Computer Science & IT

BASIC MATHEMATICS:
Elements of probability, matrix algebra, numerical methods: interpolation, root finding, differentiation and integration. Discrete mathematics: sets, relations, functions, mathematical induction, counting, groups, graphs, partial orders, lattices and boolean algebra, propostional logic.

THEORY OF COMPUTATION:
Regular and context free languages, finite state machines and push down automata, turing machines and undecidability.

COMPUTER HARDWARE:
Logic function, minimization techniques, design of combinational and sequential circuits using gates and flip-flops, design with integrated circuts incuding ROM and multiplexers, microprocessor architecture: programming, interfacing with memory and I/O devices(modes of data transfer and their implementation, serial and parallel communication interface). Detailed knowledge of 8085 microprocessor will be assumed.

COMPUTER ORGANIZATION:
Number representation and airthmetic, functional organization, machine instructions and addressing modes, ALU, hardwired and microprogrammed control, instrucation pipelining, memory organization, input/output.

PROGRAMMING AND DATA STRUCTURE:
structured programmming with pascal/C including recursion; arrays, stacks, strings, queues, lists, trees, sets and graphs; algorithm for tree and graphs traversals, connected component, spanning trees, shortest paths; hashing, sorting and searching algorithm design and analysis techniques, big 'oh' notation, solution of sample recurrence relations.

LANGUAGE PROCESSOR:
Assembler, loader, linker, macroprocessors, text editors, programming languages, scope rules and parameter passing mechanism; compilers lexical analysis, parsing, syntax, directed translation, run time environment, machine code generation; interpreters.

OPERATING SYSTEM:
Batch, multi-programming and time-sharing systems; processsor, memory, device and file management, virtual memory, process scheduling, interprocess communication, process synchoronization and concurrency, deadlocks, protection.

DATABASE SYSTEM:
File organization techniques; indexing,B-trees, B-plus trees; relational and network datat models; normal forms; query language: SQL.