

नेपाल नागरिक उड्डयन प्राधिकरण
प्राविधिक सेवा, फ्लाइट अपरेशन सर्भिसेज समूह, सातौं तह, वरिष्ठ अधिकृत पदको खुला/आन्तरिक
प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र – सेवा सम्बन्धी

खण्ड (क) - ५० अङ्क

1. **Aircraft**

- 1.1 **Airframe and System:** 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 system, electrical system, fuel system of general aircraft
- 1.2 **Aerodynamics:** Aeroplane: 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, Weight-factors affecting the gravity (load factors), Components of lift, drag, thrust and weight
- 1.3 **Aircraft Performance:** Aircraft performance, definition and practical use, Factors affecting aircraft performance, Use of various performance charts, Weight and balance-computation and practical uses
- 1.4 **Engine and Performance:** Work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop, Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption, Engine efficiencies; By pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations
- 1.5 **Aircraft Instruments:** Basic flight instruments, principle of operation and practical uses, Basic navigation instruments for VFR flights, principle of operation and practical uses, Basic engine instruments, principle of operation and practical uses

2. **Air Navigation**

- 2.1 Basic Navigation, The earth, Great circles, small circles, rhumb lines, Magnetic compass- Principle of operation and limitations
- 2.2 Charts: Representation of meridians, parallels, great circles and rhumb line, Use of aeronautical charts
- 2.3 Dead Reckoning: Fundamentals of dead-reckoning, Practical application of track, heading, wind, speeds (airspeed, groundspeed)
- 2.4 In-Flight Navigation: Navigation during climb and descent regime of flight, Navigation in cruise flying, Use of fixes to revise navigation data eg speed, track, wind, EET and ETA and others etc
- 2.5 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

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खण्ड (ख) - ५० अङ्क

3. **Meteorology**

- 3.1 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
- 3.2 Humidity in atmosphere and its effect on density
- 3.3 Clouds: Types and classification of clouds, Principle of formation of clouds and its modifications, Flying characteristics in different types of clouds, Cooling by advection, radiation and adiabatic expansion
- 3.4 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)
- 3.5 Surface Weather: Formation of fog, mist, haze; Effect on weather by haze, fog and mist; Effect on visibility due to fog, mist, haze, blowing sand, snow or dust etc
- 3.6 Air Masses: Description, factors affecting the properties of an air mass; Classification of air masses, modification due to various factors and their area of origin; Fronts; Warm, cold, occluded, Stationary fronts, associated clouds and weather
- 3.7 Weather Observation: Weather charts; Ground observation; Pilot observation; Significant of weather charts; Weather forecast

4. **Human Performance and Limitation**

- 4.1 Altitude Flying: Respiration and blood circulation; Hypoxia, definition, causes, symptoms and remedy; Time of useful consciousness; Definition, causes of hyperventilation; Symptoms and remedy of hyperventilation
- 4.2 Human Information Processing: Central and peripheral nervous system; Mechanism of perception, constancies, selective perception; Reflexes and biological control systems
- 4.3 Integration of Sensory Inputs: Basic concepts and definition; Categories of disorientation; Vertigo, Coriolis effect, pressure vertigo, flicker vertigo
- 4.4 Human Behavior: General personality and characteristics; Individual differences in personality; Attitude development; Types of human error, prevention and counter measures; Crew coordination
- 4.5 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

5. **Operational Procedures and Rules of the Air**

- 5.1 General: Aerodrome operating minima; Minimum flight altitudes; Requirement for alternate aerodrome; Rules of the Air

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- 5.2 Carriage of Freights and Dangerous Goods: Definitions as per ICAO Annex-18; Carriage of freight in passenger cabin with passengers on board; Proper loading and stowing of freight; Classification of dangerous goods
 - 5.3 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
 - 5.4 Rules and Regulations for CPL Holders: National legislation; Necessity to hold Nepalese CPL; Requirements to issue CPL; Privileges for CPL holder pilots; Limitations for CPL holders
 - 5.5 Rules of The Air: Definition as per ICAO Annex 2 and 11; Classification and types of aircraft; Right of way; Lights to be displayed by aircraft
6. **Instrument Flying Procedures and Radio Aids to Navigation**
- 6.1 Basic Instrument Environment: Fundamentals of instrument flying; Pitch instrument; Yaw instrument; Roll instrument; Power instrument
 - 6.2 Navigation: Orientation to radio navigational aids; Bearings; Interception, tracking of bearings; Way points; Minimum IFR altitudes
 - 6.3 IFR Charts: Basic concept of charts; Aerodrome charts; Departure charts
 - 6.4 VOR: Principle of operation; Bearings (Radial); To/From indication and uses; Position of aircraft in relation to radial
 - 6.5 DME: Principle of operation; DME arcs and indication; DME distances; Difference between DME distance and actual distance; Components of DME receiver
 - 6.6 ILS: Ground facilities involved; ILS identification; ILS and VOR differences; Back course and front course approaches
 - 6.7 RADAR: Concept of RADAR; Principle of operation of RADAR; Types of RADAR; Uses of RADAR in navigation; Uses of RADAR in approaches
 - 6.8 INS, GPS: Fundamental principle of operation; Uses in air navigation; Uses in approaches; Sources of information

द्वितीय पत्रबाट निम्नानुसार प्रश्न सोधिनेछ :

द्वितीय पत्र (विषयगत)				
विषय	खण्ड	अङ्कभार	छोटो उत्तर	लामो उत्तर
सेवा सम्बन्धी	(क)	५०	२ प्रश्न X ५ अङ्क = १०	४ प्रश्न X १० अङ्क = ४०
	(ख)	५०	२ प्रश्न X ५ अङ्क = १०	४ प्रश्न X १० अङ्क = ४०
जम्मा		१००	४ प्रश्न X ५ अङ्क = २०	८ प्रश्न X १० अङ्क = ८०