सामाजिक सुरक्षाकोष

सेवा:विविध, समुह: कम्प्युटर इन्जिनियरिङ, तह: ६, पद: सूचना प्रविधि अधिकृतको खुला र आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रुपरेखा :– यस पाठ्यक्रमको आधारमा निम्नानुसार दुई चरणमा परीक्षा लिइने छ :

प्रथम चरण :– लिखित परीक्षा — पूर्णाङ्क:– २००
द्वितीय चरण :– अन्तर्वार्ता — पूर्णाङ्क :– ३०

प्रथम चरण – लिखित परीक्षायोजना(Examination Scheme)

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या×अङ्क	समय
प्रथम	कम्प्युटर सम्बन्धी बिषय	१००	४०	वस्तुगतबहुउत्तर (Multiple Choice)	१००×१= १००	१ घण्टा ३० मिनेट
द्वितीय		१००	४०	विषयगत(Subjective)	४×५= २० ७×१० = ७० १×१० = १०	३ घण्टा

द्वितीय चरण

विषय	पूर्णाङ्क	परीक्षा प्रणाली
व्यक्तिगत अन्तर्वार्ता	३०	मौखिक

१.लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
२. पाठ्यक्रमको प्रथम र द्वितीय पत्रको विषयवस्तु एउटै हुनेछ ।
३. प्रथम र द्वितीयपत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
४. प्रथम तथा द्वितीयपत्रका एकाईहरुको प्रश्न संख्या निम्नानुसार हुनेछ :

प्रथम पत्रका एकाई	1	2	3	4	5	6	7	8	9	10	11	12	13	14
प्रश्न संख्या	7	8	8	8	8	6	8	3	8	8	7	7	4	10
द्वितीय पत्रका एकाई	1	2	3	4	5	6	7	8	9	10	11	12	13	14
अङ्कभार	7	7	7	7	7	5	7	5	7	7	7	7	5	5+10

५. प्रथम पत्रमा वस्तुगत बहुउत्तर (Multiple Choice) प्रश्नहरुको उत्तर सही दिएमा प्रत्येक सही उत्तर बापत १ (एक) अङ्क प्रदान गरिनेछ भने गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अर्थात् ०.२ अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

६. द्वितीय पत्रको विषयगत प्रश्नकालागि तोकिएका ७अङ्कका प्रश्नहरुको 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 सकिने छ ।

७ यस पाठ्यक्रममा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका ऐन, नियमहरु परीक्षाको मितिभन्दा ३ (तीन) महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा रहेको सम्झनु पर्दछ ।

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

९.पाठ्यक्रम लागू मिति - २०७६।०२।१५

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, 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,Therole 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. Software Engineering

9.1 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
9.3 Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static anddynamicspecifications,requirements review.
9.4 Software design: Design for reuse, design for change, design notations, design

evaluation and validation
9.5 Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance
9.6 Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
9.7 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.

10. Management Information System (MIS) and Web Engineering

10.1 Information Systems, Client-Server Computing.
10.2 Information Systems and Decision Making.
10.3 Database Design issues, Data Mining, Data Warehousing
10.4 Knowledge Management, The strategic use of Information Technology.
10.5 Work Process Redesign (Reengineering) with Information Technology, Enterprise Resources Planning Systems, Information Systems Security, Information Privacy, and Global Information Technology issues.
10.6 Software Supported Demonstrations including advanced Spreadsheet topics, Software Component Based Systems (CBSE),
10.7 Multimedia
10.8 Object-Oriented Programming with COMS & DECOMS,
10.9 Group Decision Support Systems
10.10 Basics of Website Design.

11. E-Commerce Technology

11.1 Introduction to E-Commerce.
11.2 Electronic Commerce Strategies.
11.3 Electronic Commerce Security Issues.
11.4 Success Models of E-Governance.
11.5 E-Business: b2b, b2c, b2e, c2c, g2g, g2c.
11.6 Principles of Electronic Payment, Strategies & Systems.
11.7 E-marketing, Reverse Engineering.
11.8 E-Banking, Electronic data interchange (EDI) Methods, SWIFT.
11.9 Encryption and Decryption Methods, XML, Layout Managers, Event Model.

12. Information Technology (IT) Strategy

12.1 Strategic use of IT.
12.2 Porter 5 Forces model.

12.3 Formulating long-term objectives;
    12.3.1 Long-term objectives.
    12.3.2 Generic strategies.
    12.3.3 The value disciplines.
    12.3.4 Grand strategies.
12.4 Strategic analysis and choices.
12.5 Value chain analysis.
12.6 SWOT analysis.
12.7 Core competencies.
12.8 Strategy control and continuous improvement.
12.9 Strategy implementation.

13. IT in Nepal

13.1 History of IT in Nepal
13.2 National Information and Communication Technology Policy,2015
13.3 Electronic Transaction Act, 2063 B.S.
13.4 Copyright Act, 2059 B.S.
13.5 Nepali Unicode, Nepali Fonts

14. Social Security in Nepal

14.1 Introduction to Social Security Fund
14.2 Vision, Mission and Objectives of Social Security Fund
14.3 Organizational Structure of Social Security Fund
14.4 नेपालको सं वधान २०७२
14.5 सामाजिक सुरक्षाको अवधारणा
14.6 योगदानमा आधारित सामाजिक सुरक्षा ऐन, २०७४
14.7 योगदानमा आधारित सामाजिक सुरक्षा नियमावली, २०७५
14.8 सामाजिक सुरक्षा कोषको (कर्मचारीप्रशासन) वनियमावली, २०७५
14.9 सामाजिक सुरक्षा योजना संचालन कार्य व ध, २०७५
14.10 रोजगारदाता र श्र मक सु चकरण सम्बन्धी कार्य व ध, २०७५
14.11 श्रम ऐन, २०७४
14.12 श्रम नियमावली, २०७५
14.13 बोनस ऐन, २०३०
14.13 बोनस नियमावली, २०३९
14.14 कोषको रकम (वा णज्य बैंकहरुमा) लगानि गर्ने कार्य व ध, २०७५

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