

नेपाल विद्युत् प्राधिकरण

प्राविधिक सेवा, मेकानिकल समूह, तह-७ ईन्जिनियर पदको खुल्ला प्रतियोगितात्मक लिखित परीक्षाको पाठ्यक्रम

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

पत्र	विषय	पूर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या	प्रति प्रश्न अंकभार	समय
प्रथम	जनरल मेकानिकल ईन्जिनियरिङ्ग	३०	वस्तुगत बहुउत्तर	३०	१	३० मिनेट
द्वितीय	पावर प्लाण्ट ईन्जिनियरिङ्ग	७०	विषयगत	छोटो उत्तर	५	२ घण्टा ३० मिनेट
				लामो उत्तर	३	

३. वस्तुगत बहुउत्तर परीक्षा प्रणाली प्रश्नको उत्तर लेख्दा केरमेट गरेको, दोहोरो लेखेको, सच्याएको, निर्दिष्ट स्थानभन्दा अन्यत्र लेखेको वा उत्तर नै सारेकोलाई गलती मानिनेछ ।
४. वस्तुगत बहुउत्तर परीक्षा प्रणाली प्रश्नमा प्रत्येक गलत उत्तर वापत सो प्रश्न वापत पाउने अंकको ०.२ (बीस प्रतिशत २०%) का दरले सो विषयमा पाएको कुल प्राप्तांकबाट घटाईनेछ ।
५. 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 ।
६. प्रथम र द्वितीयपत्रको परीक्षा २ पटक गरेर हुनेछ । प्रथमपत्रको परीक्षा सकिएपछि द्वितीयपत्रको परीक्षा तत्काल हुनेछ ।
७. द्वितीयपत्रको लिखित परीक्षाको माध्यम नेपाली वा अंग्रेजी भाषा हुनेछ ।
८. सामान्यतः प्रत्येक शिर्षकको अंकभार तोकिए बमोजिम हुनेछ ।

प्रथम पत्र: जनरल मेकानिकल ईन्जिनियरिङ्ग [30]

1. Internal combustion engines [4]

Construction and working of spark ignition and compression ignition internal combustion engines, Compression ratio; thermal efficiency, Air standard (ideal), Carnot cycle, Otto cycle, Diesel cycle, Dual combustion cycle, Rankin cycle, First and Second Laws of Thermodynamics, Consequences of Second Law, Energy balance in a closed and open system, Two stroke and four stroke engines, Thermodynamic processes, Determination of cycle efficiencies, Temperatures etc, Numerical problems of the basis of cycle parameters, Engine cooling, Engine rating, Diesel and petrol fuel properties, Air pollutants in exhaust gases and measures to control/reduce them.

2. Workshop technology [4]

Oxy-acetylene welding Electric arc welding, Different kinds of metal cutting tools commonly used with metal cutting machines such as lathe, Milling, Drilling and shaping machines, Safety rules and regulations, Precautions in electrical works, Safety equipment; Types application and maintenance of fire extinguishing equipment, Noise, Dust, Smoke and protection from them, Electric shocks-first aid, Fire safety codes.

3. Lubrication [4]

Type of lubricants, Properties, Viscosity units, Grading of lubricating oils, Multi grade oils, Commonly available lubricating oils, Their selection and applications.

4. Refrigeration and air conditioning [3]

Basic refrigeration cycles used using vapor compression system, Function and use of cycle control components such as expansion devise, Thermostats and pressure cutouts, Major components of an air conditioning system and their function, Ventilation system and its importance, Fresh air requirements for a confined space.

5. Heavy equipment [4]

Salient features of reciprocating air compressors and pneumatic earth drilling equipment, Functions, Characteristics and rating of loader, Bulldozer, Grader and excavators, Servicing requirements of heavy equipment.

6. Automotive systems [3]

Breaking system, Clutch system, Transmission system, Suspension system, Cooling system, Steering system, Electrical and electronics system and lubrication system for light and heavy petrol and diesel automobiles .

7 Safety Engineering [4]

Effects of non-ionizing electromagnetic fields on human body, Physical effects of electric shocks, Safety and precaution, safety rules and regulation, Safety tools and devices for electricity, Live line maintenance and precautions, Explosions of electrical equipment in premises and precautions to be taken, Earthing and shielding techniques, Fire hazards, Fire fighting techniques and equipment, Noise hazard, sources, Control and effect on health, First aid requirements for post-event treatment.

8 Institutional Know-How [4]

- 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.

द्वितीय पत्र: पावर प्लाण्ट ईन्जिनियरिङ [70]**1 Power Plant Cycles [8]**

Classification, Rankine cycle, Reheat cycle, Binary Vapour cycle, Otto cycle, Diesel cycle, Dual Combustion cycle, Gas Turbine Cycle.

2 Steam Power Plant [4]

Classification, Combustion Equipment for Steam Boilers, Boilers, Accessories, steam Cooling Ponds and Cooling Towers.

3 Diesel Engine Power Plant [8]

Heat Engines, Classification of I.C. Engines, Different Parts of I.C. Engines, Four Stroke Cycle Diesel Engines, Two Stroke Cycle Diesel Engines, Combustion Processes in C.I. Engines, Basic Designs of C.I. Engine Combustion, Supercharging, Turbo charging, Operation of a Diesel Power Plant, Types of Diesel Engine used for Diesel Power Plants.

4 Gas Turbine Power Plant [4]

Classification, Constant Processes Combustion Gas Turbines, Constant Volume Combustion Gas Turbines, Gas Turbine Fuels, Operation of Components of a Gas Turbine Power Plant.

5 Hydro-Electric Power Plant [10]

Types of Hydro-electric Power Plants, Essential Components, Auxiliaries (General, Operational, Maintenance), Hydro-electric Plant Controls, Electrical and Mechanical Equipment, Ventilator, Cooling and lubrication, Calculation of Hydro power, Power House Planning, Preventive Measures, Safety Measures, Maintenance of Electrical and Mechanical Plants.

6 Hydraulic Machines [18]

Turbines: Main types, Classification, Design, Working principles and characteristics of different types of turbines, Specific speed, Cavitation, Efficiencies, Performance, Specific speed, selection, Governing of water turbines.

Pumps: Reciprocating pumps (Main Components, working principle, Single acting and double acting, Head discharge characteristics, Power and efficiency calculation, Seals and packing, Common troubles and remedies), Centrifugal pumps (Working principle, classification, Pumping head, Cavitation, Power requirements, Pump characteristic curves, Selection, Overhauling, Trouble shooting and their remedies).

7 Machine Design [10]

Ball bearing, journal bearing, Thrust bearing, and roller bearing (Construction and types, Selection criteria, Bearing materials and Construction, Mounting and alignment), Jacks, Brakes and clutches, V-belts and flat belts, Pulleys, Ropes, Cranes, Lubrication film temperature and film thickness, Clearances and oil grooves, Gasket, Sealing, Machine Dynamic.

8 Economic and Financial Analysis [8]

Methods of economic/financial analysis such as cost-benefit ratio, Internal rate of return, Net present worth, Payback period, Minimum attractive rate of return and their applications, Risk analysis, Tariff structure, Investment decisions, Interest and time value of money.

