नेपाल नागरिक उड्डयन प्राधिकरण
प्राबिधिक सेवा , इलेक्ट्रिकल ईन्जिनियरिङ्ग समूह,
उपप्रवन्धक (इलेक्ट्रिकल इन्जिनियर), आठौं तहको खुला तथा आन्तरिक
प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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

पत्र	विषय	पूर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या	अंक भार	समय
प्रथम	प्रशासन तथा व्यवस्थापन र ऐन नियम	१००	तर्कयुक्त समस्या समाधान	२ x २०	४०	३ घण्टा
			छोटो उत्तर	६ x १०	६०	
द्वितीय	सेवा सम्वन्धी	१००	तर्कयुक्त समस्या समाधान	२ x २०	४०	३ घण्टा
			छोटो उत्तर	६ x १०	६०	

द्रष्टव्य :

१. प्रथमपत्र र द्वितीयपत्रको परीक्षा २ दिनमा हुनेछ ।

२. परीक्षाको माध्यम नेपाली वा अंग्रेजी वा दुवै हुनसक्ने छ ।

३. प्रत्येक पत्रको उत्तिर्णाङ्क ४०% (चालिस प्रतिशत) हुनेछ । दुवै पत्रमा न्यूनतम उत्तिर्णाङ्क प्राप्त नगर्ने उम्मेदवारहरु अन्तर्वार्तामा सम्मिलित हुन योग्य हुनेछैनन् ।

४. अन्तर्वार्ता र शैक्षिक योग्यता
   क) अन्तर्वार्ताको अङ्क भार - ३०
   ख) शैक्षिक योग्यताको अङ्कभार - ३

   शैक्षिक योग्यता वापतको अङ्क : न्यूनतम शैक्षिक योग्यता वापत प्रथम श्रेणीलाई ३, द्वितीय श्रेणीलाई २ र तृतीय श्रेणीलाई १ अङ्क प्रदान गरिनेछ ।

५. यस पाठ्यक्रममा जेसुकै विषयवस्तु समावेश गरिएको भएतापनि पाठ्यक्रममा परेका कानुन, ऐन, नियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई कायम रहेकालाई यस पाठ्यक्रममा परेको संझनुपर्दछ ।

६. यस पाठ्यक्रममा उल्लेख भएका विषयहरुका अतिरिक्त समसामयिक घट्ना तथा विषयवस्तुहरुका सम्वन्धमा समेत प्रश्न सोध्न सकिनेछ ।

प्रथमपत्र : प्रशासन तथा व्यवस्थापन र ऐन नियम

क) प्रशासन तथा व्यवस्थापन

१. सार्वजनिक प्रशासनको परिचय, नवीनतम अवधारणा

२. प्रशासनिक विधिहरु :- कार्य विश्लेषण, कार्य विवरण, कार्य मूल्यांकन र नेपाल नागरिक उड्डयन प्राधिकरणको संगठन संरचना तथा कार्यविधि

३. संगठनात्मक व्यवहार, समूहगत गतिशीलता, समूहगत कार्य र यिनको प्रभावकारिता

४. व्यवस्थापनमा मनोवल, उत्प्रेरणा, बृत्तिविकास र उत्तरदायित्व

५. व्यवस्थापनमा संचार, समन्वय, सुपरिवेक्षण, अनुगमन तथा मूल्यांकन

६. अधिकार प्रत्यायोजन, निर्णय प्रक्रिया र प्रभावकारिता

७. व्यवस्थापन सूचना प्रणाली र महत्व

८. आयोजना तर्जुमा कार्यान्वयन अनुगमन र मूल्यांकनका चरणमा देखा पर्ने चुनौतीहरुको विश्लेषण

९. वार्ता तथा संझौता गर्ने सम्वन्धी सैद्धान्तिक र व्यवहारिक ज्ञान ।

१०. योजनाको परिचय, तर्जुमाका चरणहरु र नेपालमा आवधिक योजना वारे जानकारी

११. नेपाल नागरिक उड्डयन प्राधिकरणको उद्देश्य, कार्य, नेपाल सरकारसित सम्पर्क

१२ नेपालमा हवाई यातायातको विकासक्रम र चुनौतीहरु

१३. विश्वव्यापीकरण, उदारीकरण र सार्वजनिक संस्थानको अवधारणा र प्रयोग

१४. नेपाल सरकारको राष्ट्रिय हवाई तथा पर्यटन नीति

१५. सम्पूर्ण गुण व्यवस्थापन (Total Quality Management)

ख) ऐन नियम

१. नेपालको अन्तरिम संविधान, २०६३

२. नेपाल नागरिक उड्डयन प्राधिकरण ऐन, २०५३

३. नेपाल नागरिक उड्डयन प्राधिकरण कर्मचारीहरुको सेवाका सर्त र सुविधा सम्वन्धी नियमावली, २०५६

४. नेपाल नागरिक उड्डयन प्राधिकरण आर्थिक प्रशासन सम्वन्धी नियमावली, २०५७

५. नागरिक उड्डयन नियमवाली, २०५८

६. नेपाल नागरिक उड्डयन प्राधिकरण विमानस्थल सेवा शुल्क नियमावली, २०६७

७. हवाई सुरक्षा व्यवस्था नियमावली, २०४६

८. भ्रष्टाचार निवारण ऐन, २०५९

९. सार्वजनिक खरिद ऐन, २०६३ तथा नियमावली, २०६४

१०. करार ऐन, २०५६

११. श्रम ऐन, २०४८

द्वितीयपत्र : सेवा सम्वन्धी

1. Electrical Machine:

- Transformers type, construction, load and no load condition, open circuit and short circuit test, equivalent circuit, losses, efficiency and voltage regulation, auto transformer, parallel operation, load sharing, instrument transformer.
- DC Machines type, construction. voltage /speed/ load characteristics of dc generators, separate and self-exited machines, voltage regulation of generator, torque/speed characteristics of shunt field, series field and compound field motors, armature reaction and commutation, DC motor starters, speed regulation and control of DC motor.
- Synchronous Generators classification and construction, voltage regulation of an alternator by synchronous impedance method and mmf method, losses and efficiency, power angle characteristics.
- Synchronous Motors: equivalent circuit, power and torque, effect of excitation, stability v-curve, hunting, starting and application.
- Induction Motors type, construction, equivalent circuits. torque-slip characteristics starters, speed control and motor selection.
- Induction Generators: principle of operation, application, controllers and harmonics.

2. Power Generation

Types of Generating Plants- Thermal, Hydro, Diesel and Solar (Working Principles, Equipment, Bus Bar, AVR and Reactors; Stand by Generator and Auto Transfer Switch; Uninterruptible Power Supplies (UPS); Basic Principle of No-break power generation

3. Power System Analysis

- Load Flow Study **:** Load characteristics, effects on voltage and frequency, real power frequency balance, reactive power frequency balance, basic complex power flow equations for a network, voltage profile and VAR compensation, causes and effects of low power factor, advantages and methods of power factor improvement.
- Stability**:** Steady state, dynamic and transient stability, equal area criterion, Swing equation for multi machine, Steady-state stability implications..
- Control and Protection : Faults in power system and their calculation, Components of power system protection, Isolators/Disconnecting switches, contactors, Types and characteristics of circuit breakers and protective relays, Automatic reclosure, Protection of generators, transformers and transmission/distribution lines, Lightning protection, Governor's principle and characteristics.
- Load dispatching : principle of economic load dispatch, requirements, tools and benefits, role of a dispatcher.
- Transmission System :Choice of voltage, route selection, right of way, substation layout and location.
- Distribution System: Types of Distribution systems, Distribution substations, Bus bar schemes, Power factor correction, Protection coordination in distribution systems, Distribution system reliability indices, Rural distribution system, Loss reduction.

- Quality of Electricity: Supply quality parameters, effect of quality on equipment and application, standards.

4. Power Distribution and Consumer Services

Sub-station & switchyards: General layout of Sub-station and their key elements. Types of underground Cable, Cable Resistances and Capacitances, Insulation Resistance, general concepts about Cables used for runway power distribution, selection of cable and selection criteria. Handling of cable and protection, Cable joints, Single wire power Distribution, lightening phenomenon, lightening arrestors types and function, overhead earth wire, voltage drops, Ferranti effects, SIL of Transmission Line; earthing of electrical system and electrical equipments its importance and methods of earthing, Energy Tariffs structure.

5. Economics of Power Utilization

Basic concept about Energy Audit, Load management TOD meter, Demand side management Power Factor Improvement: Causes and effects of low power factor, advantages and methods of power factor improvement. economics of power generation, Load forecast, demand factor, load factor, plant use factor, diversity factor, energy rates (tariff), depreciation, Rate of Return

6. Electrical Maintenances

Maintenance schedules – Periodic, Preventive and emergency maintenance; NOTAM : Fault reporting and fault finding: fault reporting procedures, fault category and action plan, maintaining log, fault clearing and logging and fault recording system; Check list of equipment – Daily, Weekly, Monthly and Yearly. Duty and Responsibilities of Shift- In charge and section Chief, Roaster Duty, Manpower Management and Leadership, Motivation.

7. Electrical Safety

Safety rules and regulation, storage and handling of explosives and compressed gases and flammables substances, explosion of electrical equipment In premises and precaution to be taken Concept of touch voltage, effects of non-ionizing electromagnetic fields on human, ear thing and shielding techniques for electrical equipment. First aid requirements for after the event treatment Fire Alarm System.- Principle and operation, electrical induction into communication and transmission lines.

8. Power Electronics

Power diodes, Thyristors, Transistors, Gate turn off devices, AC to DC and DC to AC conversions, Harmonic filtering, Switched Mode Power Supplies.

9. Illumination

Law of illumination; Radiant Efficiency, design of Lighting Schemes; Type of Electric Lamps and comparison between Filament lamp and Fluorescent

10. Instrumentation

Theory of measurements, transducers, electrical signal transmission and processing, non-electrical signal transmission, analog to digital and digital to analog converters, digital instrumentation, output devices, display and recording system.

11. Visual Aids and Aerodrome Lighting

Lighting fixture and structures, Elevated lights, Surface(Inset) lights, Airport Lighting Control and Monitoring System(ALCMS) based on TCP/IP (Touch screen control).

11a. Application, Location and Characteristics of followings lights :

Aerodrome beacon, circling guidance system, runway threshold identification lights, runway edge lights, runway threshold lights, wing bar lights, runways end light, runway centre line lights, runway touchdown zone lights, rapid exit taxiway light, , stopway light, taxiway centre line lights, taxiway edge lights, runway turn pad lights, stop bar lights, runway guard lights.

11b. Approach Lighting System

Simple Approach Lighting System, Precision Approach Lighting System, types and characteristics of approach lighting system, intensity control of approach lights.

11c. Visual Approach Slope Indicator System

T-VASIS and AT-VASIS, PAPI and APAPI

12. Project management and Administration

- Inventory Control & Management
- Budget Planning and Allocation
- National Standard Bidding Document, PPMO guidelines.
- International Standard Bidding Document
- Terms of Reference (ToR), EOI, Contract Documents
- Construction Managements: Work Schedule, Preparation of progress reports, Monitoring and evaluation, Quality control and Assurance.
- Contract Dispute Resolution

13 Aerodrome Safety

- Safety management system frameworks (Regulatory framework, ICAO SARPs)
- Safety Policy, Safety organization, Safety planning and safety Standards
- Universal Safety Oversight Audit and Continuous Monitoring Approach.
- Eight critical elements of safety oversight system
- State Safety Programme.
- Hazard identification, Safety Risk Assessment, gap-analysis.
- Acceptable level of Safety, Risk mitigation and Safety Assurance
- SMS implementation.
- Runway safety programme, ramp safety

14. ICAO Annex – 14, Annex 15 & Related Documents

- ICAO Annex – 14
- Aerodrome Design Manual Part-4 Visual Aids
- Aerodrome Design Manual Part-5 Electrical System
- NOTAM/SNOWTAM, AIP & its revision process.