Syllabus for examination for Computer Teacher

Fundamentals of Information Technology

Computer :

Block Diagram of elements of digital computer-their functions.
Memory, CPU, I-O devices, Secondary storages, Magnetic Tape, Disk, CD-ROM.
Other recent developments-Scanners, Digitizer, Plotters.
Hardware and Software. Micro, Mini and Main-frame computers-their features.

Representation of Data:

Binary, Octal, Hexadecimal, BCD, EBCDIC, ASCII Conversions. Simple
Additions, Subtractions, Multiplications, Divisions (in Octal and Hexadecimals).

Boolean Algebra:

Algebra Rules and DeMorgans rules.   Simplification of equations-simple
equations. Logic Circuits-AND, OR, NAND, NOR, Exclusive OR and NOR Truth
tables.   Gated flip-flops, Registers, Accumulators.

Introduction to 8086/8088 microprocessors-architecture

Base-Data, Address, Control. Introduction to 80286, 80386 and Pentium chips.

Software:

Introduction to Programming, Flowcharts and Algorithms. System   software,
application software, firmware machine, Assembly, and Higher
Level Languages, Stored program Concept. MS Office Packages

Operating System-Introduction:

Process management-FCFS, Round Robbin, Priority based. Memory
management-segmentation, paging, virtual memory. I-O management-concept
of I-O port. File management-FAT, file handling functions. Software and
hardware interrupts, I/O and Memory based Addresses,
DMA channels.

File:

Concept of file. File organization and accessing techniques-Indexed, Line
sequential, Hashed. File handling functions : Sorting, Merging, Indexing,
Updating

Instructions and Addressing Techniques:

Instruction execution cycle. Direct, Indirect, Relative, Paging, Indexed

Broad view of Operating Systems:

MS-DOS, UNIX, MS-WINDOWS

Basic Concept of Networking and Data Communications:

Introduction to LAN and basic communication concepts.
OSI 7 layers, Topologies, Protocols, Ethernet, Arcnet, TCP/IP

Introduction to Virus and Vaccines, Applications, DTP, E-Mail and Internet.

'C' PROGRAMMING

C Fundamentals

C Character Set, Identifiers and Keywords under ANSI C. Data Types, Constants: int, float, double, char. Qualifiers: long, short, unsigned and signed. Escape sequences (like \n,\b etc.). Arithmetic Expressions and different built-in Operators. Pre-processor directives (like #include, #define), concept of header files, Symbolic constants,Comments, sizeof., steps involved in translation of C Program.

Built-in operators and function

Console based I/O and related built-in I/O functions: printf(), scanf();getch(), getchar(), putchar(), gets(), puts().

Decision and Case Control Structure

Iif statement; if-else construct; use of logical operators and Compound Relational Tests; Nested if statements; The else if construct; the relational operators; the conditional expression (ternary) operator. The Switch Statement with or without break, concept of a case label

Loop Control Structure

Concept of Loop, loops supported by 'C', concept of top tested and bottom tested loops, the for loop statement; Nested for Loop ; for loop variants; the while loop statement; simple and nested while loop, Increment/decrement operators; Use of Break and Continue;the do-while loop, comparison between for, while and do while loops.

Storage Classes

Automatic, Register, Static (local and global), External. Scope rules.

Arrays

Concept of a collection, types of collections supported by 'C', Array collection and its features, concept of indexing, index variable, index type, positional value of a member of array collection, concept of dimension and size of an array, 'C' syntax for declaration of array,name of the array and its type, Referring individual elements, Entering data into an array, reading data from an array concept of Array initialization and list of initializers, size option, Bounds checking, the concept of two dimension arrays and related syntax,similarities between dimension and nesting.

Character Strings

What are strings, standard library string functions like strlen(),strcat(), strcpy(), strcmp() etc.,similarity between string and 1-D array of char.

Functions

Concept of a subprogram, the interface of a subprogram, role of a interface, Arguments of a subprogram, kinds of subprograms supported by C, return statement as an interface, local variables;Default Return type and the type void; Passing values between functions through interfaces; Declaration of function type; iterative and recursive subprograms, Recursion; concept of call by value, call by reference, return and their underlying implementation should be explained, similarities.

Pointers

Concept of Pointers, Pointer as an address variable, concept of a pointer data type and its syntax, built-in address operator, Pointers to existing variables of different data types and their uses, use of indirection operator, the name of the array as a pointer variable, Pointers and Arrays, Pointers arithmetic, use of unary operators (++,--), One Dimension Arrays and Pointer, concept of array of pointers and simple use, command line arguments for the main.

Structures

Structure as a homogeneous and heterogeneous collection, possible applications, syntax of declaring structure, Initializing structures, structure variables, accessing structure elements using member operator, Arrays of Structures, and array as member of structure, conceptual difference between array and structure collection, Functions and Structures, nested structures, concept of anonymous structures and their use, Concept of self referential structure, pointer as member of structure and pointer to structure use of member selector operator(->), comparison between indirection (*) operator and member selector operator (->), structure as an argument to function and return type of a function.

Unions

Concept of Union collection, Syntax of declaration and its use, comparison of Array, Structure and Union, array of unions and union as a member of structure, structure as a member of union and array as member of union, concept of memory saving and union, union as a generic data type, concept of anonymous union.

File based I/O

Concept of a file, text files in 'C', concept of a predefined FILE pointer and its definition as given in header file stdio.h, meanings of different members of the structure representing FILE, Disk I/O Functions: High level file I/O or standard functions- fopen(), putc(),getc(), fclose(), fgets(),fputs(),feof(), simple file based programs showing the working of different members of FILE structure.

Dynamic Memory Allocation and Memory functions

Concept of dynamic environment as run time environment, concept of dynamic memory management, use of built-in dynamic memory management tools of 'C' viz. malloc(), free(), simple programs using malloc() and free()

Bitwise Operators

Concept of modifying the value using bit shifting, built-in bit shift operators left bit shift operator(<<) and right bit shift operator (>>) their uses, limitations of bitwise operators, use of bitwise relational operators.

Other features and Miscellaneous functions

Use of atof(), atoi(), atol(), toupper(), tolower(), isalnum(), isalpha(), isdigit(),exit().

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Visual Basic 6.0

INTRODUCTION TO VB 6.0

a. VB Environment
i. Menu Bar, Toolbars, Tool Box ii. Project explorer iii. Properties Window
iv. Form Designer v. From Layout

b. VB The language
i. Variable, Constants, Datatypes, User defined Datatypes
ii. Scope of variable(Global, Local, Modular, static)
iii. Control Flow Statements(IF, IIF, Select Case)
iv. Looping , nesting(Do While, Do until, For, for Each, Exit)
v. Arrays
vi. User defined Procedure, Functions
vii. VB Functions:1.Date 2.Mathematical 3.String 4.Conversion

c. Visual Basic Controls from Toolbox
i. Properties
ii. Methods
iii. Events
iv. Other Controls:1. Microsoft Windows Common Controls (6.0)
2. Microsoft windows Common controls-3(6.0)
3. Control Arrays (adding controls at runtime& design time)

d. Managing Menus
i. Creating and modifying menu at Design time
ii. Programming menu commands
iii. Shortcuts keys & menus at runtime

VALIDATING AND PROCESSING USER INPUTS
Overview , Importance , Types of validation, Implementing Form level and field
level validations, Text box Properties, Using Events, validate Event

USING DEBUGGING TOOLS

a Types of errors & debug menu
       i Types of errors
       ii Debug menu
b Testing the application
       i Immediate window
       ii Using debug and local window
       iii Setting watch expression
c Implementing error handler
       i How VB Handles the runtime error
       ii VB error handler
d VB error handling options
       i How VB handles the runtime error
       ii Disabling the error handler

e Inline error handling

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DATABASE CONNECTIVITY
a How VB access data
     i Data access interface
     ii Relational database concepts
b Introduction to OLE DB & ADO
     i What is OLE DB
     ii How OLE DB relates to ADO
     iii SQL Statements
     iv ADO Data Control
        · Using ADO
        · Connecting to data source
        · Binding controls (DataCombo, DataList, DataGrid
     v Coding ADO
        · Creating record set
        · Adding records in record set
        · Modify, Delete, Search
     vi Data Environment
     vii Introduction to crystal Report (7.0 or above)

BASIC JAVA

Introduction to JAVA
· History of Java · Features of Java · JDK Environment · The Java Virtual Machine · Garbage Collection

Programming Concepts of Basic Java
· Identifiers and Keywords   · Data Types in Java   · Java coding Conventions
· Expressions in Java   · Control structures, decision making statements
· Arrays and its methods

Objects and Classes
· Object Fundamentals · Pass by value · 'this' reference
· Data hiding and encapsulation   · Overloading   · Overriding
· Constructors   · Finalization   · Subclasses (Inheritance)
· Relationship between super class object and subclass object
· implicit subclass object to super class object Conversion
· Dynamic method dispatch

Language Features
· scope rules   · static data, static methods, static blocks
· all modifiers of class, method, data members and variable
· Abstract Classes· Interfaces · Inner classes   · Wrapper Classes
· packages · Package access · importing packages and classes
· user define packages

Exception Handling
· Types of Exceptions   · try, catch, finally, throws keywords
· creating your own exception · exceptions and Inheritance

Multithreading
· Multithreading Concept   · Thread Life Cycle

Abstract Window Toolkit
Components and Graphics   Containers, Frames and Panels

Layout Managers   Border Layout   Flow Layout   Grid Layout
Card Layout   AWT all Components   Event Delegation Model
Event Source and Handlers   Event Categories, Listeners, adapters
Anonymous Classes
- Applets
- Applet Life Cycle
- Applet Context
- Inter applet communication

Java utility Packages , classes, Interfaces
    HashTable Vector   Math Random   System   String StringBuffer
Streams and File IO
    - Files and Stream
- Stream classes
    - Reader Writer classes
    - File class Tests and Utilities
    - Serialization and de serialization

DATA BASE MANAGEMENT SYSTEM

Introduction
1.1 History : Advantages and limitations of DBMS; Users of DBMS,
1.2 Software Modules in DBMS; Architecture of DBMS.

2 Modeling Techniques
2.1 Different Types of Models, Introduction to ERD.

3 Hierarchical Database
3.1 Introduction.

4 Network Database
4.1 Introduction

5 Relational Algebra
5.1 Select, Project, Union, Intersection, Difference, Cartesian Product,
Simple Join. Queries to be solved based on the above.

6 Relational Database
6.1 Introduction; Codd's 12 Rules; Concept of Domain, Tuple,
cardinality; Comparison between HDB-NDB-RDB

7 Normalisation
7.1 Advantages & disadvantages of Normalisation; 1NF-2NF-3NFrules
with examples; Anomalies.

8 Integrity Constraints
8.1 Entity-Domain-Referential integrity rules; Assertion and
Triggers concept.

9 Recovery Mechanisms
9.1 Recovery from various problems of volatile and non-volatile

storage devices; Concept-properties-states of Transaction; Introduction to mechanisms such as - Log, Checkpoint and Shadow Paging.

Concurrency Controls

10.1 Problems of concurrent Transactions; Control Mechanisms such as - Locks, Time-Stamps, Optimistic Scheduling and MVT.

11 Distributed Databases

11.1 Concepts, Data Distributions Techniques.

12 Data Warehousing and Data Mining

12.1 Concept, Architecture, Various tools in Data Warehousing, Tools in Data Mining, Difference between Data mining and normal query.

SQL commands.

List of SQL commands to be covered   Create/drop a Database
Create /Modify/Alter/Drop Table   DML Commands
Insert,Update, Delete, Select Aggregate Function
Max, Min, Avg, Count, Sum
GROUP BY
ORDER BY
HAVING

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