Syllabus of combined Test (JEE-Main Type) for IIT-Target batches

Date: 13–01–2021 (Online only)

PHYSICS

General

Units and dimensions, dimensional analysis, least count, significant figures, method of measurement and error, analysis for physical quantities, Vernier calipers and screw gauge (micrometer).

Mechanics

Kinematics in one and two dimensions, projectile motion, relative motion, Newton's laws of motion, inertial and uniformly accelerated frames of references.

Static and dynamic friction, circular motion, worked and power, kinetic and potential energy, conservation of linear momentum and mechanical energy.

Electrostatics, reflection from plane and spherical surfaces, photoelectric effect and Dual nature of matter.

CHEMISTRY

Mole concept, atomic structure, solution, hydrocarbon, nomenclature of organic compound, periodic table, chemical bonding, general organic chemistry, alkyl/aryl halide.

MATHEMATICS

SETS, RELATIONS AND FUNCTIONS

Sets, and their representation; Union, intersection and complement of sets and their algebraic properties; Power set; Relation, Types of relations, equivalence relations, function; one-one, into and onto functions, composition of functions.

COMPLEX NUMBERS AND QUADRATIC EQUATIONS:

Complex numbers as ordered pairs of reals, Representation of complex numbers in the form $a + ib$ and their representation in a plane, Argand diagram, algebra of complex numbers, modulus and argument (or amplitude) of a complex number, square root of a complex numbers, triangle inequality, Quadratic equations in real and complex number system and their solutions. Relation between roots and co-efficient nature of roots, formation of quadratic equations with given roots

Logarithms and their properties.

TRIGONOMETRY: –

Trigonometric functions, their periodicity and graphs, addition and subtraction formulae, formulae involving multiple and sub-multiple angles, general solution of trigonometric equations.

Relation between sides and angles of a triangle, sine rule, cosine rule, half-angle formula and the area of a triangle, inverse trigonometric functions (principal value only).

MATRICES AND DETERMINANTS:

Matrices, algebra of matrices, types of matrices, determinants and matrices of order two and three. Properties of determinants, evaluation of determinants, area of triangles using determinants. Adjoint and evaluation of inverse of a square matrix using determinants and elementary transformation, Test of consistency and solution of simultaneous linear equations in two or three variables using determinants and matrices.

SEQUENCES AND SERIES

Arithmetic and Geometric progressions, insertion of arithmetic, geometric means between two given number, Relation between A.M. and G.M. Sum upto n terms of special series; S_n, S_{n2}, S_{n3}, Arithmetico-Geometric progression

DIFFERENTIAL CALCULUS: –

Real – valued functions, algebra of functions, polynomial, rational, trigonometric, logarithmic and exponential functions, inverse functions. Graphs of simple functions. Limit continuity and differentiability. Differentiation of the sum, difference, product and quotient of two functions. Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite and implicit function; derivatives of order upto two.

COORDINATE GEOMETRY:

Straight Lines, Pair of Straight Lines, Circle.

MATHEMATICAL REASONING:

Statements, logical operations and, or, implied by, if and only if. Understanding of tautology, contradiction, converse and contrapositive.