स्थानीय तह अन्तर्गत्का प्राविधिक तर्फ विविध सेवा, छैठौं तह, कम्प्युटर अधिकृत पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

पाठ्यक्रमको रुपरेखालाई निमन अनुसार विभाजन गरिएको छ :

| भाग १ लिखित परीक्षा (Written Examination | ı):- प्रथम चरण | पूर्णाङ्ग :- १०० |
|---|---|------------------------------------|
| भाग २ | द्वितीय चरण | पूर्णाङ्क :- ५० |
| अन्तिम चरण (Final Examination) | :- (क) प्रयोगात्मक परीक्षा | पूर्णाङ्क :- ५० |
| | (ख) सामूहिक परीक्षण (ग) अन्तर्वार्ता | पूर्णाङ्ग :- १० पूर्णाङ्ग :- ३० |

परीक्षा योजना (Examination Scheme)

9. लिखित परीक्षा :- प्रथम चरण (First Phase)

| पत्र | विषय | पूर्णाङ्क | उतीर्णाङ्ग | परीक्षा प्रणाली | प्रश्नसंख्या X अङ् | समय |
|-------|--------------------|-----------|------------|--|--------------------|--------------------|
| प्रथम | कम्प्युटर सम्बन्धी | 900 | ४० | वस्तुगत: बहुवैकल्पिक प्रश्न (MCQs) | १०० प्रश्नx १ अङ् | १ घण्टा १५मिनेट |

२. लिखित परीक्षा :- द्वितीय चरण (Second Phase)

| पत्र | विषय | पूर्णाङ्ग | उतीर्णाङ्क | परीक्षा प्रणाली | प्रश्नसंख्या x अङ्ग | समय |
|---------|--------------------|-----------|------------|------------------------|---------------------|--------------------|
| द्वितीय | कम्प्युटर सम्बन्धी | ५० | २० | विषयगत (Subjective) | ५ प्रश्न x १० अङ्ग | १ घण्टा ३०मिनेट |

अन्तिम चरणः - प्रयोगात्मक परीक्षा, सामूहिक परीक्षण र अन्तर्वार्ता

| विषय | पूर्णाङ्ग | उतीर्णाङ्ग | परीक्षा प्रणाली | समय | |
|---------------------------------|-----------|------------|--|--------------------|--|
| प्रयोगात्मक परीक्षा | ५० २५ | | प्रयोगात्मक (Practical) (५ प्रश्न x १० अङ्क) | १ घण्टा ३०मिनेट | |
| सामूहिक परीक्षण (Group Test) | 90 | | समूहमा व्यक्तिगत प्रस्तुति (Individual Presentation in Group) | ३०मिनेट | |
| अन्तर्वार्ता (Interview) | ३० | | मौखिक (Oral) | | |

द्रष्टव्य :

- यो पाठ्यक्रम योजनालाई लिखित परीक्षा (प्रथम चरण र द्वितीय चरण) तथा अन्तिम चरण (प्रयोगात्मक परीक्षा, सामूहिक परीक्षण र अन्तर्वार्ता) गरी दुई भागमा विभाजन गरिएको छ ।
- २. प्रश्नपत्र अंग्रेजी भाषामा हुनेछ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- ४. वस्तुगत बहुवैकित्पक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० प्रतिशत अङ्ग कट्टा गरिनेछ । तर उत्तर निदएमा त्यस वापत अङ्ग दिइने छैन र अङ्ग कट्टा पनि गरिने छैन ।
- प्. परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

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स्थानीय तह अन्तर्गतका प्राविधिक तर्फ विविध सेवा, छैठौं तह, कम्प्युटर अधिकृत पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

- ६. विषयगत प्रश्नका लागि तोकिएका अङ्कका हकमा 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 सिकने छ ।
- ७. विषयगत प्रश्न हुने पत्रका हकमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- आयोगबाट संचालन हुने परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- ९. लिखित परीक्षामा प्रथम पत्र र द्वितीय पत्रका पाठ्यक्रमका विषयवस्तु एउटै हुनेछ।
- १०. लिखित परीक्षामा सोधिने प्रश्न संख्या प्रथम पत्रको लागि यथासम्भव देहाय बमोजिम हुनेछ ।

| प्रथम पत्रका एकाई | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------|----|---|----|----|----|---|----|---|---|----|----|----|
| प्रश्न संख्या | 10 | 8 | 10 | 10 | 14 | 6 | 10 | 2 | 2 | 6 | 10 | 12 |

- ११. प्रथम चरण (First Phase) को लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरण (Second Phase) को लिखित परीक्षामा सिम्मिलत गराइनेछ ।
- १२ लिखित परीक्षामा सोधिने प्रश्न संख्या द्वितीय पत्रको लागि यथासम्भव देहाय बमोजिम हुनेछ ।

| द्वितीय पत्रका खण्ड | A | | В | 116 | C | |
|---------------------|---|---|---|---------|---|----|
| द्वितीय पत्रका एकाई | 2 | 6 | 3 | 4 | 5 | 12 |
| प्रश्न संख्या | 1 | 1 | 1 | 1,74,74 | 1 | 1 |

- १३. लिखित परीक्षाको प्रथम चरण (First Phase) मा प्राप्त गरेको प्राप्ताङ्कको शत् प्रतिशत अङ्क तथा द्वितीय चरण (Second Phase) को प्राप्ताङ्कहरु जोडि कूल अङ्कको आधारमा लिखित परीक्षाको नितजा प्रकाशित गरिनेछ,।
- १४. लिखित परीक्षामा छनौट भएका उम्मेदवारहरुलाई मात्र अन्तिम चरणको प्रयोगात्मक परीक्षा, सामूहिक परीक्षण र अन्तर्वार्तामा सिम्मिलित गराइनेछ।
- १५ प्रयोगात्मक परीक्षाका प्रश्न संख्या निम्नानुसार हुनेछन ।

| प्रयोगात्मक परीक्षाको एकाई | 4 | 5 | 6 | 7 |
|----------------------------|---|---|---|---|
| प्रश्न संख्या | 1 | 2 | 1 | 1 |

- १६. लिखित परीक्षा र अन्तिम अन्तिम चरणको प्रयोगात्मक परीक्षा, सामूहिक परीक्षण र अन्तर्वार्ताको कुल अङ्क योगका आधारमा प्रयोगात्मक परीक्षामा उत्तीर्ण हुने परीक्षार्थीहरुलाई मात्र योग्यताक्रम सूचीमा समावेश गरी अन्तिम परीक्षाफल प्रकाशित गरिनेछ।
- 9७ यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापिन पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगािड (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्कममा परेको सम्भन
- १८ पाठ्यक्रम लागू मिति : २०७६/०२/१२



लोक सेवा आयोग स्थानीय तह अन्तर्गतका प्राविधिक तर्फ विविध सेवा, छैठौं तह, कम्प्युटर अधिकृत पदको प्रतियोगितात्मक परीक्षाको लागि 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, 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,

Involved in a JAD: Sponsor, Business Users, System Analyst

- 3.3 Involved in a JAD. Sponsor, Business States States and Roles of JAD Group Member: Project Leader, Record Keeper, Time Keeper
- 3.4 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.

Proposal, Technical Feasibility, System Analysis Model Requirement

Requirements analysis: Representing System Analysis Model, Requirement Model, Design Model,

3.8 Development Process: Design Method

स्थानीय तह अन्तर्गतका प्राविधिक तर्फ विविध सेवा, छैठौं तह, कम्प्युटर अधिकृत पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

- 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.
- Relationship Sets: Degree of Relationship and Cardinality Relationship, 3.10 Specialization, Generalization, Aggregation.
- Data Flow Diagrams (DFDs): Introductions, Data flow Diagram, Symbol, 3.11 Files or data store, External entities, Data flows,
- Describing System by Data Flow Diagram: Context diagram, Top level DFD, 3.12 Expansion Level DFD, Conversions of Data.
- Object Modeling: Object -Oriented Concept, Object Structure, Object Feature, 3.13 Class and Object.
- and Composition, Inheritance, 3.14 Representation: Association Inheritances
- Modeling: Use Case Diagram, State Diagram, Event Flow Diagram 3.15
- Documentation: Automatic and Manual System 3.16

4. **Operating Systems**

- Definition, Developments and Functions of Operating Systems, 4.1
- Basic components of the Operating Systems, Understand Information Storage 4.2 and Management Systems,
- Disk Allocation and Scheduling Methods, Basic Memory Management 4.3 strategies, Virtual Memory Management Techniques, Define a Process and the features of the Process Management System
- Features of Process Scheduling; Features of Inter-Process Communication and 4.4 Deadlocks,
- Concepts of Parallel and Distributed Processing, Security Threats to Operating 4.5 Systems
- Overview of the MS-DOS Operating System 4.6
- Introduction to the Windows Family of Products, Unix Family of Products, 4.7 Linux Family of Products
- Introduction to Windows Networking 4.8
- Windows Architecture, Linux Architecture 4.9
- Troubleshooting Windows, & Linux 4.10
- Managing Network Printing 4.11
- Managing Hard Disks and Partitions 4.12
- Monitoring and Troubleshooting Windows Users, Groups and Permission Linux and Windows 4.13
- **Database Management System and Design** Introduction, Database Model, Relational Database Model, Integrity, RDBMS 5.
 - 5.1 SQL and Embedded SQL
 - Writing Basic SQL SELECT Statements 5.2
 - Restricting and Sorting data 5.3 5.4
 - Single Row Functions 5.5
 - Displaying Data from Multiple Tables 5.6
 - Aggregation Data Using Group Functions Sub Queries, Manipulating Data and Creating & Managing Tables 5.7
 - Creating Views and Controlling User Access 5.8
 - 5.9
 - Using Set Operators, Date-time Function 5.10



स्थानीय तह अन्तर्गतका प्राविधिक तर्फ विविध सेवा, छैठौं तह, कम्प्यूटर अधिकृत पदको प्रतियोगितात्मक लुविवनी स्पार्वेली परीक्षाको लागि पाठयक्रम

5.11 Database Design: Logical Design, Conceptual Design, Mapping Conceptual to Logical, Pragmatic issues, Physical Design, Integrity and Correctness, Relational Algebra, Relational Calculus.

Normalization: 1NF, 2NF, 3NF, BCNF, 4NF,5NF, DKNF 5.12

- Architecture of DBMS: Client-server, Open Architectures, Transaction 5.13 Processing, Multi-User & Concurrency, and Backup & Recovery Database.
- Basic Concept of major RDBMS products: Oracle, Sybase, DB2, SQL Server 5.14 and other Databases.

6. **Programming Language**

Overview of Programming Language: History, Programming Paradigms, The 6.1 role of Language translates in the Programming Process

6.2 Fundamental Issues in Language Design

Virtual Machines, Code Generation, Loop Optimization 6.3

Concept of Procedural Programming, Structural Programming, Object-Oriented 6.4 Programming

6.5 Concept of C programming, C++ Programming,

Java Programming for Declaration, Modularity and Storage Management 6.6 Software Development

7. Networking

- Basic Network Theory: Network Definition, Network Models, Connectivity, 7.1 Network Addressing
- Network Connectivity: The Data Package, Establishing a Connection, Reliable 7.2 Delivery, Network Connectivity, Noise Control, Building Codes, Connection Devices
- Advanced Network Theory: The OSI model, Ethernet, Network Resources, 7.3 Token ring, FDDI, Wireless Networking.
- Common Network Protocols: Families of Protocols, NetBEUI, Bridge and 7.4 Switches, TCP/IP Protocol, Building TCP/IP Network, TCP/IP Suite

TCP/IP Services: Dynamic Host Configuration Protocol, DNS Name 7.5 Resolution, NetBIOS support, SNMP, TCP/IP Utilities, FTP

Network LAN Infrastructure: LAN Protocols on a Network, IP Routing, IP Routing Tables, Router Discovery Protocols, Data Movement in a Routed 7.6 Network, Virtual LANs (VLANS)

Network WAN Infrastructure: WAN Environment, Wan Transmission Technologies, Wan Connectivity Devices, Voice Over Data Services 7.7 .

Remote Networking: Remote Networking, Remote Access protocols, VPN 7.8 Technologies

Computer Security: Computer Virus, Worm, Trojan Horse Network Security: Introduction, Virus Protection, Local Security, Network 7.9 7.10

Access, Internet Security.

Disaster Recovery: Need for Disaster Recovery, Disaster Recovery plan, Data 7.11 backup, Fault Tolerance Advanced Data Storage Techniques: Enterprise Data Storage, Clustering,

Network Attached Storage, Storage Area Networks 7.12

Network Troubleshooting: Using Systematic Approach to Troubleshooting 7.13

Network Support Tools: Utilities, Network Baseline

Network Access Points (NAP), Common Network Component, Common 7.14 7.15 Peripheral Ports



स्थानीय तह अन्तर्गतका प्राविधिक तर्फ विविध सेवा, छैठौं तह, कम्प्युटर अधिकृत पदको प्रतियोगितात्मक परीक्षाको लागि पाठ्यक्रम

8. Computer Architecture & Organization

- Evaluation of Computers, Design Methodology, Set Architecture, MIPS ISA, 8.1 ALU Design
- Datapath Design: Single and Multiple Cycle Implementations, Pipelining, 8.2 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.

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.
- Information Systems and Decision Making. 11.2
- Database Design issues, Data Mining, Data Warehousing 11.3
- Knowledge Management, The strategic use of Information Technology. 11.4
- Work Process Redesign (Reengineering) with Information Technology, 11.5 Enterprise Resources Planning Systems, Information Systems Security, Information Privacy, and Global Information Technology issues.
- Software Supported Demonstrations including advanced Spreadsheet topics, 11.6 Software Component Based Systems (CBSE),
- Multimedia 11.7
- Object-Oriented Programming with COMS & DECOMS, 11.8
- Group Decision Support Systems 11.9
- 11.10 Basics of Website Design

Legislations and IT in Nepal 12.

- The Constitution of Nepal (From Part 1 to 5, 13, 14, 15, 16, 17, 18, 19 & 20; 12.1 and Schedules)
- History of IT in Nepal, 12.2
- IT Policy of Nepal, 2072 B.S. 12.3
- Electronic Transaction Act, 2063 B.S. 12.4
- Copyright Act, 2059 B.S.
- Uses of Computers and Software Development 12.5
- 12.6 Nepali Unicode, Nepali Fonts 12.7
- Licensing Issues
- Local Government Operation Act, 2074 (Provisions related to ICT) 12.8