

# नेपाल विद्युत प्राधिकरण

## प्राविधिक सेवा, कम्प्युटर इन्जिनियरिङ्ग समूह, तह-७, इन्जिनियर पदको खुल्ला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

१. लिखित परीक्षाको विषय, पूर्णाङ्क, परीक्षा प्रणाली, प्रश्नसंख्या, अंकभार र समय निम्नानुसार हुनेछ ।

पत्र	विषय	पूर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या	प्रति प्रश्न अंकभार	समय
प्रथम	सामान्यज्ञान तथा सेवा सम्बन्धि सामान्य विषय	१००	४०	क) सामान्यज्ञान र बौद्धिक परीक्षण	२५	२	२ घण्टा
				(ख) सेवासम्बन्धी सामान्य विषय	१०	५	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत	१०	१०	३ घण्टा

- वस्तुगत प्रश्नमा प्रत्येक प्रश्नका चार वटा सम्भाव्य उत्तर दिइने छ । जस मध्ये एउटा सही उत्तरमा (लोकसेवा आयोगले तोके बमोजिम) चिन्ह लगाउने वा लेख्नु पर्नेछ । गलत उत्तर बापत प्रति गलत उत्तर २० प्रतिशतका दरले अंक घटाइनेछ ।
- प्राविधिक सेवा अन्तर्गतका सबै समूह/उपसमूहहरूको प्रथम पत्रको पाठ्यक्रम एउटै हुनेछ । प्रथम पत्रको लिखित परीक्षा सबै समूह/उपसमूहका लागि संयुक्त रूपमा एउटै प्रश्नपत्रबाट एकैदिन वा छुट्टाछुट्टै प्रश्नपत्रबाट छुट्टाछुट्टै दिन हुन सक्नेछ ।
- प्रथमपत्र र द्वितीयपत्रको परीक्षा फरक फरक हुनेछ । द्वितीय पत्रमा २ खण्डहरू हुनेछन् । प्रत्येक खण्डको लागि फरक फरक उत्तर पुस्तिका प्रयोग गर्नुपर्नेछ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी वा दुवै हुन सक्नेछ ।
- सामान्यतः प्रत्येक इकाईबाट प्रश्नहरू सोधिनेछन् । प्रत्येक इकाईको अंकभार तोकिए बमोजिम हुनेछ । लामो उत्तर दिनुपर्ने प्रश्न एकै वा खण्ड खण्ड गरी (दुई वा सो भन्दा बढी) सोध्न सकिनेछ । यस्तो प्रश्न एक भन्दा बढी इकाईबाट पर्ने गरी सोध्न सकिनेछ ।
- यस पाठ्यक्रममा जेसुकै लेखिएको भएता पनि पाठ्यक्रममा परेका ऐन, नियमहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- परीक्षामा कालो मसी भएको कलम वा डटपेन मात्र प्रयोग गर्नुपर्नेछ ।

### प्रथमपत्र: सामान्य ज्ञान तथा सेवासम्बन्धी सामान्य विषय (प्राविधिक सेवा, तह-७ का सबै समूहका लागि)

खण्ड (क): सामान्य ज्ञान र बौद्धिक परीक्षण

[५० अंक]

१. सामान्यज्ञान :

(१५x२=३०)

- नेपालको भूगोल र आर्थिक तथा सामाजिक कृयाकलाप: धरातलीय स्वरूपको किसिम र विशेषता, नेपालमा पाईने हावापानीको किसिम र विशेषता, नदीनाला, तालतलैया, खनिज पदार्थ, प्राकृतिक स्रोत साधन, विद्युत, शिक्षा, स्वास्थ्य र सञ्चारसम्बन्धी जानकारी
- नेपालको सामाजिक एवं सांस्कृतिक अवस्था: प्रथा, परम्परा, धर्म, जातजाति, भाषाभाषी, कला, संस्कृति र साहित्य
- नेपालमा विद्युत विकास, ऊर्जाका स्रोत र सम्भावना
- नेपालको संघीय, प्रादेशिक र स्थानीय संरचना तथा शासन प्रणालीसम्बन्धि जानकारी

- ड) विश्वको भूगोल: महादेश, महासागर, अक्षांश, देशान्तर, अन्तर्राष्ट्रिय तिथि रेखा, समय, पर्वतश्रृंखला, नदी, हिमनदी, ताल, हिमताल
- च) अन्तर्राष्ट्रिय सम्बन्ध तथा संघ/संस्था: संयुक्त राष्ट्र संघ र यसका एजेन्सीहरू (UNO and Its Agencies, दक्षिण एशियाली क्षेत्रीय सहयोग संगठन (SAARC) सम्बन्धी जानकारी
- छ) राष्ट्रिय तथा अन्तर्राष्ट्रिय महत्वका समसामयिक घटना तथा नविनतम गतिविधिहरू

## २. बौद्धिक परीक्षण:

### २.१ Verbal and Non-verbal Aptitude: (१०x२=२०)

Vocabulary, Alphabetical ordering of words, Classification, Coding-Decoding, Insert the missing character, Direction and Distance sense test, Ranking order test, Relationship Test, Logical sequence of words, Common sense test, Assertion and Reason, Logical reasoning, Figure series, Figure analogy, Figure Classification, Figure Matrix, Pattern completion/finding, Construction of squares and triangles, Analytical reasoning.

### २.२ Numerical Ability and Quantitative Aptitude :

Arithmetical reasoning, Insert the correct mathematical signs, Decimal and Fraction, Percentage, Ratio, Average, Profit and Loss, Time and work.

## खण्ड (ख): सेवासम्बन्धी सामान्य बिषय (५० अङ्क)

### 1. Constitution, Act and Rules 3\*5= 15

- 1.1. Present Constitution of Nepal
- 1.2. Nepal Electricity Act, 2041
- 1.3. Nepal Electricity Authority, Present Employee Service by laws
- 1.4. Electricity Regulatory Commission Act, 2074
- 1.5. Electricity Act, 2049 and Electricity Regulation, 2050
- 1.6. Public Procurement Act, 2063
- 1.7. Nepal Electricity Authority, Present Financial Administration by laws
- 1.8. Corruption Control Act, 2059
- 1.9. Good Governance ( Management and Operation) Act, 2064
- 1.10. Land Acquisition Act, 2034
- 1.11. Environment Protection Act, 2053 and Environment Protection Regulation, 2054

### 2. Electricity Development in Nepal 2\*5= 10

- 2.1. History of power development in Nepal; energy supply demand trends
- 2.2. Recent trends in power sector reform; Hydropower potential of Nepal and prospects and challenges for its development
- 2.3. Nepal Electricity Authority: objective, functions, corporate structure, achievement and challenges
- 2.4. Concept of NEA Restructuring in federal context
- 2.5. Silent features of energy crisis decade by government of Nepal

### 3. Development 1\*5= 5

- 3.1. General concept of development administration
- 3.2. Planning in Nepal: efforts, achievement and challenges
- 3.3. Sustainable Development
- 3.4. Public Private Partnership

### 4. Management and financial analysis: 2\*5= 10

- 4.1. Concept of Management
- 4.2. Motivation, Leadership, Control, Coordination and Team work, Decision making
- 4.3. Corporate planning and strategic management
- 4.4. Corporate social responsibility
- 4.5. Project management: Use of network models like CPM, PERT, manpower planning and resource scheduling; project monitoring and control; project control cycle

- 4.6. Financial analysis: Methods of financial analysis such as benefit cost ratio, internal rate of return, net present value, payback period, minimum attractive rate of return and their application; Concept of EIRR and FIRR; tariff structure

## 5. New Trends of Power Sector

2\*5= 10

- 5.1. Various Sources of Energy: trend, Possibilities and challenges
- 5.2. Role of IPP (Independent Power Producer), opportunities and challenges
- 5.3. Power Purchase Agreement (PPA), Power development agreement (PDA)
- 5.4. Concept of Energy Pool Market and Energy Banking
- 5.5. Regional and sub regional interconnections with Nepalese grid

**द्वितीय पत्र: सेवा सम्बन्धी**  
(कम्प्यूटर इन्जिनियरिङ्ग समूहका लागि)

१०० अङ्क

### Section: A

(5x10=50)

#### 1. Digital Logic

Digital and analog system, Numbering system, logic gates, Boolean algebra, Combinational logic circuits, Sequential logic circuits, arithmetic operator and circuits, decoders, multiplexers, demultiplexer, Flip Flops, Counters and registers, Memory devices

#### 2. Computer Architecture and Organization

Basic computer Architecture and organization, Instruction Format, addressing modes, Control unit design, Computer Arithmetic, Memory system, Input-output organizations, RISC / CISC architecture, synchronous data transfer, DMA, memory system, Multiprocessor

#### 3. Computer system software

Machine languages, Assembly language, Interpreters and Compilers

#### 4. Operating system

Concept of process, preemptive and non-preemptive process, Symmetric Multiprocessing, parallel processing. Micro-kernels, Concurrency, Mutual Exclusion and synchronization, deadlock, Scheduling, Memory Management, Input/ Output and files: I/O devices and organization, Files and directories organization, file system implementation, different types of OS (DOS, UNIX, LINUX, WINDOWS), Distributed Systems: Distributed Message passing, RPC, Client/ Server architecture, Clusters, Security: Authentication and access authorization, system flows and attacks, trusted system

#### 5. Structure and object oriented programming

Types of data, data representation, data structure, arrays, operators, variables and assignments, control structures, procedure/function, Class definitions, encapsulation, inheritance, object composition, polymorphism, pattern and framework

#### 6. Software Engineering

Software Process: Software life cycle model, risk-driven approaches, software project management, Software requirements, Software design, Implementation, maintenance, formal specifications, agile software development, process maturity and improvement, ISO standards, CASE tools), Embedded software, Verification and Validation, software inspections, Critical system validations, Software quality assurance planning and process, software safety

#### 7. Computer Networks

OSI model, Network layer: Services, datagram and virtual circuits, routing principles and algorithms, Internet protocol, IP addressing, IP transport, fragmentation and assembly, Internet Control Message Protocol, routing on the internet, routing information protocol, Open Shortest path first, routing intervals, IPv6, Transport Layer: Principles, multiplexing and demultiplexing, UDP, TCP, flow control, principles of congestion control, TCP congestion control, Application layer: Web and web caching, File transfer protocol, E-mail, Internet, Intranet, Domain Name Service, Socket programming, Distributed system and clusters

**Section: B****(5x10=50)****8. Data Structures**

Abstract data type, Time and space analysis of algorithms, Big oh and theta notations, Average, best and worst case analysis, linear data structures, binary tree, representations and traversals, Binary search trees, balancing trees, AVL trees, Greedy methods, priority queue search, Exhaustive search, Divide and conquer, dynamic programming, Recursion, Hashing, Graphs, digraphs, Sorting

**9. Database Management System**

The relational model, ER model, SQL, Functional dependency and relational database design, file structure, Transaction management and concurrency control, Crash Recovery, query processing and optimization, indexing, distributed database systems and object oriented database system, data mining and data Warehousing, security Management system

**10. Artificial Intelligence**

Natural language processing, Learning, planning, Game playing, automated reasoning, Vision and robotics, Knowledge representation, Rule-based and object-based systems

**11. Theory of computation**

Finite automata, regular expressions, push-down automata, context free grammars, pumping lemmas, Turing machines, Church-Turing thesis, decidability, halting problem, reducibility, recursion theorem, time and space measures, hierarchy theorems, complexity classes P, NP, L, NL, PSPACE, BPP and IP, complete problems, P versus NP conjecture, quantifiers and games, provably hard problems, relativized computation and oracles, probabilistic computation, interactive proof systems. Possible advanced topic as time permits

**12. Information security**

Information Security Concepts, Security Threats and Vulnerabilities, Cryptography and Encryption, Digital Signatures, Public Key infrastructure, Applications of Cryptography, Tools and techniques of Cryptography, Security Management, Security Policy, Risk Management, Security Procedures and Guidelines, Business Continuity and Disaster Recovery, Ethics and Best Practices Information and Network Security, System and Application Security, Security Assurance, Security Laws, IPR

**13. Emerging technology**

Simulation and modeling, Distributed and cloud computing, Big data, Internet of Things, Cryptography and network security, embedded system, Multimedia system

**14. Power and Environmental Conditioning**

Power requirements for computer installation, UPS, Environmental conditioning requirements for computer installation

