

## MCA SYLLABUS [MATHEMATICAL SCIENCE]

### MCA ENTRANCE EXAM

**Algebra:** Fundamental operations in Algebra, Expansions, Factorization, simultaneous linear and quadratic equations, indices, logarithms, arithmetic, geometric and harmonic progressions, binomial theorem, permutations and combinations, surds, determinants, matrices and application to solution of simultaneous linear equations, Set Theory, Group Theory.

**Coordinate Geometry:** Rectangular Cartesian coordinates, equations of a line, midpoint, intersections etc., equations of a circle, distance formulae, pair of straight lines, parabola, ellipse and hyperbola, simple geometric transformations such as translation, rotation, scaling.

**Calculus:** Limit of functions, continuous functions, differentiation of functions tangents and normals, simple examples of maxima and minima, Integration of function by parts, by substitution and by partial fraction, definite integrals, and applications of Definite Integrals to areas.

**Differential Equations:** Differential equations of first order and their solutions, linear differential equations with constant coefficients, homogenous linear differential equations.

**Vector:** Position Vector, additions and subtraction of vectors, scalar and vector products and their applications to simple geometrical problems and mechanics.

**Trigonometry:** Simple identities, trigonometric equations, properties of triangles, solution of triangles, height and distance, inverse function, Inverse Trigonometric functions, General solutions of trigonometric equations, Complex numbers.

**Real Analysis:** Sequence of real numbers, Convergent Sequences, Cauchy's Sequences, Monotonic Sequences, Infinite series and their different tests of convergence, Absolute convergence, Uniform convergence, properties of continuous functions, Rolle's theorem, Mean value theorem, Taylor's and Maclaurian's series, Maxima and Minima, Indeterminate forms.

**Statistics & Linear Programming:** Frequency distribution and measure of dispersion, skewness and Kurtosis, Permutations and Combinations, Probability, Random variables and distribution function, Mathematical expectation and generating function, Binomial, Poisson normal

distribution curve fitting and principle of least squares, Correlation and Regression, Sampling and large sample tests, Test of significance based on  $t$ ,  $\chi^2$  and  $f$  distribution, Formulation of simple linear programming problems, basic concepts of graphical and simple methods.

### Analytical Ability and Logical Reasoning

The questions in this section will cover logical reasoning, quantitative reasoning.

### Computer Awareness

**Computer Basics:** Organization of a Computer, Central Processing Unit (CPU), Structure of instructions in CPU, input/output devices, computer memory, memory organization, back-up devices.

**Data Representation:** Representation of characters, integers and fractions, binary and hexadecimal representations, Binary Arithmetic: Addition, subtraction, division, multiplication, single arithmetic and two's complement arithmetic, floating point representation of numbers, normalized floating point representation, Boolean algebra, truth tables, Venn diagrams.

### Elements of Data Structures

### Computer Organization

### C Language