शंखरापुर नगरपालिका
सूचना प्रविधि समूह, अधिकृतस्तर छेठौं, सूचना प्रविधि अधिकृत पदको
प्रतियोगितात्मक परीक्षाको

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्कः- १००

द्वितीय चरण :- (क) प्रयोगात्मक परीक्षा (Practical Test) पूर्णाङ्क :– ५०

(ख) अन्तर्वाता(Interview) पूर्णाङ्क :– ३५

(Examination Scheme)

प्रथम चरण : लिखित परीक्षा(Written Examination) पूर्णाङ्कः- १००

पत्र	विषय	खण्ड	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या ×अङ्क	समय
प्रथम	General Subject	Part I: General Awareness & General Reasoning Test	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	५० प्रश्न×१ अङ्क	१घण्टा ३० मिनेट
		Part II: General Technical Subject					५०प्रश्न×१ अङ्क	

द्वितीय चरण : प्रयोगात्मक परीक्षा, अन्तर्वार्ता **पूर्णाङ्क :–** ८०

पत्र /विषय	पूर्णाङ्क	उर्तीर्णाङ्क	परीक्षा प्रणाली	समय
प्रयोगात्मक परीक्षा (Practical Test)	५०	२५	प्रयोगात्मक(Practical) (५ प्रश्न×१० अङ्क)	१ घण्टा ३० मिनेट
अन्तर्वार्ता(Interview)	३५		बोर्ड अन्तर्वार्ता(Board Interview)	

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प्रथम पत्र (Paper I): General Subject

Part (I) : - General Awareness & General Ability Test (50 Marks)

1. **General Awareness and Contemporary Issues (25 ×1 Mark = 25 Marks)**
   - 1.1 Physical, socio-cultural and economic geography and demography of Nepal
   - 1.2 Major natural resources of Nepal
   - 1.3 Geographical diversity, climatic conditions, and livelihood & lifestyle of people
   - 1.4 Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
   - 1.5 Current periodical plan of Nepal
   - 1.6 Information on sustainable development, environment, pollution, climate change, biodiversity, science and technology
   - 1.7 Nepal's international affairs and general information on the UNO, SAARC & BIMSTEC
   - 1.8 The Constitution of Nepal (From Part 1 to 5 and Schedules)
   - 1.9 Governance system and Government (Federal, Provincial and Local)
   - 1.10 Provisions of civil service act and regulation relating to constitution of civil service, organisational structure, posts of service, fulfillment of vacancy and code of conduct
   - 1.11 Functional scope of public services
   - 1.12 Public Service Charter
   - 1.13 Concept, objective and importance of public policy
   - 1.14 Fundamentals of management : planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
   - 1.15 Government planning, budgeting and accounting system
   - 1.16 Major events and current affairs of national and international importance

2. **General Reasoning Test (25 ×1 Mark = 25 Marks)**
   - 2.1 **Logical Reasoning** (9×1 Mark = 9 Marks)
     Verbal Ability, Alphanumeric Series, Reasoning Analogies, Classification, Coding-Decoding, Order & Ranking, Distance & Directions, Analytical and Logical Reasoning, Assertion and Reason, Statement and Conclusion, Input-Output, Venn- diagram
   - 2.2 **Numerical Reasoning** (8×1 Mark = 8 Marks)
     Arithmetic Series, Analogy, Classification, Arithmetical Reasoning, Fraction. Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calender, Data Sufficiency, Data Interpretation & Data Verification
   - 2.3 **Spatial Reasoning** (8×1 Mark = 8 Marks)
     Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion, Embedded Images, Image Formation & Analysis, Mirror and Water Images, Cubes and Dices, Paper Folding & Cutting

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Part (II) : - General Technical Subject (50 Marks)

1. **Computer Fundamentals (10%)**
   - 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, system unit, Starting the computers
   - 1.5 **Input Devices:** keyboard, mouse, other input devices
   - 1.6 **Processing:** CPU, Memory
   - 1.7 **Storages devices:** Overview of Storage Devices, Floppy Disk Drive, Hard Drive, 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**: Windows Desktop, Program Manager, Organizing the Desktop, 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 (8%)**
   - 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 (10%)**
   - 3.1 Definition of 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, 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 (10%)

4.1 Definittion, Development and Functions of Operating Systems
4.2 Basic components of the Operating Systems, Information Storage and Management Systems
4.3 Disk Allocation and Scheduling Methods, Basic Memory Management strategies, Virtual Memory Management Techniques, Define a Process and features of the Process Management System
4.4 Features of Process Scheduling; List the features of Inter-Process Communication and Deadlocks
4.5 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 (14%)

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 (8%)

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 (10%)

7.1 **Basic Network Theory:** Network Definition, Network Models, Connectivity, Network Addressing.
7.2 **Network Connectivity:** Data Package, Establishing a Connection, Reliable Delivery, Network Connectivity, Noise Control, Building Codes, Connection Devices
7.3 **Advanced Network Theory:** OSI model, Ethernet, Network Resources, Token ring, FDDI, Wireless Networking
7.4 **Common Network Protocols:** Families of Protocols, NetBEUI, Bridge and Switches, TCP/IP Protocol, Building TCP/IP Network, 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:** 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: N**eed 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, Network Baseline
7.15 Network Access Points,Common Network Component, Common Peripheral Ports

8. Computer Architecture & Organization (4%)
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 (2%)
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 (4%)
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 (10%)
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 (10%)
12.1 History of IT in Nepal
12.2 IT Policy of Nepal
12.3 Electronic Transaction Act
12.4 Copyright Act
12.5 Uses of Computers and Software Development
12.6 Nepali Unicode, Nepali Fonts
12.3 Licensing Issues