

# नेपाल विद्युत प्राधिकरण

## प्राविधिक सेवा, मेकानिकल समूह, तह-५, सुपरभाइजर पदको खुल्ला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

१. लिखित परीक्षाको विषय, पूर्णाङ्क, परीक्षा प्रणाली, प्रश्नसंख्या, अंकभार र समय निम्नानुसार हुनेछ ।

पत्र	विषय	पूर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या	प्रति प्रश्न अंकभार	समय
प्रथम	आधारभूत सामान्य ज्ञान र सेवा सम्बन्धी	१००	४०	वस्तुगत बहु वैकल्पिक प्रश्न	खण्ड (क) आधारभूत सामान्य ज्ञान	२०	२	४५ मिनेट
					खण्ड (ख) सेवा सम्बन्धी	३०	२	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत प्रश्न	छोटो उत्तर आउने प्रश्न	१०	५	२ घण्टा
					लामो उत्तर आउने प्रश्न	५	१०	३० मिनेट

- प्रथमपत्रको खण्ड क सबै समूहको लागि एउटै हुनेछ । प्रथमपत्रको खण्ड क समाप्त भएपछि एकै सिटिङ्ग खण्ड ख को परीक्षा हुनेछ । प्रथमपत्रको खण्ड ख र द्वितीयपत्रको पाठ्यक्रम एउटै हुनेछ ।
- वस्तुगत प्रश्नमा प्रत्येक प्रश्नका चार वटा सम्भाव्य उत्तर दिइने छ । जस मध्ये एउटा सही उत्तर लेख्नु पर्नेछ । गलत उत्तर बापत प्रति गलत उत्तर २० प्रतिशतका दरले अंक घटाइनेछ ।
- प्रथमपत्र र द्वितीयपत्रको परीक्षा फरक फरक हुनेछ ।
- परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ ।
- सामान्यतः प्रत्येक इकाईबाट प्रश्नहरू सोधिनेछन् । इकाईको अंकभार तोकिए बमोजिम हुनेछ । लामो उत्तर दिनुपर्ने प्रश्न एकै वा खण्ड खण्ड गरी (दुई वा सो भन्दा बढी) सोध्न सकिनेछ ।

### प्रथमपत्र:

#### खण्ड (क) आधारभूत सामान्य ज्ञान (प्राविधिक सेवा, तह-५ का सबै समूहका लागि):

- नेपालको भूगोल: धरातलीय स्वरूपको किसिम र विशेषता, नदीनाला, तालतलैया र खनिज पदार्थ, राजनैतिक विभाजन (संघ, प्रदेश तथा स्थानीय तह)
- नेपाल विद्युत प्राधिकरण सम्बन्धि जानकारी: स्थापना, नेपाल विद्युत प्राधिकरणका व्यवसाय/निर्देशनालयहरू, प्राधिकरणको काम, कर्तव्य र अधिकार, संचालक समिति
- दक्षिण एशियाली क्षेत्रीय सहयोग संगठन (SAARC) बारे सामान्य जानकारी
- राष्ट्रिय महत्वका समसामयिक घटना तथा नविनतम गतिविधिहरू ।
- सामान्य गणितिय अभ्यास: अनुपात, भिन्न, प्रतिशत, औषत, अंकगणितिय तर्क, नाफा-नोक्सान, श्रेणीक्रम ।
- विद्युत चोरी नियन्त्रण ऐन, २०५८ अनुसार विद्युत चोरी मानिने अवस्था, विद्युत चोरी नियन्त्रण नियमावली, २०५९ अनुसार विद्युत आपूर्ति बन्द गर्न सक्ने, पूनः जडान गर्ने अवस्था र पुरस्कार व्यवस्था ।
- विद्युत वितरण विनियमावली, २०६९ को विद्युत लाईन एवं मिटर जडान सम्बन्धी व्यवस्था र मिटर जाँच तथा मिटर रिडिङ्ग सम्बन्धी व्यवस्था ।

### प्रथमपत्र खण्ड ख र द्वितीयपत्रको पाठ्यक्रम (मेकानिकल समूह)

#### 1. SAFETY PRACTICES

[2x2=4, 1x5=5]

- 1.1. Importance of Safety
- 1.2. Types of Safety
  - 1.1.1. Personal Safety
  - 1.1.2. Machine's Safety
  - 1.1.3. Tools Safety
  - 1.1.4. Workplace Safety
- 1.3. Knowledge of Industrial safety & Hygiene
- 1.4. Fire fighting
  - 1.4.1. Firefighting Equipment

- 1.4.2. Classification of fire
- 1.4.3. Application of DCP and CO<sub>2</sub> in firefighting, chemical form
- 1.5. Safety rules, tools & devices

## 2. GENERAL CONCEPT

[4x2=8, 2x5=10]

- 2.1 Diesel power plant and hydropower plant
  - 2.1.1 General concept
  - 2.1.2 Classification
  - 2.1.3 Advantages and disadvantages
- 2.2 Important of Earthling and of Electrical and Mechanical Equipment.
- 2.3 Measuring tool and equipment
  - 2.3.1 Metric, FPS, SI Unit
  - 2.3.2 Conversion of unit
  - 2.3.3 Fundamental & derived unit
  - 2.3.4 Area, Perimeter, Weight, Density
  - 2.3.5 Measuring Voltage, Current, Power and Energy
- 2.4 General ideal of fuse MCB and MCCB protection
- 2.5 Physical properties of Metal and difference between carbon steel and cast iron

## 3. OPERATION AND MAINTENANCE

[5x2=10, 1x5=5, 2x10=20]

- 3.1 operation and maintenance planning and concept of various maintenance system
- 3.2 General operational rules, assignment, duties and communication, supervision, inspection and recording
- 3.2 Prerequisite for starting and stopping of generator in hydro and thermal station
- 3.3 Maintenance of runner, guide vanes and guide bearing
- 3.4 Maintenance of different gate and their operating device
- 3.5 concept and Maintenance of
  - 3.5.1 Governor oil system
  - 3.5.2 Lubricating oil system
  - 3.5.3 Generator cooling system
  - 3.5.2 Air-conditioning system and ventilation system
  - 3.5.5 Compressed air System
  - 3.5.6 Dewatering system of Power station
- 3.6 Condition monitoring and troubleshooting in power plant
- 3.7 record keeping of operation and maintenance work and data keeping.

## 4. WORKSHOP PRACTICE

[4X2=8, 1x5=5, 1x10=10]

- 4.1. Welding
  - 4.1.1. Arc welding - Principle, Tools, Equipment, Welding procedure.
  - 4.1.2. Oxy-acetylene welding - Principle, Tools, Equipment, Welding procedure.
  - 4.1.3 Type of Electrode and their application and care
  - 4.1.4 Welding defect, causes and remedies and testing of welding defects.
  - 4.1.5. Soldering & Brazing -Principle, Tools, Equipment, Procedure.
  - 4.1.6. Safety Precaution in welding work.
- 4.3. Type of machine tools and equipment used in mechanical works shop
- 4.4 types of fits, uses of fits and tolerance
- 4.5 Type of non-destructive testing
- 4.6. Sheet metal and plumbing
  - 4.6.1. Marking, Cutting, Folding, Bending, Joining & Soldering of Sheet Metal
  - 4.6.2. Marking, Cutting, Bending, Threading, Joining and Sealing of Pipes
- 4.7. Basic Knowledge of lifting devices used in mechanical workshop including their operation
  - 4.7.1. Chain hoist
  - 4.7.2. Jacks
  - 4.7.3. Gantry crane/ other cranes
  - 4.7.4. Fork lift

**5. HYDRAULIC, THERMODYNAMICS, I.C. ENGINES AND HYDRAULIC MACHINES.****[5x2=10, 2x10=20]****5.1. Hydraulics and Hydraulic Turbines**

- 5.1.1 Types of flow and basics of compressible and non-compressible flow
- 5.1.2 Frictional losses in flow, losses due to sudden enlargement and contraction.
- 5.1.1 Types of hydraulic turbines
- 5.1.2 Selection of Turbines with head and flow.
- 5.1.3 Function of runner, guide vanes, spiral casing, inlet valve, and shaft seal, guide bearing
- 5.1.4 Nozzles, Butterfly valve, needle vales, deflector and deflector servo mechanism
- 5.1.3 Governor and its function

**5.2 Hydraulic pump and compressors**

- 5.2.1 Different types of pumps and their selection and use.
- 5.2.2 Types of compressor and their use

**5.3 Thermodynamics**

- 5.3.1 Term used in thermodynamics
- 5.3.2 First law, Second law and Zeroth law of thermodynamics
- 5.3.3 Otto and Diesel cycle

**5.4 IC Engines & automobiles**

- 5.4.1 Difference between two stroke and four stroke engines
- 5.4.2 Difference between petrol and diesel engines
- 5.4.3 General concept of fuel system, Lubrication system, ignition system and cooling system in IC engines
- 5.4.4 Power train & braking system of automobiles and construction equipment

**5.5 Governor in hydro and thermal power plant, speed drop and other parameters of governor****5.6 Different type of bearing, their application and replacement.****5.7 Working principle of hydraulic system of construction equipment.****6. FUELS AND LUBRICANTS****[2x2=4, 2x5=10]**

- 6.1. General knowledge on different types of fuels and lubricants used in machinery
- 6.2. Knowledge on application and changing interval of lubricants

**7. KNOWLEDGE OF BASIC DRAWING****[3x2=6, 1x5=5]**

- 7.1. Scale & Dimensions
- 7.2. Symbols, Views
- 7.3. Parts and assembly drawing of joint
  - 7.3.1. Permanent joint (Rivet and welding)
  - 7.3.2. Temporary joint (Nut bolt, key and Spline joint)

**8. AIR CONDITIONING****[2x2=4, 1x5=5]**

- 8.1 Introduction and layout of air-conditioning system
- 8.2 Introduction and function of different component of air-conditioning system
- 8.3 Type of refrigerant
- 8.4 Troubleshooting

**9. INSTITUTIONAL KNOW-HOW****[3x2=6, 1x5=5]**

- 9.1 General knowledge of Nepal Electricity Authority
- 9.2 General knowledge regarding capacities of various power plants of Nepal and their locations
- 9.3 General knowledge on standard transmission and distribution voltage of Nepalese power system.

**द्रष्टव्यः** पाठ्यक्रममा राखिएका संविधान, ऐन, नियम र विनियमहरू परीक्षा हुनु भन्दा ३ महिना अगाडी सम्म संशोधन वा खारेज भई त्यसको सट्टा हाल प्रचलनमा रहेकालाई सोही अनुरूप पाठ्यक्रममा समावेश भएको मानिने छ ।

