नेपाल विद्युत प्राधिकरण

प्राविधिक सेवा, सवै 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		प्रश्नसख्या ×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	६ प्रश्न * ५ अङ्क	१ घण्टा ३० मिनेट
						लामो उत्तर आउने प्रश्न	२ प्रश्न *१० अङ्क	
द्वितिय	सेवा सम्बन्धी विस्तृत ज्ञान	१००	४०	(क)	विषयगत	छोटो उत्तर आउने प्रश्न	२ प्रश्न * ५ अङ्क	३ घण्टा
						लामो उत्तर आउने प्रश्न	४ प्रश्न * १० अङ्क	
				(ख)		छोटो उत्तर आउने प्रश्न	२ प्रश्न * ५ अङ्क	
						लामो उत्तर आउने प्रश्न	४ प्रश्न *१० अङ्क	

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

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अग्रेजी अथवा नेपाली र अग्रेजी दुवै हुन सक्नेछ ।

२. प्रथम र द्धितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

३. लिखित परीक्षामा सोधिने प्रश्न संख्या र अङ्कभार यथासम्भव सम्बन्धित पत्र / विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० प्रतिशत अङ्क कट्टा गरिनेछ। तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अग्रेजी 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 रद्ध हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्यालकुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको 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 टिप्पणीहरु (Short notes) सोध्न सकिनेछ।

८. विषयगत प्रश्न हुने पत्र/विषयका प्रत्येक खण्डका प्रश्नका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन। परीक्षार्थीले प्रत्येक खण्डका प्रश्नको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/ विषय विषयवस्तुमा जुनसुकै कुरा लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडी (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम स्वीकृत मिति :- २०८०/०८/२१

नेपाल विद्युत प्राधिकरण

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

प्रथम पत्र

खण्ड (क) सामान्य ज्ञान र बौद्धिक परीक्षणः ५० अङ्क

1. सामान्य ज्ञानः (३०x १ = ३० अङ्क)

1.1 नेपालको भूगोल र आर्थिक तथा सामाजिक क्रियाकलापः धरातलीय स्वरुपको 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 अवस्थाः 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 भूगोलः महादेश, महासागर, अक्षांश, देशान्तर, अन्तर्राष्ट्रिय तिथि रेखा, समय, पर्वतश्रृङ्खला, नदी, हिमनदी, ताल, हिमताल

1.6 अन्तर्राष्ट्रिय सम्बन्ध तथा संघ/ संस्थाः संयुक्त राष्ट्र संघ र यसका एजेन्सीहरु (UNO and Its Agencies) दक्षिण एशियाली क्षेत्रीय सहयोग संगठन (SAARC) सम्बन्धी जानकारी

1.7 राष्ट्रिय तथा अन्तर्राष्ट्रिय महत्वका समसामयिक घटना तथा नविनतम गतिविधिहरु

2. बौद्धिक परीक्षणः (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 मामिलाः 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

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

नेपाल विद्युत प्राधिकरण

प्राविधिक सेवा, सिभिल समूह, सर्भे उपसमूह, तह-७, सर्भे इञ्जिनियर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्रः

सेवा सम्बन्धी विस्तृत ज्ञान

खण्ड (क) : ५० अंङ्क

1. **Fundamentals of Surveying**
   - 1.1 Definitions, objectives, Principle, Discipline of surveying, significance to engineering
   - 1.2 Linear measurement techniques, Types, sources of errors in linear measurements; commonly accepted error ratio
   - 1.3 Angular measurement techniques Types, sources of errors and classification of errors in angular measurements,
   - 1.4 Accuracy and precision, propagation of error
   - 1.5 Principle and methods of plain table surveying, Advantages and disadvantages
   - 1.6 Bearings, types and bearing systems, magnetic declination, Local attraction in compass survey
   - 1.7 Application of surveying in different project development like hydropower, transmission line etc.
   - 1.8 Plotting and Mapping

2. **Survey Management**
   - 2.1 Survey team : Composition of survey team and terms of reference
   - 2.2 Survey design, specification and cost estimation
   - 2.3 Equipment and suitability analysis of different types of survey
   - 2.4 Surveying safety management
   - 2.5 Professional ethics and code of conduct
   - 2.6 Coordination with institutions

3. **Levelling**
   - 3.1 Definition, Requirements of vertical measurements, Principle of levelling
   - 3.2 Booking and calculation of reduced level (HI method, Rise/Fall method)
   - 3.3 Temporary and Permanent adjustment of level (Two peg test and collimation correction)
   - 3.4 Classification of leveling: Fly leveling; Profile leveling; Cross sectioning; Reciprocal leveling
   - 3.5 source of error in levelling
   - 3.6 Errors, precision, Adjustment of level circuit
   - 3.7 Introduction of grades or slopes in leveling and setting out of grade stakes as per grade elevation.
   - 3.8 Trigonometric levelling; Definition, determination of height and distance in inaccessible object, reciprocal trig-levelling
   - 3.9 Significance of levelling in hydropower projects

4. **Traversing, Triangulation and Trilateration**
   - 4.1 Introduction, Traverse party, Equipment for traverse party, Purpose of traverse, Types of traverse and methods of traversing
   - 4.2 Field works for traversing, traverse field notes
   - 4.3 Traverse computation for closed traverse and link (closed loop) traverse
   - 4.4 Horizontal and vertical control of traverse
   - 4.5 Errors, precision and adjustment in angles, bearings and coordinates
   - 4.6 Traverse omitted measurements

4.7 Plotting of traverse
4.8 Principle of triangulation and trilateration
4.9 Triangulation figures, well-conditioned triangle
4.10 Computation and adjustment of triangulation and trilateration

5. **Contouring**
5.1 Terms: contour, contouring, contour interval, horizontal equivalent
5.2 Characteristics of contour line
5.3 Method of contouring: direct and indirect
5.4 Interpolation of contours and plotting
5.5 Uses of contour maps, grade contour

6. **Intersection and Resection**
6.1 Definition and uses
6.2 Analytical intersection and resection
6.3 Two point and three points resection and their significance

7. **Computation of Area and Volume**
7.1 Introduction, computation of area, computation of area from field notes and plotted pians
7.2 Computations of volumes, Volume from cross sections, Trapezoidal and Prismoid formulae
7.3 Prismoid correction, Curvature correction
7.4 Capacity of reservoir, volume from borrow pits

8. **Photogrammetry and Remote Sensing**
8.1 Introduction, principle, uses Aerial camera, aerial photographs
8.2 Definitions, scale of vertical and tilted photograph
8.3 Displacement in photogrammetry and their corrections
8.4 Procedure of aerial survey, flight planning, ground control points
8.5 Photomaps and mosaics
8.6 Application of photogrammetry
8.7 Orientation in photogrammetry, Aerial triangulation, DTM generation
8.8 Modern Technologies like UAV, LiDAR; basics, techniques and application
8.9 Introduction, principles of energy interaction in atmosphere and earth surface features
8.10 Types of remote sensing
8.11 Image resolution, characteristics
8.12 Digital image processing and interpretation
8.13 Application of remote sensing

खण्ड (ख) : ५० अंङ्क

9. **Global Navigation satellite system (GNNS)**
9.1 Introduction to space geodesy
9.2 Principle and concept of GNSS
9.3 Types of GNSS; GPS, GLONAS, Bei Dou, Galileo, QZSS; significance of different GNSS systems
9.4 Components of GNSS
9.5 GNSS signals and positioning
9.6 GNSS error and accuracy

9.7 GNNS survey method
9.8 GNNS data processing; Significance of CORS, availability of CORS in Nepal
9.9 Geometric coordinates and WGS 84
9.10 Availability of GNNS/CORS data in Nepal
9.11 Application of GNSS

10. **Cartography**
10.1 Definition, scope and content of the spheroid
10.2 Map scale, co-ordinate system, methods of mapping, relief maps, thematic maps, map projections
10.3 Classification, principles of construction of common projections, cylindrical, conical, azimuthal projections
10.4 Properties and uses a choice of projections, plane co-ordinates
10.5 UTM system, projection used in Survey of Nepal topographical sheets, map reproduction, enlargement and reduction
10.6 Concept of colour in map preparation
10.7 Web cartography

11. **Geographical Information System (GIS)**
11.1 Introduction to GIS
11.2 GIS component
11.3 Data model
11.4 GIS operation and spatial analysis
11.5 Geometric coordinates and WGS 84
11.6 Application of GIS

12. **Cadastral surveying**
12.1 Historical Background, Development of Cadastral System, Concept of Cadastre and Cadastral survey, types of Cadastre, Cadastral system (analog and digital), importance of Cadastre
12.2 Principles of cadastral surveying
12.3 Land laws, Land acquisition and compensation
12.4 Cadastral System of Nepal: Analogue cadastral system, Digital cadastral system, Maintenance of cadastre, LIS in Nepal, Organization involved in cadastral system, Legal framework for cadastral system

13. **Geodesy**
13.1 Coordinate system and star coordinate updating
13.2 Mathematical model for latitude, longitude and azimuth
13.3 Transformation between local and global system
13.4 Celestial system

14. **Plotting and Mapping**
14.1 Introduction to maps, Plotting of topographic map, L-section, Cross - section
14.2 Software of plotting and mapping for modern map
14.3 Mapping for hydropower project

15. **Use of Survey Instrument**
15.1 Types of surveying equipment and their Uses

15.2 Plane table, Telescopic alidade, Compass, Level, Theodolite, EDM, Total station, GNSS receiver

15.3 Aerial camera, process camera, digital camera, scanner, 3D scanners, ground penetrating radar, stereo plotter, stereoscope, scribing tools, drawing equipment

16. **Engineering Surveying**

16.1 Road Survey: Alignment surveying, curve setting, different type of curves, profile surveying, cross section surveying

16.2 Transmission line surveying; route surveying, Profile survey of transmission line and distribution line; fixing tower location; angle points; Power line/ Transmission line rossing

16.3 Tunnel survey; Alignment of the centerline of the tunnel; Transferring the alignment underground; Transferring the levels under ground

16.4 Hydropower station survey: Intake, reservoir, dam, power house

17. **Digital mapping**

17.1 Digital mapping in Nepal

17.2 Capture and handling of digital data

17.3 Conversion of raster data to vector and vice-versa

17.4 Knowledge of proprietary and open-source data software for surveying and mapping purpose

18. **Power sector development and Engineering Economics**

18.1 Importance of Engineering Economics in hydropower development

18.2 Role of engineer for potential of hydropower development

18.3 Identification of hydropower scheme

18.4 Risks in hydropower sector Investments and opportunity

18.5 Payback period, Net Present value, Cost benefit ratio, internal rate of return

18.6 Risk analysis, tariff structure