

# नेपाल विद्युत प्राधिकरण

## प्राविधिक सेवा, मेकानिकल समूह, 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	मेकानिकल ईन्जिनियरिङ्ग (I)	३०	वस्तुगत बहुउत्तर	३०	१	३० मिनेट
द्वितीयपत्र	मेकानिकल 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 गल्ती 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. General

- Types of hydropower and thermal power stations
- General layout of hydro power stations
- Advantages and disadvantages of hydro and thermal power stations
- Importance of safety rules. Safety tools and devices.
- Fire fighting equipments. Application of DCP, CO<sub>2</sub>, Chemical Foam in firefighting
- Types of Gates, hoist & their applications

#### 2. Fundamentals

- Physical properties of metal and Difference between carbon steel and cast iron
- Heat treatment and their effect in properties of metal
- First and second law of thermodynamics
- Basics of free and forced vibrations, Vibration damping
- Load factor, plant Availability and Reliability of a power station.
- Current, voltage, frequency, power, power factor and energy
- Importance of earthing of electrical equipments.

#### 3. Hydraulics, Hydraulic machines, I.C.Engines & auxiliaries

- Types of hydro turbines and their selection with respect to Head
- Basics of compressible & non compressible flow, friction loss due to sudden enlargement & contraction
- Functions of turbine runner, wearing ring, guide vanes, nozzles, needle, deflector and deflector servomotor, BF Valve
- Different types of pumps & their application
- Types of compressors and their use
- Types of bearing and their applications
- Operating principle of IC Engine. Two stroke & Four stroke Engines
- Diesel & Petrol engine. Their respective advantages & disadvantage
- Power train system of automobile & construction equipments

- Working principle of Hydraulic system, brakes in automotive & construction equipments
- Turbochargers, Heat Exchangers, Cooling Towers, Separators, Purifiers & filters
- Types of fuel, Lubricating Oil and their properties
- Quality of Cooling Water, Chemical treatment of cooling water

#### **4. Workshop Practice**

- Different Types of measuring tools & equipments
- Types of welding & their application
- Principle of arc welding, oxy-acetylene welding, their advantages and limitations
- Welding equipments, tools and accessories, safety precautions in welding
- Types of electrodes, application & care
- Welding defects, causes, remedies and testing of welding defects
- Types of machine tools & equipments used in Mechanical work shop
- Uses of fits and tolerances
- Types of Non-destructive testing

#### **5. Operation and Maintenance**

- Operation and Maintenance planning, Concept of various maintenance system
- General operational rule, assignment, duties and communication, Supervision, inspection & recording
- Pre-requisite for starting of generator in a hydro & thermal power station
- Role of governors in hydro as well as thermal power station, speed droop & other parameters of a governor
- Importance of air conditioning and ventilation
- Condition monitoring
- Cavitations, wear & pitting of runner and other parts and their remedy
- Corrosion, its effects & protective measures
- Trouble shooting in power plants

#### **6. 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.

