

नेपाल विद्युत् प्राधिकरण

प्राविधिक सेवा, इलेक्ट्रिकल समूह, इलेक्ट्रिकल उपसमूह, तह-५, सुपरभाइजर पदको खुल्ला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

- शैक्षिक योग्यता: प्रचलित कर्मचारी सेवा विनियमावलीमा व्यवस्था भए अनुसार ।
- लिखित परीक्षाको विषय, पूर्णाङ्क, परीक्षा प्रणाली, प्रश्नसंख्या, अंकभार र समय निम्नानुसार हुनेछ ।

पत्र	विषय	पूर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या	प्रतिप्रश्न अंकभार	समय
प्रथमपत्र	इलेक्ट्रिकल ईन्जिनियरिङ्ग (I)	३०	वस्तुगत बहुउत्तर	३०	१	३० मिनेट
द्वितीयपत्र	इलेक्ट्रिकल ईन्जिनियरिङ्ग (II)	७०	विषयगत	१०	७	२ घण्टा ३० मिनेट

- 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 गलती मानिनेछ ।
- प्रत्येक गलत उत्तर वापत सो प्रश्न वापत पाउने अंकको ०.२ (बीस प्रतिशत २०%) का दरले सो विषयमा पाएको कुल प्राप्तांकबाट घटाईनेछ ।
- कालो/नीलो मसी मात्र भएको डटपेन/कलमले उत्तरको लागि निर्धारित कोठाका प्रश्नमा क,ख,ग,घ मध्ये एउटा मात्र सहि उत्तर स्पष्ट रूपले लेख्नुहोला । पेन्सिलले लेखेकोलाई मान्यता दिइने छैन ।
- प्रथम र द्वितीयपत्रको परीक्षा २ पटक गरेर हुनेछ । प्रथमपत्रको परीक्षा सकिएपछि द्वितीयपत्रको परीक्षा तत्काल हुनेछ ।
- द्वितीयपत्रको लिखित परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ ।

प्रथम र द्वितीयपत्रको पाठ्यक्रम

1. FUNDAMENTALS

- Concept of resistance, inductance, capacitance and their role in electric circuits.
- Series and parallel connection of resistance, inductance and capacitance.
- Ohm's law and Kirchhoff's law.
- Alternating current fundamentals: Faraday's laws of electromagnetic induction, generation of alternating voltages and currents and their equations and waveforms, amplitude, frequency, phase, phase difference, average and rms values, A.C. through resistance, inductance, capacitance and through their combinations, single phase and three phase AC systems.
- Heating effect of electric current
- General norms of system voltage regulation and frequency regulation.

2. POWER PLANTS

- Hydroelectric power plants: Merits and demerits, classifications and respective layouts, selection of sites, types of water turbines, their working principles and applications.
- Diesel electric power plants: Merits and demerits, selection of sites, elements of a diesel plant and its layout.
- Non conventional power generation: Photo voltaic or solar cells, solar power generation, wind power generation.

3. ELECTRICAL MACHINES

- D.C. generators: Working principle, types of D.C. generators, external, internal and no load characteristics, losses and efficiency.
- D.C. motors: Working principle, types of D.C. motors, characteristics of D.C. series and shunt motors, losses and efficiency
- Synchronous generator: Working principle, equation of induced E.M.F., short circuit and open circuit characteristics, voltage regulation, losses and efficiency, parallel operation and synchronizing, Alternators connected to infinite bus bars, different types of excitation systems, drying of alternators.
- Three phase induction motors: Working principle, squirrel cage and slip ring motors, characteristic of induction motors, starting torque and torque under running condition, starting of induction motors.

- Transformers: Working principle, E.M.F. equation, transformer at no load and at loaded condition, losses and efficiency, parallel operation, different components of transformers, transformer oil and its role, cooling of transformers, Bucholtz protection.
- 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.
- Concept of black start units in power stations.

4. CONTROL AND PROTECTION

- Necessity of D.C. system in power stations.
- Working principle of bulk oil, vacuum, minimum oil and gas filled circuit breakers.
- Working principle of over current, earth fault and under voltage relays and their importance for protection of the system.
- Instrument transformers and their role in system protection.
- Power line carrier communication and its importance.
- Surge arrestor and its importance in protection against lightning.

5. SUB-STATION AND TRANSMISSION LINE

- Substations: Substation equipments and their functions, general layout of substation, types of bus bar arrangements, earthing of equipments in a substation.
- Transmission lines: General concept of overhead transmission line and under ground cabling, necessity of high voltage transmission, line parameter, resistance, inductance and capacitance, choice of voltage level, conductor spacing, voltage regulation and efficiency of short and medium transmission lines, sag, tension and clearances, supports and cross arms, insulating materials and their classification, conducting materials, vibrations and dampers in transmission lines..
- Lightning phenomenon, types and functions of lightning arrestor, over head earth wire.
- Corona and its effects, advantages and disadvantages.

6. DISTRIBUTION AND CONSUMER SERVICES

- 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
- Selection of supports and conductors in secondary distribution system
- Earthing of electrical system and equipment
- Consumer supply connection
- General idea of fuse, MCB and MCCB protection
- Consumer supply energy meters: Construction and principle of operation, creeping errors and their compensation, testing of energy meters

7. POWER SYSTEM OPERATION AND MAINTENANCE

- Concept of maximum demand, 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 and precautions, safety rules and regulation, safety tools and devices.

8. INSTITUTIONAL KNOW-HOW

- General knowledge of Nepal Electricity Authority, its organizational structure and function of various business groups
- General knowledge of various power plants of Nepal, their types, salient features, and their geographical locations

- General knowledge on Nepalese power transmission system, voltage levels and lengths, export-import links for power exchange with India.

