Mathematics: (50 Questions)

Set Theory and Logic: Concepts of Sets- Unions, Intersection, Difference, Symmetric difference, Cartesian Product, Cardinality, Functions and Relations, Venn Diagrams, Truth tables, Connectives, Tautology and Contradictions.

Probability and Statistics: Basic concepts of probability theory, Averages, Dependent and independent events, Bayes' Theorem, Mean, Median, Mode, Mean deviation, Standard deviation, variance, Moments, and Frequency distributions.

Algebra: Fundamental operations in algebra, Quadratic equations with real coefficients, Relation between roots & coefficients, Symmetric functions of roots and their sums, indices, logarithms, exponentials, arithmetic, geometric, harmonic progressions, finite sums of powers of natural numbers. Matrices & determinants, simultaneous linear equations, Permutations & Combinations, and Binomial Theorem.

Coordinate Geometry: Rectangular Cartesian coordinates, distance formulae, equation of a line (various forms), and intersection of lines, pair of straight lines, equations of a circle, parabola, ellipse, and hyperbola, Section formula, Tangents and normal to circles and conics.

Calculus: Functions on real numbers, limits of functions, left and right limits, limits at infinity, continuous functions, applications of the intermediate value theorem, differentiation, applications of differentiation, tangents, normals, simple examples of maxima and minima, applications of Rolle's theorem, Mean Value Theorem, Integration of functions- by parts, by substitution, by partial fraction, integration of odd & even functions, periodic, definite integrals, area computations.

Trigonometry: Trigonometric functions, identities, principal value of inverse trigonometric functions, properties of triangles, solution of triangles, heights and distances, trigonometric equations and their general solutions.