

## चिलिमे जलविद्युत कम्पनी लिमिटेड

प्राविधिक सेवा, सिभिल समूह, तह-५, सुपरभाईजर पदको  
खुला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

- शैक्षिक योग्यता: चिलिमे जलविद्युत कम्पनी लिमिटेड कर्मचारी सेवा शर्त विनियमावली २०७१ मा व्यवस्था भए अनुसार ।
- लिखित परीक्षाको बिषय, पूर्णाङ्क, परीक्षा प्रणाली, प्रश्न संख्या, अंकभार र समय निम्नानुसार हुनेछ ।

पत्र	विषय	परीक्षा प्रणाली	प्रश्न संख्या	प्रति प्रश्न अंकभार	पूर्णांक	समय
प्रथम	सिभिल ईन्जिनियरिङ्ग (I)	बस्तुगत बहुउत्तर	३०	१	३०	३० मिनेट
द्वितीय	सिभिल ईन्जिनियरिङ्ग (II)	बिषयगत	१०	५	५०	२ घण्टा
अन्तर्वार्ता					२०	

- वस्तुगत बहुउत्तर परीक्षा प्रणालीमा प्रत्येक प्रश्नका चार वटा सम्भाव्य उत्तर दिइने छ । प्रश्नको उत्तर लेख्दा केरमेट गरेको, दोहोरो लेखेको, सच्याएको, निर्दिष्ट स्थानभन्दा अन्यत्र लेखेको वा उत्तर नै सारेकोलाई गल्ती मानिनेछ ।
- बस्तुगत बहुउत्तरमा प्रत्येक गलत उत्तर वापत सो प्रश्न वापत पाउने अंकको ०.२ (बीस प्रतिशत २०%) का दरले सो विषयमा पाएको कूल प्राप्तांकबाट घटाइनेछ ।
- कालो/नीलो मसी मात्र भएको डटपेन/कलमले उत्तरको लागि निर्धारित कोठाका पत्रमा क,ख,ग,घ मध्ये एउटा मात्र सही उत्तर स्पष्ट रूपले लेख्नुहोला । पेन्सिलले लेखेकोलाई मान्यता दिइने छैन ।
- प्रत्येक पत्रको न्यूनतम ४० प्रतिशत उत्तीर्णाङ्क हुनेछ ।
- प्रथम र द्वितीयपत्रको परीक्षा २ पटक गरेर हुनेछ । प्रथम पत्रको परीक्षा सकिएपछि द्वितीयपत्रको परीक्षा तत्काल हुनेछ ।
- द्वितीयपत्रको लिखित परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ ।
- सामान्यतः प्रत्येक शिर्षकको अंकभार तोकिए बमोजिम हुनेछ ।

### प्रथमपत्र र द्वितीयपत्रको पाठ्यक्रम

#### 1. DRAWING

(2X1)

- 1.1 Drafting techniques, development of plan and preparation of drawing. Sections of Hydropower structures.
- 1.2 Objectives and role of working drawing and its relationship with detail estimating and specifications.
- 1.3 The comparative parameters of tender drawing and working drawing.
- 1.4 Preparation of large-scale construction details in plan and section.

- 1.5 Tracing of topographical maps and drawings of construction schedule and presentation of maps and drawings with required features, accuracy and standard.

**2. CONSTRUCTION MATERIAL (3X1, 1X5)**

- 2.1 **Stone:** Formation and availability of stones in Nepal, Methods of construction with various stones
- 2.2 **Cement:** Types of Cement, Grades of Cement, Ingredients, properties, manufacture, Storage and transport.
- 2.3 **Brick:** type, manufacture, laying, bonds
- 2.4 **Paints and Varnishes:** Type and selection, Preparation techniques, Uses
- 2.5 **Bitumen:** Type, Selection and Use.
- 2.6 General knowledge of types of conductors, fittings, insulators, insulator protective fittings and line insulator materials.

**3. SURVEYING (3X1, 1X5)**

- 3.1 Classifications, Principle of surveying, Selection of suitable method, Scales, plans and maps, Entry into survey field books and level books
- 3.2 Precision and accuracy, Errors and the methods of adjustments in surveying.
- 3.3 Methods of leveling, levelling instruments and accessories, Principles of levelling
- 3.4 Temporary adjustments of theodolites, Fundamental lines and desired relations,
- 3.5 Tachometry: stadia method, Trigonometrical levelling, Checks in closed traverse
- 3.6 Characteristics of contour lines, Method of locating contours, Contour plotting
- 3.7 Setting Out of Small buildings and Simple curve
- 3.8 General concept of survey for power house and tunneling.

**4. GEOTECHNICAL (2X1, 1X5)**

- 4.1 General concept of geology. Geological investigation.
- 4.2 Classification of soil, soil-water relation and their significance.
- 4.3 Consolidation and compaction and their distinguishing characteristics.
- 4.4 Factors affecting soil compaction, methods of soil compaction for preparing foundation. Foundation treatments.
- 4.5 Concept of optimum moisture content, its significance and methods to control moisture content.
- 4.6 Active and passive earth pressures, and concept of surcharge load.

- 4.7 Bearing capacity, safe bearing capacity and ultimate bearing capacity of foundation.
- 4.8 Types of foundation and their application.
- 4.9 General concept about stability of structure, the destabilizing and stabilizing factors.

**5. BUILDING CONSTRUCTION AND TECHNOLOGY (3X1, 1X5)**

- 5.1 **Foundations:** Type and suitability of different foundations: Shallow, deep, Shoring and dewatering, Design of simple brick or stone masonry foundations
- 5.2 **Walls:** Type of walls and their functions, Choosing wall thickness, Height to length relation, Use of scaffolding
- 5.3 **Damp Proofing:** Source of Dampness, Remedial measures to prevent dampness
- 5.4 **Concrete Technology:** Constituents of cement concrete, Grading of aggregates, Concrete mixes, Water cement ratio, Factors affecting strength of concrete, Form work, Curing
- 5.5 **Wood work:** Frame and shutters of door and window, Timber construction of upper floors, Design and construction of stairs
- 5.6 **Flooring and Finishing: Floor finishes:** brick, concrete, flagstone and Plastering.

**6. MECHANICS OF STRUCTURES AND STRUCTURAL DESIGN (4X1, 1X5)**

- 6.1 Mechanics of Materials: Internal effects of loading, Ultimate strength and working stress of materials
- 6.2 Mechanics of Beams: Relation between shear force and bending moment Thrust, shear and bending moment diagrams for statically determinate beams under various types of loading.
- 6.3 R.C. Sections in Bending: Under reinforced, over reinforced and balanced sections: Analysis of single and double reinforced rectangular sections
- 6.4 Shear and Bond for R.C. Sections: Shear resistance of a R.C. section, Types of Shear reinforcement and their design, Determination of anchorage length
- 6.5 Axially Loaded R.C. Columns: Short and long columns, Design of a rectangular column section
- 6.6 Design of R.C. Structures: Singly and doubly reinforced rectangular beams, Simple one-way and two-way slabs.
- 6.7 Steel structures, design criteria and procedure.
- 6.8 General mechanical features of the transmission lines.

- 6.9 General precautions to be taken during the design and construction process.
- 6.10 Span length of transmission line.
- 6.11 Concept of line supports- poles and towers and their basic design.
- 6.12 Construction and manufacture of poles and towers.
- 6.13 Live- metal clearance and effect of other materials in proximity.
- 6.14 Stability of structure and the destabilizing and stabilizing factors.

**7. HYDRAULICS AND HYDRAULIC STRUCTURES (3X1, 1X5)**

- 7.1 **Properties of fluid:** mass, weight, specific weight, density, specific volume, specific gravity, viscosity
- 7.2 Pressure and Pascal's law
- 7.3 **Hydro-Kinematics and Hydro-Dynamics:** Energy of flowing liquid: elevation energy, Kinetic energy, potential energy, internal energy
- 7.4 **Measurement of Discharge:** Weirs and notches and Discharge formulas
- 7.5 **Flows:** Characteristics of pipe flow and open channel flow
- 7.6 Headwork structures (Dams, Spillways), types and components.
- 7.7 General concept of design parameters of headwork structure. Computation of waterpower potential.
- 7.8 Hydropower plants, type and components.
- 7.9 General concept of design parameters of hydropower plants.
- 7.10 Understanding of power station, substation, penstocks, turbine, surge tank, the draft tube, the tail race and energy dissipaters.
- 7.11 Causes of failures of dams (general knowledge).
- 7.12 General understanding of surface hydrology.
- 7.13 General functions of hydraulic structures. (Dams, spillways, intake, canal, tunnel.
- 7.14 Design and layout of form works (scaffolding).
- 7.15 Protective structures, types and functions.
- 7.16 River training works, types, functions and layouts.

**8. TRANSMISSION LINES, TOWERS AND DISTRIBUTION LINES (3X1, 1X5)**

- 8.1 Types of electrical towers and transmission lines.
- 8.2 Knowledge of transmission towers.
- 8.3 Knowledge of transmission lines.
- 8.4 General understanding of power station, substation,
- 8.5 Types and categories of distribution cables.
- 8.6 Technical problems, such as, power loss, leakage and thefts.

- 8.7 Internal wiring and connections.
- 8.8 Techniques of connection of single circuits with single phase, 3- phase power supply system.
- 8.9 Installation of a rigid PVC conduit (pipe or holder pipe) on masonry surface.
- 8.10 Mounting of fixtures such as wall plugs, boxes and blocks on wall surfaces.
- 8.11 Safety precautions.

**9. ESTIMATING AND COSTING (2X1, 1X5)**

- 9.1 Various methods of measurements and estimating quantities of civil works. Different units in which the various quantities are expressed.
- 9.2 Analysis of rates for civil works, development of unit rates and factors affecting the unit rates.
- 9.3 Preparing analysis of rates for civil works with related to hydropower projects.
- 9.4 Methods of cost estimating. Preparation of project cost estimate.
- 9.5 Objectives and importance of specification. Techniques of preparing specifications for different types of works.

**10. CONSTRUCTION MANAGEMENT (3X1, 1X5)**

- 10.1 **Organization:** Type of organization, Relations between Client Consultant and Contractor
- 10.2 **Site Management:** Responsibilities of a site supervisor; Preparation of site plan, Measures to improve labor efficiency
- 10.3 **Planning and Control:** Construction schedule, Bar chart, CPM and PERT, monitoring and control.
- 10.4 **Contract Procedure:** Contracts, Departmental works and day-work, Types of contracts, Tender and tender notice, Earnest money and security deposit, Preparation before inviting tender, Agreement, Conditions of contract and Construction supervision
- 10.5 **Accounts:** Administrative approval and technical sanction, standard account keeping formats used in governmental organizations, Muster roll, Measurement Book, Running Bill, Final Bill, and Project Completion report
- 10.6 Safety measures and programs in excavation, drilling, blasting, tower erection, cable stringing and underground works.

**11. INSTITUTIONAL KNOW-HOW**

**(2X1, 1X5)**

- 11.1 General knowledge of Chilime Jalvidhyut Company Ltd. and its organizational structure.
- 11.2 General knowledge of various power plants of Nepal, their types, salient features, and their geographical locations
- 11.3 General knowledge on Nepalese power transmission system, voltage levels and lengths.

- द्रष्टव्यः -** पाठ्यक्रममा राखिएका संविधान, ऐन, नियम र विनियमहरू परीक्षा हुनु भन्दा ३ महिना अगाडिसम्म संशोधन वा खारेज भएकालाई सोही अनुरूप पाठ्यक्रममा समावेश भएको मानिने छ ।
- लिखित परीक्षा उत्तीर्ण हुनेहरूको मात्र अन्तरवार्ता हुनेछ ।

