63. COMPUTER SCIENCE

Part-A (40 Marks):
PC Software and 'C' Programming: Fundamentals of Computers: Computer Definition – Types of Computers-Logical Organization of a Digital computer-Memory: Main Memory: RAM, ROM and Cache-Secondary Memory: magnetic tape, Floppy disk, hard disk, Compact disk-input devices-Output devices-Operating system: Definition, functions of an operating system, Types of Operating systems: Brief details of batch processing, Multi Programming multi tasking, time sharing, real time operating systems-Introduction to DOS, DOS Internal Commands, DOS External Commands- Introduction to windows, Desktop, File, Folder, My Computer, My documents, recycle bin, Internet Explorer-Windows Explorer Types of Programming Languages. **Word Basics:** Starting word, Creating a new document, Opening pre-existing document, The parts of a word window, Typing text, Selecting text, Deleting text, Undo, Redo, Repeat, Inserting text, Replacing text, Formatting text, Cut, Copy, Paste-Printing. Formatting Your Text and Documents: Auto format, Line spacing, margins, Borders and Shading. **Working with headers and Footers:** Definition of headers and Footers, creating basic headers and footers, creating different headers and footers for odd and even pages. **Tables:** Creating a simple Table, Creating a Table using the table menu, Entering and editing text in a table, selecting in table, adding rows, changing row heights, Deleting rows, Inserting columns. Deleting columns, changing column width. **Graphics:** Importing graphics, Clipart, Insert Picture, Clip Art Gallery, using words drawing features, drawing objects, text in drawing. **Templates:** Template types, using templates, exploring templates, modifying templates. Macros: Macro, Recording macros, editing macros, running a macro. **Mail Merge:** Mail Merge concept, main document, data sources, merging data source and main document, Overview of word menu options word basic tool bar. **Power Point:** Basics, Terminology, Getting started, Views. **Creating Presentation:** Using auto content wizard, Using blank presentation option, Using design template option, Adding slides, Deleting a slide, Importing Images from the outside world, Drawing in power point, Transition and build effects, Deleting a Slide, Numbering a slide, Saving presentation Closing presentation, Printing Presentation elements. **MS Access:** Creating a Simple Database and Tables: Creating a contacts Databases with the wiz, The Access Table wizard, Creating Database Tables without the wizard, Field Names, Data Types and properties, Adding, deleting fields, renaming the fields in a table. **Forms:** The Form Wizard, Saving Forms, modifying forms. **Entering and Editing Data:** Adding Records, Duplicating previous entries without Retyping, Undo, Correcting Entries, Global Replacements, Moving From record to Record in a table. **Finding, Sorting and Displaying Data:** Queries and Dynasets, Creating and using select queires, Returning to the Query Design, Multilevel Sorts, Finding incomplete matches, Showing All records after a query, Saving Queries, Crosstab Queries. **Printing Reports:** Simple Table, Form and Database printing, Defining advances Reports, Manual Reporting, properties in Reports, saving reports. **Relational Databases:** Flat Versus Relational, Types of Relationships, Viewing Relationships, Defining and Redefining Relationships, Creating and Deleting relationships. **MS Excel:** Excel Basics: Overview of Excel Features, Getting started, creating a new worksheet, selecting cells. Entering and editing text, entering and editing numbers, entering and editing Formulas, referencing cells, moving cells, copying cells, sorting cell data, inserting rows, inserting columns, inserting cells, Deleting parts of a worksheet, clearing parts of a worksheet. **Formatting:** Page setup, changing column widths and Row heights, auto format, changing font sizes and Attributes, centering text across columns, using border buttons and Commands, changing colours and shading, hiding rows and columns. **Introduction to functions:** Parts of functions, function Requiring Add-ins, The Function Wizard. Examples functions by category: Data and time functions, Engineering functions, math and Trig functions, Statistical functions, text Functions. **Excel Charts:** Chart parts and terminology, Instant charts with the chard wizard, creation of different types of charts, printing charts, deleting charts-Linking in Excel. **Excel Graphics:** Creating and placing graphic objects, resizing Graphics, Drawing Lines and Shapes. **Introduction-'C' Fundamentals:** Programming-High level languages-compiling programs-integrated Development Environments-language interpreters-Compiling your first program-Running your program-understanding your first program-comments-variables, Data types, and Arithmetic Expressions: working with variables-understanding Data types and constants–working with arithmetic expressions- The Assignment operators-The printf function-The scanf function-Decision making: The if statement-The if else construct-Nested if statements - The else if construct-the switch statement-Boolean variables-The conditional operator- program looping: The for statement-relational operators-Nested for loops-The while statement-The do statement-The break statement-The continue statement-working with Arrays: Defining an array-Initializing Arrays-character Arrays-The const Qualifier-Multidimensional arrays-variable length arrays. **Working with Functions:** Defining a Function – Arguments and Local variables-Returning Function results-Function calling-

Declaring Return Types and Argument types-Top Down Programming-Functions and Arrays-global variables-Automatic and static Variables-Recursive Functions. **Programming in C: Working with structures:** Defining structure-Functions and structures-Initializing structures-Array of structures-structures containing structures-structures containing Arrays-Structure variants-Character strings; Arrays of characters-variable length character stings-escape characters–character stings structure and arrays-character operations. **Pointers:** Defining a pointer variable-using pointers in Expressions-pointers and structures (Exclude Linked List)-Pointers and Functions-Pointers and Arrays-operations on pointers-pointers and Memory address. **Operations on Bits:** Bit Operators-Bit fields **The pre-processor:** The #define statement- The ## operator-the #include statement- conditional compilation. **More on Data Types:** Enumerated Data types-The typedef statement-Data type conversions. **Input and Output Operations in "C":** Character I/O-formatted I/O-input and Output Operations with files-Special functions for working with Files. **Miscellaneous and Advances features:** The Goto Statement, The null statement, working with unions-the comma operator-type qualifiers.

Part-B (60 Marks):

Java Fundamentals: *Fundamentals of Object Oriented Programming:* Object Oriented paradigm-Basic concepts of Object Oriented Programming-Benefits of OOP-Applications of OOP. Java Evolution: Java Features-How Java Differs from C and C++ - Java and Internet-Java and World Wide Web: Web Browsers-Hardware and Software Requirements-Java Environment. Overview of Java Language: Simple Java Program-Java Program Structure-Java Tokens-Java Statements-Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants, Variables and Data types: Constants – Variables – Data Types – Declaration of Variables-Giving Values to variables-Scope of Variables-Symbolic Constants-Type Casting. *OOPS Concepts in Java:* Operators and Expressions: Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators-Arithmetic Expressions-Evaluation of Expressions-Precedence of Arithmetic Operators-Operator Precedence and Associativity. *Decision Making and Branching:* Decision Making with If statement-Simple If Statement-If else Statement-Nesting If Else Statement-the Else-If Ladder-The switch Statement–the: Operator. *Decision Making and Looping?:* The while statement-The do statement-The for statement-Jumps in Loops. Class, Objects and Methods*:* Defining a Class-Fields Declaration, Methods Declaration -Creating Objects-Accessing class members-Constructors-Methods Overloading-Static Members-Nesting of Methods-Inheritance-Overriding Methods-Final Variables and methods-Final Classes-Abstract Methods and Classes-Visibility Control] *Packages and Interfaces in Java:* Arrays, Strings and Vectors: One-dimensional Arrays-creating an Array-Two dimensional Arrays-Strings-Vectors-Wrapper Classes-Enumerated Types. Interfaces: Multiple Inheritance: Defining Interfaces-Extending Interfaces-Implementing Interface-Accessing Interface Variables. Packages: Java API Packages – Using system Packages-Naming Conventions-Creating Packages-Accessing a Package-Using a Package-Adding a Class to a Package-Hiding Classes-Static Import. *Multithreaded Programming and Applets:* Multithreaded Programming: Creating Threads-Extending the Thread Class-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Exceptions-Thread Priority-Synchronization. Managing Errors and Exceptions: Types of Errors-Exceptions-Syntax of Exception Handling Code-Multiple Catch Statements-Using Finally Statement-Throwing our own Exceptions- Using Exceptions for debugging. Applet Programming: How Applets differ from Applications-Preparing to write Applets-Building Applet Code-Applet Life Cycle-Creating an Executable Applet-Designing a webpage-Applet Tag-Adding Applet to HTML file – Running the Applet – More about Applet Tag-Passing parameters to Applets – Aligning the display – More about HTML tags-Displaying Numerical Values-Getting Input from the user. *Data Structures:* Sorting: Bubble Sort-Selection Sort-Insertion Sort-Quick Sort- Stacks and Queues: Stacks- Queues-Circular Queue-Deques-Priority queue-Parsing Arithmetic Expressions-Linked List: Simple Linked List – Finding and Deleting Specified Links – Double Ended Lists-Abstract Data types-Sorted Lists-Doubly Linked Lists-Advanced Sorting: Quick Sort-Binary Trees: Tree Terminology-Finding a Node-Inserting a Node–Traversing the tree- Finding Maximum and Minimum values – Deleting a Node – Efficiency of Binary Trees-Trees Represented as Arrays-Graphs: Introduction to Graphs-Searches-Minimum Spanning Tree-Topological Sorting with Directed Graphs-Connectivity in Directed Graphs. **Database Systems Introduction and Fundamentals:** Database Systems: Introducing the database and DBMS, Why the database is important, Historical Roots: Files and File Systems, Problems with File System Data Management, Database Systems. Data Models: The Importance of Data Models, Data Model Basic Building Blocks, Business Rules, The evaluation of Data Models, Degree of Data Abstraction. *The Relational Database Model:* A logical view of Data, Keys, Integrity Rules, Relational Set Operators, The Data Dictionary and the system catalog, Relationships with in the Relational Database, Data Redundancy revisited, Indexes, Codd's relational

database rules. ***Data Modeling and Normalization:*** Entity Relationship Model: The ER Model, Developing ER Diagram, Database Design Challenges: Conflicting Goals. Advanced Data Modeling: The Extended Entity Relationship Model, Entity clustering, Entity integrity: Selecting Primary keys, Design Cases: Learning Flexible Database Design. Normalization of Database Tables: Database Tables and Normalization, The need for Normalization, The Normalization process, Improving the design, Surrogate Key Considerations, High level Normal Forms, Normalization and database design, denormalization. ***Interaction with Databases and Construction of Information System:*** Introduction to SQL: Data Definition Commands, Data Manipulation Commands, Select queries, Advanced Data Definition Commands, Advanced Select queries, Virtual Tables, Joining Database Tables. Advanced SQL: Relational Set Operators, SQL Join Operators, Sub-queries and correlated queries, SQL Functions, Oracle Sequences, Updatable Views, and Procedural SQL. Database Design: The Information System, The Systems Development Life Cycle, The Database Life Cycle, Database Design strategies, Centralized Vs Decentralized design. ***Transaction Management in DBMS Environment:*** Transaction Management and Concurrency Control: What is transaction, Concurrency control, Concurrency control with locking Methods, Concurrency control with time stamping methods, concurrency control with optimistic methods, database recovery management. Distributed Database Management Systems: The evolution of Distributed Database Management Systems, DDBMS advantages and Disadvantages, Distribution Processing and Distribution Databases, characteristics of Distributed database management systems, DDBMS Components, Levels of Data and Process distribution, Distributed database Transparency Features, Distributed Transparency, Transaction Transparency, Performance Transparency and Query Optimization, Distributed Database Design, Client Server VS DDBMS. ***Data Warehouse Concepts and Database Administration:*** The Data Warehouse: The need for data analysis, Decision support systems, The data warehouse, Online analytical processing, Star schemas, Data mining, SQL extension for OLAP. Database Administration: Data as a Corporate asset, The need for and role of databases in an organization, The evolution of the database administration function, The database environment's Human Component, Database administration Tools, The DBA at work: Using Oracle for Database Administration.