

# **Syllabus for examination for Computer Teacher**

## **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**

if 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().

## 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

---

## 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-3NF rules 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