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Part II—Section 2

**Notifications or Orders of interest to a Section of the public
issued by Secretariat Departments.**

NOTIFICATIONS BY GOVERNMENT

SCHOOL EDUCATION DEPARTMENT

**SYLLABUS FOR COMPETITIVE EXAMINATION FOR RECRUITMENT OF COMPUTER
INSTRUCTORS GRADE - I**

[G.O. (2D) No. 10, School Education (SE 7(1)), 27th February 2019, மாசி 15, விளம்பி, திருவள்ளூர் ஆண்டு-2050.]

No. II(2)/SE/205(b)/2019.

I. PRESCRIBED QUALIFICATIONS

No persons shall be eligible for appointment to the said post unless he / she possesses the following qualifications namely;

(a) Post Graduate with at least 50% marks (or its equivalent) from recognized University and Bachelor of Education (B.Ed.) from National Council for Teacher Education recognized institution.

(or)

(b) Post Graduate with at least 45% marks (or its equivalent) from recognized University and Bachelor of Education (B.Ed.) from NCTE recognized institution (in accordance with the National Council for Teacher Education (Form of application for recognition, the time limit of submission of application, determination of norms and standards for recognition of teacher education programmes and permission to start new course of training) Regulations, 2002 notified on 13.11.2002 and National Council for Teacher Education (Recognition Norms and Procedure) Regulations, 2007 notified on 10.12.2007.

(or)

(c) Post Graduate with at least 50% marks (or its equivalent) from recognized University and B.A. Ed./B.Sc. Ed., from any NCTE recognized institution.

The above NCTE norms to be followed with the below mentioned relevant subjects.

- i. Master's Degree in Engineering or Technology in Computer Science / M.Tech Degree in Computer Science / Computer Engineering / Information Technology / Software Engineering from recognised University or its equivalent

(or)

- ii. Master's Degree in Computer Application / Master's Degree in Computer Science or Information Technology from recognised University or its equivalent

and

B.Ed., B.A. Ed.,/ B.Sc. Ed., by recognised University or its equivalent

II . QUESTION PATTERN

No of Questions : 150

Sl.No	SUBJECT	MARKS
1.	Computer Science	130
2.	General Knowledge	10
3.	Education Psychology	10
Total		150

III. SYLLABUS

COMPUTER SYSTEMS ARCHITECTURE

1. THE COMPUTER SYSTEM

Marks: 10

System buses: Computer Components, Computer function, Interconnection Structures.

Internal Memory: Computer Memory System Overview, Cache Memory.

Input/ Output: External Devices, Direct Memory Access, The External Interface.

Operating System Overview.

2. THE CENTRAL PROCESSING UNIT

Computer Arithmetic: The Arithmetic and Logic Unit (ALU), Floating-Point Arithmetic.

Instruction Sets: Types of Operands, Types of Operation, Register Organization, The Instruction Cycle.

OPERATING SYSTEMS

Marks: 10

Introduction: System software, OS strategies; multiprogramming, batch.

Operating System Organization: basic OS function, kernels, device drivers.

Device Management: buffering.

Process Management: resource abstraction, process hierarchy.

Scheduling: Strategy selection.

Synchronization Principles: deadlock, semaphores, multiprocessors.

Deadlocks: hold and wait, Banker's Algorithm, consumable resources.

Memory Management: memory allocation strategies, variable partition.

Protection and Security: internal access authorization.

DIGITAL ELECTRONICS

Marks: 10

Fundamental Concepts: NAND, NOR and Exclusive-OR operation, Boolean Algebra.

Number system and Codes: Primary, Octal, Hexadecimal, Signed Numbers Codes.

Combinational Logic Design: K-map representation of logical functions and simplification using K-map of 4 and 5 variables.

Multiplexers, Decoders.

Flip-Flops: Edge triggered flip flop.

DATA STRUCTURES**Marks: 15**

Abstract data types and objects, graphical user interfaces; language support and OOP: Inheritance, classes and subclasses, header files, overloading.

Programming with Data structures: Stacks, queues, lists, trees and balanced binary trees, algorithms for searching and sorting and open office.

PROGRAMMING IN C++**Marks: 20**

1. Object Oriented Programming: Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies.
2. Implementation of Object Oriented Programming concepts in C++: Members of a class-Data Members AND Member Functions (methods), inside class definition and outside class definition using scope resolution operator (::) Objects as function arguments-pass by value and pass by reference;

Constructor and Destructor:

Constructor: Declaration and Definition of a constructor, Default Constructor, Overloaded Constructors

Destructor: Declaration and definition of destructor;

Inheritance (Extending Class): Concept of Inheritance, Base Class, Derived Class, Defining derived classes, Multilevel inheritance and Multiple inheritance,

Data File Handling:

Reading and Manipulation of text from an already existing text File (accessing sequentially);

3. Pointers:

Declaration and Initialization of Pointers: Dynamic memory allocation/ deallocation operators: new, delete; Pointers and Arrays: Array of Pointers, Function returning a pointer. Deference operator: *,->; self referential structures, Python, PHP;

RELATIONAL DATABASE MANAGEMENT SYSTEM**Marks: 10**

1. Database Management System

Introduction to database concepts: Relation/ Table, Data, Concept of String Candidate key, Alternate key, Primary Key, Foreign Keys; Data Normalization-first, second, third, BCNF normal form;

Examples of Commercially available Database Management System's (Back-End) –MySQL,

Examples of Front End Software's Visual C++

2. RDBMS Tools: Oracle

Classification of SQL Statements: DML (SELECT, INSERT, UPDATE, DELETE),

SQL SELECT Statement: SQL SELECT statement, Selecting All the Columns, Selecting Specific Column, Column Heading Default,

SELECT Statement Continued: Limiting Rows during selection (using WHERE clause), Logical Operators, Use of Logical

Operators (AND/OR/NOT Operators), Logical Operator Precedence, ORDER BY Clause, Sorting in Ascending/ Descending Order,

Functions: SQL Functions, Types of SQL Function (Single Row/ Multiple Row), Character Functions UPPER (), TRIM (), SUBSTR (), (ROUND (), TRUNC (), MOD ()), Working with Dates [LAST_DAY(), MONTHS_BETWEEN(), ROUND(), Implicit and Explicit Conversion,

Grouping Records: Types of group functions [MAX (), MIN (), AVG (), SUM (), COUNT ()], using AVG and SUM Functions, Group By Clause, Grouping By More than One Column, Having Clause.

Sub Queries: Guidelines for Using Sub Queries, Types of Sub-Queries (Single Row and Multiple Row)

Database Objects: DDL (Data Definition Language), , Creating Synonyms, Querying a View, Modifying a view.

Including Constraints: UNIQUE KEY, PRIMARY KEY, FOREIGN KEY, FOREIGN KEY

Creation of a Table/ Relation: CREATE TABLE Statement, Creating a Table by Using a Sub-Query;

Managing Existing Tables and other Database Objects: The ALTER TABLE Statement, Adding a New Column in a Table, Dropping Tables;

BUSINESS COMPUTING**Marks: 15**

Integration of User Interface and Database;

More application areas of Databases:

Inventory control, Financial Accounting, Fees Management System, Result Analysis System, Admission Management System, Income Tax Management System;

Advance Program Development Methodology: System Development

Life Cycle, Data Models (Entity Relationship Model), Attributes (Single, Composite and Multi- Valued), Relationship (One-to-One, One-to-Many and Many-to-Many SQL Statements,

Data Dictionary, Data Warehousing, Data Mining,

WEB DEVELOPMENT**Marks: 10**

HTML/ DHTML

Introduction, Objectives, Introduction to Universal Resource Identifier (URI)

Basic Tags of HTML: HTML, HEAD, TITLE, BODY, Ordered List-OL (L1, Type-1, I, A, a; START, VALUE), Unordered List-UL (Bullet Type- Disc, Circle, Square, DL, DT, DD), Web Page Authoring Using HTML

Tables: Creating Tables, Border, WIDTH, CAPTION, ALIGN,

Frames: Frameborder, height and width,

Forms: Definition, MS-Access or Oracle,

Form Tags: FORM, METHOD, Document Object Model

1. Active Server Pages (ASP)

Active Server Pages (ASP): Concept of ASP, features of ASP,

Variables: Explicit and Implicit Declaration;

Functions:

String Manipulation Functions: Ucase (), Lcase (), Len (), Left (), Right (), Mid (), Ltrim (), InStr()

Time & Date Functions: Date (), Day(), Hour (), Left (), Len (), Minute (), Month (), Monthname (), Now ();

Arrays: Declaration and use of 1 dimensional and 2 dimensional arrays;

Procedures and Functions, Passing parameters/ arguments;

Connecting with Databases: Creation of DSN, using OLEDB.

WEB SCRIPTING**Marks: 10**

1. Java Script

Event handling, Adding Java Script in an HTML Page

MULTIMEDIA AND AUTHORING TOOLS

Image Formats

TIFF, BMP, JPG/ JPEG, GIF, IC, PDF, PSD:

Image Scanning with the help of scanner: Setting up Resolution, Size, File formats of images; image preview

Significance of PDF-creation, modification; Animation, Morphing and Applications

Graphic Tools: Image Editing Software (Photoshop/ CorelDraw)

Image Handling: Cropping an image, adjusting image size, saving an image;

Layers: Adding layers, dragging and pasting selections on to layers, moving and copying layers, duplicating layers, deleting layers, merging layers. Opacity.

Concept of Multimedia: Picture/ Graphics, Audio, Video;

Sound: Recording Sound using Sound Recorder (Capture), Sound editing, Effect enhancement;

Voice Recognition Software Philips/ Dragon, MIDI Player, Sound Recorder.

Sound Quality: Radio Quality,

1. Movie File Formats: AVI, MPEG.
Movie Frames: Concept of Frame, Frame Buffer,;
2. Multimedia Authoring Using Macromedia Flash
Making of Simple Flash Movie,

COMMUNICATION AND NETWORK CONCEPTS

Marks: 20

Evolution of Networking: Internet;

Data Communication terminologies: Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps, kbps, Mbps, Gbps, Tbps);

Network devices: Modem, Ethernet Card, Hub, Switch, Router,

Different Topologies- Bus, Tree; Concepts of LAN, WAN, MAN;

Protocol: TCP/IP, Internet, Wireless/ Mobile Communication, GSM, Electronic Mail, Chat, Video Conferencing;

Network Security Concepts: Cyber Law, Hackers and Crackers;

WebPages; Hyper TEXT markup Language (HTML), Hyper Text Transfer Protocol (HTTP); Website, Web-Browser, Web Servers.

PRADEEP YADAV,
Principal Secretary to Government.