

# चिलिमे जलविद्युत कम्पनी लिमिटेड

प्राविधिक सेवा, सिभिल समूह, तह-९, उप-प्रबन्धक, बरिष्ठ हाइड्रोपावर इन्जिनियर पदको प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम ।

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

पत्र	विषय	परीक्षा प्रणाली	हल गर्नुपर्ने प्रश्न संख्या	प्रति प्रश्न अंकभार	पूर्णाङ्क	समय	
प्रथमपत्र	सेवा सम्बन्धी	विषयगत	छोटो उत्तर	५	५	५५	२ घण्टा
			लामो उत्तर	३	१०		
द्वितीयपत्र	व्यवस्थापकीय ज्ञान	विषयगत	छोटो उत्तर	३	५	३०	१ घण्टा
			लामो उत्तर	१	१५		
अन्तर्वार्ता					१५		

- प्रथम र द्वितीयपत्रको परीक्षा २ पटक गरेर हुनेछ । प्रथम पत्रको परीक्षा सकिएपछि द्वितीयपत्रको परीक्षा तत्काल हुनेछ ।
- परीक्षामा कालो/नीलो मसी मात्र प्रयोग गर्नुपर्ने छ ।
- प्रत्येक पत्रको न्यूनतम ४० प्रतिशत उत्तीर्णाङ्क हुनेछ ।
- परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ ।
- सामान्यतः प्रत्येक शिर्षकको अंकभार तोकिए बमोजिम हुनेछ ।
- प्रश्नहरू खण्ड खण्ड गरी सोध्न सकिनेछ ।

## प्रथमपत्र — सेवा सम्बन्धी [55]

- Overview of Hydrology and Sedimentology**
- Project Engineering**
  - Power market survey
  - Load demand forecast and determination of capacity requirement.
  - Site selection
  - Different stages of project studies.
  - Field investigations
    - General reconnaissance
    - Topographical survey
    - Hydrological investigation.
    - GLOF Investigation
    - Sedimentological investigation.
    - Geological investigations.
    - Sub-surface exploration.
    - Sesmological studies.
    - Material investigation
  - Project preparation for implementation and justification of the Project.
  - Types of Hydropower Projects.

3. **Optimization Study**

- Optimization of dam height.
- Optimization of water conveyance system.
- Optimization of installed capacity, firm capacity of plant and dependable capacity.
- Determination of load factor, utilization factor and plant capacity factor.
- General knowledge of firm energy, useable energy and secondary energy.
- Daily pondage basin and its importance for run-off-river schemes.
- Basin optimization

4. **Overall Design of Hydro-Electric Projects**

- General layout of hydraulic structures.
- Selection of surface structures and underground structures.
- General arrangement of electrical and mechanical installations.
- Output and capacity of the plant.
- Water conveyance structures.
- Storage reservoirs.
- Down stream compensation water release.
- Fish passing facilities.
- Stations "In Cascade"
- Some economic Parameters(Factors).
- Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA).
- PMF and Flood Routing

5. Overview of Different Types of Dams such as Concrete Gravity, Masonry and Embankment Dams.

6. Overview of Principles of Design and Stability Analysis of Concrete Gravity and Embankment Dams.

7. Overview of Water Conveyance Structures Design and Construction.

8. Overview of Power Station Design and Construction.

9. **Aesthetics of Hydro-Electric Structures**

- Relationship between Dam and Adjacent Power Station.
- Planning and design of Surface structures.
- Planning and design of Modern Power Stations.

10. **Overview of Impact on Environment and Fishery requirements**

- Concept of IEE and EIA.
- Effect of Hydro-electric works of Fishery.
- Provision and management of fish passing facilities.
- Environmental Monitoring Plan (EMP)

**11. Safety Engineering**

- Safety rules and regulations.
- Storage and handling of explosives, compressed gases and inflammable substances.
- Safety precautions in handling electrical installations in construction premises, earthing and shielding techniques.
- Fire hazards, fire fighting techniques and equipment.
- Noise hazards, its sources, effect on health and control.
- first aid requirements in case of health hazards.
- Field instrumentation and warning systems.

**12. Multi-Purpose Hydropower Projects**

- Benefits of river basin development.
- Multi-purpose hydropower projects and their planning.
- Special considerations affecting power development.
- Examples of multi-purpose Projects.

**13. Reservoirs – Problems of Sedimentation**

- Influence of forest on rainfall.
- Evaporation.
- Sedimentation and causes of erosion.
- Effects of deforestation of soil erosion.
- Soil conservation.
- Effect of dams on river regime.
- Effects of sediment in energy generation in reservoir projects.
- Mechanism of reservoir silting.
- Control of silting.

**14. Maintenance of Civil Engineering Works**

- Maintenance and its requirement.
- Maintenance processes.
- Scheduling and programming of preventive maintenance.
- Maintenance squad.
- Maintenance of:
  - Reservoirs
  - Dams and spillways
  - Hydraulic equipment
  - Canals and forebays
  - Tunnels
  - Pipelines
  - Powerstation
  - Gates

## द्वितीयपत्र – व्यवस्थापकीय ज्ञान [30]

### क) व्यवस्थापकीय ज्ञान [3X5]

#### **1. POWER SECTOR DEVELOPMENT AND INSTITUTIONS INVOLVED:**

History of power development in Nepal, Energy demand supply trends, Challenges and prospects of hydropower development, Importance of power exchange agreement with India, Cross border/regional power trade, Scope of power exchange with other countries, Coordination between stakeholders in power sector, Scope for export oriented development of power sector, Chilime Jalabidhyut company's mission and objectives, Basic trends in NEA development, Policies and programs of GoN, Financing of GoN, Indicators of GoN financial performance, Chilime Jalabidhyut company rules and regulations on employment, procurement and promotion, Inventory control, Impediments for growth and possible reform measures, Role of Government institutions involved in power sector development, Role and importance of IPPs, Major projects under implementation and planning.

#### **2. LEGAL PROVISIONS FOR POWER SECTOR DEVELOPMENT:**

Hydropower Development policy, 2058, Water Resources Act, 2049, Water Resources Regulations, 2050, Electricity Act, 2049, Electricity Regulation, 2050, Nepal Electricity Authority Act, 2041, Environment Protection Act, 2053, Environment Protection Regulation, 2054, Electricity Pilferage Control Act, 2058, Electricity Pilferage control regulation, 2059, Electricity Tariff Fixation Regulation 1993, Land Acquisition Act.2034, Industrial Policy 2067,

#### **3. ENGINEERING ECONOMICS:**

Cash flow analysis, Project evaluation indicators, Payback period, Debt service ratio, Criteria for capital investment decision, Risk analysis, Taxation system in Nepal, Energy tariff and regulatory issues.

#### **4. PROJECT MANAGEMENT:**

Project Planning and Scheduling: Network models, CPM/PERT, Manpower leveling, Material scheduling, Project preparation for implementation and justification of the project.

Project monitoring and control: System of control, Project control cycle, Feedback control systems, Cash control.

Capital Planning and Budgeting: Capital planning procedures, Preparation of operating budgets, fixed and flexible budget, budgetary control.

#### **5. ORGANIZATION AND MANAGEMENT:**

Concept of Management, Internal Organization, Motivation, Leadership, control, coordination and team work, Decision making, Corporate planning and strategic management, Management Information System, Job description, Job analysis, Performance appraisal, Auditing and inventory control, Personnel Management, Familiarization with procurement guidelines and standards of World Bank, ADB, PPMO. Preparation of Contract documents, specifications, condition of contract and other contractual procedures.

**6. सेवासँग सम्बन्धित निर्देशिका (Manuals) हरू:**

Safty Guidelines/standards for Electricity Generation, Transmission and Distribution of Hydropower Projects, Manual for preparing Environmental Management Plan (EPM) for Hydropower Projects, National Environmental Impact assessment Guidelines, 1993.

**ख) समस्या समाधान [1x15]**

व्यवस्थापकीय कार्यसँग सम्बन्धित कुनै एउटा समस्या दिईनेछ । प्रचलित ऐन नियमको परिधि र अवस्था समेतलाई विचार गरी दिइएको समस्याको निम्न आधारमा उपयुक्त समाधान र सुझाव प्रस्तुत गर्नु पर्नेछ ।

- (१) समस्याका खास खास कारणहरू दर्शाउने ।
- (२) समस्या समाधानका लागि सुझावहरू दर्शाउने ।
- (३) प्रस्तुत सुझावहरू कार्यान्वयन गर्दा त्यसबाट पर्न सक्ने सकारात्मक प्रभावहरू उल्लेख गर्ने ।

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

Level 9: Hydropower

Question will be set as follows:

**प्रथमपत्र-सेवासम्बन्धि [55]**

Section	Units	No. of questions		Marks allocated
		Analytical Answer	Analytical and Problem Solving	
A	1,2,3	1	1	5(1x5) + 10(1x10) = 15
B	4,5,6,7,8	1	1	5(1x5) + 10(1x10) = 15
C	9,10	1		5(1x5) = 5
D	11,12	1		5(1x5) = 5
E	13,14	1	1	5(1x5) + 10(1x10) = 15

**द्वितीयपत्र-ब्यबस्थापकीय ज्ञान [30]**

क) ब्यबस्थापकीय ज्ञान [3x5]

ख) समस्या समाधान [1x15]

