

# MAULANA AZAD NATIONAL URDU UNIVERSITY

Gachibowli, Hyderabad 500032

## Syllabus for Written Test for the Post of Senior Technical Assistant To be held on 3.11.2018

**The Written Test shall broadly cover the following subjects and the Test Paper shall be a mix of objective and subjective questions:**

**Information Technology** – its concept and scope, information processing and information transmission; Elements of computer system, computer hardware and software; Software and program; Computer organization, block diagram of a computer, CPU, memory; inter-connections between computer units, connectors and cables; primary and secondary memory; device controllers, serial port, parallel port, system bus; Special features, various cloud based and desktop based word processors and Spreadsheets;

**Operating System:** Overview of Operating Systems, Definition of Operating Systems; Types of Operating Systems; Linking, loading and executing control program; Process Management Functions, Job Scheduler, Process Scheduler, Process synchronization Module; CPU Scheduling - Scheduling Criteria-Scheduling algorithms – FCFS, SJF, Priority, RR, Multilevel, Feedback Queue - Process synchronization - The Critical Section Problem-Synchronization Hardware-Classical Problems of synchronization, File and Database System - File System - Functions of organization-Allocation and Free space management. Memory Management Function, Introduction, Single Process System, Fixed Partition Memory, System Loading, Segmentation, Swapping, Simple Paging System.

Concept of Active Directory and its management. Configuring DHCP, DNS, Web services of Windows/Linux Systems. Firewall and Antivirus/Malware.

**Object Oriented Programming:** Classes and Objects, Creating objects, member function, Static class members, Friend functions, Passing and returning objects to and from functions, Nesting of classes Constructors: Default constructors, Parameterized constructors, Constructor overloading, Constructors with default arguments, Copy constructors – Destructors; Single Inheritance, Overriding base class members, Abstract classes, Constructors and destructors in derived classes, Multilevel inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual functions, Virtual base class, File processing: Opening and closing files, File pointers, File stream functions, Creating and processing text and binary files.

**Data Structures:** Arrays, Structure of arrays, Representation of arrays, Operations on one dimensional arrays; Stacks: Definition, Operation on stack, Implementation using arrays and linked lists, Evaluation of arithmetic expressions, Queues: Implementations using arrays and linked lists, Circular queue, Dequeues, Priority queues, Applications of queues; Lists: Representation and Traversing of linked list, Operations with linked list, Doubly linked list, Circular list, Header linked list, Sparse matrices: Array representation and Linked representation of Sparse matrices; Binary trees, Properties of binary tree, Traversal application, Representation of binary trees and operations.

Linear search, Binary search, Comparison of different methods, Sorting: Insertion, Bubble, Selection, Quick, Heap, Merge sort methods, Comparisons, Hashing: Different hashing functions, Methods for collision handling

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**Data Communication and Computer Networks:** Uses of Computer Networks, Network Hardware, ISO OSI and TCP/IP Reference Model, Transmission Media - Twisted Pair, Coaxial Cable, Fibre Optics, Wireless Transmission - Radio Transmission, Microwave Transmission, Satellites.

Modulation, Concept of AM, FM, PM, PAM, FSK, PSK and PCM Concept of bandwidth, noise and channel capacity of different communication system, optical fiber system and issues like line characteristics and impedance matching.

Data Communication Principles: Concept of simplex, half duplex and full duplex modes, synchronous and asynchronous communication data transfer; Frame level communication, data packets, address encoding and decoding of data packets, data encryption and decryption; Serial and parallel data communication, comparison in terms of speed of data transfer.

Network Equipment: Modem, Hub, Switches, Bridges, Routers, Controllers, APs; IEEE 802.3 and IEEE 802.11 x; Concept of Subnet, Super-net, Classless; Windows and Linux commands for configuring and troubleshooting network on Servers/PCs, Commonly used commands for configuring switches and routers with reference to Cisco equipment.

**Database System:** Purpose of database systems, Data abstraction, Instances and Schemas, data models. Database languages, Database administrator, database users, database architecture. The entity-relationship model- Entity sets, Relationship sets, Attributes. Constraints- Mapping cardinalities, Keys, ER diagrams, Weak entity sets, Strong entity sets.

Relational Database Design: 1st, 2nd, 3rd, BCNF, 4th, 5th Normal forms. Transactions - Properties (ACID), States, Concurrent executions. Concurrency control lock based protocols - Locks.

Data Definition in SQL: Data types, creation, Insertion, viewing, updation, deletion of tables, modifying the structure of tables, renaming, dropping of tables. Data constraints- I/O constraints- Primary key, foreign key, Unique key constraints. Business rule constraints- Null, not null, check integrity constraints, Defining different constraints on table, ALTER TABLE Command.

Database Manipulation in SQL: Select command, Logical operators, Range searching, Pattern matching, Grouping data from tables in SQL, GROUP BY, HAVING clauses, Joins - Joining Multiple Tables, Joining a Table to itself. Views - Creation, Renaming the column of a view, destroys view. Granting and revoking permissions - Granting privileges, Object privileges, Revoking privileges.

Program with SQL – data types Using set and select commands-procedural flow and controls, working with cursors- Error handling-developing stored procedures- create, alter and drop; passing and returning data to stored procedures-using stored procedures within queries- building user defined functions— creating and calling a scalar function- implementing triggers creating triggers - multiple trigger interaction.

**PHP Programming:** Introduction to PHP, Handling HTML Form With PHP, Decisions and loop, Function, String, Array, Working with file and Directories, State management, String matching with regular expression, Generating Images with PHP, Database Connectivity with MySql. MVC Framework.