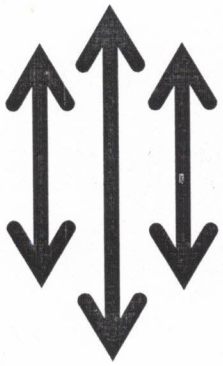
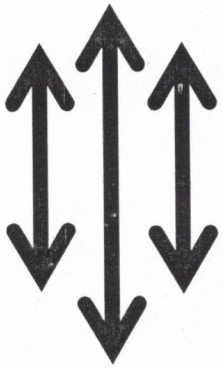
नेपाली सेना

श्री भर्ना छनौट निर्देशनालय,कार्यरथी विभाग,

जंगी अड्डा



पाईलट उ.से. (खुला तथा आन्तरिक) पदको लिखित परीक्षाको पाठ्यक्रम



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नेपाली सेना

पाइलट उ.से.(खुला तथा आन्तरिक) पदको लिखित परीक्षाको पाठ्यक्रम

समय : ३ घण्टा ३० मिनेट

पूर्णाङ्क : १५०

उत्तीर्णाङ्क : ६०

यो पाठ्यक्रम नेपाली सेनाको पाईलट उ.से. (खुला तथा आन्तरिक) पदको उम्मेदवार छनौट परीक्षाको लागि निर्धारण गरिएको हो । लिखित परीक्षामा सरिक हुने उम्मेदवारहरुको पेशा सम्बन्धी विषयलाई आधारमानी प्रश्नहरु सोधिने छ ।

(क) लिखित परीक्षाको माध्यम नेपाली/अंग्रेजी वा दुवै भाषा हुनेछ ।

(ख) लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र अर्को चरणको परीक्षामा सम्मिलित गराईनेछ ।

(ग) प्रश्नपत्र निर्माण गर्दा पाठ्क्रममा समावेश भएका सबै विषयहरुलाई यथासंभव समिटनेछ ।

(घ) बस्तुगत र विषयगत संयुक्त रुपमा पूर्णाङ्क र उत्तीर्णाङ्क कायम गरिनेछ ।

(ङ) बस्तुगत र विषयगत परीक्षाको पाठ्यक्रम एउटै हुनेछ ।

(च) बस्तुगत र विषयगत विषयको लिखित परीक्षा एकैपटक वा छुट्टाछुट्टै गरी लिन सकिनेछ

(छ) यो पाठ्यक्रम मिति २०७७/०६/१९ गतेबाट लागु हुनेछ ।

लिखित परीक्षाको योजना र पाठ्यक्रम

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्न संख्या x अङ्क	समय
पेशा सम्बन्धी	७५	६०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	७५ प्रश्न x १ अङ्क = ७५	१ घण्टा
	७५		विषयगत (Subjective)	छोटो उत्तर	९ प्रश्न X ५ अङ्क = ४५	२ घण्टा ३० मिनेट
				लामो उत्तर	३ प्रश्न X १० अङ्क = ३०	

लिखित परीक्षाको पाठ्यक्रम

1. Aircraft Construction and Systems

1.1 Aircraft Design, Certification and Airworthiness.

1.2 Lift and Basic Aerodynamics.

1.3 Major Components, Fuselage, Wings/Rotors, Landing Gear, Powerplant, Subcomponents.

1.4 Types of Aircraft Construction, Truss Structure, Semimonocoque, Composite Construction.

1.5 Aeroplane: Powerplant, Reciprocating Engines, Propeller, Fixed-Pitch Propeller, Adjustable Pitch Propeller, Propeller overspeed in Piston Engine Aircraft, Induction Systems, Carburetor Systems, Mixture Control, Carburetor Icing, Carburetor Heat, Carburetor Air Temperature Gauge, Outside Air Temperature Gauge.

or

Helicopter: Powerplant, Reciprocating Engines, Turbine Engines, Compressor, Combustion Chamber, Turbine, Transmission System, Main Rotor Transmission, Main Rotor System, Semirigid Rotor System, rigid Rotor System, Fully Articulated Rotor System, Freewheeling Unit, Swash Plate Assembly, Antitorque System.

1.6 Fuel Injection Systems, Superchargers and Turbo-superchargers, System Operation, High Altitude Performance, Ignition System.

1.7 Oil Systems, Engine Cooling Systems.

1.8 Exhaust Systems, Starting System, Combustion, Full Authority Digital Engine Control (FADEC).

1.9 Turbine Engines, Types of Turbine Engines, Turbojet, Turboprop, Turbofan, Turboshaft, Turbine Engine Instruments, Engine Pressure Ratio (EPR), Exhaust Gas Temperature (EGT), Torquemeter, N1 Indicator, N2 Indicator, Turbine Engine Operational Considerations, Engine Temperature Limitations, Thrust Variations, Foreign Object Damage (FOD), Turbine Engine Hot/Hung Start, Compressor Stalls, Flameout, Performance Comparison.

1.10 Airframe Systems, Fuel Systems, Gravity-Feed System, Fuel-Pump System, Fuel Primer, Fuel Tanks, Fuel Gauges, Fuel Selectors, Fuel Strainers, Sumps, and Drains, Fuel Grades, Fuel Contamination, Fuel System Icing, Prevention Procedures, Refueling Procedures.

1.11 Heating System, Fuel Fired Heaters, Exhaust Heating Systems, Combustion Heater Systems, Bleed Air Heating Systems.

1.12 Electrical System.

1.13 Hydraulic Systems, Landing Gear, Tricycle Landing Gear, Tailwheel Landing Gear, Fixed and Retractable Landing Gear, Brakes.

1.14 Pressurized Aircraft, Oxygen Systems, Oxygen Masks, Cannula, Pressure-Demand Oxygen Systems, Continuous-Flow Oxygen System, Electrical Pulse-Demand Oxygen System, Pulse Oximeters, Servicing of Oxygen Systems.

1.15 Anti-Ice and Deice Systems, Airfoil Anti-Ice and Deice, Windscreen Anti-Ice, Propeller Anti-Ice, Other Anti-Ice and Deice Systems.

2. Principles of Flight

2.1 Structure of the Atmosphere, Air is a Fluid, Viscosity, Friction.

2.2 Pressure, Atmospheric Pressure, Pressure Altitude, Density Altitude, Effect of Pressure on Density, Effect of Temperature on Density, Effect of Humidity (Moisture) on Density.

2.3 Theories in the Production of Lift, Newton's Basic Laws of Motion, Bernoulli's Principle of Differential Pressure, Airfoil Design, Low Pressure Above, High Pressure Below, Pressure Distribution, Airfoil Behavior.

2.4 Aerodynamics for Aeroplane/Helicopter, Forces Acting on the Aircraft, Thrust, Lift, Lift/Drag Ratio, Drag, Parasite Drag, Induced Drag, Weight.

2.5 Wingtip Vortices, Formation of Vortices, Avoiding Wake Turbulence, Ground Effect.

2.6 Axes of an Aircraft, Moment and Moment Arm.

2.7 Aircraft Design Characteristics, Stability, Static Stability, Dynamic Stability, Longitudinal Stability (Pitching), Lateral Stability (Rolling), Directional Stability (Yawing), Free Directional Oscillations (Dutch Roll), Spiral Instability, Effect of Wing Platform.

2.8 Aerodynamic Forces in Flight Maneuvers, Forces in Turns, Forces in Climbs, Forces in Descents, Stalls, Angle of Attack Indicators, Basic Propeller Principles, Torque and P-Factor, Torque Reaction, Corkscrew Effect, Gyroscopic Action, Asymmetric Loading (P-Factor), Load Factors, Load Factors in Aircraft Design, Load Factors in Steep Turns, Load Factors and Stalling Speeds, Load Factors and Flight Maneuvers, Rate of Turn, Radius of Turn.

2.9 Weight and Balance, Effect of Weight on Flight Performance, Effect of Weight on Aircraft Structure, Effect of Weight on Stability and Controllability, Effect of Load Distribution.

2.10 High Speed Flight, Subsonic Versus Supersonic Flow, Speed Ranges, Mach Number Versus Airspeed, Boundary Layer, Laminar Boundary Layer Flow, Turbulent Boundary Layer Flow, Boundary Layer Separation, Shock Waves, Sweepback, Mach Buffet Boundaries, High Speed Flight Controls.

3. Flight Controls

3.1 Flight Control Systems, Flight Controls, Primary Flight Controls.

3.2 Aeroplane: Elevator, T-Tail, Rudder, V-Tail, Secondary Flight Controls, Flaps, Leading Edge Devices, Spoilers, Trim Tabs, Balance Tabs, Servo Tabs, Antiservo Tabs, Ground Adjustable Tabs, Adjustable Stabilizer, Autopilot.

or

Helicopter: Collective Pitch Control, Throttle Control, Governor/Correlator, Cyclic Pitch Control, Antitorque Pedals.

4. Flight Instruments

4.1 Pitot-Static Flight Instruments, Impact Pressure Chamber and Lines, Static Pressure Chamber and Lines.

4.2 Altimeter, Principle of Operation, Effect of Nonstandard Pressure and Temperature, Setting the Altimeter, Altimeter Operation, Types of Altitude, Vertical Speed Indicator (VSI), Principle of Operation, Airspeed Indicator (ASI), Airspeed Indicator Markings, Other Airspeed Limitations.

4.3 Blockage of the Pitot-Static System, Blocked Pitot System, Blocked Static System.

4.4 Electronic Flight Display (EFD), Attitude Indicator, Altimeter, Vertical Speed Indicator (VSI), Heading Indicator, Turn Indicator, Tachometer, Slip/Skid Indicator, Turn Rate Indicator.

4.5 Gyroscopic Flight Instruments, Gyroscopic Principles, Rigidity in Space, Precession, Sources of Power, Turn Indicators, Turn-and-Slip Indicator, Turn Coordinator, Inclinometer, Yaw String, Attitude Indicator, Heading Indicator, Attitude and Heading Reference System (AHRS).

4.6 The Flux Gate Compass System, Remote Indicating Compass, Angle of Attack Indicators, Compass Systems, Magnetic Compass, Magnetic Compass Induced Errors, The Vertical Card Magnetic Compass, Instrument Checks, Lags or Leads, Eddy Current Damping, Outside Air Temperature (OAT) Gauge.

5. Flight Manuals and Other Documents

5.1 General (Section 1)

5.2 Instrument Markings, Airspeed Limitations, Altitude Limitations, Powerplant Limitations, Weight and Loading Distribution, Flight Limitations, Placards, Limitations (Section 2).

5.3 Airspeed, Powerplant, Weight and Loading Distribution, Flight Limits, Placards, Emergency Procedures (Section 3).

5.4 Normal Procedures (Section 4)

5.5 Performance (Section 5)

5.6 Weight and Balance/Equipment List (Section 6)

5.7 Systems Description (Section 7)

5.8 Handling, Service, and Maintenance (Section 8)

5.9 Supplements (Section 9)

5.10 Safety Tips (Section 10)

5.11 Aircraft Documents, Certificate of Aircraft Registration, Airworthiness Certificate.

5.12 Aircraft Maintenance, Aircraft Inspections, Annual Inspection, 100-Hour Inspection, Other Inspection Programs, Altimeter System Inspection, Transponder Inspection, Emergency Locator Transmitter, Preflight Inspections, Minimum Equipment Lists (MEL) and Operations, Preventive Maintenance, Maintenance Entries, Repairs and Alterations.

5.13 Special Flight Permits, Airworthiness Directives (ADs), Aircraft Owner/Operator Responsibilities.

6. Weight and Balance

6.1 Weight Control, Effects of Weight, Weight Changes.

6.2 Balance, Stability, and Center of Gravity, Effects of Adverse Balance, Stability, Control, Management of Weight and Balance Control.

6.3 Principles of Weight and Balance Computations, Weight and Balance Restrictions, Determining Loaded Weight and CG, Computational Method, Graph Method, Table Method, Computations with a Negative Arm, Computations with Zero Fuel Weight, Shifting, Adding, and Removing Weight, Weight Shifting, Weight Addition or Removal.

7. Aircraft Performance

7.1 Importance of Performance Data, Structure of the Atmosphere, Atmospheric Pressure, Pressure Altitude, Density Altitude, Effects of Pressure on Density, Effects of Temperature on Density, Effects of Humidity (Moisture) on Density.

7.2 Performance, Straight-and-Level Flight, Climb Performance, Angle of Climb (AOC), Rate of Climb (ROC), Climb Performance Factors, Range Performance, Region of Reversed Command, Takeoff and Landing Performance.

7.3 Runway Surface and Gradient/Helipad shape, size, surface, Landing Performance, Performance Speeds, Performance Charts, Interpolation, Density Altitude Charts, Takeoff Charts, Climb and Cruise Charts, Crosswind and Headwind Component Chart, Landing Charts/IGE and OGE charts, Stall Speed Performance Charts/Autorotation.

8. Meteorology

8.1 Atmosphere, Composition of the Atmosphere, Atmospheric Circulation, Atmospheric Pressure, Coriolis Force, Measurement of Atmosphere Pressure, Altitude and Atmospheric Pressure, Altitude and Flight, Altitude and the Human Body, Wind and

Currents, Wind Patterns, Convective Currents, Effect of Obstructions on Wind, Low-Level Wind Shear, Wind and Pressure Representation on Surface, Weather Maps.

8.2 Atmospheric Stability, Inversion, Moisture and Temperature, Relative Humidity, Temperature/Dew Point Relationship, Methods by Which Air Reaches the Saturation Point, Dew and Frost, Fog, Clouds, Ceiling, Visibility, Precipitation, Air Masses, Fronts, Warm Front, Flight Toward an Approaching Warm Front, Cold Front, Fast-Moving Cold Front, Flight Toward an Approaching Cold Front, Comparison of Cold and Warm Fronts, Wind Shifts, Stationary Front, Occluded Front, Thunderstorms, Hazards, Squall Line, Tornadoes, Turbulence, Icing, Hail, Ceiling and Visibility, Effect on Altimeters, Lightning, Engine Water Ingestion,

8.3 Monsoon, Weather and Climate of Nepal.

8.4 Observations, Surface Aviation Weather Observations, Air Route Traffic Control Center (ARTCC), Upper Air Observations, Radar Observations, Satellite, Service Outlets, Flight Service Station (FSS).

8.5 Weather Briefings, Standard Briefing, Abbreviated Briefing, Outlook Briefing, Aviation Weather Reports, Aviation Routine Weather Report (METAR), Pilot Weather Reports (PIREPs), Aviation Forecasts, Terminal Aerodrome Forecasts (TAF), Area Forecasts (FA), Inflight Weather Advisories, AIRMET, SIGMET, Convective Significant Meteorological Information (WST), Winds and Temperature Aloft Forecast (FB), Weather Charts, Surface Analysis Chart, Weather Depiction Chart, Significant Weather Prognostic Charts, ATC Radar Weather Displays, Weather Avoidance Assistance.

8.6 Electronic Flight Displays (EFD) /Multi-Function, Display (MFD) Weather, Weather Products Age and Expiration, Pilot Responsibility.

8.7 Department of hydrology and meteorology, Meteorological stations in Nepal.

9. Air Law

9.1 Rules of Air

9.2 Nepalese Civil Aviation Regulations (NCAR) related to Pilot Certification and Privileges.

9.3 Personal Licensing Requirement, Flight Operation Requirement (Aero plane/Helicopter), Medical Certification, Supplemental Oxygen Requirements, Visual Flight Rules, Instrument Flight Rules, Aeronautical Information Publication.

9.4 Controlled Airspace, Class A to Class E Airspace, Uncontrolled Airspace, Class G Airspace, Special use Airspace.

9.5 Prohibited Areas, Restricted Areas, Warning Areas, Military Operation Areas (MOAs), Alert Areas, Controlled Firing Areas (CFAs), Local Airport Advisory (LAA), Military Training Routes (MTRs), Temporary Flight Restrictions (TFR), Published VFR Routes, Terminal Radar Service Areas (TRSAs), National Security Areas (NSAs), Air Traffic Control and the National Airspace System, Coordinating the Use of Airspace, Operating in the Various Types of Airspace.

9.6 Basic VFR Weather Minimums, Operating Rules and Pilot/Equipment Requirements, Ultra-light Vehicles, Balloons, Unmanned Aircraft Systems.

9.7 Airport Categories, Types of Airports, Towered Airport, Non-towered Airport.

9.8 Sources for Airport Data, Aeronautical Charts, Notices to Airmen (NOTAM), Automated Terminal Information Service (ATIS).

9.9 Airport Markings and Signs, Runway Markings and Signs, Relocated Runway Threshold, Displaced Threshold, Runway Safety Area, Runway Safety Area Boundary Sign, Runway Holding Position Sign, Runway Holding Position Marking, Runway Distance Remaining Signs, Runway Designation Marking, Land and Hold Short Operations (LAHSO), Taxiway Markings and Signs, Enhanced Taxiway Centerline Markings, Destination Signs, Holding Position Signs and Markings for an Instrument Landing System (ILS) Critical Area, Holding Position Markings for Taxiway/Taxiway, Intersections, Marking and Lighting of Permanently Closed Runways and Taxiways, Temporarily Closed Runways and Taxiways, Airport Signs.

9.10 Airport Lighting, Airport Beacon, Approach Light Systems, Visual Glideslope Indicators, Visual Approach Slope Indicator (VASI), Runway Lighting, Runway End Identifier Lights (REIL), Runway Edge Lights, In-Runway Lighting, Control of Airport Lighting, Taxiway Lights, Omnidirectional Clearance Bar Lights, Runway Guard Lights, Stop Bar Lights, Obstruction Lights, New Lighting Technologies.

9.11 Wind Direction Indicators, Traffic Patterns Single Runway, Parallel Runways.

9.12 Radio Communications, Radio License, Radio Equipment, Using Proper Radio Procedures, Lost Communication Procedures, Air Traffic Control (ATC) Services.

9.13 Primary Radar, ATC Radar Beacon System (ATCRBS), Transponder, Automatic Dependent Surveillance–Broadcast (ADS-B), Radar Traffic Advisories.

9.14 Wake Turbulence Vortex Generation, Terminal Area, En Route, Vortex Behavior, Vortex Avoidance Procedures, Collision Avoidance, Clearing Procedures, Pilot Deviations (PDs), Runway Incursion Avoidance, Causal Factors of Runway Incursions, Runway Confusion, Causal Factors of Runway Confusion, ATC Instructions, ATC Instructions (Hold Short, Explicit Runway Crossing, Line Up and Wait (LUAW), Runway Shortened), Pre-Landing, Landing, and After-Landing.

9.15 Aeronautical Decision Making.

10. Navigation

10.1 Aeronautical Charts, Sectional Charts, VFR Terminal Area Charts, World Aeronautical Charts.

10.2 Latitude and Longitude (Meridians and Parallels), Time Zones, Measurement of Direction, Variation, Magnetic Variation, Magnetic Deviation, Deviation.

10.3 Effect of Wind, Basic Calculations of Aeronautical Units, Fuel Consumption, Flight Computers, Plotter, Pilotage, Dead Reckoning, Wind Triangle or Vector Analysis, Flight Planning, Weather Check, Filing a VFR Flight Plan.

10.4 Ground-Based Navigation, Very High Frequency (VHF) Omnidirectional Range (VOR), Using the VOR, Course Deviation Indicator (CDI), Horizontal Situation Indicator, Radio Magnetic Indicator (RMI), Tracking With VOR, Time and Distance Check From a Station Using a RMI, Time and Distance Check From a Station Using a CDI, Course Intercept, Rate of Intercept, Angle of Intercept, Distance Measuring Equipment (DME), VOR/DME RNAV, Automatic Direction Finder (ADF), Global Positioning System, VFR Use of GPS, RAIM/WAAS Capability, Tips for Using GPS for VFR Operations, VFR Waypoints, Lost Procedures, Flight Diversion.

10.5 Instrument Approach Charts and Procedures, Standard Instrument Departure (SID), Standard Terminal Arrivals (STARs), En-route Procedures, Precision Approach, Non-precision Approach, IFR Cross-country Flight Planning.

11. Aeromedical Factors

11.1 Obtaining a Medical Certificate.

11.2 Health and Physiological Factors Affecting Pilot Performance, Hypoxia, Hyperventilation, Middle Ear and Sinus Problems, Spatial Disorientation and Illusions, Vestibular Illusions, Visual Illusions, Postural Considerations, Demonstration of Spatial Disorientation, Climbing While Accelerating, Climbing While Turning, Diving While Turning, Tilting to Right or Left, Reversal of Motion, Diving or Rolling Beyond the Vertical Plane, Coping with Spatial Disorientation, Optical Illusions, Runway Width Illusion, Runway and Terrain Slopes Illusion, Featureless Terrain Illusion, Water Refraction, Haze, Fog, Ground Lighting Illusions, How To Prevent Landing Errors Due to Optical Illusions, Motion Sickness, Carbon Monoxide (CO) Poisoning.

11.3 Stress, Fatigue, Exposure to Chemicals, Hydraulic Fluid, Engine Oil, Fuel, Dehydration and Heatstroke, Alcohol, Drugs, Altitude-Induced Decompression Sickness (DCS), DCS After Scuba Diving, Vision in Flight, Vision Types, Photopic Vision, Mesopic Vision, Scotopic Vision, Central Blind Spot, Empty-Field Myopia, Night Vision, Night Blind Spot, Dark Adaptation, Scanning Techniques, Night Vision Protection, Self-Imposed Stress, Distance Estimation and Depth Perception, Binocular Cues, Night Vision Illusions, Autokinesis, False Horizon, Reversible Perspective Illusion, Size-Distance Illusion, Fascination (Fixation), Flicker Vertigo, Night Landing Illusions, Enhanced Night Vision Systems, Synthetic Vision System, Enhanced Flight Vision System.

पाठ्यक्रमका एकाइहरुबाट सोधिने प्रश्नहरुको संख्या निम्नानुसार हुनेछ

एकाई नं. (Unit No.)	बहु बैकल्पिक प्रश्न (MCQs) को संख्या	छोटो उत्तर प्रश्नहरुको संख्या	लामो उत्तर प्रश्नको संख्या
१.	१० x १	९ प्रश्न x ५ = ४५	३ प्रश्न x १० = ३० (एकाई १, २, ४, ६, ८ र ९ मध्येबाट)
२.	१० x १		
३.	३ x १		
४.	१० x १		
५.	३ x १		
६.	३ x १		
७.	५ x १		
८.	१० x १		
९.	१० x १		
१०.	६ x १		
११.	५ x १		
जम्मा	७५ x १ = ७५	९ x ५ = ४५	३ x १०= ३०

नोटः Unit 1 को 1.5 र Unit 3 को 3.2 बाट बहुबैकल्पिक प्रश्न सोध्दा Aeroplane र Helicopter को लागि यथा सम्भव समान अंकको सोधिनेछ ।

प्रयोगात्मक परिक्षाको पाठ्यक्रम

समयः १ घण्टा

पूर्णाङ्कः ५०
उतिर्णाङ्कः ३५

S.N.	TOPICS	MARKS	TOTAL MARKS
1	**PRE FLIGHT PREPARTION**		10
	A. FLIGHT PLAN	4	
	B. EXTERNAL NAD INTERNAL CHECKS	2	
	C. RADIO PROCEDURE	2	
	D. AIRMANSHIP	2	
2	**TAKE OFF AND APPROACH**		5
	A. TAKE OFF	1.5	
	B. APPROACH	1.5	
	C. AIRMANSHIP	2	
3.	**BASIC MANEUVERS**		15
	A. STRAIGHT AND LEVEL	3	
	B . CLIMB	3	
	C. DESCEND	3	
	D . TURNS	3	
	E. AIRMANSHIP	3	
4	**EMERGENCY**		5
	A. SITUATIONAL AWARENESS TO WARNING LIGHT	3	
	B. RESPONSE TO EMERGENCIES	2	
5	**INSTRUMENT FLIGHT**		10
	A. VOR TRACKING	2	
	B. HOLDING (DME/VOR)	2	
	C. SID/STAR	3	
	D. AIRMANSHIP	3	
7	**AVIATION KNOWLEDGE**		5
	TOTAL MARKS		50