

NDA Exam Syllabus

PAPER-I MATHEMATICS

1. ALGEBRA

Set Theory
Real Number and Complex Numbers
Equations and Graphs: Linear, Quadratic, cubic etc
Permutation and Combination
Binomial Theorem
Logarithms

2. MATRICES AND DETERMINANTS:

Types, operations on matrices
Determinant of a matrix and basic properties of determinants.
Adjoint and inverse of a square matrix,
Applications-Solution of a system of linear equations in two or three unknowns by Cramer's rule and by Matrix Method.

3. TRIGONOMETRY:

Angles and their measures in degrees and in radians.
Trigonometrical ratios.
Trigonometric identities
Multiple and Sub-multiple angles.
Inverse trigonometric functions.
Applications-Height and distance, properties of triangles.

4. ANALYTICAL GEOMETRY OF TWO AND THREE DIMENSIONS:

Co-ordinate Geometry: Points, lines, circles, Quadrilaterals, Parabola and Hyperbola.
Eccentricity and axis of a conic.
Point in a three-dimensional space, distance between two points.
Direction Cosines and direction ratios.
Equation two points. Direction Cosines and direction ratios. Equation of a plane and a line in various forms.
Equation of a sphere.

5. DIFFERENTIAL CALCULUS:

Function: Domain, Range and Graph of a Function.
Composite functions, one to one, onto and inverse functions.
Notion of limit, Standard limits
Continuity of functions
Derivative of function -applications.

Derivatives of sum, product and quotient of functions, derivative of a function with respect to another function, derivative of a composite function. Second order derivatives. Increasing and decreasing functions.

Application of derivatives in problems of maxima and minima.

6. INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS:

Integration as inverse of differentiation, integration by substitution and by parts, standard integrals involving algebraic expressions, trigonometric, exponential, and hyperbolic functions.

Evaluation of definite integrals—determination of areas of plane regions bounded by curves—applications.

Definition of order and degree of a differential equation, formation of a differential equation by examples.

General and solution of a differential equations, solution of first order and first-degree differential equations of various types

Application in problems of growth and decay.

7. VECTOR ALGEBRA:

Vectors in two and three dimensions, magnitude, and direction of a vector.

Unit and null vectors, addition of vectors, scalar multiplication of a vector, scalar product, or dot product of two vectors.

Vector product or cross product of two vectors.

Applications—work done by a force and moment of a force and in geometrical problems.

8. STATISTICS AND PROBABILITY:

Statistics:

Classification of data, Frequency distribution, cumulative frequency distribution

Measures of Central tendency—Mean, median and mode.

Variance and standard deviation—determination and comparison.

Correlation and regression.

Probability:

Random experiment, outcomes and associated sample space, events, mutually exclusive and exhaustive events, impossible and certain events. Union and Intersection of events.

Complementary, elementary, and composite events.

Definition of probability—classical and statistical

Conditional probability,

Bayes' theorem

Random variable as function on a sample space.

Binomial distribution,

PAPER-II

GENERAL ABILITY TEST

Part 'A'—ENGLISH (Maximum Marks—200)

Grammar and usage

Comprehension and cohesion

Spotting of errors

Para Jumbling
Fill in the blanks
Synonyms and antonyms
Vocabulary
Cloze test
Sentence correction and improvement
Idioms and proverbs
Completion of Sentence and Para

Part 'B'—GENERAL KNOWLEDGE (Maximum Marks—400)

Section 'A' (Physics)

Physical Properties and States of Matter, Mass, Weight, Volume, Density and Specific Gravity, Principle of Archimedes, Pressure Barometer.
Motion of objects, Velocity and Acceleration, Newton's Laws of Motion, Force and Momentum, Parallelogram of Forces, Stability and Equilibrium of bodies, Gravitation, elementary ideas of work, Power and Energy.
Effects of Heat, Measurement of Temperature and Heat, change of State and Latent Heat, Modes of transference of Heat.
Sound waves and their properties, Simple musical instruments.
Rectilinear propagation of Light, Reflection and refraction. Spherical mirrors and Lenses, Human Eye.
Natural and Artificial Magnets, Properties of a Magnet, Earth as a Magnet.
Static and Current Electricity, conductors and Nonconductors, Ohm's Law, Simple Electrical Circuits, Heating, Lighting and Magnetic effects of Current, Measurement of Electrical Power, Primary and Secondary Cells, Use of X-Rays.
General Principles in the working of the following:
Simple Pendulum, Simple Pulleys, Siphon, Levers, Balloon, Pumps, Hydrometer, Pressure Cooker, Thermos Flask, Gramophone, Telegraphs, Telephone, Periscope, Telescope, Microscope, Mariner's Compass; Lightning Conductors, Safety Fuses.

Section 'B' (Chemistry)

Physical and Chemical changes. Elements, Mixtures and Compounds, Symbols, Formulae and simple Chemical Equations, Law of Chemical Combination (excluding problems).
Properties of Air and Water.
Preparation and Properties of Hydrogen, Oxygen,
Nitrogen and Carbon dioxide, Oxidation and Reduction. Acids, bases, and salts. Carbon—different forms.
Fertilizers—Natural and Artificial.
Material used in the preparation of substances like Soap, Glass, Ink, Paper, Cement, Paints, Safety Matches and Gun- Powder.
Elementary ideas about the structure of Atom, Atomic Equivalent and Molecular Weights, Valency.

Section 'C' (General Science)

Difference between the living and non-living. Basis of Life—Cells, Protoplasm and Tissues.
Growth and Reproduction in Plants and Animals.
Elementary knowledge of Human Body and its important organs.

Common Epidemics, their causes and prevention.
Food—Source of Energy for man. Constituents of food, Balanced Diet. The Solar System—Meteors and Comets, Eclipses.
Achievements of Eminent Scientists.

Section 'D' (History, Freedom Movement etc.)

A broad survey of Indian History, with emphasis on Culture and Civilization.
Freedom Movement in India.
Elementary study of Indian Constitution and Administration. Elementary knowledge of Five Year Plans of India.
Panchayati Raj, Co-operatives, and Community Development.
Bhoodan, Sarvodaya, National Integration and Welfare State, Basic Teachings of Mahatma Gandhi.
Forces shaping the modern world; Renaissance, Exploration and Discovery; War of American Independence.
French Revolution, Industrial Revolution and Russian Revolution.
Impact of Science and Technology on Society.
Concept of one World, United Nations, Panchsheel, Democracy, Socialism and Communism.
Role of India in the present world.

Section 'E' (Geography)

The Earth, its shape and size. Latitudes and Longitudes,
Concept of time. International Date Line. Movements of Earth and their effects. Origin of Earth. Rocks and their classification; Weathering—Mechanical and Chemical, Earthquakes and Volcanoes.
Ocean Currents and Tides
Atmosphere and its composition; Temperature and Atmospheric Pressure, Planetary Winds, Cyclones and Anti-cyclones; Humidity; Condensation and Precipitation; Types of Climates, Major Natural regions of the World.
Regional Geography of India—Climate, Natural vegetation. Mineral and Power resources; location and distribution of agricultural and Industrial activities.
Important Sea ports and main sea, land, and air routes of India. Main items of Imports and Exports of India.

Section 'F' (Current Events)

Knowledge of Important events that have happened in India in the recent years.
Current important world events.
Prominent personalities—both Indian and International including those connected with cultural activities and sports.

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