चिलिमे जलविद्युत कम्पनी लिमिटेड

प्राविधिक सेवा, ईलेक्ट्रिकल समूह, तह-७, ईन्जिनियर पदको
आन्तरिक प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

१. शैक्षिक योग्यताः चिलिमे जलविद्युत कम्पनी लिमिटेड कर्मचारी सेवा शर्त विनियमावलीमा व्यवस्था भए अनुसार।
२. 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	सेवा सम्बन्धी	बिषयगत	लामो उत्तर	२	१०	६०	२ घण्टा
			छोटो उत्तर	८	५		
द्वितीय	ब्यवस्थापकीय ज्ञान	बिषयगत	लामो उत्तर	३	५	२५	१ घण्टा
			छोटो उत्तर	१	१०		
अन्तर्वार्ता						१५	

३. प्रथम र द्वितीयपत्रको परीक्षा २ पटक गरेर हुनेछ। प्रथम पत्रको परीक्षा सकिएपछि द्वितीयपत्रको परीक्षा तत्काल हुनेछ।
४. परीक्षामा कालो/नीलो मसी मात्र प्रयोग गर्नुपर्ने छ।
५. प्रत्येक पत्रको न्यूनतम ४० प्रतिशत उत्तीर्णाङ्क हुनेछ।
६. परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ।
७. सामान्यतः प्रत्येक शिर्षकको अंकभार तोकिए बमोजिम हुनेछ।

प्रथमपत्र – सेवा सम्बन्धी (६०)

1. FUNDAMENTALS (5X1)

- Ohm's law and Kirchhof's law, electric power and energy, Temperature effects in resistance
- Superposition theorem, Thevenin's & Norton's theorems.
- Alternating current fundamentals: Principle of generation of alternating voltages and currents and their equations and waveforms, average, peak and rms values, A.C. through resistance, inductance, capacitance and through their combinations, active and reactive power, Power factor.
- Three phase AC systems: Principle of three phase AC generation, star delta connection, three phase three wire and three phase four wire systems

2. POWER PLANTS (10X1)

- Hydroelectric power plants: classifications and respective layouts, selection of sites, classification of water turbines, working principle and operating range with respect to head and discharge of impulse and reaction turbines, selection of water turbines, governing of water turbines, essential features of hydroelectric alternators, hydro-plant auxiliaries.
- Diesel electric power plants: selection of sites, elements of a diesel plant and its layout.
- Comparative study of hydro & diesel power plant.
- Non conventional power generation: Photo voltaic or solar cells, solar power generation, wind power generation.

3. ELECTRICAL MACHINES (5X2)

- Transformers: Construction, working principle, short circuit & open circuit test, voltage regulation, losses and efficiency, parallel operation, oil test, temperature rise, role of transformer oil, cooling of transformers, Bucholtz protection, three phase transformer connection.

- Three phase induction motors: Construction and working principle, types, starting and speed control, applications.
- D.C. generators: Working principle, types of D.C. generators, losses and efficiency, application of series, shunt and compound generators.
- D.C. motors: Working principle, types of D.C. motors, applications of D.C. series and shunt motors, losses and efficiency, speed control, starters.
- Synchronous generator: Construction and working principle, equation of induced E.M.F., voltage and frequency regulation, losses and efficiency, parallel operation and synchronizing, alternators connected to infinite bus bars, different types of excitation systems, drying of alternators.
- Synchronous motors: Working principle and characteristics, application, starting.

4. CONTROL AND PROTECTION (10X1)

- Necessity of D.C. system in power stations.
- Instrument transformers and their role in system protection.
- Over current, earth fault and under voltage relays, isolators and contactors
- Overload and short circuit protection, earth fault protection, differential protection, distance protection, protection against over voltage and lightening
- Working principle and construction of ACB, VCB, ABCB and SF_6 Circuit breakers and their comparative study, specification, rating, testing and selection of circuit breakers.
- Working Principal, types and rating of Fuse, MCB, MCCB and ELCB
- Voltage control: Necessity of voltage control; methods of voltage control.
- Power Line carrier communication

5. POWER STATION AND SUB-STATION (5X2)

- Prerequisites for starting of generators in hydro and diesel station.
- Necessity of cooling in power stations.
- Role of auxiliary equipments in power stations, storage batteries, their capacities, charging and maintenance.
- Necessity of black start units in power stations.
- Substations: Classification, indoor and outdoor substations, selection and location of site, equipments used in substations, general layout of substation, bus bar arrangements, earthing of equipments in a substation.
- Lightening phenomenon, types and functions of lightening arrestor, over head earth wire.

6. TRANSMISSION, DISTRIBUTION AND CONSUMER SERVICE(5X2)

- Transmission lines: Overhead transmission line and under ground cabling, advantages and limitations of high voltage transmission, choice of voltage level, conductor size, spacing; supports and cross arms, insulators used in overhead lines, vibration and vibration dampers, conductor configuration, clearances, span lengths, voltage regulation and efficiency of short and medium transmission lines, sag, tension, right of way.
- Primary distribution system: Radial system, ring main system and interconnected network system
- Secondary distribution system: Three phase four wire distribution, single phase two wire distribution
- Voltage regulation and losses in distribution system
- Selection of supports and conductors in primary and secondary distribution systems
- Consumer supply connection, System and equipment earthing
- Energy meters: Construction and principle of operation, creeping errors and their compensation, testing of energy meters.

7. POWER SYSTEM OPERATION AND MAINTENANCE (5X1)

- Concept of demand factor, diversity factor, load factor and load curves, load duration curves, power factor correction and improvement

- Operation of substation during normal and abnormal condition
- Synchronizing and system restoration
- Preventive maintenance in electrical system for transmission lines and its equipment, distribution lines and its equipments, transformers, switchgears, motors, generators, turbines excitation system, and communication system used in power system
- Maintenance of D.C. system
- Safety engineering: Physical effects of electric shock; safety and precaution; safety rules and regulation; safety tools and devices; live line maintenance and precautions; earthing and shielding techniques; fire hazards; fire fighting techniques and equipment; first aid requirements for after event treatment.

द्वितीयपत्र – व्यवस्थापकीय ज्ञान [२५]

1. General (5X1)

History of power development in Nepal; hydro power potential; energy supply demand trends; challenges and prospects of hydropower development; Hydropower development policy, 2058; Role of HMG institutions; IPP's involvement in power development; NEA organizational structure and functions of different business groups, concept of NEA grid code.

2. चिलिमे जलविद्युत कम्पनी सम्बन्धी कानूनी व्यवस्था (५X१)

- चिलिमे जलिवद्युत कम्पनीको प्रचलित कर्मचारी सेवा शर्त विनियमावली र आर्थिक प्रशासन विनियमावली
- चिलिमे जलविद्युत कम्पनीको कर्मचारी व्यवस्थापन
- चिलिमे जलविद्युत कम्पनीका सम्वद्ध कम्पनीहरू

3. ऐन नियम, कानूनहरू (५X१)

- विद्युत ऐन, २०४९
- विद्युत नियमावली, २०५०
- नेपाल विद्युत प्राधिकरण ऐन, २०४१
- विद्युत चोरी नियन्त्रण नियमावली, २०५९
- कम्पनी ऐन, २०५३

ख) समस्या समाधान [१०X १]

पदले गर्नु पर्ने कामको सिलसिलामा पर्न सक्ने समस्यालाई अधार मानी समस्या दिइनेछ। समास्याको समाधान प्रस्तुत गर्नु पर्नेछ। यसरी समस्याको समाधान गर्दा प्रचलित ऐन नियमको परिधि र अवस्था समेतलाई विचार गरी दिइएको समस्याको निम्न आधारमा उपयुकत समाधान र सुझाव प्रस्तुत गर्नु पर्नेछ।

(१) समस्याको स्पष्ट पहिचान गर्ने।

(२) समस्याका खास खास कारणहरू दर्शाउने।

(३) समस्या समाधानका लागि सुझावहरू दर्शाउने।

(४) प्रस्तुत सझावहरू कार्यान्वयन गर्दा त्यसबाट पर्न सक्ने सकारात्मक प्रभावहरू उल्लेख गर्ने।

द्रष्टव्य: - पाठ्यक्रममा राखिएका ऐन, नियम र विनियमहरु परीक्षा हुनु भन्दा ३ महिना अगाडि सम्म संशोधन भएकालाई सोही अनुरुप पाठ्यक्रममा समावेश भएको मानिने छ।

- लिखित परीक्षा उत्तीर्ण हुनेहरूको मात्र अन्तरवार्ता हुनेछ।

✡