



ललितपुर महानगरपालिका
नगर कार्यपालिकाको कार्यालय
पुल्चोक, ललितपुर, ३ नं प्रदेश, नेपाल

प्राविधिक तर्फ विविध सेवा, छैठौं तह, जि. आई. एस अफिसर पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

पाठ्यक्रमको रूपरेखालाई निम्न अनुसार विभाजन गरिएको छ :

भाग १

लिखित परीक्षा (Written Examination) :- वस्तुगत (बहुवैकल्पिक)

पूर्णाङ्क :- १००

भाग २ अन्तिम चरण (Final Examination)

प्रयोगात्मक परीक्षा

पूर्णाङ्क:- ५०

अन्तर्वार्ता

पूर्णाङ्क :- ५०

परीक्षा योजना (Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या X अङ्क	समय
प्रथम	कम्प्युटर र जि.आई.एस. सम्बन्धी	१००	४०	वस्तुगत : बहुवैकल्पिक प्रश्न (MCQs)	१०० प्रश्न X १अङ्क	१ घण्टा १५मिनेट

विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	समय
(क) प्रयोगात्मक परीक्षा	५०	२५	प्रयोगात्मक	४५ मिनेट
(ख) अन्तर्वार्ता	५०		मौखिक (Oral)	

द्रष्टव्य :

- यो पाठ्यक्रम योजनालाई लिखित परीक्षा (प्रथम चरण) तथा अन्तिम चरण (अन्तर्वार्ता) गरी दुई भागमा विभाजन गरिएको छ ।
- प्रश्नपत्र अंग्रेजी भाषामा हुनेछ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- कार्यालय बाट संचालन हुने परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- लिखित परीक्षामा छनौट भएका उम्मेदवारहरूलाई मात्र अन्तिम चरणको परीक्षामा सम्मिलित गराइनेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- पाठ्यक्रम लागू मिति : २०७६/०८/१३

प्राविधिक तर्फ विविध सेवा, छैठौं तह, जि. आई. एस अफिसर पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

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, 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

- 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 **Joint 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 **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 Definition, Developments and Functions of Operating Systems,
 - 4.2 Basic components of the Operating Systems, Understand Information Storage and Management Systems,
 - 4.3 Disk Allocation and Scheduling Methods, Basic Memory Management strategies, Virtual Memory Management Techniques, Define a Process and the features of the Process Management System
 - 4.4 Features of Process Scheduling; Features of Inter-Process Communication and Deadlocks,
 - 4.5 Concepts of Parallel and Distributed Processing, 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, 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, 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:** 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, 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. 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
- 11.10asics of Website Design

12. Software Engineering

- 12.1. **Software process:** The software lifecycle models, risk-driven approaches 9.2 Software Project management: Relationship to lifecycle, project planning, project

control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics

12.2. **Software requirements:** Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review.

12.3 **Software design:** Design for reuse, design for change, design notations, design evaluation and validation

12.4 **Implementation:** Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance

12.5. **Maintenance:** The maintenance problem, the nature of maintenance, planning for maintenance

12.6. **Software Engineering (SE) issues:** Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, International Organization for Standardization (ISO) standards, Software Engineering Institute Capability Maturity Model (SEI-CMM), Computer-Aided Software Engineering (CASE) Tools.

13. Information Technology (IT) Strategy

13.1 Strategic use of IT.

13.2. Porter 5 Forces model.

13.3. Formulating long-term objectives;

13.3.1. Long-term objectives.

13.3.2. Generic strategies.

13.3.3. The value disciplines.

13.3.4. Grand strategies.

13.4. Strategic analysis and choices.

13.5 Value chain analysis.

13.6. SWOT analysis.

3.7. Core competencies.

13.8 Strategy control and continuous improvement.

13.9 Strategy implementation.

14. Legislations and IT in Nepal

14.1 **The Constitution of Nepal** (From Part 1 to 5, 13, 14, 15, 16, 17, 18, 19 & 20; and Schedules)

14.2 History of IT in Nepal,

14.3 IT Policy of Nepal, 2072 B.S.

14.4 Electronic Transaction Act, 2063 B.S.

14.5 Copyright Act, 2059 B.S.

14.6 Uses of Computers and Software Development

14.7 Nepali Unicode, Nepali Fonts

14.8 Licensing Issues

14.9 Local Government Operation Act, 2074 (Provisions related to ICT)

15. GIS System

15.1 Arc GIS

15.2 Digital Map, digitization

- 15.3 Road Network in GIS
- 15.4 Metric System of House Numbering, attributes
- 15.5 Data Processing
- 15.6 Map Editing
- 15.7 Base Map Preparation
- 15.8 GIS and its various uses
- 15.9 GIS and municipal TAX relation
- 15.10 Use of Digital map