

**खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेड**  
 स्तर: अधिकृत, सेवा/समूह:-विविध/कम्प्युटर, तह:-७, पद:-वरिष्ठ कम्प्युटर इन्जिनियर  
 खुला/आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छः

प्रथम चरण:-	लिखित परीक्षा	पूर्णाङ्क:- २००
द्वितीय चरण:-	अन्तर्वार्ता	पूर्णाङ्क:- ३०

**परीक्षा योजना (Examination Scheme)**

**१. प्रथम चरण: लिखित परीक्षा**

पूर्णाङ्क:- २००

पत्र	विषय	खण्ड	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या x अङ्क	समय
प्रथम	General Subject	Part I: General Awareness & General Reasoning Test	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न (MCQ)	१०० प्रश्न x १ अङ्क	१ घण्टा ३० मिनेट
		Part II: General Technical Subject						
द्वितीय	प्राविधिक ज्ञान र संस्थागत जानकारी		१००	४०	विषयगत	छोटो उत्तर लामो उत्तर	६ प्रश्न x ५ अङ्क ७ प्रश्न x १० अङ्क	३ घण्टा

**२. द्वितीय चरण:**

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

**द्रष्टव्य:-**

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिनेछैन ।
- बहुवैकल्पिक प्रश्न हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नहरूको हकमा तोकिएको अंकको 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 टिप्पणी (Short notes) सोध्न सकिने छ ।
- द्वितीय पत्रमा (विषयगत प्रश्न हुनेको हकमा) प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिका हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीति परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनुपर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- यस भन्दा अगाडि लागु भएका माथि उल्लेखित सेवा, समूहको पाठ्यक्रम खारेज गरिएको छ ।
- पाठ्यक्रम स्वीकृत मिति: २०८२/०३/२५

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प्रथम पत्र (Paper I) :- General Subject

**Part (I) : - General Awareness & General Ability Test (50 Marks)**

1. **General Awareness and Contemporary Issues** (25 ×1 Mark = 25 Marks)
  - 1.1 Physical, socio-cultural and economic geography and demography of Nepal
  - 1.2 Major natural resources of Nepal
  - 1.3 Geographical diversity, climatic conditions, and livelihood & lifestyle of people
  - 1.4 Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
  - 1.5 Current periodical plan of Nepal
  - 1.6 Information on sustainable development, environment, pollution, climate change, biodiversity, science and technology
  - 1.7 Nepal's international affairs and general information on the UNO, SAARC & BIMSTEC
  - 1.8 The Constitution of Nepal (From Part 1 to 5 and Schedules)
  - 1.9 Governance system and Government (Federal, Provincial and Local)
  - 1.10 Provisions of civil service act and regulation relating to constitution of civil service, organisational structure, posts of service, fulfillment of vacancy and code of conduct
  - 1.11 Functional scope of public services
  - 1.12 Public Service Charter
  - 1.13 Concept, objective and importance of public policy
  - 1.14 Fundamentals of management : planning, organizing, directing, controlling, coordinating, decision making, motivation and leadership
  - 1.15 Government planning, budgeting and accounting system
  - 1.16 Major events and current affairs of national and international importance
2. **General Reasoning Test** (25 ×1 Mark = 25 Marks)
  - 2.1 **Logical Reasoning** (9×1 Mark = 9 Marks)  
Verbal Ability, Alphanumeric Series, Reasoning Analogies, Classification, Coding-Decoding, Order & Ranking, Distance & Directions, Analytical and Logical Reasoning, Assertion and Reason, Statement and Conclusion, Input-Output, Venn- diagram
  - 2.2 **Numerical Reasoning** (8×1 Mark = 8 Marks)  
Arithmetic Series, Analogy, Classification, Arithmetical Reasoning, Fraction. Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calender, Data Sufficiency, Data Interpretation & Data Verification
  - 2.3 **Spatial Reasoning** (8×1 Mark = 8 Marks)  
Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion, Embedded Images, Image Formation & Analysis, Mirror and Water Images, Cubes and Dices, Paper Folding & Cutting

**Part (II) : - General Technical Subject (50 Marks)**

**Section A- (15 ×1 Mark = 15 Marks)**

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 network 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 demultiplexing, 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
2. **Computer Architecture & organization and micro-processors**
  - 2.1 Basic Structures : sequential circuits, design procedure, state table and state diagram, Von Neumann / Harvard architecture, RISC/CISC architecture
  - 2.2 Addressing Modes and Programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction, cycle and excitation cycle.
  - 2.3 Processing Unit: instruction formats, arithmetic and logical instruction
  - 2.4 Input Output Organization : I/O programming , memory mapped I/O, basic interrupt system, DMA
  - 2.5 Memory Systems
  - 2.6 808X and Intel microprocessors: programming and interfacing
3. **Digital Design**
  - 3.1 Digital and Analog Systems
  - 3.2 Logic Elements
  - 3.3 Combinational Logic Circuits
  - 3.4 Sequential Logic
  - 3.5 Arithmetic Circuits
  - 3.6 MSI Logic circuits
  - 3.7 Counters and Registers
  - 3.8 IC logic families
  - 3.9 Interfacing with Analog Devices
  - 3.10 Memory Devices
4. **Basic Electrical & Electronics**
  - 4.1 **Electrical**
    - 4.1.1 Basic Circuit Theory
    - 4.1.2 AC circuit Fundamentals
    - 4.1.3 Magnetic circuits and Transformers
    - 4.1.4 Transient Analysis, Filters
  - 4.2 **Electronics**
    - 4.2.1 Semiconductors, Diodes and Diode Circuits, Transistors,
    - 4.2.2 Transistor modeling
    - 4.2.3 Biasing and Amplification

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- 4.2.4 Small Signal amplifiers and frequency response
- 4.2.5 Large signal amplifiers, feedback amplifiers and Oscillators
- 4.2.6 Operational amplifiers

**5. Principles of Electronic Communications**

- 5.1 Block Diagram of analog/ digital communication system
- 5.2 Analog and Digital modulation techniques
- 5.3 Fundamentals of Error Detection and Correction
- 5.4 Performance evaluation of analog and digital communication systems: SNR and BER

**Section B - (20 ×1 Mark = 20 Marks)**

**6. Structured and object oriented programming**

- 6.1 Data types, ADT
- 6.2 Operators, variables and assignments, control structures
- 6.3 Procedure/function
- 6.4 Class definitions, encapsulation, inheritance, object composition, polymorphism
- 6.5 Pattern and framework

**7. Data structures**

- 7.1 General concepts : Abstract data Type, Time and space analysis of algorithms, Big oh and theta notations, Average, best and worst case analysis
- 7.2 Linear data structures
- 7.3 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
- 7.4 Algorithm design techniques: Greedy methods, Priority queue search, Exhaustive search, Divide and conquer, Dynamic programming, Recursion
- 7.5 Hashing
- 7.6 Graphs and digraphs
- 7.7 Sorting

**8. Software Engineering principles (System analysis & design)**

- 8.1 Software process: The software lifecycle models, risk-driven approaches
- 8.2 Software Project management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics
- 8.3 Software requirements: Requirements analysis, requirements solicitation, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review.
- 8.4 Software design: Design for reuse, design for change, design notations, design evaluation and validation
- 8.5 Implementation: Programming standards and procedures, modularity, data abstraction, static analysis, unit testing, integration testing, regression testing, tools for testing, fault tolerance
- 8.6 Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance
- 8.7 SE issues: Formal methods, tools and environments for software engineering, role of programming paradigm, process maturity and Improvement, ISO standards, SEI-CMM, CASE tools

9. **Database Management System**

- 9.1 Introduction : The relational model, ER model, SQL, Functional dependency and relational database design, File structure
- 9.2 Transaction Management and Concurrency Control: Concurrent execution of the user programs, transactions, Concurrency control techniques
- 9.3 Crash Recovery : types of failure, Recovery techniques
- 9.4 Query Processing and Optimization
- 9.5 Indexing : Hash based indexing, Tree based indexing
- 9.6 Distributed Database Systems and Object oriented database system
- 9.7 Security Management System and Cyber Security

10. **Operating System**

- 10.1 Processes and Threads: Symmetric Multiprocessing, Micro-kernels, Concurrency, Mutual Exclusion and Synchronization, Deadlock
- 10.2 Scheduling
- 10.3 Memory Management
- 10.4 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
- 10.5 Distributed Systems: Distributed Message passing, RPC, Client/Server Computing, Clusters
- 10.6 Security : Authentication and Access Authorization, System Flaws and Attacks, Trusted system

**Section C- (15 ×1 Mark = 15 Marks)**

11. **Artificial Intelligence**

- 11.1 Search
- 11.2 Natural Language Processing
- 11.3 Game Playing
- 11.4 Learning
- 11.5 Automated reasoning
- 11.6 Planning
- 11.7 Vision and Robotics

12. **Theory of Computation**

- 12.1 BNF, Languages, grammars
- 12.2 DFA and NDFA, regular expressions, regular grammars
- 12.3 Closure, homomorphism
- 12.4 Pigeonhole principle, pumping lemma
- 12.5 CFGs, Parsing and ambiguity, Pushdown automata, NPDAs & CFGs
- 12.6 Pumping lemma
- 12.7 Turing machine
- 12.8 Recursively enumerable languages Unrestricted grammars
- 12.9 The Chomsky hierarchy, Undecidable problems, Church's Thesis
- 12.10 Complexity Theory, P and NP

13. **Compiler design**

- 13.1 The Structure of a Compiler
- 13.2 Lexical Analyzer
- 13.3 Top down Parsing/ Bottom up Parsing
- 13.4 Syntax Directed Translation
- 13.5 Types and Type Checking

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- 13.6 Run-Time Storage Administration
- 13.7 Intermediate Code generation
- 13.8 Data-Flow Analysis and Code Optimizations
- 13.9 Architecture and recent development on compilers
  
- 14. **Computer Graphics**
  - 14.1 Graphics concepts
  - 14.2 Input devices and techniques
  - 14.3 Basic raster graphics algorithms and primitives
  - 14.4 Scan conversion
  - 14.5 Graphics hardware
  - 14.6 2D geometrical transformations and viewing
  - 14.7 3D geometry and viewing
  - 14.8 Hierarchical modeling
  - 14.9 Projections
  - 14.10 Hidden surface removal
  - 14.11 Shading and rendering
  
- 15. **Emerging Technology**
  - 15.1 Modeling and simulation
  - 15.2 Parallel and distributed computing
  - 15.3 High speed networks
  - 15.4 Artificial Neural Network and Computer Vision
  - 15.5 Adaptive web technology
  - 15.6 Distributed Object technology ( ORB, DCOM)
  - 15.7 Speech signal processing
  - 15.8 Data Mining and Data Warehousing
  - 15.9 Cryptography and network security
  - 15.10 E-commerce
  - 15.11 Software project management
  - 15.12 Embedded systems
  - 15.13 Image processing
  - 15.14 Multimedia
  - 15.15 Expert system
  - 15.16 GIS/ Remote sensing/ GPS

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**द्वितीय पत्र (Paper II) : प्राविधिक ज्ञान तथा संस्थागत जानकारी**

**खण्ड (क) -६० अङ्क**

(४ प्रश्न x ५ अंक, ४ प्रश्न x १० अंक)

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  - 3.1 Digital and Analog Systems. Number Systems.
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  - 10.4 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
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  - 11.6 Planning
  - 11.7 Vision and Robotics
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  - 12.2 DFA and NDFA, regular expressions, regular grammars
  - 12.3 Closure, homomorphism
  - 12.4 Pigeonhole principle, pumping lemma
  - 12.5 CFGs, Parsing and ambiguity, Pushdown automata, NPDA's & CFGs
  - 12.6 Pumping lemma
  - 12.7 Turing machines
  - 12.8 Recursively enumerable languages    Unrestricted grammars
  - 12.9 The Chomsky hierarchy, Undecidable problems, Church's Thesis
  - 12.10 Complexity Theory, P and NP
- 13. **Compiler design**
  - 13.1 The Structure of a Compiler
  - 13.2 Lexical Analyzer
  - 13.3 Top down Parsing/ Bottom up Parsing
  - 13.4 Syntax Directed Translation
  - 13.5 Types and Type Checking
  - 13.6 Run-Time Storage Administration
  - 13.7 Intermediate Code generation
  - 13.8 Data-Flow Analysis and Code Optimizations
  - 13.9 Architecture and recent development on compilers
- 14. **Computer Graphics**
  - 14.1 Graphics concepts
  - 14.2 Input devices and techniques
  - 14.3 Basic raster graphics algorithms and primitives
  - 14.4 Scan conversion

**खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेड**  
**स्तर: अधिकृत, सेवा/समूह:-विविध/कम्प्युटर तह:-७, पद:-वरिष्ठ कम्प्युटर इन्जिनियर**  
**खुला/आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम**

- 14.5 Graphics hardware
  - 14.6 2D geometrical transformations and viewing
  - 14.7 3D geometry and viewing
  - 14.8 Hierarchical modeling
  - 14.9 Projections
  - 14.10 Hidden surface removal
  - 14.11 Shading and rendering
15. **Emerging Technology**
- 15.1 Modeling and simulation
  - 15.2 Parallel and distributed computing
  - 15.3 High speed networks
  - 15.4 Artificial Neural Network and Computer Vision
  - 15.5 Adaptive web technology
  - 15.6 Distributed Object technology ( ORB, DCOM)
  - 15.7 Speech signal processing
  - 15.8 Cryptography and network security
  - 15.9 Data Mining and Data Warehousing
  - 15.10 E-commerce
  - 15.11 Software project management
  - 15.12 Embedded systems
  - 15.13 Image processing
  - 15.14 Multimedia
  - 15.15 Expert system
  - 15.16 GIS/ Remote sensing/ GPS

**खण्ड (ख) -२० अङ्क**

**(२ प्रश्न x १० अंक)**

16. This section consists of 2 (two) sub-sections i.e. Technical Writing and Case study.

16.1 **Technical Writing**

This section may ask the examinee to write technical proposal on given specification, essay, views/critics etc. The topic must be related to computer technology or the matter related therewith and examinee should be encouraged to put his/her own views and reasoning rather than facts/information.

16.2 **Case Study**

This section is dedicated to the analysis and design of a software system. Examinee should be given a scenario of existing system and asked to analyze and design it following one particular paradigm. This section should include the various domain of knowledge in one platform (for e.g. A case study may incorporate questions from Software Engineering and Database management and Operating system domains).

**खण्ड (ग) -२० अङ्क**

**(२ प्रश्न x ५ अङ्क, १ प्रश्न x १० अङ्क)**

१७. **सार्वजनिक संस्थान र कम्पनी सम्बन्ध जानकारी**

- १७.१ नेपालमा सार्वजनिक संस्थान/कम्पनीको आवश्यकता, संभावना, चुनौती तथा व्यवस्थापनका सवाल
- १७.२ व्यावसायिक शासकीय पद्धति
- १७.३ खाद्य व्यवस्था तथा व्यापार कम्पनीको इतिहास, लक्ष्य, उद्देश्य, रणनीति, संगठनात्मक संरचना, स्रोत व्यवस्थापन, उपादेयता तथा वर्तमान अवस्था, संस्थागत सुधारका प्रयास
- १७.४ सार्वजनिक संस्थान/कम्पनीहरूको स्वायत्तता र व्यवसायिकता

**खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेड**  
**स्तर: अधिकृत, सेवा/समूह:-विविध/कम्प्युटर तह:-७, पद:-वरिष्ठ कम्प्युटर इञ्जिनियर**  
**खुला/आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम**

- १७.५ साविकमा नेपाल खाद्य संस्थान र नेशनल ट्रेडिङ लिमिटेडले गर्दै आएका कामको सामान्य जानकारी
- १७.६ कम्पनीको व्यापार विविधीकरण, प्रतिस्पर्धात्मक क्षमता, आन्तरिक तथा बाह्य व्यापारका संभावना
- १७.७ खाद्य व्यवस्था तथा व्यापार कम्पनीको व्यावसायिक योजनाको आवश्यकता र प्रारूप
- १७.८ नेपालमा वस्तु तथा सेवाका गुणस्तर सम्बन्धी मापदण्ड, संस्थागत व्यवस्था, गुणस्तर नियन्त्रण र प्रयोगशाला
- १७.९ कम्पनीले संचालन गर्ने खरिद विक्री, भण्डारण, कुटानी पिसानी, ब्राण्डिङ, प्याकेजिङ, ढुवानी सम्बन्धी विषयहरू
- १७.१० कम्पनीले प्रयोगमा ल्याएको बजारीकरण रणनीति एवं अनलाइन विजिनेस पोर्टल सम्बन्धी जानकारी
- १७.११ चालु आवधिक योजना र चालु आ.व.को नीति तथा कार्यक्रम तथा बजेटमा खाद्य व्यवस्थासँग अन्तरसम्बन्धित विषय
- १७.१२ कम्पनीको चालु आ.व. को नीति तथा बजेट सम्बन्धी सामान्य जानकारी
- १७.१३ कम्पनीको अचल सम्पत्ति व्यवस्थापनका उपयुक्त रणनीति
- १७.१४ कम्पनी र प्रदेश एवं स्थानीय तहबीच सहकार्यको संभावित क्षेत्र र सहकार्यको मोडल
- १७.१५ खाद्यान्न लगायत अन्य वस्तु तथा सेवा व्यापार, खरिद प्रक्रिया, निकासी पैठारी, लेखाङ्कन र भुक्तानी विधि तथा प्रक्रिया एवं ओभर ड्राफ्ट तथा अन्य कर्जा सम्बन्धी जानकारी
- १७.१६ खाद्य व्यवस्था तथा व्यापार कम्पनीका सरोकारवाला, साझेदार तथा सहयोगी निकाय
- १७.१७ नेपालमा खाद्यान्न उत्पादनको वर्तमान अवस्था, माग आपूर्ति तथा बजारीकरणको व्यवस्था
- १७.१८ खाद्य सुरक्षा, खाद्य सम्प्रभुता र पौष्टिकता सम्बन्धी अवधारणा, अवस्था तथा कम्पनीको भूमिका

**१८. सेवासँग सम्बद्ध कानुनी व्यवस्थाहरू**

- १८.१ खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेडको प्रवन्धपत्र र नियमावली
- १८.२ संस्थान ऐन, २०२१
- १८.३ कम्पनी ऐन, २०६३
- १८.४ खाद्य व्यवस्था तथा व्यापार कम्पनी लिमिटेड कर्मचारी सेवा, शर्त र सुविधा सम्बन्धी विनियमावली, २०७९
- १८.५ खाद्य व्यवस्था तथा व्यापार कम्पनी खरिद तथा आर्थिक प्रशासन विनियमावली, २०७९
- १८.६ खाद्य स्वच्छता तथा गुणस्तर ऐन, २०८१
- १८.७ सार्वजनिक खरिद ऐन, २०६३ तथा सार्वजनिक खरिद नियमावली, २०६४
- १८.८ आर्थिक कार्यविधि तथा वित्तीय उत्तरदायित्व ऐन, २०७६ र नियमावली, २०७७ (बजेट निकास र सरकारी रकम खर्च गर्ने तरीका, लिलाम बिक्री सम्बन्धी व्यवस्था)
- १८.९ विद्युतीय कारोबार ऐन, २०६३ र नियमावली, २०६४
- १८.१० खाद्य अधिकार तथा खाद्य सम्प्रभुता सम्बन्धी ऐन, २०७५ र नियमावली, २०८०