

नेपाल विद्युत प्राधिकरण

प्राविधिक सेवा, सबै समूह/उपसमूह, तह ७, विभिन्न पदको लागि खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ ।

प्रथम चरण: लिखित परीक्षा पूर्णाङ्क :- २००

द्वितीय चरण: अन्तर्वार्ता पूर्णाङ्क :- ३०

१. प्रथम चरण: लिखित परीक्षा (Written Examination) पूर्णाङ्क :- २००

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	खण्ड	परीक्षा प्रणाली	प्रश्नसंख्या × अङ्क	समय	
प्रथम	सामान्य ज्ञान र बौद्धिक ज्ञान	१००	४०	(क)	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	५० प्रश्न * १ अङ्क	४५ मिनेट	
	संस्थागत एवं सामाजिक मामिला			(ख)	विषयगत	छोटो उत्तर आउने प्रश्न लामो उत्तर आउने प्रश्न	६ प्रश्न * ५ अङ्क २ प्रश्न * १० अङ्क	१ घण्टा ३० मिनेट
द्वितीय	सेवा सम्बन्धी विस्तृत ज्ञान	१००	४०	(क)	विषयगत	छोटो उत्तर आउने प्रश्न लामो उत्तर आउने प्रश्न	२ प्रश्न * ५ अङ्क ४ प्रश्न * १० अङ्क	३ घण्टा
						(ख)	विषयगत	

२. द्वितीय चरण: अन्तर्वार्ता (Interview) पूर्णाङ्क :- ३०

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

**द्रष्टव्य :**

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- लिखित परीक्षामा सोधिने प्रश्न संख्या र अङ्कभार यथासम्भव सम्बन्धित पत्र / विषयमा दिईए अनुसार हुनेछ ।
- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ। तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेखदा अंग्रेजी ठूलो अक्षर (Capital Letter ) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small Letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नहरूको 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 टिप्पणीहरू (Short notes) सोध्न सकिनेछ ।
- विषयगत प्रश्न हुने पत्र/विषयका प्रत्येक खण्डका प्रश्नका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन। परीक्षार्थीले प्रत्येक खण्डका प्रश्नको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/ विषय विषयवस्तुमा जुनसुकै कुरा लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडी (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम स्वीकृत मिति :- २०८०/०८/२१

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**प्रथम पत्र**

**खण्ड (क) सामान्य ज्ञान र बौद्धिक परीक्षण: ५० अङ्क**

**1. सामान्य ज्ञान: (३०x १ = ३० अङ्क)**

- 1.1 नेपालको भूगोल र आर्थिक तथा सामाजिक क्रियाकलाप: धरातलीय स्वरूपको किसिम र विशेषता, नेपालमा पाईने हावापानीको किसिम र विशेषता, नदीनाला, तालतलैया, खनिज पदार्थ, प्राकृतिक स्रोत साधन, विद्युत, शिक्षा, स्वास्थ्य र सञ्चारसम्बन्धी जानकारी
- 1.2 नेपालको सामाजिक एवं सांस्कृतिक अवस्था: प्रथा, परम्परा धर्म, जातजाति, भाषाभाषी, कला, संस्कृति र साहित्य
- 1.3 नेपालमा विद्युत विकास, उर्जाका स्रोत र सम्भावना
- 1.4 नेपालको संघीय, प्रादेशिक र स्थानीय संरचना तथा शासन प्रणाली सम्बन्धी जानकारी
- 1.5 विश्वको भूगोल: महादेश, महासागर, अक्षांश, देशान्तर, अन्तर्राष्ट्रिय तिथि रेखा, समय, पर्वतश्रृङ्खला, नदी, हिमनदी, ताल, हिमताल
- 1.6 अन्तर्राष्ट्रिय सम्बन्ध तथा संघ/ संस्था: संयुक्त राष्ट्र संघ र यसका एजेन्सीहरू (UNO and Its Agencies) दक्षिण एशियाली क्षेत्रीय सहयोग संगठन (SAARC) सम्बन्धी जानकारी
- 1.7 राष्ट्रिय तथा अन्तर्राष्ट्रिय महत्वका समसामयिक घटना तथा नविनतम गतिविधिहरू

**2. बौद्धिक परीक्षण: (२०x १ = २० अङ्क)**

**2.1 Verbal and Non-verbal Aptitude:**

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.

**2.2 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) संस्थागत एवं सामाजिक मामिला: ५० अङ्क**

**1. Constitution, Act and Rules**

- 1.1. Constitution of Nepal
- 1.2. Nepal Electricity Authority Act, 2041
- 1.3. Electricity Regulatory Commission Act, 2074
- 1.4. Electricity Act, 2049 and Electricity Regulation, 2050
- 1.5. Public Procurement Act, 2063 and Regulations, 2064
- 1.6. Nepal Electricity Authority, Present Financial Administration bylaws
- 1.7. Nepal Electricity Authority, Present Employee Service bylaws
- 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, 2076 and Environment Protection Regulation, 2077

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2. **Electricity Development in Nepal**
  - 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 Reliable and Equality Electricity Services in Administration Development (Nepal: Prospects and Challenges)
  
3. **Development**
  - 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
  - 3.5 General Concept of Public Administration and its Function
  
4. **Management and Financial Analysis**
  - 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- CPM, PERT, human resource 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 (EIRR and FIRR), net present value, payback period, minimum attractive rate of return and their application; tariff structure
  
5. **New Trends of Power Sector**
  - 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 exchange pool market, energy banking
  - 5.5 Regional and sub-regional interconnections with Nepalese grid

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द्वितीय पत्र:  
सेवा सम्बन्धी विस्तृत ज्ञान  
खण्ड (क) : ५० अङ्क

- 1. Workshop Technology:**  
Types of hand tools and workshop equipment used in a Mechanical workshop; Measuring tools and Measurement of Precision works; Machine tools: Lathe, Shaper, Milling, Grinding, Drilling Machines; Metal Joining: Soldering, Brazing, Gas welding, Arc welding; Fits and tolerances
- 2. Safety Engineering:**  
Safety tools and devices; Live line maintenance and precautions, Earthing and shielding technique; Fire hazards, Firefighting technique and equipment, Application of DCP, CO<sub>2</sub>, Chemical Foam in firefighting; Noise hazards its Sources and Effect on health. Control of noise; First-aid requirements.
- 3. Material Science:**  
Types of Materials, Material Selection, Mechanical Properties and Testing, Cold working and Hot working, Types of steel, Phase Transformation and Heat Treatment
- 4. Thermodynamics:**  
Basic Concepts: Thermodynamic System, Thermodynamic Property, Pure Substance, Zeroth Law; First Law of Thermodynamics: Control mass and Control volume formulation; Second Law of Thermodynamics: Heat engine, Refrigerator and Heat pump, Kelvin Planck and Clausius Statements, Entropy; Thermodynamic Cycles: Carnot cycle, Otto cycle, Diesel Cycle, Brayton cycle, Rankine cycle; Modes of heat transfer: Conduction, Convection and Radiation
- 5. Fluid Mechanics:**  
Fluid Properties: Viscosity, Surface tension, Compressibility, Vapor Pressure; Fluid Statics: Pressure variations in static fluid, Pressure head, Manometer, Force on submerged surfaces; Equations of Fluid Flow: Types of flow, Continuity equation, Bernoulli's equation, and Momentum equation; Viscous Effects: Reynolds number, Boundary layer, Frictional resistance to flow in pipes; Flow measurement: Pitot-static tube, Orifice, Venturi meter, Nozzle, Rotameter
- 6. Drawing and Machine Elements:**  
Types of Projection, Production Drawings; Common machine elements, Gears, Bearings, Belt drive, Chain drive
- 7. Energy Resources and Environment:**  
Energy consumption scenario of Nepal, Different types of energy resources and their application; Causes and effects of air pollution, Causes and effects of water pollution, Global impacts, green house effects, acid rain, Montreal protocol; Environmental Impact Assessment
- 8. Industrial Engineering:**  
Role of production/Operation Management and System Concepts; Plant Location and Plant Layout Design; Production Planning and Control: Selection of materials, methods, machines and manpower; Network methods: PERT, CPM; Inventory Control: Inventory

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costs and Inventory models; Forecasting Techniques: Requirements of forecasting, Time series and Moving average methods, Regression analysis; Quality Management: Importance of quality, Statistical process control; Statistical Analysis: Measurement of central tendency, Deviation, Distribution

9. **Engineering Economics:**

Types of engineering economics decisions; Time Value of Money: Simple interest, Compound interest, Continuous compound interest; Project Evaluation Techniques: Payback period method, NPV method, Future value analysis, IRR method; Benefit and Cost Analysis: Cost benefit ratio, breakeven analysis

10. **Professional Practice:**

Ethics and Professionalism: Perspective on morals, Codes of ethics and guidelines of professional engineering practice; Legal aspects of Professional Engineering in Nepal: Provision for private practice and employee engineers; Procurement process; Contract law and contract documents; Tendering

### खण्ड (ख) : ५० अंका

11. **Power Plant Basics:**

Voltage, Current, Power, Power factor; Daily load curve, Load factor, Installed capacity, Capacity factor, Utilization factor; Plant availability and Reliability of power station

12. **Hydropower Plants:**

General Layout of a Hydropower station, Types of Hydroelectric power plants, Major components of a Hydro-electric power plant and their functions; Types of Hydro Turbines & their Selection, Specific speed; Efficiencies and performance of turbines, Cavitation; Governor of water turbine

13. **Thermal Power Plant:**

Diesel Power Plant: Major components of Diesel power Plant, Fuel Storage and Supply System, Cooling System, Performance of Diesel Power Plant, Applications of Diesel Power Plant, Advantages and Disadvantages of Diesel Power Plant, Supercharger, Turbochargers; Gas Turbine Power Plant: Gas Turbine Cycle; Open and Closed Cycles, Performance Improvement of Gas Turbine Power Plants; Intercooling, Regeneration and Reheating, Advantages and Disadvantages of Gas Turbine Power Plant; Steam Power Plant: Improved Rankine cycle, Performance Analysis, superheating reheating and regeneration, Advantages and Disadvantages Thermal Power Plants

14. **Hydro-electric and Auxiliary Machines:**

Pumps: Centrifugal pump and reciprocating pump (working principle and characteristics); DC Motors: Shunt field, series field and compound field motors, Torque-speed characteristics; DC Generators: Shunt, series and compound field machines, voltage/speed/load characteristics, effects of variable load, variable torque; Synchronous and induction machines: Basic structure of synchronous machines, Generator on isolated load, generator on large system, synchronous motor; Valves, Gates, Hoist and Lifting equipment, Trash rack and cleaning devices

15. **Operation & Maintenance:**

General Operational rule, Assignment, Duties and communication, Supervision, Inspection and Recording, Maintenance job card and log sheet, Acquiring materials for

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repair works, Estimation of repair works; Starting and shut down of Hydro & Thermal Power station; Maintenance Planning & Concept of various maintenance practices; Condition monitoring of Mechanical Equipment used in a Power Station; Wear, Pitting of Runner and Other parts and their maintenance; Corrosion, its effects and protective measures; Troubling shooting in a Power station; SCADA system: Functions, elements and architecture.

16. **Refrigeration and Air Conditioning:**

Basic refrigeration cycles; Refrigerants; Types of air conditioning and their selection, Major components of an air conditioning system and their functions, Chiller Plant; Ventilation system and its importance in a power plant; Cooling tower, Quality of cooling water, Treatment of cooling water; Operation and maintenance of an Air-conditioning system

17. **Automotive system and Heavy Equipment :**

Components of Automobile; Transmission system; Steering system; Suspension system; Cooling system; Lubrication system; Exhaust system; Electrical system, Fuel system; Basic knowledge of heavy equipment: Loader, Bulldozer, Grader, Excavator, Roller, Crane & Forklift

18. **Wind Power Plant :**

Introduction, different components, operation and maintenance