नेपाल नागरिक उड्डयन प्राधिकरण
प्राबिधिक सेवा, सिभिल एभिएसन समूह, फ्लाईट अपरेशन सर्भिसेज उपसमूह
उपप्रवन्धक (पाइलट), 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

A. AIRCRAFT AND ENGINES

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

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

3. Flight Planning

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

4. Aerodynamics

Aeroplane :

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

5. Aircraft Instruments

5.1 Basic flight instruments, principle of operation and practical uses.
5.2 Basic navigation instruments for VFR flights, principle of operation and practical uses.
5.3 Basic engine instruments, principle of operation and practical uses.
5.4 Pictorial interpretation of the cockpit instruments.
5.5 Gyroscopic and pressure instruments.

B. AIR NAVIGATION

1. Basic Navigation

1.1 The earth.
1.2 Great circles, small circles, rhumb lines.
1.3 Latitudes, longitudes, and its uses in air navigation.
1.4 Directions
- compass, true and magnetic, definitions, their interrelationship and uses.
1.5 Magnetic compass
- Principle of operation and limitations.

2. Dead Reckoning

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

3. Navigational Computer

3.1 Practical application of navigational computer.
3.2 Computation of various speeds, time enroute (EET, ETA), distances, headings, wind, fuel consumption etc.
3.3 Triangle of velocities, its practical use in air navigation.

4. Charts

4.1 General properties of various types of projections.
4.2 Representation of meridians, parallels, great circles and rhumb line.
4.3 Use of aeronautical charts.

5. In-Flight Navigation

5.1 Navigation during climb and descent regime of flight.
5.2 Navigation in cruise flying.
5.3 Use of fixes to revise navigation data e.g. speed, track, wind, EET and ETA and others etc.
5.4 Computation of speed, distance, time, fuel etc associated with climb descent and cruise phase of flight.

C. METEOROLOGY

1. The Atmosphere and Physical Process

1.1 Composition, extent and vertical division.
1.2 Pressure, density and temperature.
1.3 Variation of pressure, density and temperature and their effects on the weather.
1.4 Adiabatic processes, dry air, evaporation, condensation, latent heat, saturated and unsaturated air, inversions and their influences on the weather.
1.5 Stability, instability of air and weather associated to it.
1.6 Lapse rate, vertical distribution of temperature and density.

2. Humidity and Precipitation

2.1 Humidity in atmosphere and its effect on density.
2.2 Humidity variation and weather associated with it.
2.3 Condensation, precipitation, sublimation and freezing in atmosphere.
2.4 Precipitation, its characteristics and development.

3. Clouds

3.1 Types and classification of clouds.
3.2 Principle of formation of clouds and its modifications.
3.3 Flying characteristics in different types of clouds.
3.4 Cooling by advection, radiation and adiabatic expansion.
3.5 Characteristics of all clouds.
3.6 Hazards to flying by various clouds.

4. Motion of Atmosphere

4.1 Relationship between isobars and wind.
4.2 Fundamental cause of wind, pressure gradient, carioles force, geotropic and cyclostrophic winds.
4.3 Convergence and divergence effects.
4.4 Local winds (Font, anabatic, catabatic winds, land and sea breezes and others).
4.5 Variation of wind with height.
4.6 Thermal component of wind.
4.7 Origin of jet streams and standing waves.
4.8 Mountain waves.
4.9 Wind shear.

5. Surface Weather

5.1 Formation of fog, mist, haze.
5.2 Effect on weather by haze, fog and mist.
5.3 Effect on visibility due to fog, mist, haze, blowing sand, snow or dust etc.
5.4 Types of fog and source of their origin.

6. Air Masses

6.1 Description, factors affecting the properties of an air mass.
6.2 Classification of air masses, modification due to various factors and their area of origin.
6.3 Fronts.
6.4 Warm, cold, occluded, Stationary fronts, associated clouds and weather.
6.5 Frontal depressions, non frontal depressions and associated weather.
6.6 Electricity in atmosphere.
6.7 Movement of fronts.
6.8 Turbulence, thunderstorm, squall lines.

7. Weather Observation

7.1 Weather charts.
7.2 Ground observation.
7.3 Pilot observation.
7.4 Significant of weather charts.
7.5 Weather forecast.

D. HUMAN PERFORMANCE AND LIMITATION

1. Altitude Flying

1.1 Respiration and blood circulation.
1.2 Hypoxia, definition, causes, symptoms and remedy.
1.3 Time of useful consciousness.
1.4 Definition, causes of hyperventilation.
1.5 Symptoms and remedy of hyperventilation.
1.6 Blood pressure.
1.7 The gas Laws.
1.8 Rapid decompression, effects and counter measures.
1.9 Entrapped gases.

2. Human Information Processing

2.1 Central and peripheral nervous system.
2.2 Mechanism of perception, constancies, selective perception.
2.3 Reflexes and biological control systems.
2.4 Functional anatomy of eye.
2.5 Physiology of visual system.
2.6 Night vision.
2.7 Functional anatomy of ear.
2.8 Hearing loss (perceptive, conductive).
2.9 Detection of rotary and linear acceleration.
2.10 Motion sickness.

3. Integration of Sensory Inputs

3.1 Basic concepts and definition.
3.2 Categories of disorientation.

3.3 Vertigo, coriolis effect, pressure vertigo, flicker vertigo.
3.4 Visual illusions.
3.5 Prevention and handling of disorientation.
3.6 Effects of stress and time of day.

4. Human Behaviour

4.1 General personality and characteristics.
4.2 Individual differences in personality.
4.3 Attitude development.
4.4 Behaviour and skills.
4.5 Learning, motivation and performance.
4.6 Types of human error, prevention and counter measures.
4.7 Crew coordination.
4.8 Optimizing of crew performance in flight.
4.9 Effects of different communication styles.
4.10 Pilot judgement concepts.
4.11 Identification of hazardous attitudes.
4.12 Cockpit stress management and safety awareness.

5. Flying and Health

5.1 Causes and symptoms of incapacitation.
5.2 Side effects of drug and medication.
5.3 Procedures for dealing with incapacitation.
5.4 Various toxic materials, alcohol, smoking.
5.5 Effects of disturbances and treatment.
5.6 Causes, types, symptoms, prevention and treatment of fatigue.
5.7 Effects of anxiety and defense mechanism.
5.8 Common minor ailments.
5.9 Tropical climates.

E. OPERATIONAL PROCEDURES AND RULES OF THE AIR

1. General

1.1 Definitions as per ICAO Annex 6.
1.2 Flight operations.
1.2.1 Aerodrome operating minima.
1.2.2 Minimum flight altitudes.
1.2.3 Requirement for alternate aerodrome.
1.2.4 Oxygen requirements.
1.3 Duties and responsibility of Pilot-In-Command and First Officers.
1.4 Equipments required for aircraft on all flights.
1.5 Fuel and oil requirements.
1.6 Fitness of flight crew members.

2. Carriage of Freights and Dangerous Goods

2.1 Definitions as per ICAO Annex-18.
2.2 Carriage of freight in passenger cabin with passengers on board.
2.3 Proper loading and stowing of freight.
2.4 Weight and balance reports.
2.5 Classification of dangerous goods.
2.6 Packing, labelling and markings of freight and dangerous goods.

2.7 Procedures to be followed for transportation of dangerous goods.
2.8 Identification of dangerous and non-dangerous goods.
2.9 Responsibility of Pilot-In-Command.

3. Flight Safety

3.1 Safety briefing to passengers
3.2 Safety procedures to be followed during embarkation and disembarkation of passengers.
3.3 Handling of passengers during emergency situations.
3.4 Hazards to flight safety due to cabin pressurization failure.
3.5 Flight crew at their duty station.
3.6 Use of seatbelts, harnesses and their significances.
3.7 Wake turbulence hazard to flight safety.
3.8 Unauthorized operations
3.9 Notification to ATS authority of any incident and or accident.

4. Rules and Regulations for CPL Holders

4.1 National legislation.
4.2 Necessity to hold Nepalese CPL.
4.3 Requirements to issue CPL.
4.4 Privileges for CPL holder pilots.
4.5 Limitations for CPL holders.
4.6 Responsibility.
4.7 Logging of flight time.
4.8 Maintaining the currency of License.
4.9 Renewal process.

5. Rules of The Air

5.1 Definition as per ICAO Annex 2 and 11.
5.2 Classification and types of aircraft.
5.3 Right of way.
5.4 Lights to be displayed by aircraft.
5.5 Requirements to submit flight plan.
5.6 Altimeter setting procedures.
5.7 Instrument flight rules.
5.8 Visual flight rules.
5.9 Air Traffic Control clearances and any changes to it.
5.10 Unlawful interferences.
5.11 Communication failure procedures.
5.12 Visual, light signals to aircraft.

F. INSTRUMENT FLYING PROCEDURES

1. Basic Instrument Environment

1.1 Fundamentals of instrument flying.
1.2 Pitch instrument.
1.3 Yaw instrument.
1.4 Roll instrument.
1.5 Power instrument.
1.6 Primary and supporting instruments.

1.7 Cross checking of instruments.
1.8 Gyroscopic, and pilot-static instruments.
1.9 Causes and prevention of disorientation.

2. Attitude Flying

2.1 Flying with reference to instruments.
2.2 Recognition of deviation from required flying attitudes.
2.3 Establishing coordinated turns, climbs and descents at various speeds, and power settings.
2.4 Definitions of standard rate of turn, V-speed and others associated with instrument flying.
2.5 Relation between speed, power and attitude of aircraft.
2.6 Maintaining constant attitude.
2.7 Change of attitude.
2.8 Pictorial interpretations.

3. Navigation

3.1 Orientation to radio navigational aids.
3.2 Bearings.
3.3 Interception, tracking of bearings.
3.4 Way points.
3.5 Minimum IFR altitudes.
3.6 Alternate course of action.
3.7 RADAR & Non RADAR environnent.
3.8 Pictorial Interpretation.

4. IFR Charts

4.1 Basic concept of charts.
4.2 Aerodrome charts.
4.3 Departure charts.
4.4 En-route navigation charts.
4.5 Approach charts.
4.6 Identification of initial, intermediate and final approach fixes.
4.7 Deriving information from charts.
4.8 Determination of MRA, MOCA, MSA, MEA from the charts

5. Standard Instrument Departures/Arrivals

5.1 Use of radio navigational aids.
5.2 Operating minima.
5.3 Clearance limits.
5.4 Runway lights and markings.
5.5 Taxiway lights and markings.
5.6 Threshold lights and markings.
5.7 Touch down zone light and markings.
5.8 Approach lights.
5.9 Aerodrome beacon.
5.10 RVR
5.11 Computation of speeds versus heights.
5.12 Decision heights, minimum descent altitudes.

5.13 Approach fixes.
5.14 Holding patterns and entry procedures and speeds to be maintained while holding.
5.15 Procedures to be followed to make SIA and SIDs.

6. Emergency Procedures

6.1 Emergency reference data.
6.2 Emergency communication procedures.
6.3 Deviations from flight plan.
6.4 Lost procedures.
6.5 Choice of alternate.
6.6 Communication failure procedures.
6.7 Partial panel flights.
6.8 Power plant failures.
6.9 Vision adaptation.
6.10 Unusual attitudes.

G. RADIO AIDS TO NAVIGATION

1. Fundamental

1.1 Basic radio theory.
1.2 Waves, and wave transmission.
1.3 Radio waves.
1.4 Characteristics of radio wave propogation.
1.5 Frequency, frequency bands.
1.6 Current.
1.7 Reception, transmission of radio waves/signals and disturbances to it.
1.8 Types of radio aids to navigation.

2. VOR

2.1 Principle of operation.
2.2 Bearings (Radial).
2.3 To, From indication and uses.
2.4 Position of aircraft in relation to radial.
2.5 Components of VOR receiver, functions and uses.
2.6 Accuracy.
2.7 Limitations.
2.8 Errors.
2.9 Pictorial interpretation.
2.10 Tests.

3. DME

3.1 Principle of operation.
3.2 DME arcs and indication.
3.3 DME distances.
3.5 Difference between DME distance and actual distance.
3.6 Components of DME receiver.
3.7 Pictorial interpretation.
3.8 Frequency band.
3.9 Accuracy.
3.10 Limitations.

3.11 Errors.
3.12 Test of DME receiver.

4. NDB

4.1 Principle of operation.
4.2 Bearings, QDM, QDR
4.3 Position of aircraft in relation to bearing.
4.4 Components of ADF receiver.
4.5 Differences between ADF & VOR.
4.6 Fixed card and routable card type indicators.
4.7 Pictorial interpretation.
4.8 Limitations.
4.9 Errors.
4.10 Accuracy.
4.11 Frequency band.

5. ILS

5.1 Ground facilities involved.
5.2 ILS identification.
5.3 ILS and VOR differences.
5.4 Sources of azimuth information and utilization.
5.5 Sources of range information and utilization.
5.6 Sources of height information and utilization.
5.7 Runway environment indicating systems.
5.8 Back course and front course approaches.
5.9 Approaches with one or more ILS components unserviceable.
5.10 Limitations.
5.11 Errors.
5.12 Accuracy.
5.13 Frequency bands.
5.14 Pictorial interpretation.

6. RADAR

6.1 Concept of RADAR.
6.2 Principle of operation of RADAR.
6.3 Types of RADAR.
6.4 Uses of RADAR in navigation.
6.5 Uses of RADAR in approaches.
6.6 Frequency band.
6.7 Limitations.
6.8 Accuracy.

7. INS, GPS

7.1 Fundamental principle of operation
7.2 Uses in air navigation.
7.3 Uses in approaches.
7.4 Sources of information.

H. RADIOTELEPHONY

1.1 Radiotelephony Procedure and Phraseology as applied to VFR operation.
1.2 Action to be taken in case of communication failure.

I. ANNEX AND REQUIREMENTS

1. ANNEX

1.1 Annex 1
1.2 Annex 2
1.3 Annex 6
1.4 Annex 19

2. REQUIREMENTS

Flight Operations Requirement (FOR)
Nepalese Civil Airworthiness Requirement (NCAR)
Aeronautical Information Publication (AIP)
Air Operator Certification Requirement