

**नेपाल दूरसंचार कम्पनी लिमिटेड**

(नेपाल टेलिकम)

खुला तथा आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

सेवा:- प्राविधिक

समूह:-सिभिल इन्जिनियरिङ

उप समूह:-सिभिल

तह:-७

पद:- इन्जिनियर (सिभिल)

किसिम:- खुला तथा आ.प्र.

**पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ**

प्रथम चरण :- लिखित परीक्षा

पूर्णाङ्क :- २००

द्वितीय चरण :- अन्तर्वार्ता

पूर्णाङ्क :- ३०

**परीक्षा योजना (Examination Scheme)**

**१ प्रथम चरण - लिखित परीक्षा (Written Exam)**

पूर्णाङ्क :- २००

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या ✎ अङ्क	समय
प्रथम	General Awareness, Management & Institutional Awareness Test	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न (MCQs)	५० प्रश्न X १ अङ्क
				विषयगत	छोटो उत्तर आउने प्रश्न	६ प्रश्न X ५ अङ्क
					लामो उत्तर आउने प्रश्न	२ प्रश्न X १० अङ्क
द्वितीय	Technical Subject (Service Specific)	१००	४०	विषयगत	छोटो उत्तर आउने प्रश्न	४ प्रश्न X ५ अङ्क
					लामो उत्तर आउने प्रश्न	८ प्रश्न X १० अङ्क

**२ द्वितीय चरण - अन्तर्वार्ता (Interview)**

पूर्णाङ्क :- ३०

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

**द्रष्टव्यः**

- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ।
- लिखित परीक्षाको प्रश्नपत्रको भाषा नेपाली वा अंग्रेजी हुनेछ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी वा दुवै हुन सक्नेछ।
- 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 लेख्दा 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) सोधन सकिनेछ।
- विषयगत प्रश्न हुने पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन्। परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्ने छ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जुनसुकै कुरा लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाइएका 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 : २०८१/१०/२१

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**प्रथम पत्र:**

**General Awareness, Management & Institutional Awareness Test**

**Section (A):- General Awareness**

**MCQs (50 Questions × 1 Mark = 50 Marks)**

**1. General Awareness and Contemporary Issues (30 Marks)**

**1.1 Geography, History and Culture**

- 1.1.1 Physical geography of Nepal and the world
- 1.1.2 Socio-cultural and economic geography and demography of Nepal
- 1.1.3 Major natural resources of Nepal
- 1.1.4 Geographical diversity, climatic conditions, livelihood and lifestyle of people
- 1.1.5 Major Historical Events of Nepal and the World
- 1.1.6 Notable Events, Personalities and Socio-Cultural Aspects of Ancient, Medieval and Modern History of Nepal
- 1.1.7 Customs, Traditions, Values, Religions, Ethnicity, Languages, Cultures, Arts, Literature, Music and Heritages of Nepal

**1.2 Economic Aspects of Nepal**

- 1.2.1 Economic Indicators (Economic Growth, GDP, GNP, Per Capita Income, Remittance, Foreign aid & Investment)
- 1.2.2 Infrastructures of Development (Agriculture, Industry, Trade, Tourism, Transportation, Communication, Health, Electricity)
- 1.2.3 Government Planning and Budgeting
- 1.2.4 Current periodical plan of Nepal

**1.3 Governance & Organizations**

- 1.3.1 The Constitution of Nepal; Federal, Provincial and local Governments
- 1.3.2 General Information on the UNO, WTO, ITU, WB, ADB, AIIB, SAARC & BIMSTEC
- 1.3.3 Public Service Charter and scope of public services

**1.4 Contemporary Issues**

- 1.4.1 Information on Sustainable Development, Environment, Pollution, Climate Change, Biodiversity, Demography, Urbanization, Science and Technology.
- 1.4.2 Recent Advance and Major Achievements in Telecommunication Sectors.
- 1.4.3 Major Events and Current Affairs of National and International Importance
- 1.4.4 Concept of Good Governance

**2. Mathematics and Statistics (20 Marks)**

**2.1 Mathematics**

- 2.1.1 Arithmetical Reasoning, Percentage, Ratio, Average, Profit & Loss, Time & Work, Data interpretation & Data verification

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सेवा:- प्राविधिक

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- 2.1.2 Function and Limit, Maxima and Minima, Differentiation and Integration Equations of Straight Lines, Circle, Parabola, Hyperbola, Spheres, Cylinders and Cones
- 2.1.3 Linear Differential Equations, Fourier Series, Fourier Transforms, Fourier Integral, Odd and Even Function, Laplace Transforms, Taylor Series, Z-Transforms

## 2.2 Statistics

- 2.2.1 Introduction of Statistics, Mean, Median, Mode, Dispersion, Variance, Correlation and Regression
- 2.2.2 Probability, Random Variables and Probability Distributions, Samples and Sampling

## Section (B):- Management and Institutional Awareness Test

**Subjective (6 Questions × 5 Marks + 2 Questions × 10 Marks = 50 Marks)**

### 3. Management and Marketing

- 3.1 Management : Concept and Modern Approaches
- 3.2 Motivation, Leadership, Control, Coordination, Teamwork and Group Dynamics
- 3.3 Management Information System
- 3.4 Corporate and Strategic Planning and Management
- 3.5 Corporate Social Responsibility
- 3.6 Ethics, Integrity and Responsibility in Business /Service Like Institution
- 3.7 Business Strategic Planning, Marketing Process, Product Planning, Developing the Marketing Program

### 4. Project Management & Financial Management

- 4.1 Project life Cycle
- 4.2 Network Models: CPM & PERT, Gantt Chart
- 4.3 Project Scheduling, Resource Leveling, Systems of Project Control, Cost Control, Preparation of Operational Budget, Planning of Quality, Time & Cost Dimensions, Negotiating for Materials, Supplies & Services, Project Monitoring and Evaluation,
- 4.4 Quality Management & TQM Techniques
- 4.5 Essential Business & Accounting Terminology, Cost Classification & Analysis, Interest & Time Value of Money, Basic Methodology of Engineering Economics, Cost and Benefit Analysis, Risk Analysis, Investment Decisions, Demand Analysis and Sales Forecasting, Concept of EIRR (Economic Internal Rate of Return) and FIRR (Financial Internal Rate of Return)
- 4.6 Basic Knowledge of Trial Balance & Balance Sheet, Income Statements, Revenue and Capital Expenditure, Budgeting and Capitalization, Depreciation and Subsidy, Procurement Procedures (FOB, CIF, Liquidated Damages, Letter of Credit, Insurance, Invoice, Bid Security, Performance Bond), Competitive Bidding

### 5. संस्थागत ज्ञान र सम्बद्ध कानूनहरू

- 5.1 नेपाल दूरसंचार कम्पनी लिमिटेड सम्बन्धी जानकारी: उद्देश्य, संगठनात्मक संरचना र कार्यक्षेत्र
- 5.2 नेपाल दूरसंचार कम्पनी लिमिटेडले सेवा प्रवाहमा अवलम्बन गरिएका प्रविधि

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- 5.3 सेवाको महशूल दर निर्धारण सम्बन्धी व्यवस्था
- 5.4 नेपाल दूरसंचार प्राधिकरण : स्थापना, लक्ष्य, उद्देश्य, कार्यहरू र भूमिका
- 5.5 नेपाल सरकारको चालु आवधिक योजनामा दूरसंचार सेवा
- 5.6 नेपाल दूरसंचार कम्पनी र नेपाल सरकार तथा अन्य सरोकारवाला निकायहरूसंगको सम्बन्ध
- 5.7 दूरसंचार ऐन, २०५३ तथा दूरसंचार नियमावली, २०५४
- 5.8 नेपाल दूरसंचार कम्पनी लिमिटेडको प्रवन्धपत्र र नियमावली
- 5.9 नेपाल दूरसंचार कम्पनी लिमिटेडको कर्मचारी विनियमावली, २०७८ को परिच्छेद-७ विदा, परिच्छेद-९ आचरण तथा अनुशासन, परिच्छेद-१० सजाय र पुनरावेदन, परिच्छेद-११ अवकाश, उपदान, निवृत्तिभरण तथा अन्य सुविधा
- 5.10 नेपाल दूरसंचार कम्पनी लिमिटेडको आर्थिक विनियमावली, २०७९को भाग -२ को खरिद सम्बन्धी कार्यबिधि, भाग ३ को परिच्छेद -१ योजना तर्जुमा वार्षिक कार्यक्रम र बजेट, परिच्छेद-३ कम्पनीको सम्पत्तिको जिम्मा, त्यसको लगत, संरक्षण र बरबुझारथ सम्बन्धी व्यवस्था
- 5.11 कम्पनी ऐन, २०६३ को परिच्छेद -२ कम्पनीको संस्थापना, परिच्छेद-३ प्रवन्धपत्र, विनियमावली र विवरणपत्र र परिच्छेद -५ कम्पनीको साधारण सभा
- 5.12 दुरसंचार नीति, २०६०
- 5.13 डिजिटल नेपाल फ्रेमवर्क, २०७६ (डिजिटल फाउण्डेशन बुँदा १ देखि १९ सम्म)
- 5.14 सूचना तथा सञ्चार प्रविधि नीति, २०७२
- 5.15 राष्ट्रिय साइबर सुरक्षा नीति, २०८०

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किसिम:- खुला तथा आ.प्र.

**द्वितीय पत्र :**

**Technical Subject (Service Specific)**

**Section (A):- 50 Marks**

**(2 Questions × 5 Marks + 4 Questions × 10 Marks)**

**1. Engineering Survey and Drawing Techniques**

- 1.1 Surveying : Introduction and basic principles
- 1.2 Linear measurements techniques; representation of measurement and common scales; sources of errors; slope and slope correction; Abney level and clinometers
- 1.3 Compass and plane table surveying: type of compass; problems and sources of errors of compass survey; principles and methods of plane tabling
- 1.4 Levelling and contouring: Principle of levelling; longitudinal and cross sectioning; reciprocal levelling; trigonometric levelling; contour interval and characteristics of contours; methods of contouring
- 1.5 Theodolite traversing: adjustment of closed traverse; closing errors
- 1.6 Uses of Total Station and Electronic Distance Measuring Instruments
- 1.7 Drawing sheet: Types, composition and its essential component, Theory of projection: perspective, orthographic and axonometric projection; first and third angle projection
- 1.8 Suitable scales, site plans, preliminary drawings, working drawings
- 1.9 Drafting tools, equipment and software
- 1.10 Drafting conventions and symbols
- 1.11 Topographic, electrical, plumbing and structural drawings
- 1.12 Techniques of free hand drawing

**2. Construction Materials and Concrete Technology**

- 2.1 Construction materials: Properties and their uses
- 2.2 Stones: characteristics and requirements of stones as a construction material
- 2.3 Brick: types and testing of bricks
- 2.4 Sand and aggregates
- 2.5 Ceramic materials: ceramic tiles, Mosaic tiles
- 2.6 Cementing materials: types and properties of lime and cement, cement mortar tests
- 2.7 Metals: Steel, Alloys of steel, Aluminium
- 2.8 Timber and wood: timber trees in Nepal, types and properties of wood.
- 2.9 Miscellaneous materials: Asphaltic materials (Asphalt, Bitumen and Tar), paints, varnishes, glass, insulating and plastic materials, soils, prefab materials
- 2.10 Constituents and properties of concrete, grade and strength of concrete
- 2.11 Water cement ratio and its effect on the quality and strength of concrete
- 2.12 Concrete mix design, testing of concrete
- 2.13 Mixing, transportation, pouring, placement and curing of concrete
- 2.14 Use of steel reinforced concrete and its applicability
- 2.15 Different chemical admixtures in concrete, high strength concrete, green concrete, pre-stressed concrete technology
- 2.16 Concrete durability and quality control

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## सेवा:- प्राविधिक

## समहः-सिभिल इन्जिनियरिंग

उप समहः-सिभिल

तहः-७

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### **3. Soil Mechanics, Foundation Engineering and Hydraulics**

- 3.1 Properties of soils, Soil three-phase diagram, Basic definitions of phase relationships, Index properties of soil, Determination of various index properties
  - 3.2 Consolidation and settlements; Behaviour of soil under compressive loads, Settlement of structures resting on soil: its nature, causes and remedial Measures, Primary and secondary consolidation, Compressibility of soil, Stability of slopes; Causes of slope movements and failures, Types of slope and slope failures, Critical surfaces and factor of safety, Method of stability analysis and stability number
  - 3.3 Bearing capacity of soils; Types of bearing capacity and factors influencing bearing capacity, Effects of various factors on bearing capacity, Modes of foundation failure, Terzaghi's general bearing capacity theory, Ultimate bearing capacity of cohesionless and cohesive soil
  - 3.4 Tower foundation: Types based on soils and loads
  - 3.5 Fluid Properties: Viscosity, Surface Tension, Compressibility, Vapor Pressure
  - 3.6 Equation of fluid flow: Type of flow, Continuity equation, Bernoulli's equation and momentum Equation.
  - 3.7 Viscous effects: Reynolds number, Boundary layer, Pipe flow

## **Section (A):- 50 Marks**

**(2 Questions × 5 Marks + 4 Questions × 10 Marks)**

#### **4. Structural Analysis and Design**

- 4.1 Types of Structures based on the material used
  - 4.2 Concept of reinforced concrete structures, working stress and limit state
  - 4.3 Analysis of Beams, Columns and Frames: Bending Moment, Shear Force and Frictional Forces, Basic Concepts of Deflection, Deflection of Beams and Frames: Determinate Structure - Energy Methods; Three Hinged Systems, Indeterminate Structures- Slope Deflection Method and Moment Distribution Method; Use of Influence Line Diagrams for Simple Beams, Unit Load Method
  - 4.4 Reinforced Concrete Structures: Difference Between Working Stress and Limit State Philosophy, Analysis and Design of RC Beams and Slabs in Bending, Shear, Deflection, Bond and End Anchorage, Design of Axially Loaded Columns; Isolated and Combined Footings, Introduction to Pre-Stressed Concrete
  - 4.5 Steel Structures : Types of Steel Structure, Advantages & Disadvantages of Steel structures, Physical & Mechanical properties of Steel for Structural Member, Steel Member jointing (Riveted, Bolted, Pinned & welded), Codal Provisions Required for Design of Telecommunication Towers, Technical Specification Used by NT for Telecommunication Towers

## **5. Estimating and Costing Valuation and Specification**

- 5.1 Types of Estimates and Their Specific Uses
  - 5.2 Methods of Calculating Quantities
  - 5.3 Key Components of Estimating Norms and Rate Analysis
  - 5.4 Preparation of Bill of Quantities
  - 5.5 Purpose, Types and Importance of Specification
  - 5.6 Purpose, Principles and Methods of Valuation

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किसिम:- खुला तथा आ.प्र.

### 5.7 Variation, Alteration and Omissions

## 6. Construction Technology and Environment

- 6.1 Technological development of construction works in Nepal
- 6.2 Promotion of local technology and materials, and their adaptation
- 6.3 Types and sources of pollution: point and non-point (air, water, sound, soil)
- 6.4 Social mobilization in local infrastructure development and utilization in Nepal.
- 6.5 Participatory approach in planning, implementation, maintenance and operation of local infrastructure
- 6.6 Environmental Impact and its assessment: Environmental impact of transmission infrastructure, BES (Brief Environmental Study), IEE (Initial Environmental Examination) and EIA (Environmental Impact Assessment)
- 6.7 Screening, scoping, initial impact identification, TOR preparation, EIA report writing
- 6.8 Management of BES/IEE/EIA process: public participation, EIA review, Mitigation measures, monitoring and Environmental Management Plan

## 7. Construction Management

- 7.1 Contract management and administration: types of contracts, tender and tender notice, preparation of bidding (tender) document, contractors' pre-qualification, evaluation of tenders and selection of contractor, bid acceptance, condition of contract; quotation and direct order
- 7.2 Material management and handling
- 7.3 Cost control
- 7.4 Quality assurance and quality control mechanism
- 7.5 Variation, time extension, alteration, omissions
- 7.6 Claims and dispute, disputes resolution
- 7.7 Project closure and evaluation

## 8. Professional Ethics

- 8.1 Ethics and Professionalism: Perspective on Morals, Codes of Ethics and Guidelines of Professional Engineering Practice
- 8.2 Legal aspects of Engineering Profession in Nepal
- 8.3 Nepal Engineering Council Act, 2055 and Rules, 2056