विरगंज उप–महानगरपालिका
अधिकृतस्तर छैटौं तह, कम्प्युटर अधिकृत
पदको खुला/आन्तरिक लिखित परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रुपरेखा :– 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 बिषय	१००	४०	वस्तुगत बहुउत्तर (Multiple Choice)	५०x२ = १००	४५ मिनेट
द्वितीय		५०	२०	विषयगत (Subjective)	५x१० = ५०	१ घण्टा ३० मिनेट

द्वितीय चरण

(क)	प्रयोगात्मक परीक्षा	५०	२५	प्रयोगात्मक	५x१० = ५०	१ घण्टा ३० मिनेट
(ख)	अन्तर्वार्ता	३०	-	मौखिक	-	-

१. पाठ्यक्रमको प्रथम र द्वितीय पत्र तथा प्रयोगात्मक परीक्षाको विषयवस्तु एउटै हुनेछ ।

२. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

३. प्रथम पत्रमा वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरुको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत २ (एक) अङ्क प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात् ०.४ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

४. द्वितीय पत्रको विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको 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 टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

५. द्वितीय पत्रको पाठ्यक्रमलाई ४ वटा खण्ड/एकाईमा विभाजन गरिएको छ । ४ वटा खण्ड/एकाईको लागि ४ वटै उत्तरपुस्तिका दिईनेछ र परिक्षार्थीले प्रत्येक खण्ड/एकाईका प्रश्नहरुको उत्तर सोही खण्ड/एकाईको उत्तर पुस्तिकामा लेख्नु पर्नेछ ।

६. यस पाठयक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरु 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 ।

७. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।

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प्रथम र द्वितीय पत्र :– कम्प्युटर सम्वन्धी 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 Nonrecursive 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 J**oint Application Development (JAD)**: JAD definition, JAD purpose, JAD Philosophy, JAD Scope,
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, Datetime 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 **Datapath Design**: Single and Multiple Cycle Implementations, Pipelining, Memory Hierarchy, Input/Output System: Bus & Role of Operating System.

9. Complier 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

13. स्थानीय निकायको प्रशासन

१. स्थानीय स्वायत्त शासन ऐन, २०५५

२. स्थानीय स्वायत्त शासन नियमावली, २०५६
