

SEMESTER-1

MCA Paper-I: INTRODUCTION TO INFORMATION TECHNOLOGY

Section-I

Computer Fundamentals: Block structure of a computer, characteristics of computers, generation of computers, classification of computers.

Number System: Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other, Binary Arithmetic: Addition, subtraction and multiplication. Representation of Information: Integer and floating point representation, Complement schemes, Character codes (ASCII, EBCDIC, BCD, Excess-3, Grey).

Section-II

Elements of a computer processing system: Hardware – CPU storage devices and media, VDU, input output devices, data communication equipment. Software – system software, application software.

Programming languages: classification, machine code, assembly language, higher level language, and fourth generation languages

Section-III

Operating system: Batch, multi-programming, time sharing, multiprocessing, PC operating system, network operating system, on-line and real time operating system.

Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media, network protocol, (TCP/IP.)

Internet and its Applications: E-mail, TELNET, FTP, World Wide Web, Internet chatting.

Range of application: Scientific, Business, educational, weather forecasting, and remote sensing, planning, multilingual applications, management information, decision support system, inventory control, medical, industrial control, banks, railways, etc.

MCA-Paper-II: PROGRAMMING IN C

Section-I

Problem Solving with Computers: Algorithms, and Flowcharts. Data types, constants, variables, operators, data input and output, assignment statements, conditional statements.

Iteration, arrays, strings processing, defining function, types of functions, function prototype, passing parameters, recursion.

Storage class specifiers, pre-processor, header files and standard functions.

Section-II

Pointers: Definition and uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer.

Structures, union, pointers to structures, user-defined data types, enumeration.

Section-III

Data files: Opening, closing, creating, processing and unformatted data files.

Introduction to Dynamic Memory Allocation

C-programming applications: Sorting (Bubble sort, Selection sort), Searching (Binary search, Linear Search)

MCA-Paper-III: ACCOUNTING AND FINANCIAL MANAGEMENT

Section-I

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basis books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment)

Section-II

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments)

Costing: nature, importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances (only introduction)

Section-III

Computerized accounting: Meaning and advantages, Computer Programs for accounting, Balancing accounts, Trial balance and final accounts in computerized, Accounting, control, and Audit, Sub- Modules of computerized accounting systems.

MCA-Paper-IV: COMPUTER MATHEMATICAL FOUNDATION

Section-I

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

Section-II

Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, solving simultaneous equations using Gauss elimination, Gauss Jordan Methods, Matrix Inversion method.

Section-III

Algebra of logic, Propositions, Connectives, Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction, quantifiers.

A general introduction, simple and multipgrpahs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bipartite graph, graph coloring.

MCA-Paper-V: SYSTEMS ANALYSIS AND DESIGN

Section-I

System: Definition, Characteristics, elements and types of system. System Development Life Cycle, Role of system analyst, Initial investigation, Feasibility study-Technical, economic and behavioral feasibility, Cost and Benefit analysis.

Section-II

System Analysis: Problem Definition, Information requirements, Information gathering tools, Tools of structured Analysis – Data Flow Diagrams, Data Dictionary, Decision Tree, Decision tables and structured English.

System Design: Structured Design, Input design, and Output design, Form Design. File Organization: Sequential Indexed Sequential, Chaining and Inverted list organization.

Section-III

System Testing: Test Plan AND test data, type s of system test.

System Implementation: Implementation Plan, activity network for conversion, combating resistance to change. Hardware/Software Selection: Procedure for selection, Major phases in selection, Make v/s buy decision, Criteria for software selection.

MCA-Paper-VI: COMMUNICATION & SOFT SKILLS

Section - I

What is communication
Communication skills
Business Communication
Other types of Communication
What is Science Communication?
Strategic Communication
Technical Communication

Section - II

Professional Communication
Some realms of Communication and their theories
Development Communication
Information

SEMESTER-2

MCA-Paper-I: MANAGEMENT INFORMATION SYSTEM

Section I

Introduction to systems and Basic systems concepts, Types of systems, The systems Approach, Information systems: Definition and characteristics, types of Information, role of Information in Decision – Making, Sub – systems of information systems: EDP and MIS, management levels, EDP/MIS/DSS

Section-II

An overview of Management Information System: Definition and Characteristics, Components of MIS, Frame Work understanding MIS: Robert Anthony's Hierarchy of Management Activity. Information requirements and Levels of Management, Simon's Model of decision – Making, structured Vs unstructured decisions, Formal Vs. Information systems

Section-III

Developing Information systems: Analysis and design of information systems: Implementation and evaluation, Pitfalls in MIS development.
Functional MIS: A study of Marketing, Personnel, financial and Production MIS

MCA-Paper-II: PROGRAMMING IN C++

Section-I

Evolution of OOP, OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading. Introduction to C++, Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, features of iostream.h and iomanip.h input and output, conditional expression loop statements, breaking control statements.

Section-II

Defining function, types of functions, storage class specifiers, recursion, pre-processor, header files and standard functions, Arrays, pointer arithmetic's, structures, pointers and structures, unions, bit fields typed, enumerations.
Classes, member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors, destructors, inline member functions, static class member, friend functions, dynamic memory allocation.

Section-III

Inheritance, single inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers, virtual functions, late binding, pure virtual functions, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing.

MCA-Paper-III: DATA COMMUNICATION & COMPUTER NETWORKS

Section-I

Introduction to data communication, analog Vs Digital Communication, Fourier Analysis, Band Width limitation, data rate of a channel, Error detection and correction; nature of errors, parity check, CRC, hamming code, Modulation; Multiplexing: SDM, FDM, TDM, STDM.

Introduction to computer networks and application; network hardware, network software

Section-II

OSI reference model, TCP/IP model, network standardization, physical layer: circuit switching, packet switching, message switching, terminal handling, telephone system, modems, connections, transmission media.

Data link layer: design issues, elementary data link protocols- sliding window protocol, HDLC/SDLC, ALOHA, CSMA/CD, token passing, IEEE standard 802 for LAN and WAN.

Section-III

Network layer: design issues, Routing algorithms: shortest path routing, flooding, distance vector routing, flow based routing, Congestion control algorithms: leaky bucket, token bucket, Internet working, the network layer in the Internet IP protocol, IP address.

Transport layer: design issues, elements of transport protocol, addressing establishing & releasing a connection, flow control & buffering, TCP/IP service model, TCP connection management.

MC-Paper-IV: PRINCIPLES OF MANAGEMENT Section I

Management: Nature and scope

Planning: - Nature, Types, Steps in planning, the process of planning, setting of objectives, strategies policies and planning premises, the process of decision making.

Organizing: nature, Process of organizing, departmentation, line and staff arrangement, organization structure and design, project and matrix organization, authority, decentralization, delegation, creating an effective span of management.

Section II

Need, recruitment and selection techniques, types of interview co-ordination: Need and importance, types and techniques.

Controlling: Control process, control techniques

Directing: - Conception, motivation, communication and leadership.

Section III

Introduction of the following function Areas:

Production – Production systems Production planning and control, work study

Marketing – Concept, segmentation of market, marketing mix, marketing research.

Finance – Finance functions, sources of finance for fixed assets and working capital structure HRD – concept, different functions of HRD

MCA-Paper-V: INTRODUCTION TO MICROPROCESSOR Section I

Introduction to Microprocessor, its historical background and Microprocessor applications.

INTEL 8085: Microprocessor Architecture and its operations, 8085 MPU and its architecture, 8085 instruction cycle and timing diagram, Memory read and Memory Write operations, Instructions for 8085:

Data movement, Arithmetic and logic; and branch control instructions., RISC v/s CISC processors.

Section II

INTEL 8086: Introduction, 8086Architecture, real and Protected mode, Memory Addressing, Memory Paging, Addressing Modes. Pin diagram of 8086, clock generator (8284A)

Section III

Various types of instructions: Data movement, Arithmetic and logic; and program control.

Interrupts: Introduction, 8257 Interrupt controller, basic DMA operation and 8237 DMA Controller, Arithmetic coprocessor, 80X87 Architecture

SEMESTER-3

MCA-Paper-I COMPUTER SYSTEM ARCHITECTURE

Section I

Logic gates, flip flops, Registers, Counters, Adder, Subtractor, MUX and DEMUX, Encoder-Decoder
Computer organization and design: Instruction codes, op- code, computer registers, computer instructions, Timing and control, instruction cycle, memory reference instructions. CPU: Stack organization, Instruction formats and addressing modes Program control, Types of Interrupts

Section II

Control Memory, Micro programming vs Hardwired control unit, Overview of RISC/CISC, I/O and their brief description, I/O, processing, Bus interface, data transfer techniques, I/O interrupts, channels.

Section III

Memory system, storage technologies, Memory hierarchy, Memory management, Main and Auxiliary

memory, Associative, Virtual and cache memory

MCA-Paper-II DATA STRUCTURES

Section I

Basic concepts and notations, data structures and data structure operations, mathematical notation and functions, algorithmic complexity and time space trade off.

Basic data structures such as arrays, stack and queues and their applications, linked and sequential representation. Linked list, representation of linked list, multi linked structures.

Section II

Trees- definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap tree and heap sort algorithm, AVL trees.

Section III

Graphs and their application, sequential and linked representation of graph – adjacency matrix, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS, Hashing.

Searching and sorting use of various data structures for searching and sorting, Linear and Binary search, Insertion sort, Selection sort, Merge sort, Radix sort, Bubble sort, Quick sort, Heap Sort.

MCA-Paper-III VISUAL BASIC PROGRAMMING

Section - I

Introduction to Visual Basic :The Visual Basic Program Development Process; The Visual Basic Environment; Opening a Visual Basic Project; Saving a Visual Basic Project; Running a Visual Basic Project;

Visual Basic Fundamentals : Numeric Constants; String Constants; Variables; Data Types and Data Declarations; Operators and Expressions; Hierarchy of Operations; String Expressions; Library functions , Branching and Looping Statements, Relational Operators and Logical Expressions; Logical Operators; Branching with the if-Then Block; Branching with if-Then -Else Blocks; Selection: Selectcase;

Looping with for-Next; Looping With Do-Loop; Looping with While-Wend

Visual Basic Control Fundamentals : Visual Basic Control Tools; Control tool Categories; Working with controls; Naming Forms and Controls; Assigning Property Values to Forms and Controls; Executing Commands(Event Procedures and Command Buttons); Display Output Data (Labels and Text Boxes);Entering Input data(Text Boxes); selecting Multiple Features(Check Boxes); selecting Exclusive Alternatives(Option Button and Frames);Assigning Properties Collectively(The With Block); Generating

Error Messages(The MsgBox Function);Creating Times Events; Scrollbars;

Menus and Dialog Boxes :Building Drop-down Menus; accessing a Menu from the Keyboard; Menu Enhancements; Submenus; Pop-up Menus; Dialog Boxes; Input Box;

Section - II

Executing and Debugging a New Project : Syntax Errors; Logical Errors; Setting break Points;

Defining Watch Values; Stepping Through a Program; User- Induced Errors; Error Handlers;

Procedures : Modules and Procedures; Sub Procedure; Event Procedures; Function Procedures; Scope;

Optional Arguments

Arrays : Array Characteristics; Array declarations; Processing Array Elements; Passing Arrays to Procedures; Dynamic Arrays; Array-Related Functions; Control Arrays;

Using Class Modules : Object Oriented Principles; Creating Class Modules; Using Class Modules Adding

Properties and Events and Methods.

Using COM Components : Introduction to ActiveX Components and Component Object Model; Benefits

of COM; Clients and Servers; Types of ActiveX Components Available in Visual Basic; Creating user defines ActiveX Components; Managing Components; The Visual Component Manager; Registering and UnRegistering Components.

Section - III

ActiveX Controls : Creating an ActiveX Control; Benefits of ActiveX Control; Adding Properties; Methods and Events to the Control; Managing and Distribution of the Control; Built-in Active X Controls.

ActiveX EXE and ActiveX DLL : Introduction to ActiveX DLL and EXE; Creating ActiveX EXE Component; Creating ActiveX DLL Component

Data Access using ADO : Data Access Technology with VB ; The ActiveX Data Object Model; Advantages of ADO and OLEDB; Connecting to a Data Source; Retrieving from a Data Source; Sorting and Searching Data; Updating Data; Creating Dynamic Record Sets; Using Cursors; Cursor Types; Locking; Accessing ADO Data Control.

Data Environment and Data Report : Introduction; Data Environment Designers; Working with Data Reports; Cut different types of Data Reports.

MCA-Paper-IV RELATIONAL DATABASE MANAGEMENT SYSTEM - I

SECTION-I

Overview of DBMS, Basic DBMS terminology, data independence. Architecture of a DBMS, Distributed databases, structure of distributed databases, design of distributed databases. Introduction to data models: entity relationship model, hierarchical model: from network to hierarchical, relational model, object oriented database, object relational database, comparison of OOD & ORD, comparison of network, hierarchical and relational models.

SECTION-II

Relational model: storage organizations for relations, relational algebra, relational calculus, functional dependencies, multivalued dependencies, and normalization.

SECTION-III

Relational query language: SQL, database integrity, security, concurrency, recovery, client/server architecture, and technical introduction to oracle.

MCA-Paper-V INTERNET AND WEB DESIGNING

Section - I

Internet and Web Designing
Compute Communication and Networks
Internet
E-mail
Basic Services of Internet
WWW and Interactive Web Tools

Section - II

Web browsers
HTML
Multimedia and Graphics
Search Engine
Internet Security

SEMESTER-4

MCA-Paper-I RELATIONAL DATABASE MANAGEMENT SYSTEM-II

SECTION-I

Degree Of Data Abstraction, The Database Life Cycle (DBLC): Initial Study Of The Database, Database Design, Implementation And Loading, Testing And Evaluation, Operation, Maintain Ace And Evaluation.

Centralized Verses Decentralized Design, What Is A Transaction? Concurrency Control (Locking Methods, Time Stamping Method, Optimistic Method) DDBMS Distributed Database Management Systems) Advantage And Disadvantages. Homogeneous And Heterogeneous DBMS,

SECTION-II

Distributed Database Transparency Features. Level Of Data And Process Distribution: SPSP (Single–Site Processing, Single-Site Data), MPSP (Multiple-Site Processing, Single Site Data), MPMD (Multiple –Site Processing, Multiple-Site Data) Systems, Client / Server: Architecture And Implementation Issues. Client / Server Systems, What Is Client / Server? The Forces That Drive Client /Server

SECTION-III

(DSS) Decision Support Systems: Operational Data Vs. Decision Support Data, The DSS Database Requirements. The Data Warehouse: The Evaluation Of The Data Warehouse, Rules For Data Warehouse. Online Analytical Processing (OLAP): OLAP Architecture Relational, OLAP And Comparison, Data Mining.

MCA-Paper-II SOFTWARE ENGINEERING

SECTION-I

Software: Characteristics, Components Applications, Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts Of Project Management, Role Of Metrics And Measurement. . S/W Project Planning: Objectives, Decomposition Techniques: S/W Sizing, Problem Based Estimation, Process Based Estimation, Cost Estimation Models: COCOMO Model, The S/W Equation,

SECTION-II

System Analysis: Principles Of Structured Analysis, Requirement Analysis, DFD, Entity Relationship Diagram, Data Dictionary.

S/W Design: Objectives, Principles, Concepts, Design Mythologies: Data Design, Architecture Design, Procedural Design, Object – Oriented Concepts.

SECTION-III

Testing Fundamentals: Objectives, Principles, Testability, Test Cases: White Box & black box Testing,

Testing Strategies: Verification & Validation, Unit Test, Integration Testing, Validation Testing, System

Testing.

MCA Paper-III SYSTEM SOFTWARE

Section I

Introduction to software processors; elements of assembly language programming; assembly scheme;

single pass and two pass assembler; general design procedure of a two pass assembler

Software Tools: Text editor and its design.

Macros and microprocessor: macro definition, macro expansion, Nested macro calls, features of macro

facility, design of a macro preprocessor.

Section II

Interpreters: use of interpreter, pure and impure interpreter

Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.

Compilers:

Aspects of compilation, lexical analysis, syntax analysis, memory allocation, compilation of expressions; intermediate code for expressions, compilation of control structures, Code optimization – local and global optimization. Linkers – translated linked and load time addresses, relocation and linking concepts. Design of a linker, self relocating programs.

Section III

Basic concept so f an operating system and its functions.

Memory management: contiguous, non- contiguous memory allocation, Paged allocation, Demand paged allocation, segmented paged allocation.

Processor management: Scheduler, traffic controller, race condition.

Information management: Structure and features of file systems, objectives of segmented environment

MCA Paper-IV OPERATING SYSTEMS

Section I

Introduction to operating system, its need and operating system services; operating system classification – single user, multi user, simple batch processing, Multiprogramming, Multitasking, parallel Systems, Distributed system, Real time system

Process Management: Process concept, Process scheduling, threads, overview of Inter process communication, CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.

Section II

Memory management: Logical versus Physical address space, Swapping, Partition, Paging and segmentation.

Virtual memory: Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.

File Management: File concept, access methods, and Directory structure – single level, two lever, tree structures, acrylic graph and general graph directory, file protection. Allocation methods: Contiguous, linked and index allocation, free space management.

Section III

Device management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk Scheduling Algorithms

Deadlock: Deadlock characteristics, Prevention, Avoidance, Detection and Recovery, critical section, synchronization hardware, semaphores, combined approach to deadlock handling

Resource Management: Mechanism and Policy, domain of protection, access matrix.

Security: Authentication, Program Threats, System Threats, and Encryption.

MCA Paper-V- ARTIFICIAL INTELLIGENCE

SECTION I

Introduction to AI: Definitions, Basic Elements of AI, AI application Areas, Introductory Concepts of AI - clausal form, Resolution, Unification, Inference Mechanisms.

AI Language PROLOG: Operators, Data Structures, Input & Output, Controlling Program Flow, Strings, and Recursion.

Section II

Knowledge Based Systems: Knowledge representation, acquisition, organization & Manipulation, Basic Components & architecture of Expert systems, ES-Shells, Dealing with uncertainty.

Section III

Natural language processing: syntactic processing, semantic analysis, Morphological, discourse and pragmatic processing.