National Sanskrit University, Tirupati

Part II Mathematics (Optional) paper 4(A) Marks 75

Subject – MATHEMATICS –4A (w.e.f. 2020 - 2021)

CHAPTERS

ALGEBRA

1 Function:

1 .Types of functions – Definitions.

2 .Inverse functions and Theorems.

3. Domain, Range, Inverse of real valued functions.

02. Matrices:

1 .Types of matrices

2 .Scalar multiple of a matrix and multiplication of matrices

3 .Transpose of a matrix

4 .Determinants

5 .Adjoint and Inverse of a matrix

6. Consistency and inconsistency of Equations - Rank of a matrix

VECTOR ALGEBRA

3. Addition of Vectors:

1. Vectors as a triad of real numbers.

2. Classification of vectors.

3. Addition of vectors.

4. Scalar multiplication.

5. Angle between two none zero vectors.

6. Linear combination of vectors.

7. Component of a vector in three dimensions.

8. Vector equations of line and plane including their
   Cartesian equivalent forms.

4. Products of Vectors:

1. Scalar Producof dt - Geometrical Interpretations - orthogonal projections.

2. Properties of product.

3. Expression of d ot product in i, j, k system – Angle between two vectors.

4 .Geometrical Vector methods.

5. Vector equations of plane in normal form.

6. Angle between two planes.

7. Vector product of two vectors and properties.

8. Vector product in i, j, k system.

9. Vector Areas.

10. Scalar Triple Product.

11. Vector Triple Product – Results

TRIGONOMETRY

5. Trigonometric Ratios up to Transformations:

1 Graphs and Periodicity of Trigonometric functions.

2 Trigonometric ratios and Compound angles.

3 Trigonometric ratios of multiple and sub- multiple angles.

4 Transformations - Sum and Product rules.

6. Inverse Trigonometric Functions

1 To reduce a trigonometric function into a injective function

2 Graph of Inverse Trigonometric function

3 Properties of inverse Trigonometric factions

Prescribed Text Book:

Text Book for A.P. Board of Intermediate Education, Telugu Akademi,Hyderabad

Reference Books:

1.Senior secondary school **Mathematics** – Class 12/Intermediate by R S Aggarwal

2.Inter Mathematics Class XII (set of 2 volumes) /Intermediate by R D Sharma

National Sanskrit University, Tirupati

Part II Mathematics (Optional) paper 4(B) Marks 75

REVISION OF SYLLABUS, MATHEMATICS -4B (w.e.f. 2020 -2021)

CHAPTERS

COORDINATE GEOMETRY

1. The Straight Line:

1 Revision of fundamental results.

2 Straight line - Normal form – Illustrations.

3 Straight line - Symmetric form.

4 Straight line - Reduction into various forms.

5 Intersection of two Straight Lines.

6 Family of straight lines - Concurrent lines.

7 Condition for Concurrent lines.

8 Angle between two lines.

9 Length of perpendicular from a point to a Line.

10 Distance between two parallel lines.

11 Concurrent lines - properties related to a triangle.

2. Pair of Straight lines:

1. Equations of pair of lines passing through origin, angle between a pair of Lines.

2. Condition for perpendicular and coincident lines, bisectors of angles.

3. Pair of bisectors of angles.

4 .Pair of lines - second degree general equation.

5. Conditions for parallel lines - distance between them, Point of intersection of pair of lines.

3.6 Homogenizing a second degree equation with a first degree equation in X and Y

CALCULUS

3. Limits and Continuity:

1. Intervals and neighbourhoods.

2. Limits.

3. Standard Limits.

4. Continuity.

4. Differentiation:

1. Derivative of a function.

2. Elementary Properties.

3 .Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic Function - Derivatives.

4 Methods of Differentiation.

5 Second Order Derivatives.

5. **Applications of Derivatives**:

1. Errors and approximations.
2. Geometrical Interpretation of a derivative.
3. Equations of tangents and normal.
4. Lengths of tangent, normal, sub tangent and sub normal.
5. Angles between two curves and condition for orthogonality of curves.
6. Derivative as Rate of change.
7. Increasing and decreasing functions.
8. Maxima and Minima.

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Part II Mathematics (Optional) paper 9(A) Marks 75

REVISION OF SYLLABUS, MATHEMATICS -9A (w.e.f. 2020 -2021)

CHAPTERS

1. Quadratic Expression:

1.1 Quadratic expressions, equations in one variable

1.2 Sign of quadratic expressions – Change in signs – Maximum and minimum values

1.3 Quadratic in equations

2 Theory of Equations:

2.1 The relation between the roots and coefficients in an equation

2.2 Solving the equations when two or more roots of it are connected by certain relation

2.3 Equation with real coefficients, occurrence of complex roots in conjugate pairs and its consequences

2.4 Transformation of equations – Reciprocal Equations.

3 Permutations and Combinations:

3.1 Introduction

3.2 Basic concepts

3.3 Fundamental Principles of counting- linear and circular permutations

4 Binomial Theorem:

4.1 Binomial theorem for positive integral index

4.2 Binomial theorem for rational Index (without proof).

4.3 Approximations using Binomial theorem.

5. Probability

Introduction

5.1 Random Experiments and Events

5.2 Classical definition of Probability, Axiomatic approach and addition Theorem of probability

6. Random Variables and Probability Distributions

Introduction

6.1 Random Variables

6.2 Theoretical Discrete distributions-Binomial and Poisson distributions

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Part II Mathematics (Optional) paper 9(B) Marks 75

REVISION OF SYLLABUS, MATHEMATICS -9B (w.e.f. 2020 -2021)

CHAPTERS

COORDINATE GEOMETRY

01. Circle:

1.1 Equation of circle -standard form-centre and radius of a circle with a given line segment as diameter & equation of circle through three non collinear points - parametric equations of a circle.

1.2 Position of a point in the plane of a circle – power of a point-definition of tangent-length of tangent

1.3 Position of a straight line in the plane of 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.

1.4 Chord of contact - pole and polar-conjugate points and conjugate lines - equation of chord with given middle point.

1.5 Relative position of two circles- circles touching each other externally, internally common tangents – Centers of similitude equation of pair of tangents from an external point.

02. System of circles:

2.1 Angle between two intersecting circles.

2.2 Radical axis of two circles - properties - Common chord and common tangent of two circles – radical centre.

2.3 Intersection of a line and a Circle.

03. Parabola:

3.1 Conic sections –Parabola- equation of parabola in standard form-different forms of parabola- parametric equations.

3.2 Equations of tangent and normal at a point on the parabola (Cartesian and parametric) - conditions for straight line to be a tangent.

04. Ellipse:

4.1 Equation of ellipse in standard form- Parametric equations.

4.2 Equation of tangent and normal at a point on the ellipse (Cartesian and parametric)- condition for a straight line to be a tangent.

05. Hyperbola:

5.1 Equation of hyperbola in standard form- Parametric equations.

5.2 Equations of tangent and normal at a point on the hyperbola (Cartesian and parametric)- conditions for a straight line to be a tangent- Asymptotes.

CALCULUS

06. Indefinite Integrals:

6.1 Integration as the inverse process of differentiation- Standard forms –properties of integrals.

6.2 Method of substitution- integration of Algebraic, exponential, logarithmic, trigonometric and inverse trigonometric functions. Integration by parts.

6.3 Integration- Partial fractions method.

6.4 Reduction formulae.

07. Definite Integrals:

7.1 Definite Integral as the limit of sum

7.2 Interpretation of Definite Integral as an area.

7.3 Fundamental theorem of Integral Calculus.

7.4 Properties.

7.5 Reduction formulae..

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