TELANGANA EAPCET

CHAPTERWISE SOLUTIONS

2024-2018

Mathematics

Anurag Chaudhary

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SUCCESS AND NOTHING LESS

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Agra, Ahmedabad, Bengaluru, Bareilly, Chennai, Delhi, Guwahati, Hyderabad, Jaipur, Jhansi, Kolkata, Lucknow, Nagpur & Pune.

PRICE ₹ 705.00

PO No : TXT-XX-XXXXXXX-X-XX

Published by Arihant Publications (India) Ltd.

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Syllabus

1. ALGEBRA

(a) **Functions:** Ordered pairs, 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 system of Simultaneous 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) **De Moivre's Theorem:** De Moivre's theorem- Integral and Rational indices - nth 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 in equations.

(g) **Theory of Equations:** The relation between the roots and coefficients in an equation - Solving the equations when two or more of its roots are connected by certain relation - Equations 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.

(i) **Binomial Theorem:** Binomial theorem for positive integral index - Binomial theorem for rational Index - Approximations using Binomial theorem.

(j) **Partial fractions:** Rational fraction - Partial fractions of f(x)/g(x) when g(x) contains non –repeated linear factors - Partial fractions of f(x)/g(x) when g(x) contains repeated and/or non-repeated linear factors - Partial fractions of f(x)/g(x) when g(x) contains repeated and non-repeated irreducible factors only.

2. TRIGONOMETRY

(a) **Trigonometric Ratios upto Transformations:** Trigonometric ratios - variation - Graph and Periodicity - Trigonometric ratios of Compound angles - Trigonometric ratios of multiple and sub-multiple angles - Sum and Product of transformations.

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

(c) **Inverse Trigonometric Functions**: To reduce a Trigonometric Function into a bijective function - 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 Hyperbolic Functions.

(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.

3. VECTOR ALGEBRA

(a) **Addition of Vectors:** Vectors as a triad of real numbers, some basic concepts - Classification (Types) of vectors - Addition of vectors - scalar multiplication of a vector - Angle between two non-zero vectors. Linear combination of vectors - Component of a vector in three dimensions - Vector equations of line and plane.

(b) **Product of Vectors:** Scalar or dot Product of two vectors - Geometrical Interpretations - Orthogonal projections - Properties of dot product - Expression for scalar (dot) product in i, j, k system - Angle between two vectors - Geometrical Vector methods - Vector equations of plane in normal form - Angle between two planes-Vector product (cross product) of two vectors and properties - Vector product in i, j, k system - Vector Areas - scalar Triple Product-Vector equations of plane in different forms, skew lines, shortest distance- condition for coplanarity etc., - Vector Triple Product - Results.

4. 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.

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

5. COORDINATE GEOMETRY

(a) **Locus:** Definition of locus - Illustrations - Equations of locus - Problems connected to it.

(b) **Transformation 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 to a 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 Position of a point in the plane of a circle - Definition of tangent. Position of a straight line in the plane of a circle conditions for a line to be tangent - chord of contact and polar. Relative positions of two circles.

(f) **System of circles:** Angle between two intersecting circles - Radical axis of two circles

(g) **Parabola:** Conic sections - Equations of tangent and normal at a point on the parabola

(h) **Ellipse:** Equation of ellipse in standard form- Parametric equations - Equation of tangent and normal at a point on the ellipse.

(i) **Hyperbola:** Equation of hyperbola in standard form - Parametric equations - Equations of tangent and normal at a point on the Hyperbola.

(j) **Three Dimensional Coordinates:** Coordinates - Section formulae.

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

(l) **Plane:** Cartesian equation of Plane - Simple Illustrations.

6. CALCULUS

(a) **Limits and Continuity:** Intervals and neighbourhoods - Limits - Standard Limits - Continuity.

(b) **Differentiation:** Derivative of a function - Elementary Properties - Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic Function.

(c) **Derivatives** - Methods of Differentiation - Second Order Derivatives.

(d) **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. Increasing and decreasing functions - Maxima and Minima.

(e) **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 the method of substitution - Integration of algebraic and trigonometric functions, Integration by parts- Integration of exponential, logarithmic and inverse trigonometric functions, Integration-partial fractions method, reduction formulae.

(f) **Definite Integrals:** Definite Integral as the limit of sum - Interpretation of Definite Integral as an area - Fundamental theorem of Integral Calculus - Properties - Reduction formulae. Application of Definite integral to areas.

(g) **Differential Equations:** Formation of differential equation - Degree and order of an ordinary differential equation. Solving differential equation by Variables separable method, Homogeneous differential equation, non-homogeneous differential equation, Linear differential equations.

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