

**राष्ट्रिय प्रसारण ग्रिड कम्पनी लिमिटेड**  
**इन्जिनियरिङ्ग सेवा, विविध समूह, ७ तह, इन्जिनियर (सर्भे) पदको खुला र आन्तरिक प्रतियोगितात्मक**  
**परीक्षाको पाठ्यक्रम**

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छः

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

**परीक्षा योजना (Examination Scheme)**

१. प्रथम चरण:- लिखित परीक्षा पूर्णाङ्क:- २००

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या × अङ्क	समय	
प्रथम	संस्थागत र व्यवस्थापकीय ज्ञान	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न (MCQ)	५० प्रश्न × २ अङ्क	४५ मिनेट
द्वितीय	तथा सेवा सम्बन्धी (प्राविधिक)	१००	४०	विषयगत	छोटो उत्तर लामो उत्तर	६ प्रश्न × ५ अङ्क ७ प्रश्न × १० अङ्क	३ घण्टा

२. द्वितीय चरण:- अन्तरवार्ता पूर्णाङ्क:- ३०

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तरवार्ता	३०	मौखिक

**द्रष्टव्यः**

- यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ।
- प्रथम र द्वितीय पत्रको विषयवस्तु एउटै हुनेछ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै 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 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 प्रश्न हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन।
- परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार सामान्यतया सम्बन्धित पत्र/विषयमा दिइए अनुसार हुनेछ।
- विषयगत प्रश्न हुने पत्रका हकमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन्। परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्ने छ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू 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 उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ।
- पाठ्यक्रम स्वीकृत मिति:- २०८०/११/१७

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प्रथम पत्र:- संस्थागत, व्यवस्थापकीय ज्ञान र सेवा सम्बन्धी (प्राविधिक)

खण्ड (क)- (४०% अङ्क)

**1. Fundamentals of Surveying**

- 1.1 Surveying and Mapping: Definition of terms used in Surveying, Principles of Surveying, Types and Classification of Surveying, Application and use of Surveying
- 1.2 Measurement and Units: Linear and angular measurements, Types and constructions of Scale, Area and volume of plain and geometric figures, Heights and Distances, Trigonometric ratios, properties of triangle, Pythagoras theorem, units and conversion
- 1.3 Bearings: Bearing, Types of bearing, computation of bearing, magnetic declination, dip, convergence, Application and use of bearing
- 1.4 Errors in Survey Measurements: Types and sources of errors in survey measurements, Nature of errors, accuracy and precision, Corrections and adjustment of error, measure of central tendencies, standard deviation, variance, least square adjustment
- 1.5 Survey Project Management: Survey specification, standards, survey planning, survey design, cost estimation, supervision, monitoring, evaluation, Terms of reference, proposal, report writing,
- 1.6 Survey profession and Professionalism: Survey profession, professional ethics, conducts of behaviour, basic information on National Mapping Agency, International organizations in survey profession (FIG, ISPRS, ICA etc)

**2. Geodesy and Control Survey**

- 2.1 Introduction to Geodesy: Definitions and terminology, Shape and size of the earth, geoid, spheroid and ellipsoid, mean sea level, datum
- 2.2 Reference system: Horizontal and vertical datum, reference system, reference frame, coordinate system, Local and global datum, datum transformation
- 2.3 Space Geodesy: Celestial body, celestial sphere, celestial coordinate system, Concept of time, star observation, basic understanding of various techniques of space Geodesy, application
- 2.4 Gravity Survey: Gravitational field, Gravimetry, different types of Gravimeters, gravity observation, gravity anomaly, relationship between gravitational field and shape of the earth, orthometric and ellipsoidal height, geoid undulation, basic understanding of geoid determination, application and use
- 2.5 Control Survey: Horizontal and Vertical Control, Traverse principles, methods, computations Triangulation and, Trilateration principles, methods and computations, Levelling principles, methods, types and computation, application and use of control survey
- 2.6 Introduction to GNSS: GNSS principle, types, component and segments, orbits, signals, observation, processing, error and accuracy, Application of GNSS, recent development in GPS applications.

**3. Topographic and Engineering Survey**

- 3.1 Topographic Survey: Introduction, definitions and terminology, relief representation, methods of relief representations, contours, characteristics of contour, use of contour
- 3.2 Traditional Topographic mapping techniques: Basic principles of Plain Table Survey and Tacheometry, instruments and accessories, techniques of observation and plotting, application and use, Basic knowledge of Topographic map series of Nepal
- 3.3 Hydropower and transmission line Survey: Reconnaissance Survey (Recce), alignment survey, detailed survey, profiling, intake, survey for reservoir and

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- command area, forebay and tailrace, survey for tower pad and transmission line, right of way, area, volume computation
- 3.4 Road, Highway and Bridge Survey: Recce, Alignment survey, detail survey, plan and profile drawing, cut and fill area and volume computation, different type of curves, curve setting, gradient fixing, bridge axis fixing, abutment and pier of bridge
- 3.5 Setting out of building: Basic information and equipment used in setting out of buildings
- 4. Photogrammetry and Remote Sensing**
- 4.1 Basics of Photogrammetry: Introduction, principle, classification and types of photogrammetry, aerial photograph and their types, scale of photograph, relation between flying height and scale, relief displacement, stereoscopic vision, overlaps, parallax
- 4.2 Aerial Camera: Analogue and digital camera, Camera geometry, camera coordinate system in analogue and digital camera, Types of cameras, Aerial Camera and scanners, aerial camera films,
- 4.3 Orientation: Interior and exterior, Interior, relative and absolute orientation, ground control points, aerial triangulation, collinearity condition
- 4.4 Aerial Photogrammetry Products: Aerial photograph (stereo and mono), scanning photographs, digital photographs, Image matching technique, DSM and DTM generation, Orthorectification, Orthophoto and Orthophoto map, mosaic, 2D and 3D feature extraction
- 4.5 Basics of Remote Sensing: Electromagnetic wave, energy interaction with earth surface, interaction with atmosphere, types of remote sensing, active and passive remote sensing, sources of error, application and use of remote sensing
- 4.6 Sensor and platform: Different types of sensors a platform used in remote sensing, image formation, radiometric, spatial, spectral and temporal resolution of remote sensing images, Application of various remote sensing sensors and platforms
- 4.7 Image enhancement and classification: Image interpretation, interpretation element, radiometric correction, geometric correction, various types of filters used for image enhancement, Image classification, unsupervised and supervised classification, pixel based and object-based classification

**खण्ड (ख)- ४०%**

- 5. Cartography and Geographical Information System (GIS)**
- 5.1 Basics of Cartography: Introduction and definitions of terminology used in Cartography, maps and scale, classification of maps, digital landscape model, digital cartographic model,
- 5.2 Map design and Symbol: Map making techniques, map design, element of maps, marginal information, different types of symbols used in map, point, line and area symbol, symbol design, enlargement and reduction of map, map generalization, generalization techniques
- 5.3 Projection system: Plain and curved surface of earth, map projection, classification and types of map projection (Stereographic, Mercator, LCC, Robinson etc), projection surface (plain, cylindrical, conic etc), projection aspects (Oblique, transverse, normal etc), projection properties (Conformal, equivalent, compromise etc), coordinate system, coordinate transformation, application of various projection system in mapping, projection system used in Nepal,

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- 5.4 Cartographic representation: Data measurement level, visual variable, data classification GIS, visualization, types of map and application of visual variable, basic information on web maps and atlas
  - 5.5 Basics GIS and database: GIS terminology and definition, object, field, data types, vector, raster, point line and area features, scanning and digitizing, georeferencing, topology building, spatial autocorrelation, interpolation, basics of database, field, tuple, table, relation, primary and foreign key
  - 5.6 GIS operation and analysis: Spatial analysis functions, Overlay, Clip, intersect, union, buffer, raster operations,
  - 5.7 GIS Mapping: Sources of spatial data, Data entry, import and downloading from other sources, importing from and exporting to google earth, data cleaning and editing, map design, symbol design, sheet numbering system for various types of maps used in Nepal
- 6. Cadastre and Land Administration**
- 6.1 Cadastre: Introduction and definition of terms, Concept of Cadastre and Cadastral survey, Principles of Cadastral surveying, types of Cadastres, Cadastral system, Importance of Cadastre, Developments in Cadastre,
  - 6.2 Cadastral Survey methods: Point Cadastre, Annotation on existing map/image, chain/tape, compass, Plane table alidade, Total station, Photogrammetry, RTK method, Hybrid method, comparison of different methods
  - 6.3 Cadastral Survey in Nepal: Analogue cadastral system, Digital cadastral system, Cadastral Surveying procedure in Nepal, Maintenance and updating of cadastre, parcel subdivision, field verification, LIS in Nepal, Organization in cadastral system in Nepal,
  - 6.4 Land administration system in Nepal: Land tenure, land ownership, land rights, land registration, transfer of deeds, inheritance, sale, grant, mortgage, various types of land records, protection of state (public and government) land, trust land management
  - 6.5 Land Use Policy in Nepal: Land use program, land use classification, land use zoning, land use maps, role of various institutions in land use policy implementation
  - 6.6 Land Valuation: Basic information on Land valuation, valuation method, valuation authority, property registration tax, capital gain tax
  - 6.7 Land acquisition: Appointment of Officer, identifying acquisition area, data/information collection, information publicity, dialogue and negotiation, valuation for compensation, compensation distribution, land acquisition, record updating (लगत कट्टा)
- 7. Survey Equipment and Latest Technology**
- 7.1 Traditional equipment and tools: Basic knowledge of Chain, Compass, Plane table, Telescopic alidade, Level Machine, Theodolite, Tacheometer, various accessories used along these equipment and tools, their use, care and simple maintenance
  - 7.2 Modern equipment and tools: Brief knowledge on Electronic Distance Measurement (EDM) equipment, Digital Theodolite, Digital Level, Total station, various accessories used along these equipment and tools, their use, care and simple maintenance
  - 7.3 State of the art technologies: Brief knowledge on Differential Global Positioning System (DGPS), (Continuously Operating Reference Station (CORS) system, Real

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Time Kinematics (RTK) GPS, Light Detection and Ranging (LIDAR) technology,  
Unmanned Aerial Vehicle (UAV) technology

7.4 Software system: Basic information on Various open source and proprietary software used in Surveying, mapping and GIS

**8 Survey and Land specific policies, acts and rules**

- 8.1 राष्ट्रिय भूमि नीति, २०७५
- 8.2 भूउपयोग नीति, २०७२
- 8.3 मालपोत ऐन, २०३४
- 8.4 भूउपयोग ऐन, २०७६
- 8.5 जग्गा प्राप्ति ऐन, २०३४
- 8.6 जग्गा (नाप जाँच) ऐन, २०१९
- 8.7 भूमि सम्बन्धी ऐन, २०२१
- 8.8 भूउपयोग नियमावली, २०७९
- 8.9 जग्गा (नाप जाँच) नियमावली, २०५८
- 8.10 मालपोत नियमावली, २०३६

**भाग (आ)- संस्थागत र व्यवस्थापकीय ज्ञान**

**खण्ड (ग)- (२०% अङ्क)**

**1. Institutional Knowledge and Related Legislations**

- 1.1 Rastriya Prasaran Grid Company Limited (RPGCL): Introduction, mission, vision, organisational structure, functions, present status, opportunities, challenges and possibilities
- 1.2 Corporate Development Plan (CDP) of RPGCL
- 1.3 The RPGCL Memorandum of Association and Article of association, 2072
- 1.4 The RPGCL Rules and bylaws
- 1.5 Constitution of Nepal, 2072 (part 1 to 5 and annexes)
- 1.6 Related Acts, Rules and Policies
  - 1.6.1 Hydropower development policy, 2057
  - 1.6.2 Electricity Act, 2049 and Electricity Regulation, 2050
  - 1.6.3 Environment Protection Act, 2076 (Preamble, Chapter 1,2,4,6,7)
  - 1.6.4 Environment Protection Regulation, 2077 (Preamble, Chapter 1,2,4,6,7,8; Annex-1, 2,3)
  - 1.6.5 Forest Act, 2076 (Preamble, Chapter 2,3,12,13,14)
  - 1.6.6 Forest Regulation, 2079 (Preamble, Chapter 12; Annexes-9,50,51,52)
  - 1.6.7 Procurement Act, 2063 and Procurement Regulation, 2064

**2. Management and Professional Practice**

- 2.1 Management: Concept, Function and Scope
- 2.2 Motivation, Leadership, Coordination, Team work, Decision Making
- 2.3 Organizational Behaviour and Grievance Handling
- 2.4 Corporate planning and strategic management
- 2.5 Ethics and Professionalism: Perspective on morals, codes of ethics and guidelines of professional practice
- 2.6 Public procurement practices for works, goods and services and its importance; relationship among client, consultant and contractor

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परीक्षाको पाठ्यक्रम

**3. Occupational Safety**

- 3.1 Effects of electric shock on human beings, first aid requirements, safety and precautions against electric shocks; safety rules and regulation
- 3.2 Safety rules and regulation in the project construction area, safety tools and devices, live line maintenance system
- 3.3 Storage and handling of explosives, hazard mitigation
- 3.4 Fire hazards; Types of fire and firefighting techniques

प्रथम पत्रको लागि सामान्यतया निम्नानुसार प्रश्नहरू सोधिने छ।

प्रथम पत्र (वस्तुगत)					
भाग	विषय	खण्ड	परीक्षा प्रणाली	अङ्कभार	प्रश्न संख्या
(अ)	सेवा सम्बन्धी	(क)	बहुवैकल्पिक प्रश्न (MCQS)	४०	२० प्रश्न × २ अङ्क = ४०
		(ख)		४०	२० प्रश्न × २ अङ्क = ४०
(आ)	संस्थागत र व्यवस्थापकीय ज्ञान	(ग)		२०	१० प्रश्न × २ अङ्क = २०

द्वितीय पत्रको लागि सामान्यतया निम्नानुसार प्रश्नहरू सोधिने छ।

द्वितीय पत्र (विषयगत)					
भाग	विषय	खण्ड	अङ्कभार	छोटो उत्तर	लामो उत्तर
(अ)	सेवा सम्बन्धी	(क)	४०	२ प्रश्न × ५ अङ्क = १०	३ प्रश्न × १० अङ्क = ३०
		(ख)	४०	२ प्रश्न × ५ अङ्क = १०	३ प्रश्न × १० अङ्क = ३०
(आ)	संस्थागत र व्यवस्थापकीय ज्ञान	(ग)	२०	२ प्रश्न × ५ अङ्क = १०	१ प्रश्न × १० अङ्क = १०