सहायक स्तर (सुपरभाइजर, वरिष्ठ सहायक, सहायक-IT) खुल्ला प्रतियोगिताका लागि परीक्षाको किसिम, पाठ्यक्रम, २०७९

क) लिखित परीक्षा : पूर्णाङ्क-७५

ख) प्रयोगात्मक तथा अन्तरवार्ता : पूर्णाङ्क- २५

पूर्णाङ्क : ७५

समय : २ घण्टा ३० मिनेट

क) लिखित परीक्षा:

Operating System   **Marks 15**

1. Definition, Development and Functions of Operating System (OS), Functional Architecture of OS, Types of OS, Network and distributed OS
2. Disk Allocation and Scheduling Methods, Basic Memory Management strategies, Virtual Memory Management Techniques, Define a Process and features of the Process Management System
3. Input Output and Files: I/O devices and its organization, Principles of I/O software and hardware, Disks, Files and directories organization, File System Implementation, Interrupt handling

Database Management System   **Marks:20**

1. Introduction, A Database Model, Relational Database Model, Integrity, RDBMS
2. SQL and Embedded SQL
3. Writing Basic SQL queries (DDL, DML, DCL)
4. SQL middleware basics: SQL API, Open SQL Gateway
5. Restricting and Sorting Data
6. Sub Queries, Manipulating Data and Creating &Managing Tables
7. Creating Views and Controlling User Access
8. Using Set Operators, Date time Function
9. Relational Database Design, ER Diagram, Keys (primary, foreign, candidate, alternate keys)
10. Normalizations (1NF, 2NF, 3NF, BCNF, 4NF) and functional dependencies
11. Basic Concept of major RDBMS products (MSSQL, Oracle, MariaDB etc.)
12. Concept of Time series DB
13. Fundamentals of database servers, functions, procedures, triggers and rules
14. Transaction Management and Concurrency Control: Concurrent execution of the user
15. programs, transactions, Concurrency control techniques
16. Crash Recovery: Types of failure, Recovery techniques
17. Query Processing and Optimization
18. Indexing: Hash based indexing, Tree based indexing
19. Distributed Database Systems and Object-oriented database system
20. Data Mining and Data Warehousing
21. Security Management System

Computer Networks   **Marks 20**

1. Definition, OSI & TCP/IP reference model, Topologies, Client/Server Model & Peer2Peer Model
2. Network Components: Repeater, Hub, Bridge, Switch, and Router
3. Link Layer: Services, Flow and Error Control, error detection and correction, multiple access protocols (ALOHA, Slotted ALOHA), 802.3 Ethernet CSMA/CD, Token Bus, Token Ring, FDDI, Protocols: PPP, HDLC, Virtual circuit switching: Frame relay, ATM, X.25, MPLS
4. Network Layer: services, datagram and virtual circuits, routing principles and algorithms, Internet Protocols (IPv4/v6) header format, IPv4/v6 addressing and subnetting, VLSM, CIDR, ICMPv4/v6 error/information messages, Routing: interior/exterior routing, unicast/multicast routing, adaptive/non-adaptive routing. Routing protocols: RIP, OSPF, BGP, IS-IS
5. Transport Layer: Services, multiplexing and De-multiplexing, UDP, TCP, flow control, TCP sliding window, principles of congestion control, TCP congestion control, Open/close loop congestion control, Leaky bucket & Token Bucket algorithm, overview of socket programming, TCP/UDP Sockets
6. Upper layers: Application, presentation and session layer functionalizes, principles of WWW, DNS, DHCP, FTP, email protocols: SMTP/PoP/IMAP, PGP
7. Network management: Server concepts-Proxy/web/DNS servers, IP interconnection, Tier ISP architecture, VoIP, FoIP, remote login (telnet, ssh), Traffic monitoring (MRTG, bandwidth, throughput, latency/delay)
8. Advanced Data Storage Techniques: Network Attached Storage, Storage Area Networks
9. Introduction to Latest networking: Software-Defined Networking, Software-Defined IPv6 (SoDIP6) Network, IPv6 network migration methods, SDN migration methods, IoT, WSN, NGN

Cyber Security and Ethics   **Marks 10**

1. Introduction, Security Technologies
2. Information Security and Cryptography
3. Legal Issues in Cyber Crime
4. Ethics in Cybersecurity & Cyber Law
5. Professional and Ethical Responsibilities
6. Risks and Liabilities of Computer-Based Systems

Others   **Marks 10**

1. Concept of High Availability
2. Disaster Recover and BCP
3. Fintech Software Solutions
4. Access Management.
5. Digital Banking