

**बुढीगण्डकी जलविद्युत कम्पनी लिमिटेड**  
**नेपाल इञ्जिनियरिङ्ग सेवा, सर्भे समूह, सातौं तहका करार सेवाका पदहरुको प्रतियोगितात्मक**  
**परीक्षाको पाठ्यक्रम**

यस पाठ्यक्रमलाई दुई चरणमा विभाजन गरीएको छः

प्रथम चरण:- लिखित परीक्षा ( Written Examination)

पूर्णाङ्क:- १००

द्वितीय चरण:- क) अन्तर्वार्ता ( Interview)

पूर्णाङ्क:- २०

**प्रथम चरण: लिखित परीक्षा ( Written Examination)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्याXअङ्क	समय
प्रथम	General Subject	Part-I: General Awareness Test (20)	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQS)	१०X २	१ घण्टा
		Part-II General Technical Subject (80)				४०X २	

**द्वितीय चरण: अन्तर्वार्ता ( Interview)**

पूर्णाङ्क:- २०

पत्र/विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	समय
अन्तर्वार्ता (Interview)	२०		अन्तर्वार्ता (Interview)	३० मिनेट

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- यस पाठ्यक्रम अन्तर्गतका पत्र/विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि ( संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

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**प्रथम खण्ड (Part I)**

**सामान्य ज्ञान [Part I: General Knowledge][१० x २ = २० अंक]**

**1. सामान्य ज्ञान:**

- 1.1 नेपालको भूगोल, नेपालमा पाइने हावापानीको किसिम र विशेषता, नदीनाला, तालतलैया, पर्वत श्रृंखला, हिमनदी, प्राकृतिक स्रोत साधन, विद्युतसम्बन्धी जानकारी
- 1.2 नेपालमा विद्युत विकास, उर्जाका स्रोत र सम्भावना, विद्युत व्यापार
- 1.3 नेपालको संघीय, प्रादेशिक र स्थानीय संरचना तथा शासन प्रणाली सम्बन्धी जानकारी

**1.4 Policy, Act and Rules:**

- Electricity Regulatory Commission Act, 2074
- Electricity Act, 2049 and Electricity Regulation, 2050
- Public Procurement Act, 2063 and Regulations, 2064
- Memorandum of Association , Article of Association of Budhigandaki Jalbidhyut Company Limited
- Good Governance (Management and Operation) Act, 2064
- Land Acquisition Act, 2034
- Environment Protection Act, 2076 and Environment Protection Regulation, 2077

**1.5 Electricity Development in Nepal**

- History of power development in Nepal; Electricity supply demand supply
- Hydropower potential of Nepal and prospects and challenges for its development
- Budhigandaki Jalbidhyut Company Ltd: objective, functions, corporate structure, achievement and challenges
- Reliable and Equality Electricity Services in Administration Development (Nepal: Prospects and Challenges)

**दोस्रो खण्ड (Part II) General Technical Subject [40 x 2=80]**

**1. Fundamentals of Surveying ( 3 x 2 = 6)**

- 1.1 Definitions, objectives, Principle, Discipline of surveying, significance to engineering
- 1.2 Classification of Surveying, Types of maps, Applications of Surveying and mapping, types of scale, construction and use of Scale
- 1.3 Linear and angular measurement techniques, Types and sources of errors in measurements; permissible error in measurements
- 1.4 Accuracy and precision, propagation of error
- 1.5 Principle and methods of plain table surveying, Advantages and disadvantages

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- 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( 2x 2 = 4)**

- 2.1 Survey team : Composition of survey team and terms of reference
- 2.2 Survey design, specification and cost estimation
- 2.3 Equipment, calibration and adjustment before starting 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 x 2 = 6)**

- 3.1 Definition, Requirements of vertical measurements, Principle of levelling
- 3.2 Recce, monumentation, observation, 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: Differential levelling, Fly leveling; Profile leveling; Cross sectioning; Reciprocal leveling, precise levelling
- 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
- 3.9 Significance of levelling in hydropower projects

**4. Traversing, Triangulation and Trilateration ( 4x 2 = 8)**

- 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 and Open traverse
- 4.4 Errors, precision and adjustment in angles, Bearings and coordinates
- 4.5 Traverse omitted measurements
- 4.6 Plotting of traverse
- 4.7 Principle of triangulation and trilateration
- 4.8 Triangulation figures, Well-conditioned triangle
- 4.9 Computation and adjustment of triangulation and trilateration

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**5. Contouring( 2x 2 = 4)**

- 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( 1x 2 = 2)**

- 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( 1x 2 = 2)**

- 7.1 Introduction, Computation of area, computation of area from field notes and plotted plans
- 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( 4x 2 = 8)**

- 8.1 Introduction, Principle, Uses of 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

**9. Geodesy and Global Navigation satellite system (GNSS) ( 3x 2 = 6)**

- 9.1 Introduction to Geodesy, Shape of the earth, Ellipsoid and geoid, Local and global datum, various coordinate system, datum transformation, 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

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- 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 (3x 2= 6)**

- 10.1 Definition, scope and content of the spheroid
- 10.2 Map scale, co-ordinate system, methods of mapping, relief maps, thematic maps, map
- 10.3 Projections
- 10.4 Classification, principles of construction of common projections, cylindrical, conical,
- 10.5 Azimuthal projections
- 10.6 Properties and uses a choice of projections, plane co-ordinates
- 10.7 UTM system, projection used in preparing topographical map sheets in Nepal, map reproduction,
- 10.8 Enlargement and reduction
- 10.9 Concept of colour in map preparation
- 10.10 Web cartography

**11. Geographical Information System (GIS) (4x 2 = 8)**

- 11.1 Introduction to GIS
- 11.2 GIS component
- 11.3 Data model: Vector, Raster and TIN, data conversion, Topology
- 11.4 GIS operation and spatial analysis
- 11.5 Geometric coordinates and WGS 84
- 11.6 Meta Data
- 11.7 Spatial Data Infrastructure
- 11.8 Data standards, formats and Interoperability,
- 11.9 OGC standards
- 11.10 Digital mapping and its application in Nepal
- 11.11 Various GIS Software and their application, Open source and Proprietary software
- 11.12 Application of GIS

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**12. Cadastre (4x 2 =8)**

- 12.1 Land Registration, Land Rights and Land Records, Land Transfers, Registration of Deed,
- 12.2 Registration of Titles, Fragmentation and Consolidation, Horizontal Sub division, Systematic
- 12.3 Adjudication, Land Tenure, Land Record in Nepal ,Land Registries, Cadastral Surveying, Cadastral
- 12.4 Concepts, Principles of cadastral Surveying, Boundaries, Parcel, Cadastral Survey Methods,
- 12.5 Cadastral System,
- 12.6 Cadastral Interface, Maintenance of cadaster, Land Laws, Cadastral Surveys in Nepal, Land
- 12.7 Management, Principles of Management, Cadastral Organization, Land Development Planning,
- 12.8 Financial Aspects, Land Use, Need for LIS, Land Management, GIS Applications, Land
- 12.9 Administration, Overview of Land related Acts and Rules of Nepal,
- 12.10 Land Information System (LIS), Concept of LIS, need for coordination: Structure, Parcel based LIS:
- 12.11 The Multipurpose Cadaster, The Economics of LI

**13. Plotting and Mapping ( 2x 2 = 4)**

- 13.1 Introduction to maps, Plotting of topographic map, L-section, Cross - section
- 13.2 Software of plotting and mapping for modern map
- 13.3 Mapping for hydropower project

**14. Use of Survey Instrument ( 2x 2 = 4)**

- 14.1 Types of surveying equipment and their Uses
- 14.2 Plane table, Telescopic alidade, Compass, Level, Theodolite, EDM, Total station, GNSS receiver
- 14.3 Aerial camera, process camera, digital camera, scanner, 3D scanners, ground penetrating radar,
- 14.4 Stereo plotter, stereoscope, scribing tools, drawing equipment

**15. Engineering Surveying( 2x 2 = 4)**

- 15.1 Transmission line surveying; Route surveying, Profile survey of transmission line and distribution
- 15.2 Line; fixing tower location; angle points; Power line/ Transmission line Crossing
- 15.3 Tunnel survey; Alignment of the centerline of the tunnel; Transferring the alignment underground;
- 15.4 Transferring the levels under ground
- 15.5 Hydropower station survey: Intake, reservoir, dam, power house.