

नेपाल नागरिक उड्डयन प्राधिकरण
प्राविधिक सेवा, एरोनटिकल इन्जिनियरिंग र सिभिल एभिएसन
अपरेशन समूहको ल्फा.अ.स. उपसमूहतर्फ
निर्देशक (पाइलट/ए.एम्.ई), एघारौं तह (AE; CA/FO) को 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
प्रथमपत्र	प्रशासन तथा व्यवस्थापन र ऐन नियम	१००	तर्कयुक्त विश्लेषणात्मक समस्या समाधान	२ X २०	४०	३ घण्टा
			विषयगत – छोटो प्रश्न	६ X १०	६०	
द्वितीयपत्र	सेवा सम्बन्धी	१००	तर्कयुक्त विश्लेषणात्मक समस्या समाधान	२ X २०	४०	३ घण्टा
			विषयगत – छोटो प्रश्न	६ X १०	६०	

द्रष्टव्य :

- प्रथमपत्र र द्वितीयपत्रको परीक्षा २ दिनमा हुनेछ ।
- परीक्षाको माध्यम नेपाली वा अंग्रेजी वा दुवै हुनसक्ने छ ।
- प्रत्येक पत्रको उत्तिर्णाङ्क ४०% (चालिस प्रतिशत) हुनेछ । दुवै पत्रमा न्यूनतम उत्तिर्णाङ्क प्राप्त नगर्ने उम्मेदवारहरु अन्तर्वातामा सम्मिलित हुन योग्य हुनेछैनन् ।
- अन्तर्वाता र शैक्षिक योग्यता
 - अन्तर्वाताको अङ्क भार - ३०
 - 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 ।
- 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 संभन्नुपर्दछ ।
- यस पाठ्यक्रममा उल्लेख भएका विषयहरुका अतिरिक्त समसामयिक घटना तथा विषयवस्तुहरुका सम्बन्धमा समेत प्रश्न सोध्न सकिनेछ ।

प्रथमपत्र : प्रशासन तथा व्यवस्थापन

१. राज्य र सरकार
 - १.१ संविधान निर्माण प्रकृया
 - १.२ नेपालमा राजनैतिक, संवैधानिक विकास र त्यसको विश्लेषणात्मक समीक्षा
 - १.३ नेपालको अन्तरिम संविधान, २०६३
 - १.४ व्यवस्थापिका, कार्यपालिका र न्यायपालिका बीचको अन्तरसम्बन्ध
 - १.५ व्यवस्थापिका-संसदका समितिहरूको भूमिका
 - १.६ राज्य र नागरिकता
 - १.७ राज्यको ढाँचा र पुर्नसंरचना
 - १.८ सरकारको स्वरूप
 - १.९ सार्वजनिक नीति तर्जुमा, विश्लेषण, कार्यान्वयन, अनुगमन र मूल्यांकन)
२. नेपालको सन्दर्भमा विकास प्रशासन
 - २.१ विकास प्रशासन सम्बन्धी अवधारणा र चुनौतीहरू
 - २.२ योजना र परियोजना तर्जुमा, कार्यान्वयन, अनुगमन र मूल्यांकन प्रक्रिया
 - २.३ आयोजना व्यवस्थापन)
३. नेपालको परिवेशमा सार्वजनिक प्रशासन र यसका चुनौतीहरू
 - ३.१ सार्वजनिक प्रशासन र सार्वजनिक व्यवस्थापनका अवधारणाहरू
 - ३.२ संगठन : गठनका आधारहरू, सिद्धान्तहरू र नेपाल नागरिक उड्डयन प्राधिकरणको संगठनका विशेषताहरू
 - ३.३ प्रशासकीय विधिहरू : कार्य विवरण, कार्य मूल्यांकन, कार्य पुष्टिकरण, कार्य विस्तृतीकरण, व्यवस्थापकीय परीक्षण, सम्पूर्ण गुणस्तर व्यवस्थापन, गुण चक्र
 - ३.४ प्रशासन सुधारको सैद्धान्तिक पक्ष
 - ३.५ बहुदलीय लोकतान्त्रिक अवधारणामा निजामती सेवा
 - ३.६ नेपालको सार्वजनिक संस्थानको स्थापना, उपलब्धि र व्यवस्थापन तथा निजीकरण
 - ३.७ नेपालको सार्वजनिक संस्थानमा जनशक्ति व्यवस्थापनका विविध पक्षहरू
 - ३.८ प्रशासनिक उत्तरदायित्वको परिचय, किसिम, चुनौती र जवाफदेहिता
 - ३.९ सार्वजनिक उत्तरदायित्व
 - ३.१० उपलब्धिमूलक प्रशासन
 - ३.११ प्रशासनिक प्रतिबद्धता तथा निष्पक्षता)
४. व्यवस्थापन सम्बन्धी
 - ४.१ व्यवस्थापनको अवधारणा र सिद्धान्त
 - ४.२ व्यवस्थापनका विभिन्न पक्षहरू खास गरी नेतृत्व, उत्प्रेरणा, निर्णय प्रक्रिया, सहभागितामूलक व्यवस्थापन र टोलीगत कार्य
 - ४.३ वार्ता तथा सम्झौता गर्ने सीपहरू
 - ४.४ समूहगत गतिशीलता (Group Dynamics)
 - ४.५ संचार व्यवस्थापन
 - ४.६ परिवर्तन व्यवस्थापन
 - ४.७ व्यवस्थापन सूचना प्रणाली (Management Information System) र सूचना प्रविधि (Information Technology)
 - ४.८ विवाद व्यवस्थापन(Conflict Management) र तनाव व्यवस्थापन (Stress Management)
 - ४.९ व्यवस्थापन परीक्षण)
५. विकासका आयामहरू
 - ५.१ विकेन्द्रीकरण
 - ५.२ दिगो विकास
 - ५.३ योजनाबद्ध विकास
 - ५.४ मिश्रित अर्थ व्यवस्था

- ५.५ खुला बजारमुखी अर्थतन्त्र
- ५.६ विश्वव्यापीकरण
- ५.७ गैर सरकारी क्षेत्र र विकास
- ५.८ निजीकरण
- ५.९ कर्मचारीतन्त्रका विकल्पहरु
- ५.१० सुशासन
- ५.११ गरिबी निवारण)
६. लोकतन्त्र र मानव अधिकार
 - ६.१ लोकतन्त्र र समावेशीकरण
 - ६.२ कानुनी राज्य
 - ६.३ मानव अधिकार
 - ६.४ लैंगिक सवाल (Gender Issues)
 - ६.५ आरक्षण र सकारात्मक विभेद
 - ६.६ नागरिक शिक्षा)
७. नेपाली समाज र यस्को बनोट
 - ७.१ सांस्कृतिक बहुलवाद (Cultural Pluralism)
 - ७.२ राष्ट्रिय एकता र अखण्डता
 - ७.३ नेपालका विविध जात/जाति/वर्ग/समुदायहरुको सामाजिक, आर्थिक, सांस्कृतिक र धार्मिक अवस्था / रहनसहन
 - ७.४ आदिवासी, जनजाती, मधेशी, दलित, अपाङ्ग र महिलाहरुको विद्यमान अवस्था, उत्थानका प्रयासहरु, समस्या, समाधान र सम्भावनाहरु)
८. विविध
 - ८.१ सघियता र स्वशासन
 - ८.२ सहस्राब्दी विकास लक्ष्य (Millennium Development Goals)
 - ८.३ सूचनाको हक र सार्वजनिक निकायको दायित्व
 - ८.४ द्वन्द्व पछिका पुनरनिर्माण र विकास (Post conflict Reconstruction and Development)
 - ८.५ जनसंख्या र बसाईसराई
 - ८.६ प्रतिनिधित्वको सिद्धान्त र समानुपातिक प्रतिनिधित्व
 - ८.७ सामाजिक न्याय एवं सुरक्षा (Social Justice and Security)
 - ८.८ श्रमिक संगठन (Trade Union) र सामूहिक सौदावादी (Collective Bargaining)
 - ८.९ भूपरिवेष्ठित र अति कम विकसित मुलुकहरुको अधिकार)
९. सुशासनको अवधारणा र नेपालमा भएको प्रयोग
१०. बजेटको सैद्धान्तिक अवधारणा र नेपाल नागरिक उड्डयन प्राधिकरणमा भएको व्यवस्था
११. विकासका सामयिक पक्षहरु
 - विकासमा महिला सहभागिता
 - दिगो विकास र पर्यावरण
 - गरिबी निवारण
 - आर्थिक उदारीकरण र निजीकरण
 - सूचनाको हक र सार्वजनिक निकायको दायित्व
 - प्रतिनिधित्वको सिद्धान्त र समानुपातिक प्रतिनिधित्व
 - सामाजिक न्याय एवं सुरक्षा
 - श्रमिक संगठन र सामूहिक सौदावाजी
१२. भ्रष्टाचार निवारण ऐन, २०५९
१३. अख्तियार दुरुपयोग अनुसन्धान आयोग ऐन, २०४८ तथा नियमावली, २०५९
१४. विदेशी लगानी तथा प्रविधि हस्तान्तरण ऐन, २०४९

१५. सार्वजनिक खरिद ऐन, २०६३ र नियमावली २०६४
१६. करार ऐन, २०५६
१७. आयकर ऐन, २०५८,
१८. मूल्य अभिवृद्धि कर ऐन, २०५२
१९. Proficiency in using office application software

द्वितीयपत्र : सेवा सम्बन्धी

1. Airframe And Systems

Types and construction of airframes, Aerofoils, Control surfaces, types and uses, Flight controls, types and uses, Principle of operation and construction of piston and turbine engines, Basic Lubrication, hydraulic electrical and fuel system of general aircraft, Operational procedures and limitations of power plants, Principle of operation of movable aerofoils.

2. Aircraft Performance

Aircraft performance, definition and practical use., Factors affecting aircraft performance, Use of various performance charts, Weight and balance- computation and practical uses, Factors affecting C of G, Computation of landing distance, take-off distance, climb and descent using performance charts. Limitation of aircraft operation.

3. Flight Planning

Preparation of a flight plan, Computation of fuel plan, Computation of headings, ground-speeds, time en-route (EET), true airspeed., wind velocities, Selection of routes (IFR/VFR), Necessity of obtaining weather briefing, Alternate course. Chart plotting, Checking of AIP, NOTAMS., Radio planning practice, Interpretation of aerodrome chart.

4. Aerodynamics

Newton's Laws of motion and their application in aircraft flying, Bernoulli's principle and application, Lift-causes, factors affecting lift, Drag-causes, factors affecting drag, Thrust-causes, factors affecting thrust, Weight-factors affecting the gravity (load factors), Components of lift, drag, thrust and weight (gravity), Circular motion- theory, practical usefulness in aircraft flying, equilibrium, stability, instability of forces acting on aircraft, Factors affecting stability, stalls, turns, climb, descent, load factors, Various conditions of flight and the forces acting on it.

5. Aircraft Instruments

Basic flight instruments, principle of operation and practical uses, Basic navigation instruments for IFR/VFR flights, principle of operation and practical uses. Basic engine instruments, principle of operation and practical uses, Pictorial interpretation of the cockpit instruments, Gyroscopic and pressure instruments.

6. Basic Navigation

The earth, Great circles, small circles, rhumb lines, Latitudes, longitudes, and its uses in air navigation, Directions- compass, true and magnetic, definitions, their interrelationship and uses, Magnetic compass (Principle of operation and limitations)

7. Dead Reckoning

Fundamentals of dead-reckoning., Practical application of track, heading, wind, speeds (airspeed, groundspeed), Computation of EET, ETA, groundspeeds, airspeeds, Computation of drift, wind correction angle, Determining DR, position fix.

8. **Navigational Computer**
Practical application of navigational computer, Computation of various speeds, time enroute (EET, ETA), distances, headings, wind, fuel consumption etc., Triangle of velocities, its practical use in air navigation.
9. **Charts**
General properties of various types of projections, Representation of meridians, parallels, great circles and rhumb line, Use of aeronautical charts.
10. **The Atmosphere and Physical Process**
Composition, extent and vertical division, Pressure, density and temperature.
Variation of pressure, density and temperature and their effects on the weather.
Adiabatic processes, dry air, evaporation, condensation, latent heat, saturated and unsaturated air, inversions and their influences on the weather, Stability, instability of air and weather associated to it, Lapse rate, vertical distribution of temperature and density.
11. **Motion of Atmosphere**
Relationship between isobars and wind, Fundamental cause of wind, pressure gradient, Coriolis force, geotropic and cyclostrophic winds, Convergence and divergence effects, Local winds (Foehn, anabatic, catabatic winds, land and sea breezes and others), Variation of wind with height, Thermal component of wind. Origin of jet streams and standing waves, Mountain waves, Wind shear.
12. **Human Information Processing**
Central and peripheral nervous system, Mechanism of perception, constancies, selective perception, Reflexes and biological control systems, Functional anatomy of eye, Physiology of visual system, Night vision, Functional anatomy of ear, Hearing loss (perceptive, conductive), Detection of rotary and linear acceleration, Motion sickness.
13. **Human Behaviour**
General personality and characteristics, Individual differences in personality, Attitude development, Behaviour and skills, Learning, motivation and performance, Types of human error, prevention and counter measures, Crew coordination, Optimizing of crew performance in flight, Effects of different communication styles, Pilot judgement concepts, Identification of hazardous attitudes, Cockpit stress management and safety awareness.
14. **Flying and Health**
Causes and symptoms of incapacitation, Side effects of drug and medication, Procedures for dealing with incapacitation, Various toxic materials, alcohol, smoking, Effects of disturbances and treatment, Causes, types, symptoms, prevention and treatment of fatigue, Effects of anxiety and defense mechanism.
Common minor ailments, Tropical climates.
15. **Flight Safety**
Safety briefing to passengers, Safety procedures to be followed during embarkation and disembarkation of passengers, Handling of passengers during emergency situations, Hazards to flight safety due to cabin pressurization failure, Flight crew at their duty station, Use of seatbelts, harnesses and their significances, Wake turbulence hazard to flight safety, Unauthorized operations, Notification to ATS authority of any incident and or accident.

16. **Fundamental**
Basic radio theory, Waves, and wave transmission, Radio waves, Characteristics of radio wave propagation, Frequency, frequency bands, Current, Reception, transmission of radio waves/signals and disturbances to it, Types of radio aids to navigation.
17. **VOR**
Principle of operation, Bearings (Radial), To, From indication and uses, Position of aircraft in relation to radial, Components of VOR receiver, functions and uses, Accuracy, Limitations, Errors, Pictorial interpretation, Tests.
18. **DME**
Principle of operation, DME arcs and indication, DME distances, Difference between DME distance and actual distance, Components of DME receiver, Pictorial interpretation, Frequency band, Accuracy, Limitations, Errors, Test of DME receiver.
19. **NDB**
Principle of operation, Bearings, QDM, QD, Position of aircraft in relation to bearing, Components of ADF receiver, Differences between ADF & VOR, Fixed card and routable card type indicators, Pictorial interpretation, Limitations, Errors, Accuracy, Frequency band.
20. **ILS**
Ground facilities involved, ILS identification, ILS and VOR differences, Sources of azimuth information and utilization, Sources of range information and utilization, Sources of height information and utilization, Runway environment indicating systems, Back course and front course approaches, Approaches with one or more ILS components unserviceable, Limitations, Errors, Accuracy, Frequency bands, Pictorial interpretation.
21. **RADAR**
Concept of RADAR Principle of operation of RADAR, Types of RADAR, Uses of RADAR in navigation, Uses of RADAR in approaches, Frequency band, Limitations, Accuracy.
22. **MAINTENANCE PRACTICES AND PROCEDURES**
- 22.1 Composite and non-metallic**
- Bonding methods, practices and inspection of bonded joints.
 - Environmental conditions;
- 22.2 Aircraft Weight and Balance**
- Centre of Gravity/Balance limits calculation: use of relevant documents;
 - Preparation of aircraft for weighing; Aircraft weighing.
- 22.3 Aircraft Handling and Storage**
- Aircraft taxiing/towing and associated safety precautions;
 - Aircraft jacking, chocking, securing and associated safety precautions;
 - Aircraft storage methods;
 - Refuelling/defuelling procedures;
 - De-icing/anti-icing procedures;
 - Electrical, hydraulic and pneumatic ground supplies.
 - Effects of environmental conditions on aircraft handling and operation.
- 22.4 Electromagnetic Environment**
- Influence of the following phenomena on maintenance practices for electronic system:
 - Electromagnetic Compatibility (EMC);

- Electromagnetic Interference (EMI);
- High Intensity Radiated Field Lightning (HIRF)/lightning protection.

22.5 Typical Electronic/Digital Aircraft Systems

- General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) such as:
 - Communication and Addressing and Reporting System (ACARS – ARINC);
 - Engine Indication and Crew Alerting System (EICAS);
 - Fly-by-Wire (FBW);
 - Flight Management System (FMS);
 - Inertial Reference System (IRS).
 - Electronic Centralized Aircraft Monitoring (ECAM);
 - Electronic Flight Instrument System (EFIS);
 - Global Positioning System (GPS);
 - Traffic Alert Collision Avoidance System (TCAS);
 - Integrated Modular Avionics Cabin Systems Information Systems.

23. AVIATION LEGISLATION

23.1 Aircraft Certification

a. General

- Certification Rules: Type Certificate, Supplementary Type Certificate;
- NCAR Part – 21 Design/Production Organization Approvals.

b. Documents

- Certificate of Airworthiness;
- Permit to fly;
- Certificate of Registration;
- Noise Certificate;
- Weight and Balance Schedule;
- Radio Station Licence.

13.2 Continuing airworthiness

- NCAR Part – 21 provisions related to continuing airworthiness.
- NCAR Part-M Subpart F.

24. HUMAN FACTORS

24.1 General / Introduction to human factors

- Need to address human factors
- Statistics
- Incidents

24.2 Safety Culture / Organisational Factors

Safety Culture / Organisational Factors

24.3 Human Error

- Error models and theories
- Types of errors in maintenance tasks
- Violations
- Implications of errors
- Avoiding and managing errors
- Human reliability

24.4 Human performance & limitations

- Vision
- Hearing
- Information-processing
- Attention and perception
- Situational awareness
- Memory
- Claustrophobia and physical access
- Motivation
- Fitness/Health
- Stress
- Workload management
- Fatigue
- Alcohol, medication, drugs
- Physical work
- Repetitive tasks / complacency

24.5 Environment

- Peer pressure
- Stressors
- Time pressure and deadlines
- Workload
- Shift Work
- Noise and fumes
- Illumination
- Climate and temperature
- Motion and vibration
- Complex systems
- Hazards in the workplace
- Lack of manpower
- Distractions and interruptions

24.6 Procedures, information, tools and practices

- Visual Inspection
- Work logging and recording
- Procedure – practice / mismatch / norms
- Technical documentation – access and quality

24.7 Communication

- Shift / Task handover
- Dissemination of information
- Cultural differences

24.8 Teamwork

- Responsibility
- Management, supervision and leadership
- Decision making

24.9 Professionalism and integrity

- Keeping up to date; currency
- Error provoking behaviour
- Assertiveness

24.10 Organisation's human factor program

- Reporting errors
- Disciplinary policy
- Error investigation
- Action to address problems
- Feedback

25. SAFETY MANAGEMENT SYSTEM

25.1 Safety

- Defining safety;
- Safety process: gathering data, identifying & evaluating safety problems, and implementing changes.

25.2 Maintenance Safety Program

- Maintenance safety, Ramp safety, Foreign object damage.

25.3 Emergency preparedness & response

- Accident investigation & crisis communication

25.4 Maintenance Safety

- Communication, Maintenance personnel, Maintenance Organization, Maintenance Program, Reduction of maintenance error

26. SAFETY OVERSIGHT Monitoring

26.1 Objective of Airworthiness Safety Oversight

Objective of Airworthiness Safety Oversight

26.2 Means of Airworthiness Safety Oversight

Means of Airworthiness Safety Oversight

26.3 Airworthiness Audit

26.3.1 Team Composition

Audit Manager

- Team Leader
- Observer
- Attributes of the Auditing Inspector
- Conflict of Interest and Confidentiality

26.3.2 Phases of the Audit

(a) The Initiation Phase

- Establishing the 'Need for Audit'
- Team Selection
- Team Preparation:
 - Audit Plan;
 - Pre-audit Team Meeting

(b) The Audit Execution Phase

- Pre-audit Meeting
- The Audit

- The Audit Check List
- The Three Main Steps: Observation; Interview; Some valuable Don'ts
- Sampling
- Recording and Documenting
- Analysis of Findings
- Audit Findings
- Levels of Audit Findings: Level 1, Level 2 and Level 3 Findings
- Confirmation Request
- Corrective Action Request
- Follow-up and Closure Report
- Audit Record Log
- Communication during the Audit
- Post Audit(Exit) Meeting

(c) The Post Audit Phase

The Audit Report

- Parallel Report
- Auditee Correction Action Proposals
- Audit Report Retention

26.3.3 Monitoring the Follow Up

- Monitoring the Follow Up

26.3.4 Setting Audit Frequency

Resource Allocation

- Criteria
- Risk Indicators
- Periodic Cycle

27. State Safety Programme (SSP)

28. National Civil Aviation Security Programme

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