

**निक्षेप तथा कर्जा सुरक्षण कोष**  
**कम्प्युटर सहायक अधिकृत छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक**  
**लिखित परीक्षाको पाठ्यक्रम**

**पाठ्यक्रमको उद्देश्य :-**

- १) MS-Dos, Windows 2000, Windows XP / Windows NT को ज्ञान भएको तथ्य प्रयोग गर्न सक्ने । Linux को समेत आधारभूत ज्ञान हुन सक्ने ।
- २) File/disk management सम्बन्धी कार्य गर्न सक्ने ।
- ३) Computer printer, CD-Rom, Pen drives, Multimedia र Scanner समेत अन्य Accessories को प्रयोग गर्न सक्ने ।
- ४) MS-Office package प्रयोग गर्न सक्ने ।
- ५) Computer fundamental बारे राम्रो ज्ञान हुन सक्ने
- ६) Data structure र Algorithms बारे राम्रो ज्ञान हुन सक्ने ।
- ७) System Analysis गरी Design समेत गर्न सक्ने ।
- ८) Database design गर्न सक्ने, DBMS को Architecture बारे ज्ञान हुने तथा Oracle, Sybase, DB2, SQL Server, अन्य database हरुको General concept भएको हुन सक्ने ।
- ९) C,C++ र Java programming language प्रयोग गरी program लेख्न र उक्त प्रोग्राम प्रयोग गर्दै Output निकाल्न सक्ने ।
- १०) Network सम्बन्धी basic concept भएको, Network बारे security दिने, Trouble shooting गर्ने तथा Network support tool प्रयोग गरी काम गर्न सक्ने ।
- ११) e-Commerce Technology / Management Information System (MIS) बारे राम्रो ज्ञान भएको हुने ।
- १२) नेपाल सरकारले तयार गरेका IT Policy 2000, Cyber Law of Nepal, Copy Write Law, नेपालमा विकास भई प्रयोग भैरहेको Computer Technology बारे राम्रो ज्ञान हुन सक्ने ।

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**लिखित र प्रयोगात्मक परीक्षाको पाठ्यक्रम**

पाठ्यक्रमको रूपरेखा :- यस पाठ्यक्रमको आधारमा निम्नानुसार तीन चरणमा परीक्षा लिइने छ :

|                                |                  |
|--------------------------------|------------------|
| प्रथम चरण :- लिखित परीक्षा     | पूर्णाङ्क :- १५० |
| द्वितीय चरण :- (क) प्रयोगात्मक | पूर्णाङ्क :- ५०  |
| (ख) अन्तर्वार्ता               | पूर्णाङ्क :- ३०  |

प्रथम चरण – लिखित परीक्षा योजना (Examination Scheme)

| पत्र    | विषय               | पूर्णाङ्क | उत्तीर्णाङ्क | परीक्षा प्रणाली                    | प्रश्न संख्या x अङ्कभार | समय              |
|---------|--------------------|-----------|--------------|------------------------------------|-------------------------|------------------|
| प्रथम   | कम्प्युटर सम्बन्धी | १००       | ४०           | वस्तुगत बहुउत्तर (Multiple Choice) | १०० x १ = १००           | १ घण्टा १५ मिनेट |
| द्वितीय | विषय               | ५०        | २०           | विषयगत (Subjective)                | ५ x १० = ५०             | १ घण्टा ३० मिनेट |

द्वितीय चरण

|   |                     |    |    |             |             |         |
|---|---------------------|----|----|-------------|-------------|---------|
| क | प्रयोगात्मक परीक्षा | ५० | २० | प्रयोगात्मक | ५ x १० = ५० | १ घण्टा |
| ख | अन्तर्वार्ता        | ३० | -  | मौखिक       | -           | -       |

१. लिखित परीक्षाको माध्यम नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी भाषा दुवै हुन सक्नेछ ।
२. पाठ्यक्रमको प्रथम र द्वितीय पत्र तथा प्रयोगात्मक परीक्षाको विषयवस्तु एउटै हुनेछ ।
३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
४. लिखित परीक्षा तथा प्रयोगात्मक परीक्षाका प्रश्नसंख्या निम्नानुसार हुनेछन् :-

|                            |   |   |    |    |    |   |    |   |   |    |    |    |
|----------------------------|---|---|----|----|----|---|----|---|---|----|----|----|
| प्रथम पत्रका इकाई          | 1 | 2 | 3  | 4  | 5  | 6 | 7  | 8 | 9 | 10 | 11 | 12 |
| प्रश्न संख्या              | 5 | 8 | 10 | 10 | 15 | 7 | 10 | 3 | 2 | 5  | 10 | 15 |
| प्रश्न संख्या              | 1 |   | 1  |    | 1  |   | 1  |   |   | 1  |    |    |
| प्रयोगात्मक परीक्षाको एकाई | 1 | 2 | 3  | 4  | 5  | 6 | 7  | 8 | 9 | 10 | 11 | 12 |
| प्रश्न संख्या              | - | - | -  | 1  | 2  | 1 | 1  | - | - | -  | -  | -  |

५. प्रथम पत्रमा वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरूको प्रत्येक सही उत्तर बापत १ (एक) अङ्क प्रदान गरिनेछ ।

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**लिखित र प्रयोगात्मक परीक्षाको पाठ्यक्रम**

६. द्वितीय पत्रको विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरूको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
७. द्वितीय पत्रको पाठ्यक्रमलाई ४ वटा खण्ड/एकाईमा विभाजन गरिएको छ ।
८. यस पाठ्यक्रममा जुनसुकै कुरा लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरू परीक्षाको मिति भन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ ।
९. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको प्रतियोगितात्मक परिक्षामा सम्मिलित गराइनेछ ।

निक्षेप तथा कर्जा सुरक्षण कोष  
कम्प्युटर सहायक अधिकृत छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक  
लिखित र प्रयोगात्मक परीक्षाको पाठ्यक्रम  
प्रथम र द्वितीय पत्र :- कम्प्युटर सम्बन्धी विषय

**1. Computer fundamentals**

- 1.1 Computers, Kinds of Computers in respect of size and function,
- 1.2 Generation of Computers,
- 1.3 Components and Architecture of Computers, Connecting the Components,
- 1.4 Getting started: Orientation to personal computers, The system unit, Starting the computers
- 1.5 Input Devices: The keyboard, The mouse, Other input devices
- 1.6 Processing: CPU, Memory
- 1.7 Storages devices: Overview of Storage Devices, The Floppy Disk Drive, The Hard Drive ,The Universal Serial Bus(USB) Devices and Other Storage Devices
- 1.8 Output devices: Monitors, Printers, Modems, Soundboards
- 1.9 Dos survival guide: Using Command Prompt, Creating and using AUTOEXEC.BAT and CONFIG.SYS
- 1.10 Windows survival guide: The Windows Desktop, The Program Manager, Organizing the Desktop, The File Manager
- 1.11 Application software: Using Application Software
- 1.12 Windows Explorer, E-mails, Internet, Intranet, Extranets, Ethernet, HTTP
- 1.13 Computer Viruses, Antivirus

**2. Data Structure and Algorithms**

- 2.1 Fundamental of Data Structures, Abstract Data types,
- 2.2 Lists, Linked Lists, Stacks,
- 2.3 Queues, Priority Queue,
- 2.4 Trees: Traversal, Implementations, Binary Trees, Binary Search Trees, Balanced Search Trees, AVL Trees.
- 2.5 Indexing Methods. Hashing Trees, Suffix Trees
- 2.6 Worst-Case and Expected time Complexity.
- 2.7 Analysis of Simple Recursive and Non recursive Algorithms.
- 2.8 Searching, Merging and Sorting.
- 2.9 Introductory Notions of algorithm design: Divide-and-Conquer, Dynamic Programming, Greedy Methods, Backtracking
- 2.10 Graph algorithms: Depth-first Search and Breadth-first Search, Shortest Path Problems, Minimum Spanning Trees, Directed Acyclic Graphs.

**3. System Analysis and Design**

- 3.1 Defining the System, System Owner, System User, System Designers and system Builders, System Analysts, Variations on the System Analyst title, System life Cycle,
- 3.2 Joint Application Development (JAD): JAD definition, JAD purpose, JAD Philosophy, JADScope,
- 3.3 Involved in a JAD: Sponsor, Business Users, System Analyst
- 3.4 Roles of JAD Group Member: Project Leader, Record Keeper, Time Keeper.
- 3.5 The System Design Environment: Development Process, Management Process, System Structure, Basic Component of Computer based Information System, Personal/ Centralized/Distribution System.

- 3.6 Concept formations: Introduction, Finding the Problem, Evaluating the Proposal, Technical Feasibility, Operational Feasibility, Economic Feasibility.
- 3.7 Requirements analysis: Representing System Analysis Model, Requirement Model, Design Model,
- 3.8 Development Process: Design Method.
- 3.9 Entity Relationship Diagram (E-R Diagram): Notations, Entities: Strong Entities, Weak Entities, Attributes: Simple and Composite, Single Valued and Multiple Valued, Null and Derived Attribute.
- 3.10 Relationship Sets: Degree of Relationship and Cardinality Relationship, Specialization, Generalization, Aggregation.
- 3.11 Data Flow Diagrams (DFDs): Introductions, Data flow Diagram, Symbol, Files or data store, External entities, Data flows,
- 3.12 Describing System by Data Flow Diagram: Context diagram, Top level DFD, Expansion Level DFD, Conversions of Data.
- 3.13 Object Modeling: Object -Oriented Concept, Object Structure, Object Feature, Class and Object.
- 3.14 Representation: Association and Composition, Inheritance, Multiple Inheritances.
- 3.15 Modeling: Use Case Diagram, State Diagram, Event Flow Diagram.
- 3.16 Documentation: Automatic and Manual System.

#### **4. Operating Systems**

- 4.1 Define an Operating System, Trace the Developments in Operating Systems, Identify the functions of Operating Systems,
- 4.2 Describe the basic components of the Operating Systems, Understand Information Storage and Management Systems,
- 4.3 List Disk Allocation and Scheduling Methods, Identify the Basic Memory Management Strategies, List the Virtual Memory Management Techniques, Define a Process and list the features of the Process Management System
- 4.4 Identify the Features of Process Scheduling; List the features of Inter-Process Communication and Deadlocks,
- 4.5 Identify the Concepts of Parallel and Distributed Processing; Identify Security Threats to Operating Systems
- 4.6 Overview of the MS-DOS Operating System
- 4.7 Introduction to the Windows Family of Products, UNIX Family of Products, Linux Family of Products.
- 4.8 Introduction to Windows Networking
- 4.9 Windows Architecture, Linux Architecture
- 4.10 Troubleshooting Windows, &Linux
- 4.11 Managing Network Printing
- 4.12 Managing Hard Disks and Partitions
- 4.13 Monitoring and Troubleshooting Windows
- 4.14 Users, Groups and Permission Linux and Windows.

#### **5. Database Management System and Design**

- 5.1 Introduction: A Database Model, Relational Database Model, Integrity, RDBMS.
- 5.2 SQL and Embedded SQL
- 5.3 Writing Basic SQL SELECT Statements
- 5.4 Restricting and Sorting data
- 5.5 Single Row Functions
- 5.6 Displaying Data from Multiple Tables

- 5.7 Aggregation Data Using Group Functions
- 5.8 Sub Queries, Manipulating Data and Creating & Managing Tables
- 5.9 Creating Views and Controlling User Access
- 5.10 Using Set Operators, Date time Function
- 5.11 Database Design: Logical Design, Conceptual Design, Mapping Conceptual to Logical, Pragmatic issues, Physical Design, Integrity and Correctness, Relational Algebra, Relational Calculus.
- 5.12 Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, DKNF
- 5.13 Architecture of DBMS: Client-server, Open Architectures, Transaction Processing, Multi-User & Concurrency, and Backup & Recovery Database.
- 5.14 Basic Concept of major RDBMS products: Oracle, Sybase, DB2, SQL Server and other Databases.

## **6. Programming Language**

- 6.1 Overview of Programming Language: History, Programming Paradigms, The role of Language translates in the Programming Process.
- 6.2 Fundamental Issues in Language Design.
- 6.3 Virtual Machines, Code Generation, Loop Optimization.
- 6.4 Concept of Procedural Programming, Structural Programming, Object-Oriented Programming.
- 6.5 Concept of C programming, C++ Programming,
- 6.6 Java Programming for Declaration, Modularity and Storage Management Software Development.

## **7. Networking**

- 7.1 Basic Network Theory: Network Definition, Network Models, Connectivity, Network Addressing.
- 7.2 Network Connectivity: The Data Package, Establishing a Connection, Reliable Delivery, Network Connectivity, Noise Control, Building Codes, Connection Devices.
- 7.3 Advanced Network Theory: The OSI model, Ethernet, Network Resources, Token ring, FDDI, Wireless Networking.
- 7.4 Common Network Protocols: Families of Protocols, NetBEUI, Bridge and Switches, The TCP/IP Protocol, Building TCP/IP Network, The TCP/IP Suite
- 7.5 TCP/IP Services: Dynamic Host Configuration Protocol, DNS Name Resolution, NetBIOS support, SNMP, TCP/IP Utilities, FTP
- 7.6 Network LAN Infrastructure: LAN Protocols on a Network, IP Routing, IP Routing Tables, Router Discovery Protocols, Data Movement in a Routed Network, Virtual LANs (VLANs)
- 7.7 Network WAN Infrastructure: The WAN Environment, Wan Transmission Technologies, Wan Connectivity Devices, Voice Over Data Services
- 7.8 Remote Networking: Remote Networking, Remote Access protocols, VPN Technologies.
- 7.9 Computer Security: Computer Virus, Worm, Trojan Horse.
- 7.10 Network Security: Introduction, Virus Protection, Local Security, Network Access, Internet Security.
- 7.11 Disaster Recovery: The need for Disaster Recovery, Disaster Recovery plan, Data Backup, Fault Tolerance.
- 7.12 Advanced Data Storage Techniques: Enterprise Data Storage, Clustering, Network Attached Storage, Storage Area Networks.
- 7.13 Network Troubleshooting: Using Systematic Approach to Troubleshooting.
- 7.14 Network Support Tools: Utilities, The Network Baseline.

- 7.15 Network Access Points (NAP), Common Network Component, Common Peripheral Ports.

## **8. Computer Architecture & Organization**

- 8.1 Evaluation of Computers, Design Methodology, Set Architecture, MIPS ISA, ALU Design.
- 8.2 Data path Design: Single and Multiple Cycle Implementations, Pipelining, Memory Hierarchy, Input/output System: Bus & Role of Operating System.

## **9. Compiler Design**

- 9.1 Introduction to Compiling,
- 9.2 Logical Analysis, Syntax Analysis, Semantic Analysis,
- 9.3 Run Time environment,
- 9.4 Intermediate Code Generation, Code Optimization,
- 9.5 Compiler Generation Tools.

## **10. E-Commerce Technology**

- 10.1 Introduction to E-Commerce.
- 10.2 Electronic Commerce Strategies.
- 10.3 Electronic Commerce Security Issues.
- 10.4 Success Models of E-Governance.
- 10.5 E-Business: b2b, b2c, b2e, c2c, g2g, g2c.
- 10.6 Principles of Electronic Payment, Strategies & Systems.
- 10.7 E-marketing, Reverse Engineering.
- 10.8 E-Banking, EDI Methods, SWIFT.
- 10.9 Encryption and Decryption Methods, XML, Layout Managers, Event Model.

## **11. MIS and Web Engineering**

- 11.1 Information Systems, Client-Server Computing.
- 11.2 Information Systems and Decision Making.
- 11.3 Database Design issues, Data Mining, Data Warehousing
- 11.4 Knowledge Management, The strategic use of Information Technology.
- 11.5 Work Process Redesign (Reengineering) with Information Technology, Enterprise Resources Planning Systems, Information Systems Security, Information Privacy, and Global Information Technology issues.
- 11.6 Software Supported Demonstrations including advanced Spreadsheet topics, Software Component Based Systems (CBSE),

## **11.7 Multimedia**

- 11.8 Object-Oriented Programming with COMS & DECOMS,
- 11.9 Group Decision Support Systems
- 11.10 Basics of Website Design.

## **12. IT in Nepal**

- 12.1 History of IT in Nepal,
- 12.2 IT Policy of Nepal, 2057 B.S.
- 12.3 Cyber law of Nepal (Electronic Transaction Ordinance, 2061 B.S.)
- 12.4 Copy Write Act, 2022 B.S.
- 12.5 Uses of Computers and Software Development
- 12.6 Nepali Unicode, Nepali Fonts
- 12.7 Licensing Issues
- 12.8 Deposit Security System in Nepal
- 12.9 Deposit and Credit Guarantee Corporation's Program
- 12.10 Mean, Mode, Median, Standard Deviation, Midrange, Symmetric and skewed data

प्रयोगात्मक परीक्षाको एकाई -6 को प्रयोगात्मक परीक्षाको एकाई -7  
 (प्रयोगात्मक) परीक्षाको एकाई -6 को प्रयोगात्मक परीक्षाको एकाई -7  
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|----------------------------|---|---|---|
| प्रयोगात्मक परीक्षाको एकाई | १ | २ | ३ |
| प्रश्न संख्या              | १ | २ | १ |

### 1. Operating Systems – 12

- 1.1 Overview of the MS-DOS Operating System
- 1.2 Introduction to the Windows Family of Products
- 1.3 Introduction to Windows Networking
- 1.4 Windows Architecture, Linux Architecture
- 1.5 Troubleshooting Windows
- 1.6 Managing Network Printing
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### 2. Database Management System and Design – 26

- 2.1 Introduction, Database Model, Relational Database Model, Integrity, RDBMS.
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- 2.10 Using Set Operators, Datetime Function
- 2.11 Concept of major RDBMS products: Oracle, SQL Server and other Databases.

### 3. Programming Language –12

- 3.1 Concept of Procedural Programming, Structural Programming, Object-Oriented Programming.
- 3.2 Concept of C programming, C++ Programming