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TP 14453E
(12/2005)

Study and Reference Guide

Pilot Permit - Ultra-light Aeroplane

First Edition
December 2005

Canada

Other related TC Publications:

TP 14454E – Sample Examination – Pilot Permit – Ultra-light Aeroplane

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<http://www.tc.gc.ca/civilaviation/general/exams/guides/menu.htm>

GENERAL

The conditions of issue of all flight crew licences are stated in the *Canadian Aviation Regulations (CARs)*.

KNOWLEDGE REQUIREMENTS

Applicants for the Ultra-Light Aeroplane Pilot Permit shall demonstrate their knowledge by writing a Transport Canada 80 question multiple-choice examination on the subjects contained in this guide. Applicants must be able to read the examination questions in either English or French without assistance.

All subjects in this guide are considered to be important to applicants for the Ultra-light Aeroplane Pilot Permit.

Subject areas identified with a bullet (•) are considered essential knowledge.

The **Sample Examination – Pilot Permit – Ultra-light Aeroplane (TP 14454E)** can be found at <http://www.tc.gc.ca/civilaviation/general/exams/guides/menu.htm>

EXAMINATION FEEDBACK

Feedback statements on the results letter will inform the candidate which questions were answered incorrectly.

Example of a feedback statement: *Identify the atmospheric conditions favourable for thunderstorm formation.*

EXAMINATION

This examination contains questions on the following main subject areas:

- Air Law
- Navigation
- Meteorology
- Aeronautics General Knowledge
- Emergency Procedures

Examination	Questions	Time Limit	Pass Mark
Ultra-light Aeroplane Pilot Permit (ULTRA)	80	3 hours	60%

Applicants who obtain less than 60% on the overall examination will, for licensing purposes, be required to rewrite the complete paper. The rewrite provisions detailed in the CARs Part IV apply.

Subjects marked with a bullet (•) are considered essential knowledge for the examination.

SECTION 1: AIR LAW AND PROCEDURES

Canadian Aviation Regulations (CARs)

Some CARs refer to their associated standards. Questions from the CARs may test knowledge from the regulation or the standard.

PART I – GENERAL PROVISIONS

100 – INTERPRETATION

100.01 Interpretation

103 – ADMINISTRATION AND COMPLIANCE

103.02 Inspection of Aircraft, Requests for Production of Documents and Prohibitions

103.03 Return of Canadian Aviation Documents

103.04 Record Keeping

PART II – AIRCRAFT IDENTIFICATION

200 – INTERPRETATION

200.01 Interpretation

201 – IDENTIFICATION OF AIRCRAFT

- 201.01 Aircraft Identification Plates

202 – AIRCRAFT MARKING AND REGISTRATION

- 202.01 Requirements for Marks on Aircraft
- 202.06 Alternative Mark Size or Location
- 202.13 Registration of Aircraft - General

PART III - AERODROMES AND AIRPORTS

300 – INTERPRETATION

300.01 Interpretation

301 – AERODROMES

301.08 Prohibitions

301.09 Fire Prevention

302 – AIRPORTS

302.10 Prohibitions

302.11 Fire Prevention

Subjects marked with a bullet (•) are considered essential knowledge for the examination.

PART IV - PERSONNEL LICENSING AND TRAINING

400 – GENERAL

400.01 Interpretation

401 – FLIGHT CREW PERMITS, LICENCES AND RATINGS

- 401.03 Requirement to Hold a Flight Crew Permit, Licence or Rating
- 401.05 Recency Requirements
- 401.08 Personal Logs
- 401.19 Privileges
- 401.21 Ultra-light Aeroplanes – Privileges-Requirements
- 401.88 Privileges
- 401.101 Privileges – Ultra-light Aeroplane Passenger Carrying

404 – MEDICAL REQUIREMENTS

- 404.03 Requirement to Hold a Medical Certificate
- 404.04 Issuance, Renewal and Validity Period of medical certificate
- 404.06 Prohibition Regarding Exercise of Privileges

PART VI - GENERAL OPERATING AND FLIGHT RULES

600 – INTERPRETATION

600.01 Interpretation

601 – AIRSPACE STRUCTURE, CLASSIFICATION AND USE

- 601.01 Airspace Structure
- 601.02 Airspace Classification
- 601.03 Transponder Airspace
- 601.04 IFR or VFR Flight in Class F Special Use Restricted Airspace or Class F Special Use Advisory Airspace
- 601.07 VFR Flight in Class B Airspace
- 601.08 VFR Flight in Class C Airspace
- 601.09 VFR Flight in Class D Airspace

AIRCRAFT OPERATING RESTRICTIONS AND HAZARDS TO AVIATION SAFETY

- 601.15 Forest Fire Aircraft Operating Restrictions
- 601.16 Issuance of NOTAM for Forest Fire Aircraft Operating Restrictions

602 – OPERATING AND FLIGHT RULES

603 GENERAL

- 602.01 Reckless or Negligent Operation of Aircraft.
- 602.02 Fitness of Flight Crew Members
- 602.03 Alcohol or drugs - Crew Members
- 602.05 Compliance with Instructions
- 602.07 Aircraft Operating Limitations
- 602.10 Starting and Ground Running of Aircraft Engines
- 602.11 Aircraft Icing
- 602.12 Overflight of Built-up Areas or Open-air Assemblies of Persons during Take-offs, Approaches and Landings
- 602.13 Take-offs, Approaches and Landings within Built-up Area of Cities and Towns
- 602.14 Minimum Altitudes and Distances
- 602.15 Permissible Low Altitude Flight
- 602.19 Right of Way - General
- 602.20 Right of Way - Aircraft Manoeuvring on Water
- 602.21 Avoidance of Collision
- 602.22 Towing
- 602.23 Dropping of Objects
- 602.24 Formation Flight
- 602.29 Hang Glider and Ultra-light Aeroplane Operation
- 602.31 Compliance with Air Traffic Control Instructions and Clearances
- 602.34 Cruising Altitudes and Cruising Flight Levels
- 602.35 Altimeter- setting and Operating Procedures in the Altimeter- setting Region

OPERATIONAL AND EMERGENCY EQUIPMENT REQUIREMENTS

- 602.58 Prohibition
- 602.59 Equipment Standards
- 602.61 Survival Equipment – Flights over Land
- 602.62 Life Preservers and Flotation Devices
- 602.63 Life Rafts and Survival Equipment- Flights over Water

FLIGHT PREPARATION, FLIGHT PLANS AND FLIGHTS ITINERARIES

- 602.70 Interpretation
- 602.71 Pre-Flight Information
- 602.72 Weather Information
- 602.73 Requirement to File a Flight Plan or a Flight Itinerary
- 602.74 Contents of a Flight Plan or a Flight Itinerary
- 602.75 Filing of a Flight Plan or Flight Itinerary
- 602.76 Changes in the Flight Plan
- 602.77 Requirement to File an Arrival Report
- 602.78 Contents of an Arrival Report
- 602.79 Overdue Aircraft Report

PRE-FLIGHT AND FUEL REQUIREMENTS

- 602.88 Fuel Requirements
- 602.89 Passenger Briefings

OPERATIONS AT OR IN THE VICINITY OF AN AERODROME

- 602.96 General
- 602.97 VFR and IFR Aircraft Operations at Uncontrolled Aerodromes within a MF Area
- 602.98 General MF Reporting Requirements
- 602.99 MF Reporting Procedures before Entering Manoeuvring Area
- 602.100 MF Reporting Procedures on Departure
- 602.101 MF Reporting Procedures on Arrival
- 602.102 MF Reporting Procedures When Flying Continuous Circuits
- 603.103 Reporting Procedures when Flying through an MF Area

VISUAL FLIGHT RULES

- 602.114 Minimum Visual Meteorological Conditions for VFR Flight in Controlled Airspace
- 602.115 Minimum Visual Meteorological Conditions for VFR Flight in Uncontrolled Airspace
- 602.117 Special VFR Flight

RADIOCOMMUNICATIONS

- 602.136 Continuous Listening Watch
- 602.138 Two-way Radiocommunication Failure in VFR Flight

EMERGENCY COMMUNICATIONS AND SECURITY

- 602.143 Emergency Radio Frequency Capability
- 602.144 Interception Signals, Interception of Aircraft and Instructions to Land
- 602.145 ADIZ

605 – AIRCRAFT REQUIREMENTS

- 605.01 Application

AIRCRAFT EQUIPMENT - GENERAL

- 605.05 Markings and Placards

AIRCRAFT EQUIPMENT REQUIREMENTS

- 605.14 Power-driven Aircraft - Day VFR
- 605.22 Seat and Safety Belt Requirements
- 605.25 General use of Safety Belts and Restraint Systems
- 605.29 Flight Control Locks

MISCELLANEOUS

- 606.02 Liability Insurance

Subjects marked with a bullet (•) are considered essential knowledge for the examination.

AIP/AIM

- 1 Aerodromes
- 2 Meteorology
- 3 Rules of the Air and Air Traffic Services for VFR Aircraft
- 4 Search and Rescue
- 5 Aeronautical Charts and Publications
- 6 Licensing/ Registration
- 7 Airmanship

TRANSPORTATION SAFETY BOARD OF CANADA (TSB)

- 1 Definitions
- 2 Reporting an Aviation Occurrence
- 3 Protection of Occurrence Site

AIR TRAFFIC SERVICES AND PROCEDURES

- 1 Air Traffic and Advisory Services
- 2 Flight Service Stations
- 3 Communications Procedures
- 4 Clock Position System
- 5 ATC Clearances and Instructions
- 6 Wake Turbulence Separation
- 7 Airport/Aerodrome Operations - Controlled
- 8 Airport/Aerodrome Operations - Uncontrolled
- 9 Mandatory (MF) and Aerodrome Traffic Frequencies (ATF)
- 10 VFR En Route Procedures
- 11 Holding Procedures
- 12 VFR/IFR Traffic Mix at Uncontrolled Airports/ Aerodromes

SECTION 2: NAVIGATION**DEFINITIONS**

- 1 Longitude
- 2 Equator
- 3 Latitude
- 4 Variation
- 5 Deviation
- 6 Track
- 7 Heading
- 8 Airspeed
- 9 Ground Speed
- 10 Wind Velocity
- 11 Drift

MAPS AND CHARTS

- 1 VTA
- 2 VNC
- 3 Topographical Symbols
- 4 Map Scale
- 5 Contours and Relief
- 6 Map Legends
- 7 Aeronautical Information
- 8 Locating Position by Latitude and Longitude

TIME AND LONGITUDE

- 1 24 Hour System
- 2 Conversion of UTC to Local and Vice Versa

CROSS COUNTRY PLANNING

- 1 Weather Information
- 2 Use of the Canada Flight Supplement
- 3 NOTAM
- 4 Use of Maps and Charts
- 5 Track and Distance
- 6 Time and Ground Speed
- 7 Fuel Requirements for the Trip
- 8 Weight and Balance
- 9 Documents
- 10 Aircraft Serviceability
- 11 Flight Plans/Itineraries

CROSS COUNTRY FLYING

- 1 Set Heading and Visual Angle of Departure
- 2 Map Reading
- 3 Drift Correction
- 4 Check Points
- 5 Ground Speed Check and ETA Revision
- 6 Diversion to Alternate
- 7 Procedure When Lost
- 8 Arrival Procedures

SECTION 3: METEOROLOGY

TEMPERATURE

- 1 Temperature Scales - Fahrenheit and Celsius
- 2 Temperature Variations with Altitude
- 3 Inversions

MOISTURE

- 1 Relative Humidity/Dewpoint
- 2 Precipitation

STABLE AND UNSTABLE AIR

- 1 Characteristics of Stable and Unstable Air
- 2 Surface Heating and Cooling
- 3 Lifting Process

AIR MASSES AND FRONTS

- 1 Air Masses - definition and characteristics
- 2 Fronts - types and associated weather

CLOUDS

- 1 Formation
- 2 Types
- 3 Associated Precipitation and Turbulence

VISIBILITY

- 1 Precipitation
- 2 Fog
- 3 Haze/Smoke/Dust
- 4 Blowing Obstructions to Visibility
- 5 Whiteout

WIND AND TURBULENCE

- 1 Low Level Wind - variations
- 2 Wind Shear
- 3 Topographical Effects
- 4 Mechanical Turbulence
- 5 Veer and Back

ALTIMETRY

- 1 Sea Level Pressure
- 2 Density Altitude
- 3 Altimeter Settings
- 4 Temperature and Pressure Errors

THUNDERSTORMS

- 1 Requirements for Development
- 2 Structure
- 3 Types - air mass/frontal/orographic
- 4 Squall Lines
- 5 Avoidance and Hazards - updrafts/downdrafts/gust fronts/downbursts/microbursts/hail/rain/lightning/tornadoes

METEOROLOGICAL SERVICES AVAILABLE TO PILOTS

- 1 Flight Service Stations (FSS)
- 2 Transcribed Weather Broadcasts (TWB)
- 3 TV Weather Broadcasts
- 4 Internet

AVIATION WEATHER REPORTS AND FORECASTS

- 1 Pilot's Automatic Telephone Answering Service (PATWAS)
- 2 Aviation Routine Weather Report (METAR)
- 3 Graphical Area Forecast (GFA)
- 4 Aerodrome Forecasts (TAF)
- 5 Airman's Meteorological Advisory (AIRMET)
- 6 Significant In-flight Weather Warning Message (SIGMET)

SECTION 4: ULTRA-LIGHT AEROPLANE COMPONENTS AND SYSTEMS

ULTRA-LIGHT AEROPLANE

- 1 Definitions
- 2 Skis/Floats/Wheels

ENGINES

- 1 Two Stroke Engines
- 2 Four Stroke Engines
 - 3 Reduction Drives
 - 4 Methods of Cooling
 - 5 Ignition
 - 6 Exhaust Systems
- 7 Effect of Density Altitude/Humidity
 - 8 Limitations and Operations
 - 9 Carburetor System
 - 10 Carburetor Heat/Icing
 - 11 Mixture

ELECTRICAL SYSTEM

- 1 Generator/Alternator/Battery
- 2 Master Switch
- 3 Circuit Breakers/Fuses

LUBRICATING SYSTEMS AND OILS

- 1 Types Viscosity/Grades/Seasonal use
- 2 Filters
- 3 Fuel/Oil Mixtures

FUEL SYSTEM AND FUELS

- 1 Types - colours and properties
- 2 Weight
- 3 Additives
- 4 Contamination and Deterioration
- 5 Venting
- 6 Fuel Lines/Filters/Drains
- 7 Detonation - causes/effects
- 8 Vapour Lock
- 9 Primers
- 10 Fuel Management - ground/air
- 11 Fuel Handling - refuelling aircraft
- 12 Grounding/Bonding
- 13 Fuel Selectors

ENGINE INSTRUMENTS

- 1 Tachometer
- 2 Exhaust Gas Temperature
- 3 Cylinder head Temperature
- 4 Coolant Temperature
- 5 Oil Pressure and Temperature

PROPELLERS

- 1 Pitch
- 2 Diameter
- 3 Reduction Drives and RPM
- 4 Balance
- 5 Mounting
- 6 Dangers

CARE OF ALL COMPONENTS AND SYSTEMS

- 1 Inspection/Condition
- 2 Maintenance
- 3 Repairs

SECTION 5: THEORY OF FLIGHT

FORCES ACTING ON AN AEROPLANE

- 1 Lift/Drag/Thrust/Weight
- 2 Relationship of Lift and Drag to Angle of Attack
- 3 Forces Acting on an Aircraft during Manoeuvres

LOAD FACTOR

- 1 Centrifugal Force/Weight
- 2 Load Factor - pulling out of a dive and in turns
- 3 Relationship of Load Factor to Stalling Speed
- 4 Structural Limitations
- 5 Gust Loads

WINGS

- 1 Relative Airflow and Angle of Attack
- 2 Wing Tip Vortices
- 3 Area/Span/Chord
- 4 Aspect Ratio
- 5 Dihedral
- 6 Wash In/Wash Out
- 7 Stall Strips
- 8 Flaps

PROPELLERS

- 1 Fixed/Variable Pitch
- 2 Torque/Slipstream/Gyroscopic Effect/Asymmetric Thrust

STABILITY

- 1 Longitudinal/Lateral/Directional
- 2 Inherent Stability

FLIGHT CONTROLS

- 1 Aeroplane Axes and Planes of Movements
- 2 Function of Controls
- 3 Relationship Between Yaw and Roll
- 4 Adverse Yaw/Aileron Drag
- 5 Trim/Trimming Devices

SECTION 6: FLIGHT INSTRUMENTS**AIRSPPEED INDICATOR**

- 1 Principles of Operation
- 2 Errors and limitations
- 3 Markings

ALTIMETER

- 1 Reading the Altimeter
- 2 How to set an Altimeter
- 3 Errors

DIRECT READING MAGNETIC COMPASS

- 1 Reading the Compass
- 2 Turning and Acceleration Errors
 - 3 Compass Serviceability Checks
 - 4 Checking Compass Heading on the ground and in flight

YAW AND BANK INDICATORS

- 1 Yaw string
- 2 Ball
- 3 Turn and bank indicator
- 4 Turn co-ordinator

SECTION 7: FLIGHT OPERATIONS

GENERAL

- 1 Pilot-In-Command Responsibilities
- 2 Correct Use of Checklist
- 3 Taxiing
- 4 Illusions Created by Drift
- 5 Mountain Flying Operations
- 6 Float Operations
- 7 Wheelbarrowing
- 8 Hydro-planing
- 9 Runway Numbering
- 10 Approach, Runway, Aerodrome Markings and Wind Direction Indicator
- 11 Obstruction Markings

AIRCRAFT PERFORMANCE AND LIMITATIONS

- 1 Effects of Contamination on Aircraft Surface
- 2 Effects of Density Altitude/ Humidity
- 3 Gliding for Range
- 4 Never Exceed Speed
- 5 Stall
- 6 Slipping
- 7 Recommended Safe Recovery Altitudes
- 8 Effects of Change of Weight or Centre of Gravity (C of G) on Performance
- 9 Effect of Ice/Snow/Frost/Slush/ Water on Take-off and Landing Run
- 10 Effect of Various Runway Surfaces on Take-off and Landing Run
- 11 Upslope/Downslope Runway
- 12 Crosswind Charts

WEIGHT AND BALANCE

- 1 Datum/Arm/ Moment
- 2 Locating C of G/Hang Point
- 3 C of G Limits
- 4 Weights – Empty/Gross
- 5 Load Adjustment/Hang Point
- 6 Cargo Tie-down/Passenger Loading
- 7 Wing Area and Loading

WAKE TURBULENCE

- 1 Causes
- 2 Effects
- 3 Avoidance

SEARCH AND RESCUE (SAR)

- 1 Types of Service Available
- 2 ELT (Exclude Categories)
- 3 Survival - basic techniques

AIRCRAFT SURFACE CONTAMINATION

- 1 Pre-take-off Inspection
- 2 Hoar Frost
- 3 Dirt, Insects and Water

FLOAT OPERATIONS

- 1 Taxiing
- 2 Take-off and Landing
- 3 Docking

SECTION 8: HUMAN FACTORS

AVIATION PHYSIOLOGY

- 1 Hypoxia/Hyperventilation
- 2 Vision/Visual Scanning Techniques
- 3 Hearing
- 4 Orientation/Disorientation - Including Visual/Vestibular illusions
- 5 Sleep/Fatigue
- 6 Anesthetics/Blood Donations

THE PILOT AND THE OPERATING ENVIRONMENT

- 1 Personal Health/Fitness
- 2 Diet/Nutrition
- 3 Medications (Prescribed and Over-the-counter)
- 4 Substance Abuse (Alcohol/ Drugs)
- 5 Pregnancy
- 6 Heat/Cold
- 7 Noise/Vibration
- 8 Effects of Smoking
- 9 Toxic Hazards (Including Carbon Monoxide)
- 10 Personal Safety Equipment

AVIATION PSYCHOLOGY

- 1 The Decision-Making Process
- 2 Factors That Influence Decision-Making
- 3 Situational Awareness
- 4 Stress
- 5 Managing Risk
- 6 Attitudes
- 7 Workload - attention and information processing

INTERPERSONAL RELATIONS

- 1 Communications with Air Traffic Services/Passengers
- 2 Operating Pressures - family relationships/peer group

SECTION 9 : EMERGENCY PROCEDURES

- 1 Engine Failure
- 2 Fire - electrical/engine
- 3 Forced Landings
- 4 Ballistic Parachute Recovery Systems
- 5 Water Egress

RECOMMENDED STUDY MATERIAL

- A.I.P. / Aeronautical Information Manual (A.I.M.)
- Air Command Weather Manual (TP 9352E)
- Air Command Weather Manual (Supplement) (TP 9353E)
- Canada Flight Supplement
- *Canadian Aviation Regulations* (CARs)
- Sample Examination for Ultra-light Pilot Permit (TP 14454E)
- Flight Training Manual (TP 1102E)
- From the Ground Up
- Human Factors for Aviation - Basic Handbook (TP 12863E)
- VFR Navigation Charts (VNC)/VFR Terminal Area Charts (VTA)
- Ultralight and Light Plane Condition Manual (UPAC)
- Ultralight Pilot's Manual of Aerodynamics, Meteorology and Navigation (UPAC)
- Student Pilot Permit or Private Pilot Licence for Foreign and Military Applicants, Air Regulations (PSTAR) (TP 11919E)
- The Ultralight Pilot's Flight Training Manual (USUA)

The Study Guide for the Radiotelephone Operator's Restricted Certificate (Aeronautical) is available free of charge from district offices of Industry Canada - Examination and Radio Licensing (<http://www.strategis.gc.ca/>).

Information on text books and other publications produced by commercial publishers can be obtained through local flying training organizations, bookstores and similar sources.

Publications used in pilot training in the United States are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (<http://www.access.gpo.gov/index.html>).

ENQUIRIES

Information concerning the location of pilot training organizations and matters pertaining to flight crew licensing may be obtained by contacting the appropriate Regional Offices. A complete listing may be found at: <http://www.tc.gc.ca/CivilAviation/General/Exams/Centres.htm>