

कृषि विकास बैंक लि.

खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम



पदको विवरण :

पद : वरिष्ठ ईन्जिनियर (IT)
तह : ७ (सातौं)

सेवा/समूह : प्राविधिक/सूचना प्रविधि

परीक्षाको किसिम :

(क) : लिखित परीक्षा : २०० पूर्णाङ्क (ख) : अन्तर्वार्ता : ३० पूर्णाङ्क

न्यूनतम शैक्षिक योग्यता:

मान्यता प्राप्त विश्वविद्यालयबाट आई.टि./कम्प्युटर/नेटवर्क/हार्डवेयर/सफ्टवेयर/इलेक्ट्रोनिक्स एण्ड कम्प्युनिकेशनको इन्जिनियरिङ्ग विषयमा स्नातकोत्तर तह उत्तीर्ण भएका ।

पाठ्यक्रमको उद्देश्य:

बैंकको वरिष्ठ ईन्जिनियर (IT) (प्राविधिक, ईन्जिनियरिङ्ग सूचना प्रविधि) तह-७ पदका लागि निर्धारित कार्य विवरणलाई दृष्टिगत गरी तोकिएको आवश्यक न्यूनतम योग्यता पुगेका योग्य उम्मेदवारहरूमध्येबाट बैंकको कार्यक्षेत्र र कार्य प्रकृतिसँग सम्बन्धित कम्प्युटर, सफ्टवेयर, हार्डवेयर, नेटवर्किङ्ग संचालन जस्ता सूचना प्रविधिसँग सम्बन्धित विषयमा उम्मेदवारहरूको सैद्धान्तिक र व्यावहारिक ज्ञानको परीक्षण गर्नु प्रस्तुत पाठ्यक्रमको उद्देश्य रहेको छ ।

लिखित परीक्षा संरचना:

सि.नं.	पत्र	विषय	खण्ड	प्रश्नको प्रकृति	प्रश्न संख्या	अंक	अंकभार	पूर्णाङ्क	उत्तीर्णाङ्क	समय
१	प्रथमपत्र	कानून, बैकिङ्ग, व्यवस्थापन तथा आर्थिक सम्बन्धी	क	छोटो उत्तर	४	५	२०	१००	४०	३ घण्टा
				लामो उत्तर	३	१०	३०			
			ख	छोटो उत्तर	४	५	२०			
				लामो उत्तर	३	१०	३०			
२	द्वितीय पत्र	सेवा सम्बन्धी	क	छोटो उत्तर	४	५	२०	१००	४०	३ घण्टा
				लामो उत्तर	३	१०	३०			
			ख	छोटो उत्तर	४	५	२०			
				लामो उत्तर	३	१०	३०			

द्रष्टव्य:

- लिखित परीक्षाको प्रश्न पत्र नेपाली वा अंग्रेजी दुवै भाषामा सोधिने छ । सबै प्रश्नको उत्तर अनिवार्य हुनेछ । लिखित परीक्षामा परीक्षार्थीले नेपाली र अंग्रेजी भाषामध्ये कुनै एक वा दुवै माध्यममा उत्तर दिन सक्नेछन् ।
- पाठ्यक्रममा भएका यथासम्भव सबै पाठ्यांशका ईकाईहरू समावेस हुनेगरी प्रश्न सोधिने छ ।
- यस पाठ्यक्रमका पत्र/विषयवस्तुमा जे सुकै लेखिएको भएतापनि पाठ्यक्रममा परेका ऐन, नियम तथा नीतिहरू परीक्षाको मितिभन्दा तीन महिना अगाडि संशोधन भई कायम रहेकालाई यस पाठ्यक्रममा समावेस भएको सम्झनु पर्छ ।
- लिखित परीक्षामा प्रत्येक पत्रको उत्तीर्णाङ्क न्यूनतम चालीस प्रतिशत अंक रहेको र लिखित परीक्षामा सफल भई योग्यताक्रममा छनौट भएका उम्मेदवारहरू मात्र अन्तर्वार्ता परीक्षामा सम्मिलित हुन सक्नेछन् ।
- विषयगत प्रश्नहरूका हकमा एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुईभन्दा बढी भाग (Two or More parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
- पाठ्यक्रमको स्वीकृति तथा लागू मिति : २०७७/०८/२२

प्रथम-पत्र: कानून, बैकिङ्ग, व्यवस्थापन तथा आर्थिक सम्बन्धी

खण्ड-क: कानून तथा बैकिङ्ग सम्बन्धी				छोटो उत्तर	४ प्रश्न X ५ अंक = २०		
				लामो उत्तर	३ प्रश्न X १० अंक = ३०		
पाठ्यक्रमको इकाई विभाजन							
बुँदा नं.:	१	२	३	४	५	६	७
प्रश्न संख्या:	१	१	१	१	१	१	१

- १) **ऐन, नियम:** नेपाल राष्ट्र बैंक ऐन २०५८, बैंक तथा वित्तीय संस्था सम्बन्धी ऐन, २०७३, बैकिङ्ग कसूर तथा सजाय ऐन, २०६४, सम्पत्ति शुद्धीकरण (मनी लाउण्डरिङ्ग) निवारण ऐन २०६४, तथा नियमावली २०७३, विनियम अधिकारपत्र ऐन, २०३४, बैंक तथा वित्तीय संस्थाको ऋण असुली ऐन, २०५८, तथा नियमावली २०५९, कम्पनी ऐन, २०६३, आयकर ऐन, २०५८ तथा आयकर नियमावली, २०५९, मुलुकी देवानी (संहिता) ऐन, २०७४ र मुलुकी अपराध (संहिता) ऐन, २०७४ का मुख्य प्रावधानहरु, कृषि विकास बैंक लि. कर्मचारी सेवा विनियमावली, २०६२ सम्बन्धी जानकारी ।
- २) **नेपाल राष्ट्र बैंकबाट जारी एकिकृत निर्देशन ।**
- ३) **बैकिङ्ग अवधारणा:** अवधारणा, विकासक्रम, बैंकका प्रकार तथा कार्यहरु, नेपालको आर्थिक विकासमा बैकिङ्ग क्षेत्रको आवश्यकता, महत्व, योगदान तथा वर्तमान अवस्था, केन्द्रीय बैंकको आवश्यकता, स्थापना, महत्व, भूमिका तथा काम, कर्तव्य र अधिकार, नेपालमा बैकिङ्ग क्षेत्रको वर्गीकरण तथा बैंक तथा वित्तीय संस्थाहरुको काम, कर्तव्य र अधिकार, नेपालमा वाणिज्य बैंकको मुख्य कारोवार क्षेत्र, सम्भावना, अवसर तथा चुनौतिहरु, बैकिङ्ग व्यवसायमा जोखिम र न्युनिकरणका उपायहरु ।
- ४) **बैकिङ्ग सेवाहरु:** निक्षेप सेवा, निक्षेप सेवाको अवधारणा, प्रकार, श्रोत संकलन, परिचालन तथा व्यवस्थापन, कर्जा सेवाको अवधारणा, कर्जाको प्रकार, कर्जा चक्र, कर्जा वर्गीकरण तथा कर्जा व्यवस्थापन, विप्रेषण, प्रतितपत्र, बैंक जमानत कारोवारको अवधारणा, महत्व र प्रकार, कोष र ग्रैह कोषमा आधारित कारोवारहरु, Branchless Banking, Any Branch Banking System (ABBS), Mobile Banking, Internet Banking, SWIFT, Draft, ATM, Debit Card, Credit Card, POS, Good for Payment Cheque, Manager's Cheque, Locker, Financial Literacy, Agency Service सम्बन्धी जानकारी ।
- ५) **नेपालमा वाणिज्य बैंकको मुख्य कारोवार क्षेत्र, सम्भावना तथा अवसरहरु, अन्तर्राष्ट्रियस्तरमा प्रचलनमा रहेका आधुनिक सेवा, सुविधाहरु, बैकिङ्ग व्यवसायमा प्रयोग हुने बैकिङ्ग शब्दावलीहरु (Banking Terminology) बारेमा जानकारी, नेपालको बैकिङ्ग क्षेत्रमा देखिएका अवसर, चुनौति तथा जोखिमहरु ।**
- ६) **कृषि विकास बैंक लि.:** बैंकको स्थापना, विकासक्रम, कार्यप्रकृति, दूरदृष्टि, ध्येय, उद्देश्य, संगठनात्मक संरचना, कारोवारको अवस्था, वासलातको आकार, विद्यमान सबल एवं दुर्बल पक्ष तथा अवसर र चुनौतिहरु, बैंक तथा वित्तीय संस्थामा कार्यरत कर्मचारीले पालना गर्नुपर्ने आचरण तथा अनुशासन सम्बन्धी जानकारी ।
- ७) **राष्ट्रिय अन्तर्राष्ट्रियस्तरका प्रमुख आर्थिक घटनाक्रम एवं प्रमुख अन्तर्राष्ट्रिय संघ संगठनहरु (UN, World Bank, WTO, IMF, ADB, SAARC, BIMSTEC, SAFTA) बारे जानकारी ।**



खण्ड-ख: व्यवस्थापन र आर्थिक सम्बन्धी				छोटो उत्तर		४ प्रश्न X ५ अंक = २०	
				लामो उत्तर		३ प्रश्न X १० अंक = ३०	
पाठ्यक्रमको इकाई विभाजन							
बुँदा नं.:	१	२	३	४	५	६	७
प्रश्न संख्या:	१	१	१	१	१	१	१

- 1) Organization & Management:** Organization: concept, Structure, objectives & principles, Communication system, Organization change & development, Organization cultural, Organization governance, Management: concept, Principles, Types & Functions, Key management process, Current issues of management, Management information system and its importance, Time management, Crisis management, Conflict management, Change management, Knowledge management, Record management.
- 2) Human Resource Management:** Concept, function and importance of HRM, HR planning, Recruitment & selection, Training & development, Job description, Job specification & Job analysis, Motivation, Reward & punishment, Performance appraisal, Career planning, Employee ethics, Human resource information system, Moral values, Retirement & Socialization.
- 3) Economics:** Macro and Micro Economic Concept, Elements, Nepalese economy, Current status including analysis of macroeconomic indicators with trends and sectoral analysis; GDP, National income, Per capita income, Interest rate, Inflation, Investment, Saving, Government Budgetary Operations: Revenue, Expenditures, Problems, Prospects, Issues and challenges, Government securities, International trade, Import, Export, Balance of payment, Money market, Capital market.
- 4) Strategic & Risk Management:** Strategic planning framework, Strategy formulation process and methods, Strategy implementation and Strategy evaluation, SWOT analysis., Risk management concept, Identification, Types, Measurement, Risk management techniques and strategies in banking business and contingency planning and management.
- 5) Project Management:** project identification, formulation and design, project appraisal, project implementation, monitoring and control.
- 6) Fiscal & Monetary policy:** Current budgeting system, Characteristics, objectives & programme of current fiscal year budget, concept of Monetary policy characteristics, objectives and direction of current monetary policy.
- 7) Information Technology:** Computer system (Input Device, Output Device), Operating system, Application software, MS office system, Internet, Intranet, Extranet, and e-mail system, Database management system, Hardware, Networking, Backup, Related threats. Need of core banking system (CBS) in banking business, Importance & related risks of CBS in banking institution.



द्वितीय पत्र : सेवा सम्बन्धी

खण्ड-क: सेवा सम्बन्धी				छोटो उत्तर		४ प्रश्न X ५ अंक = २०	
				लामो उत्तर		३ प्रश्न X १० अंक = ३०	
पाठ्यक्रमको इकाई विभाजन							
बुँदा नं.:	१	२	३	४	५	६	७ र ८
प्रश्न संख्या:	१	१	१	१	१	१	१

1. Computer Architecture and organization and micro-processors:

- 1.1 Basic Structures: sequential circuits, design procedure, state table and state diagram, Von Neumann / Harvard architecture, RISC/CISC architecture
- 1.2 Addressing Methods and Programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction cycle and excitation cycle
- 1.3 Processing Unit: instruction formats, arithmetic and logical instruction
- 1.4 Addressing modes
- 1.5 Input Output Organization: I/O programming, memory mapped I/O, basic interrupt system, DMA
- 1.6 Memory Systems
- 1.7 808X and Intel microprocessors: programming and interfacing

2. Artificial Intelligence:

Search, Natural Language Processing, Game Playing, Learning, Automated reasoning, Planning, Vision and Robotics

3. Digital Design:

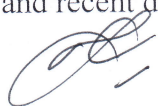
Digital and Analog Systems. Number Systems, Logic Elements, Combinational Logic Circuits, Sequential Logic, Arithmetic Circuits, MSI Logic Circuits, Counters and Registers, IC logic families, Interfacing with Analog Devices, Memory Devices

4. Theory of Computation:

- 4.1 BNF, Languages, Grammars
- 4.2 DFA and NDFA, regular expressions, regular grammars
- 4.3 Closure, homomorphism
- 4.4 Pigeonhole principle, pumping lemma
- 4.5 CFGs, Parsing and ambiguity, Pushdown automata, NPDAs & CFGs
- 4.6 Pumping lemma
- 4.7 Turing machines
- 4.8 Recursively enumerable languages, unrestricted grammars
- 4.9 The Chomsky hierarchy, Undecidable problems, Church's Thesis
- 4.10 Complexity Theory, P and NP

5. Compiler Design:

- 5.1 The Structure of a Compiler
- 5.2 Lexical Analyzer
- 5.3 Top-down Parsing/Bottom-up Parsing
- 5.4 Syntax Directed Translation
- 5.5 Types and Type Checking
- 5.6 Run-Time Storage Administration
- 5.7 Intermediate Code Generation
- 5.8 Data-Flow Analysis and Code Optimizations
- 5.9 Architecture and recent development on compilers




6. Computer Graphics:

- 6.1 Graphics Concepts
- 6.2 Input devices and techniques
- 6.3 Basic raster graphics algorithms and primitives
- 6.4 Scan conversion
- 6.5 Graphics hardware
- 6.6 2D geometrical transformations and viewing
- 6.7 3D geometry and viewing
- 6.8 Hierarchical modeling
- 6.9 Projections
- 6.10 Hidden surface removal
- 6.11 Shading and rendering

7. Basic Electrical & Electronics:

- 7.1 Electrical: Basic Circuit Theory, AC circuit Fundamentals, Magnetic circuits and Transformers, Transient Analysis, Filters
- 7.2 Electronics:
 - 7.2.1 Semiconductors, Diodes and Diode Circuits, Transistors
 - 7.2.2 Transistor modeling
 - 7.2.3 Biasing and Amplification
 - 7.2.4 Small Signal amplifiers and frequency response
 - 7.2.5 Large signal amplifiers, feedback amplifiers and. Oscillators
 - 7.2.6 Operational amplifiers

8. Principles of Electronics Communications:

- 8.1 Block Diagram of analog/digital communication system
- 8.2 Analog and Digital modulation techniques
- 8.3 Fundamentals of Error Detection and Correction
- 8.4 Performance evaluation of analog and digital communication systems

खण्ड-ख: सेवा सम्बन्धी				छोटो उत्तर		४ प्रश्न X ५ अंक = २०	
				लामो उत्तर		३ प्रश्न X १० अंक = ३०	
पाठ्यक्रमको इकाई विभाजन							
बुँदा नं.:	१	२	३	४	५	६	७ र ८
प्रश्न संख्या:	१	१	१	१	१	१	१

1. Computer Networks:

- 1.1 Protocol stack, switching
- 1.2 Link Layer: services, error detection and correction, multiple access protocols, LAN addressing and ARP (Address Resolution Protocol), Ethernet, CSMA/CD multiple access protocol, Hubs, Bridges, and Switches, Wireless LANs, PPP (Point to Point Protocol), Wide area protocols
- 1.3 Network Layer: services, datagram and virtual circuits, routing principles and algorithms, Internet Protocol (IP), IP addressing, IP transport, fragmentation and assembly, ICMP (Internet Control Message Protocol), routing on the internet, RIP (Routing Information Protocol), OSPF (Open Shortest Path First), router internals, IPv6
- 1.4 Transport Layer: principles, multiplexing and de-multiplexing, UDP, TCP, flow control, principles of congestion control, TCP congestion control
- 1.5 Application Layer: Web and Web caching, FTP (File Transfer Protocol), Electronic mail, DNS (Domain Name Service), socket programming
- 1.6 Distributed system, Clusters, Network Security, Disaster Recovery, Data Storage

2. Operating System:

- 2.1 Processing and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock
- 2.2 Scheduling
- 2.3 Memory Management
- 2.4 Input Output and Files: I/O devices and its organization, Principles of I/O software and hardware, Disks, Files and directories organization, File System Implementation
- 2.5 Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Clusters
- 2.6 Security: Authentication and Access Authorization, System Flaws and Attacks, Trusted System
- 2.7 Common Operating Systems: MS-DOS, Windows Family of Products, Unix Family of Products, Linux Family of Products, Windows Networking, Windows Architecture, Linux Architecture, Troubleshooting Windows, & Linux, Managing Network Printing, Managing Hard Disks and Partitions, Monitoring and Troubleshooting Windows, Users, Groups and Permission on Linux and Windows.

3. Structured and object-oriented programming:

- 3.1 Data types, ADT
- 3.2 Operators, variables and assignments, control structures, Procedure/function
- 3.3 Class definitions, encapsulation, inheritance, object composition, Polymorphism
- 3.4 Pattern and framework
- 3.5 Programming with C, C++, Java

4. Data Structures and Algorithms:

- 4.1 General concepts: Abstract data types, Time and space analysis of algorithms, Big Oh and theta notations, Average, best and worst-case analysis
- 4.2 Linear data structures: Lists, Linked Lists, Stacks, Queues, Priority Queue
- 4.3 Trees: General and binary trees, Representations and traversals, Binary search trees, balancing trees, AVL trees, 2-3 trees, red-black trees, self-adjusting trees, Splay Trees
- 4.4 Algorithm design techniques: Greedy methods, Priority queue search, Exhaustive search, Divide and conquer, Dynamic programming, Backtracking and Recursion
- 4.5 Indexing Methods: Hashing Trees, Suffix Trees
- 4.6 Graph algorithms: Depth-first Search and Breadth-first Search, Shortest Path Problems, Minimum Spanning Trees, Directed Acyclic Graphs.
- 4.7 Searching, Merging and Sorting

5. Software Engineering Principles (System analysis and design):

- 5.1 Software process: Software Process models, risk-driven approaches
- 5.2 Software Project Management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics
- 5.3 Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review.
- 5.4 Software design: Design for reuse, design for change, design notations, design evaluation and validation, Software Architecture, Context diagram and DFD, Object Modeling: Object-Oriented Concept, Object Structure, Object Feature, Class and Object, Use Case Diagram, State Diagram, Event Flow Diagram
- 5.5 Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault

tolerance.

- 5.6 Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
- 5.7 SE issues: Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, SEI-CMM, CASE tools

6. Database Management System and Database Design:

- 6.1 Introduction: The relational model, ER model, SQL, Functional dependency and relational database design, File structure
- 6.2 Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
- 6.3 Crash Recovery: Types of failure, Recovery techniques
- 6.4 Query Processing and Optimization
- 6.5 Indexing: Hash based indexing; Tree based indexing
- 6.6 Distributed Database Systems and Object-oriented database system
- 6.7 Data Mining and Data Warehousing
- 6.8 Security Management System
- 6.9 SQL and Embedded SQL, Writing Basic SQL SELECT Statements, Restricting and Sorting data, Single Row Functions, Displaying Data from Multiple Tables, Aggregation of Data Using Group Functions, Sub Queries, Manipulating Data and Creating & Managing Tables, Creating Views and Controlling User Access.
- 6.10 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, Database Design with major RDBMS products: Oracle, Sybase, DB2, SQL Server.

7. IT in Nepal and Emerging Technologies:

- 7.1 History of IT in Nepal
- 7.2 ICT Policy, 2072 B.S.,
- 7.3 NRB's Information Technology Policy & Guidelines 2012
- 7.4 Simulation and Modeling
- 7.5 Cryptography, Digital Signature
- 7.6 Artificial Neural Network and Computer Vision
- 7.7 Speech signal processing
- 7.8 Adaptive web technology
- 7.9 E-commerce, e-Governance
- 7.10 Multimedia, Image processing
- 7.11 GIS, Remote sensing, GPS

- 8. **Professional Practices:** Ethics and professionalism: code of conduct and guidelines for professional engineering practices, Nepal Engineering Council Act, 2055 and regulations, 2056, Relation with clients, contractor and fellow professionals, Public procurement practices for works, goods and services and its importance.

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