(x)/g(x) when g(x) contains irreducible factors.

DELETIONS FROM ALGEBRA:

a) **Complex Numbers**: 1.2.8-> Square root of a Complex Number and related problems in solved and exercise-1(b)

b) **Quadratic Expressions**: 3.3-> Quadratic inequations including exercise-3(c)

c) **Theory of Equations**: 4.4-> Transformation of Equations including exercise-4(d)

d) **Permutations and Combinations**: Derivation of formula npr and ncr. Theorems:5.2.1 and 5.6.1

e) **Binomial Theorem**: *Entire Chapter Deleted.*

f) **Partial fractions**: 7.3.8 and including exercise 7(d)

TRIGONOMETRY

a) **Trigonometric Ratios upto Transformations**: Graphs and Periodicity of Trigonometric functions - Trigonometric ratios and Compound angles - Trigonometric ratios of multiple and sub- multiple angles - Transformations - Sum and Product rules.

b) **Trigonometric Equations**: General Solution of Trigonometric Equations - Simple Trigonometric Equations – Solutions.

c) **Inverse Trigonometric Functions**: To reduce a Trigonometric Function into a bijection - Graphs of Inverse Trigonometric Functions - Properties of Inverse Trigonometric Functions.

d) **Hyperbolic Functions**: Definition of Hyperbolic Function – Graphs - Definition of Inverse Hyperbolic Functions – Graphs - Addition formulae of HyperbolicFunctions.

e) **Properties of Triangles**: Relation between sides and angles of a Triangle - Sine, Cosine, Tangent and Projection rules- Half angle formulae and areas of a triangle–Incircle and Excircle of a Triangle.

VECTOR ALGEBRA

a) **Addition of Vectors**: Vectors as a triad of real numbers - Classification of vectors - Addition of vectors - Scalar multiplication - Angle between two non-zero vectors - Linear combination of vectors - Component of a vector in three dimensions - Vector equations of line and plane including their Cartesian equivalent forms.

b) **Product of Vectors**: Scalar Product - Geometrical Interpretations - orthogonal projections - Properties of dot product - Expression of dot product in i, j, k system - Angle between two vectors - Geometrical Vector methods - Vectorequationsofplaneinnormalform-Anglebetweentwoplanes-Vectorproductoftwovectorsandproperties- Vector product in i, j, k system - Vector Areas - Scalar Triple Product - Vector equations of plane in different forms, skew lines, shortest distance and their Cartesian equivalents. Plane through the line of intersection of two planes, condition for coplanarity of two lines, perpendicular distance of a point from a plane, angle between line and a plane. Cartesian equivalents of all these results - Vector Triple Product –Results.

MEASURES OF DISPERSION AND PROBABILITY

a) **Measures of Dispersion** - Range - Mean deviation - Variance and standard deviation of ungrouped/grouped data – Coefficient of variation and analysis of frequency distribution with equal means but different variances.

b) **Probability**: Random experiments and events - Classical definition of probability, Axiomatic approach and addition theorem of probability - Independent and dependent events - conditional probability- multiplication theorem and Baye's theorem and applications.

c) **Random Variables and Probability Distributions**: Random Variables - Theoretical discrete distributions – Binomial and Poisson Distributions.

DELETIONS FROM MEASURES OF DISPERSION AND PROBABILITY:

a) **Measures of Dispersion** - Range - Mean deviation - Variance and standard deviation of ungrouped/grouped data - Coefficient of variation and analysis of frequency distribution with equal means but different variances.

COORDINATEGEOMETRY

a) **Locus**: Definition of locus –Illustrations-To find equations of locus-Problems connected to it.

b) **Trans formation of Axes**: Transformation of axes - Rules, Derivations and Illustrations - Rotation of axes - Derivations –Illustrations.

c) **The Straight Line**: Revision of fundamental results - Straight line - Normal form – Illustrations - Straight line - Symmetric form - Straight line - Reduction into various forms - Intersection of two Straight Lines - Family of straight lines - Concurrent lines - Condition for Concurrent lines - Angle between two lines - Length of perpendicular from a point to a Line - Distance between two parallel lines - Concurrent lines - properties related toa triangle.

d) **Pair of Straight lines**: Equations of pair of lines passing through origin - angle between a pair of lines - Condition for perpendicular and coincident lines, bisectors of angles - Pair of bisectors of angles - Pair of lines - second degree general equation - Conditions for parallel lines - distance between them, Point of intersection of pair of lines - Homogenizing a second degree equation with a first degree equation in x and y.

e) **Circle** : Equation of circle -standard form-centre and radius equation of a circle with a given line segment as diameter & equation of circle through three non collinear points - parametric equations of a circle - Position of a point in the plane of a circle – power of a point-definition of tangent-length of tangent - Position of a straight line in the plane of a circle-conditions for a line to be tangent – chord joining two points on a circle – equation of the tangent at a point on the circle- point of contact-equation of normal - Chord of contact - pole and polar-conjugate points and conjugate lines - equation of chord in term of its midpoint - Relative position of two circles- circles touching each other externally, internally- common tangents –centers of similitude- equation of pair of tangents from an externalpoint.

f) **System of circles**: Angle between two intersecting circles - Radical axis of two circles- properties- Common chord and common tangent of two circles – radicalcentre.

g) **Parabola**: Conic sections –Parabola- equation of parabola in standard form-different forms of parabola- parametric equations - Equations of tangent and normal at a point on the parabola (Cartesian and parametric) - conditions for straight line to be atangent.

h) **Ellipse**: Equation of ellipse in standard form- Parametric equations - Equation of tangent and normal at a point on the ellipse (Cartesian and parametric) - condition for a straight line to bea tangent.

i) **Hyperbola**: Equation of hyperbola in standard form- Parametric equations - Equations of tangent and normal at a point on the hyperbola (Cartesian and parametric) - conditions for a straight line to be a tangent-Asymptotes.

j) **Three Dimensional Coordinates**: Coordinates - Section formulae - Centroid of a triangleand tetrahedron.

k) **Direction Cosines and Direction Ratios**: Direction Cosines - DirectionRatios.

l) **Plane**: Cartesian equation of Plane - SimpleIllustrations.

DELETIONS FROM COORDINATEGEOMETRY:

a) **Circle**: 1.5-> Relative positions of two circles including Ex 1(e) and solved problems

b) **Parabola**: 3.2-> Tangents & Normal including Ex 3(b)

c) **Ellipse**: 4.2-> Equations of tangents & Normal including Ex 4(b)

CALCULUS

a) **Limits and Continuity**: Intervals and neighborhoods – Limits - Standard Limits –Continuity.

b) **Differentiation**: Derivative of a function - Elementary Properties - Trigonometric, Inverse

Trigonometric, Hyperbolic, Inverse Hyperbolic Function – Derivatives - Methods of Differentiation - SecondOrder Derivatives.

c) **Applications of Derivatives**: Errors and approximations - Geometrical Interpretation of a derivative - Equations of tangents and normals - Lengths of tangent, normal, sub tangent and sub normal - Angles between two curves and condition for orthogonality of curves - Derivative as Rate of change - Rolle's Theorem and Lagrange's Mean value theorem without proofs and their geometrical interpretation - Increasing and decreasing functions - Maxima and Minima.

d) **Integration**: Integration as the inverse process of differentiation- Standard forms -properties of integrals - Method of substitution- integration of Algebraic, exponential, logarithmic, trigonometric and inverse trigonometric functions - Integration by parts – Integration by Partial fractions method – Reduction formulae.

e) **Definite Integrals**: Definite Integral as the limit of sum - Interpretation of Definite Integral as an area - Fundamental theorem of Integral Calculus (without proof) – Properties - Reduction formulae - Application of Definite integral toareas.

f) **Differential equations**: Formation of differential equation-Degree and order of an ordinary differential equation - Solving differential equation by i) Variables separable method, ii) Homogeneous differential equation, iii) Non - Homogeneous differential equation, iv) Linear differentialequations.

DELETIONS FROM CALCULUS:

a) **Definite Integrals**: 7.1 and 7.2 -> Definite integral as the limit of the sum and limit of the sum and related problems in exercise 7(a) and 7(b) and Examples 7.6-> Application of Definite integrals to areas including exercise 7(d)

b) **Differential equations**: 8.17-> Formation of Differential Equations and problems related to it 8.2(C): Non – Homogeneous Differential Equations including Ex 8(d) Solution of linear differential Equations of the type dx+Px=Q, Where P and Q