

UNIT-I

Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem, their geometrical significance and applications. Successive differentiation and Leibnitz Theorem.

UNIT-II

Number system: division algorithm, greatest common divisor, Least common multiple, congruence relation, Integer arithmetic, Modular arithmetic.

UNIT-III

Group: definition of Group, Groups of numbers, groups of residues, groups of matrices, Groups of functions, Groups of subsets of a set, Properties of Groups, characterization of Groups, cyclic Groups.

UNIT-IV

Ring: commutative ring, ring with unity, Ring of Polynomials, ring of functions, Elementary properties of ring. Fields.

Text & Reference Books:

1. J.C. Burkill, "A First Course in Mathematical Analysis", Vikas Publishing House.
2. Sharma, R.K., Shah, S.K. and Shnkar A.G. Algebra I ; Pearson, 2012.
3. Buston, D.M., elementary Number Theory; Tata McGrawHill.

Note: In each theory paper, nine questions are to be set. Two questions are to be set from each Unit and candidate is required to attempt at least one question from each unit. Question number nine will be compulsory, which will be of short answer type with 5010 parts, out of the entire syllabus. In all, five questions are to be attempted.

UNIT –I

Vocabulary: Fill up using correct form of verb, Usage of the adverb, adjective etc, Write Antonym of the given word and use both the given word and its antonym in the single sentence clarifying meaning and usage, Give different meanings to Synonyms and use them in sentences , Give meaning and make sentences using idioms.

Grammar: Conversion among various types of the tenses in the sentence: present/ past /future tense with simple/continuous/perfect forms , Conversion between Direct/Indirect speech , Conversion between active/passive voice , Conversion among various types of sentences: affirmative, interrogative sentences, negation, exclamations .

UNIT –II

Skills in Writing: letters, official/business correspondence. CV's, Tech. Reports/types, Precis, comprehension, Paragraph writing (200 word) on current topics, writing notices, agenda, circulars.

UNIT –III

Secretarial Skills: Effective communication, listening and feedback skills, telephone handling, Attending meeting, preparing of agenda, writing of minutes, summaries. Handling problem situations. Control of voice and proper use of phonetics.

UNIT –IV

Presentation and Discussion Skills: Types of communication. Barriers to Communication. Effective use of kinesics, Planning interviews and making presentations. Taking initiatives, especially in group discussions, overcoming nervousness, making audience analyses and establishing leadership.

Text & Reference Books:

1. K.K. Sinha, "Business Communication".
2. Varinder Pal, "Business Communication".
3. T. M. Farhatullah, "Communication Skills for Technical Students".
4. Shiv K. Khera, "You can Win".

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UNIT-I

Fundamentals of semiconductor physics: Energy bands in solids, pn junction diode depletion region, forward and reverse bias, diode as switch; Bipolar Junction Transistor, transistor configurations, bipolar junction transistor (CE configuration) as switch, Saturated and non-saturated logic, Integrated Circuits, characteristics of digital logic families: TTL, ECL, CMOS.

UNIT-II

Logic gates: AND, OR, NOT Gates and their Truth Tables, NOR, NAND & XOR gates, Boolean algebra, Basic Boolean Law's, Demorgan's theorem, Boolean function and their truth tables.

UNIT-III

MAP simplification: Minimization techniques, K-Map, Sum of Product & Product of Sum, Venn diagram. Combinational circuit.

UNIT-IV

Sequential circuits: Half adder & Full adder, BCD adder, Full Subtractor, Flip-flops-RS, D, JK, T & Master-Slave flip-flops, Shift registers, Multiplexer, Encoder, Decoder.

Text & Reference Books:

1. Rajaraman V. & Radhakrishnan, "An Introduction To Digital Computer Design", PHI.
2. Malvino & Leach, "Digital Principles & Applications", TMH Publications.
3. Jain R.P. , "Modern Digital Electronics". TMH Publications.
4. Malvino, "Digital Computer Electronics". TMH Publications.
5. Bartee T.C., "Digital Computer Fundamentals". TMH Publications.

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UNIT-I

Preliminaries: Concept & notation, common operation on data structures, algorithm complexity, time-space trade off between algorithm, physical & logical representation of different data structures.

Arrays: Arrays defined, representing arrays in memory, Various operation (traversal, insertion, deletion), Multidimensional arrays, Sequential allocation, Address calculation.

UNIT-II

Linked List: Definition, type (linear, circular, doubly linked, inverted), representing linked lists in memory, advantages of using linked list over arrays, various operations on Linked list (traversal, insertion, deletion).

UNIT-III

Stacks: Definition & concepts of stack structure, Implementation of stacks, Operation on stacks (push & pop), Application of stacks (converting arithmetic expression from infix notation to polish and their subsequent evaluation), quick sort technique to sort an array, recursion).

Queue: Definition & concept of queues, implementation of queue, operation on queues (insert & delete), circular queue.

UNIT-IV

Trees Structures: Tree, Binary Trees, Tree Traversal Algorithms (Pre-Order, In-Order, Post-Order), Threaded Trees, Binary Search Trees.

Sorting & Searching: Selection sort, Bubble sort, Merge sort, Radix sort, Quick sort, Sequential search, Linear search and their complexity.

Text & Reference Books:

1. Jean Paul Tremblay & Paul G. Sorenson, " An Introduction to Data Structures with Applications", Tata McGraw Hill.
2. Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, " Data Structures using C", PHI.

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UNIT-I

Introduction To Database Concepts: Data Modeling for a Database, Fields, Records and Files, Abstraction and Data Integration, Database Architecture, Users, Structure of DBMS, Advantages and Disadvantages of DBMS.

Data Models: Entity, Attribute, Relationship, Data Model Classifications, File based, Traditional, Semantic, Entity-Relationship Model.

UNIT-II

File Organization: Operation on files, Sequential Files, Index-Sequential Files, Types of Indexes, Implicit, limit, multilevel, Direct Files, Indexing using B-Tree Structure.

Relational Model: Relational Database, Relational Algebra, Relational Calculus.

UNIT-III

Relational Database Design: Relational Scheme and Relational Design, Functional Dependency, Normal forms (First, Second, Third, Boyce Code), Decomposition and dependency preservation, Multi-valued dependency.

UNIT-IV

Ms Access: Tables (Creation/Design structure, Data Entry), Primary keys, Foreign Keys Master-Detail Table, Query (Select, Make-Table, Update, Append, Delete) Form (Modal, Modeless), Relationships Report (Creation of a simple report from a table and from a query).

Text & Reference Books:

1. Elmasri And Navathe, "Fundamentals of Database Systems", Benjamin/Cummings Publishing Co. Inc.
2. Bipin C. Desai, "An Introduction to Database Management System".
3. Users Reference Manuals Of Ms Access.
4. Date, C.J., "An Introduction to Database system", Narosa Publishing House.

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