राष्ट्रिय जीवन बीमा कम्पनी लिमिटेड

प्राविधिक सेवा, सूचना प्रविधि समूह, तह ६, सहायक व्यवस्थापक पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र (Paper II)

सेवा सम्बन्धी (Service Related)

खण्ड (A) - ७० अङ्क

(७ प्रश्न × १० अङ्क)

1. Computer Organization and Architecture

1.1. Basic Structures: Sequential Circuits, Design Procedures, State Tables and State Diagrams, Von Neumann and Harvard Architectures, RISC (Reduced Instruction Set Computer) and CISC (Complex Instruction Set Computer) Architectures

1.1. Addressing Methods and Programs: Data Representation, Arithmetic Operations, Basic Operational Concepts, Bus Structures, Instruction Cycle and Execution Cycle

1.2. Processing Unit: Instruction Formats, Arithmetic and Logical Instructions, Addressing Modes

1.3. Input/Output (I/O) Organization: I/O Programming, Memory-Mapped I/O, Basic Interrupt System, Direct Memory Access (DMA)

1.4. Arithmetic Unit: Arithmetic Operations and Logic Design

1.5. Memory Systems: Memory Organization, Types and Hierarchy

2. Design and Analysis of Algorithm

2.1. General Concepts: Abstract Data Types (ADT), Time & Space Complexity, Big-O/Theta, Best/Average/Worst-Case Analysis

2.2. Linear Data Structures: Arrays, Stacks, Queues, Linked Lists

2.3. Trees: Binary/General Trees, Traversals, BST, Balanced Trees

2.4. Algorithm Design: Greedy, Priority Queue Search, Brute Force, Divide and Conquer, Dynamic Programming

2.5. Hashing: Hash Functions, Collision Handling

2.6. Graphs: Directed/Undirected Graphs, Representations, Basic Algorithms

2.7. Sorting: Sorting Techniques and Performance Analysis

3. Artificial Intelligence

3.1. Search: State Space Search Techniques and Problem Solving

3.2. Natural Language Processing: Language Understanding and Processing Techniques

3.3. Learning: Classification, Regression, Clustering, Model Evaluation;

3.4. Automated Reasoning: Logical Reasoning and Inference Methods

3.5. Planning: Planning Techniques and Action Sequencing

3.6. Vision and Robotics: Computer Vision

3.7. Fundamentals and Robotic Systems

4. Software Engineering Principles:

4.1. Software Process: Software Development Life Cycle Models, Iterative Development and Risk-Based Approaches

4.2. Software Project Management: Planning, Monitoring, Risk and Cost Management, Version Control, Quality and Performance Metrics

4.3. Software Requirements: Collecting, Analyzing and Documenting Requirements; Functional & Non-Functional Requirements; Review and Validation

4.4. Software Design: Modular and Maintainable Design, Design Notations, Reuse, Flexibility and Validation

4.5. Implementation: Programming Standards, Modularity, Testing (Unit, Integration, Regression) and Fault Tolerance
4.6. Maintenance: Types of Maintenance, Challenges and Planning
4.7. Software Engineering Issues: Formal Methods, Se Tools, Programming Paradigms, Process Improvement, International Organization for Standardization (ISO) & Software Engineering Institute – Capability Maturity Model (SEI-CMM) Standards, Case Tools

5. Operating System

5.1. Processes and Threads: Symmetric Multiprocessing, Micro-Kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock
5.2. Scheduling
5.3. Memory Management
5.4. Input-Output(I/O) and Files: I/O Devices and Its Organization, Principles of I/O Software and Hardware, Disks, Files and Directories Organization, File System Implementation
5.5. Distributed Systems: Distributed Message Passing, Remote Procedure Call (RPC), Client/Server Computing, Clusters
5.6. Security: Authentication and Access Authorization, System Flaws and Attacks, Trusted System

6. Information Security

6.1. Goals Of Information Security: Protect Data, Systems and Networks from Threats
6.2. Challenges and Cyber Threats: Overview of Cybercrime, Cyber Warfare, Cyber Terrorism, Cyber Espionage and Common Security Issues
6.3. Cyber Security Vulnerabilities: Weak Software, Poor System Management, Complex Networks, Open Data Access, Weak Passwords, Unprotected Connections and Low Awareness
6.4. Cyber Security Safeguards: Access Control, Auditing, Authentication, Biometrics, Cryptography, Firewalls, Intrusion Detection, Ethical Hacking, Denial of Service (DOS) Protection, Security Policies and Threat Management

7. Database Systems

7.1. Database Basics: Relational and (Entity-Relationship) ER Models, Structured Query Language (SQL), Functional Dependencies, File Storage
7.2. Transactions & Concurrency: Concept of Transactions, Concurrent Execution, Basic Concurrency Control
7.3. Crash Recovery: Types of Failures and Simple Recovery Techniques
7.4. Query & Optimization: Basic Query Processing and Simple Optimization
7.5. Indexing: Introduction to Hash-Based and Tree-Based Indexing
7.6. Security: Basic Database Protection Access Control and Backup
7.7. Data Mining and Data Warehousing
7.8. Distributed Database Systems and Object-Oriented Database System
7.9. Big Data: Introduction, Characteristics (Volume, Velocity, Variety, Veracity, Value), Not Only Structured Query Language (NoSQL), Security, Privacy and Governance, Applications and Use Cases of Big Data

8. Computer Networks

8.1. Protocol Stack and Switching: Detailed Study of Network Layers, Protocol Interactions, Switching Techniques (Circuit, Packet and Virtual) and Performance Considerations

8.2. Link Layer: Error Detection and Correction Techniques, Virtual Local Area Network (VLAN), Media Access Control (MAC) Address Management, Advanced Local Area Network/Wide Area Network (LAN/WAN) Protocols, Wireless LAN Standards (802.11 A/B/G/N/Ac), Point-to-Point Protocol (PPP) Variations and Network Device Configuration

8.3. Network Layer: Internet Protocol (IP) Addressing and Sub-netting, Classless Inter-Domain Routing (CIDR), (Internet Protocol Version 6) IPv6 Addressing and Transition Methods, Advanced Routing Protocols {Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Boarder Gateway Protocol (BGP)}, Multi-Protocol Level Switching (MPLS), Quality of Service (QoS) and Packet Forwarding Optimization

8.4. Transport Layer: Detailed Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) Mechanisms, Reliable Data Transfer, Flow and Congestion Control Algorithms and Transport Layer Security Concepts –Transport Layer Security/Secure Socket Layer (TLS/SSL)

8.5. Application Layer: In-Depth Study of Application Protocols: Hypertext Transfer Protocol (HTTP), Hypertext Transfer Protocol Secure (HTTPS), File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), Post-Office Protocol Version 3 (POP3), Internet Message Access Protocol (IMAP), Domain Name System (DNS) Resolution and Caching, Content Delivery Networks

9. Ecommerce Technology

9.1. Introduction to E-Commerce: Basics of Electronic Commerce and Online Business Operations

9.2. E-Commerce Strategies: Methods and Approaches for Conducting Business Online Effectively

9.3. E-Commerce Security: Common Security Threats and Safe Practices for Online Transactions

9.4. E-Governance Models: Planning, Implementation and Success Factors of Digital Government Services

9.5. E-Business Models: Different Online Business Interactions: Business to Business (B2B), Business to Customer (B2C), Business to Employee (B2E), Customer to Customer (C2C), Government to Government (G2G), and Government to Customer (G2C)

9.6. Electronic Payments & Technologies: Principles of E-Payments, E-Banking, Encryption/Decryption, Extensible Markup Language (XML), Representational State Transfer (REST), Secure Sockets Layer/Transport Layer Security (SSL/TLS) Protocols

10. Structured and Object-Oriented Programming

10.1. Data Types, Abstract Data Type (ADT)

10.2. Operators, Variables and Assignments, Control Structures

10.3. Procedure/Function

10.4. Class Definitions, Polymorphism, Encapsulation, Inheritance, Object, Composition

10.5. Pattern and Framework

11. Emerging Technologies

11.1 Block Chain: Concept, Architecture, Benefits, Risks, and Applications
11.2 Big Data: Concept, Characteristics, Processing, and Applications in Decision Making
11.3 Cloud Computing: Concept, Service Models, Deployment Models, Virtualization, Benefits, and Uses
11.4 Cryptocurrency: Concept, Block Chain Linkage, Mining, Security, Risks, and Regulatory Considerations
11.5 Edge Computing and Grid Computing

खण्ड (B) - ३० अङ्क

(३ प्रश्न × १० अङ्क)

12. सम्बन्धित कानूनी व्यवस्था (Relevant Legal Provisions)

12.1 नेपालको संविधान: भाग १,३,४ र अनुसूची (Constitution of Nepal: Part १, २, ४ and Schedules)
12.2 बीमा ऐन, २०७९ र बीमा नियमावली, २०८१ (Insurance Act, 2079 and Insurance Regulations, 2081)
12.3 राष्ट्रिय जीवन बीमा कम्पनी लिमिटेडको प्रबन्धपत्र, नियमावली (Memorandum of Association and Articles of Association of Rastriya Jeewan Beema Company Limited)
12.4 राष्ट्रिय जीवन बीमा कम्पनी लिमिटेड कर्मचारी सेवा, शर्त तथा सुविधा सम्बन्धी विनियमावली (Employee Service, Conditions, and Facilities Bylaw, 2082 of Rastriya Jeewan Beema Company Limited)
12.5 विद्युतीय (इलेक्ट्रोनिक) कारोबार ऐन,२०६३ (Electronic Transactions Act, 2063)
12.6 सूचना तथा सञ्चार प्रविधि नीति, २०७२ (Information Technology Policy, 2015)
12.7 सम्पत्ति शुद्धीकरण (मनी लाउन्डरिङ) निवारण ऐन, २०६४ {Asset (Money) Laundering Prevention Act, 2008}
12.8 बीमकको सूचना प्रविधि मार्गदर्शन, २०७६ (Information Technology Guidelines for Insurers, 2019)
12.9 डिजिटल बीमा नीति मार्गदर्शन, २०८१ (Digital Insurance Policy Guideline, 2024)
12.10 भ्रष्टाचार निवारण ऐन, २०५९ (The Prevention of Corruption Act, 2059)
12.11 सुशासन (व्यवस्थापन तथा सञ्चालन) ऐन, २०६४ {Good Governance (Management and Operation) Act, 2064}
12.12 सार्वजनिक खरिद ऐन, २०६३ र सार्वजनिक खरिद नियमावली, २०६४: सामान्य परिचय र खरिद प्रक्रिया सम्बन्धी आधारभूत जानकारी (Public Procurement Act, 2063 and Public Procurement Regulation, 2064: An Overview and Fundamental Information on Procurement Procedures)