

PAPER 12 APTITUDE TEST FOR 2nd Year MCA (Lateral Entry)

(I) MATHEMATICAL STRUCTURES

Modern Algebra and Matrices: Algebraic structures and general properties, semigroups, groups. Rings and Fields: definitions, elementary properties and standard results. Matrices, operation on matrices, Inverse and rank of a matrix, Eigen values, eigenvectors and system of linear equations.

Set Theory: Introduction, sets and cardinals, combination of sets, multisets and set identities. Relations - definition, operations on relations, composite relations, properties of relations, partial order relations. Functions - definition, classification of functions, operations on functions, recursively defined functions.

Number Theory and Methods of Proof: Natural numbers, factorization and prime numbers, floor and ceiling functions. Methods of proof – Introduction, direct and indirect methods of proof, mathematical Induction.

Combinatorics and Probability: Introduction, counting techniques, Pigeonhole principle. Probability –definition, sample space, algebra of events, axioms of probability, prior and posterior probability, Bayes theorem.

(II) COMPUTING CONCEPTS

Principles of Computer Science: Computer organization - evaluation of computers, computer arithmetic, control design, processor design, input output organization, memory organization. Data Structures – Arrays, lists, stacks, queues. Trees and graphs - definition, properties and applications. Analysis of algorithms.

Proposition logic and Boolean Algebra: Propositions, truth tables, tautology, contradiction, algebra of propositions. Binary systems, axioms and theorems of Boolean algebra, Boolean functions and digital circuits.

Numerical Techniques: Floating point Arithmetic, solution of the system of linear equations, roots of polynomials, interpolation and curve fitting.

Theory of Computation: Finite-state machines, regular and non-regular languages, Turing machines and applications.

(III) REASONING ABILITY

Questions in this part will be aimed to asses the reasoning and logical ability of the candidates

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