Study and Reference Guide

for the written examination for the

Instrument Rating

Aeroplane and Helicopter

Sixteenth Edition
October 2006
Please direct your comments, orders and inquiries to:

The Order Desk
MultiMedia Publishing Services
Transport Canada (AARA-MPS)
330 Sparks Street
Ottawa ON K1A 0N8

Telephone: 1-888-830-4911 (in North America) 613-991-4071 (other countries)
Fax: 613-991-1653
E-Mail: MPS@tc.gc.ca

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Transport, 1977.
Permission is granted by the Department of Transport, Canada, to copy and/or reproduce the contents of this publication in whole or in part provided that full acknowledgment is given to the Department of Transport, Canada, and that the material be accurately reproduced. While use of this material has been authorized, the Department of Transport, Canada, shall not be responsible for the manner in which the information is presented, nor for any interpretations thereof.

The information in this publication is to be considered solely as a guide and should not be quoted as or considered to be a legal authority. It may become obsolete in whole or in part at any time without notice.

TP 691E
(Revised 01/2008)

TC-1002473

You may reproduce this guide as required and it can be found at http://www.tc.gc.ca/civilaviation/general/exams/guides/menu.htm
# TABLE OF CONTENTS

**GENERAL INFORMATION** ........................................................................................................................................ 1  
  KNOWLEDGE REQUIREMENTS ............................................................................................................................... 1  
  EXAMINATION RULES ............................................................................................................................................ 1  
  TIME LIMITS ............................................................................................................................................................ 1  
  REWRITING OF EXAMINATIONS ............................................................................................................................ 1  
  EXAMINATION FEEDBACK ...................................................................................................................................... 2  
  EXAMINATIONS ....................................................................................................................................................... 2  
  INSTRUMENT TYPE RATING EXAMINATION (INRAT) .......................................................................................... 2  
  CONVERSION EXAMINATION – FAA INSTRUMENT RATING – AEROPLANE (FAAIA) ........................................... 2  

**AIR LAW AND PROCEDURES** .............................................................................................................................. 3  

**METEOROLOGY** ...................................................................................................................................................... 7  

**INSTRUMENTATION, NAVIGATION AND RADIO AIDS** ...................................................................................... 8  

**HUMAN FACTORS AND AIRMANSHP** .................................................................................................................. 9  

**RECOMMENDED STUDY MATERIAL** .................................................................................................................. 10  

**ENQUIRIES** .......................................................................................................................................................... 10
GENERAL INFORMATION
The conditions of issue of the Instrument Rating are stated in the Canadian Aviation Regulations (CARs).

KNOWLEDGE REQUIREMENTS
Applicants for the Instrument Rating shall demonstrate their knowledge by writing a Transport Canada 50 question multiple-choice examination on subjects contained in this guide. Applicants must also be able to read the examination questions in either English or French without assistance.

EXAMINATION RULES
CAR 400.02
(1) Except as authorized by an invigilator, no person shall, or shall attempt to, in respect of a written examination:
   a) copy or remove from any place all or any portion of the text of the examination;
   b) give to or accept from any person a copy of all or any portion of the text of the examination;
   c) give help to or accept help from any person during the examination;
   d) complete all or any portion of the examination on behalf of any other person; or
   e) use any aid or written material during the examination.
(2) A person who commits an act prohibited under subsection (1) fails the examination and may not take any other examination for a period of one year.

TIME LIMITS
Examinations, including all sections of a sectionalized examination, that are required for the issuance of a permit or licence or for the endorsement of a permit or licence with a rating shall be completed during the 24-month period immediately preceding the date of the application for the permit, licence or rating.

REWRITING OF EXAMINATIONS
CAR 400.04 (1)
Subject to subsections (2) and (6), a person who fails an examination or a section of a sectionalized examination required for the issuance of a flight crew permit, licence, rating or foreign licence validation certificate is ineligible to rewrite the examination or the failed section for a period of:
   a) in the case of a first failure, 14 days;
   b) in the case of a second failure, 30 days; and
   c) in the case of a third or subsequent failure, 30 days plus an additional 30 days for each failure in excess of two failures, up to a maximum of 180 days.
EXAMINATION FEEDBACK
Feedback statements on the results letter will inform the candidate which questions were answered incorrectly.

Example of Feedback Statement:
Interpret instrument approach procedure charts.

EXAMINATIONS

INSTRUMENT TYPE RATING EXAMINATION (INRAT)
The examination consists of general IFR questions in addition to questions based on a simulated IFR flight.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Questions</th>
<th>Time Limit</th>
<th>Pass Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>INRAT</td>
<td>50 Multiple Choice</td>
<td>3 hours</td>
<td>70%</td>
</tr>
</tbody>
</table>

CONVERSION EXAMINATION – FAA INSTRUMENT RATING – AEROPLANE (FAAIA)
The examination consists of questions on differences between American and Canadian procedures for IFR flight.

<table>
<thead>
<tr>
<th>Examination</th>
<th>Questions</th>
<th>Time Limit</th>
<th>Pass Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAAIA</td>
<td>20 Multiple Choice</td>
<td>1 hour</td>
<td>70%</td>
</tr>
</tbody>
</table>
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**

101 – INTERPRETATION

101.01 Interpretation

**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

401.46 Rating

401.47 Privileges

401.48 Period of Validity

**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

601.05 IFR Flight in Class A, B, C, D or E Airspace or Class F Special Use Restricted or Class F Special Use Advisory Controlled Airspace

602 – OPERATING AND FLIGHT RULES

602.08 Portable Electronic Devices

602.31 Compliance with Air Traffic Control Instructions and Clearances

602.32 Airspeed Limitations

602.34 Cruising Altitudes and Cruising Flight Levels

602.35 Altimeter-setting and Operating Procedures in the Altimeter-setting Region

602.36 Altimeter-setting and Operating Procedures in the Standard Pressure Region

602.37 Altimeter-setting and Operating Procedures in Transition between Regions
OPERATIONAL AND EMERGENCY EQUIPMENT REQUIREMENTS

602.60 Requirements for Power-driven Aircraft

FLIGHT PREPARATION, FLIGHT PLANS AND FLIGHT 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 a Flight Itinerary
602.76 Changes in the Flight Plan
602.77 Requirement to File an Arrival Report
602.88 Fuel Requirements

OPERATIONS AT OR IN THE VICINITY OF AN AERODROME

602.96 General
602.97 VFR and IFR Aircraft Operations at Uncontrolled Aerodromes within an MF Area
602.104 Reporting Procedures for IFR Aircraft When Approaching or Landing at an Uncontrolled Aerodrome

INSTRUMENT FLIGHT RULES

602.121 General Requirements
602.122 Alternate Aerodrome Requirements
602.123 Alternate Aerodrome Weather Minima
602.124 Minimum Altitudes to Ensure Obstacle Clearance
602.125 En route IFR Position Reports
602.126 Take-off Minima
602.127 Instrument Approaches
602.128 Landing Minima
602.129 Approach Ban – General

 RADIOCOMMUNICATIONS

602.137 Two-way Radiocommunication Failure in IFR Flight

605 – AIRCRAFT REQUIREMENTS

605.18 Power-driven Aircraft – IFR
AIR TRAFFIC SERVICES
1 Air Traffic Control (ATC) and Advisory Services
2 Flight Service Stations (FSS)
3 Clearances and instructions
4 Communication procedures / departure / en route / arrival
5 Radar Services
   – departure / en route / arrival
6 Wake turbulence

CANADIAN AIRSPACE
1 Low level controlled airspace / types / dimensions / flight rules
2 Flight Information Regions – flight rules
3 Classification of airspace
4 Special use airspace

ROUTE AND FLIGHT PLANNING
1 Publications/Charts
   – requirements and use
2 Preferred routing
   – factors affecting flight plan form
3 Flight Log
4 Altitude selection
5 Fuel requirements
   – aeroplanes, helicopters
6 Weather requirements
   – take-off, landing, alternate
7 NOTAM
   – classifications and interpretation
8 Use of flight computer
9 Canada Air Pilot
   – utilization and definitions

DEPARTURE PROCEDURES
1 ATIS
2 Radar departure
3 Non-radar departure
4 Standard Instrument Departure (SID)
5 Departure at uncontrolled aerodrome
6 Obstacle clearance
7 Visibility requirements / RVR

EN ROUTE PROCEDURES
1 Position reports
2 Clearance limits
3 Changes to flight plan
4 Altitude Limitations
   – MEA, MOCA, MRA, GASA
5 TAS
6 Fixes/waypoints
7 1,000 Feet on Top
   – IFR flight
8 IFR flight from controlled airspace to uncontrolled airspace
9 IFR flight from uncontrolled airspace to controlled airspace

HOLDING PROCEDURES
1 Holding clearance
2 Entry
3 Standard holding pattern
4 Non-standard holding pattern
5 Timing
6 Speed limitations
7 DME
8 Shuttle
APPROACH PROCEDURES

1. ATIS
2. STARs
3. Radar vectors
4. Speed adjustment
5. Transition to approach
6. Initial approach/procedure turn
7. Straight-In approach (No PT)
8. Straight-In minima
9. Final approach
10. Precision approach – ILS
11. Non-Precision approach
   – NDB, VOR, DME, LOC, GNSS
12. Visual/Contact approach
13. Circling approach
14. Missed approach
15. Uncontrolled aerodromes / VFR / IFR
16. Obstacle clearance – Minimum safe altitude, Minimum Sector Altitude (MSA)
17. Approach Ban – visibility requirements

CANADA AIR PILOT (CAP)

CAP GEN DEFINITIONS

1. Chart Legends
   – approach, aerodrome, lighting and symbols
2. Altitude corrections
3. Operating minima
4. Aircraft categories

EMERGENCIES

1. Declaration of an emergency
2. Use of transponder
3. Deviation from clearance
4. Equipment failure
METEOROLOGY

FUNDAMENTALS OF WEATHER
1 Meteorological services available
2 Factors that determine the weather
3 Meteorological aspect of altimetry
4 Temperature
5 Moisture
6 Stability and instability
7 Clouds/surface based layers
8 Wind
9 Air masses
10 Fronts – types and associated weather

AVIATION FORECASTS
1 Times issued and validity
2 Decoding
3 Graphical Area Forecasts (GFA)
4 Aerodrome Forecasts (TAF)
5 Upper level winds and temperature forecasts (FD)
6 Significant In-Flight Weather Warning Messages (SIGMET)

ICING
1 Formation, meteorological factors
2 Types and intensities
3 Effects on aircraft performance
4 Flight precautions and avoidance

WEATHER MAPS AND PROGNOSTIC CHARTS
1 Surface weather chart
2 Upper level charts – ANAL (to 700 MB)
3 Prognostic surface chart
4 Significant weather prognostic chart (700-400 MB)
5 Times issued and validity
6 Symbols and decoding

TURBULENCE
1 Mechanical
2 Thermal
3 Frontal
4 Wind Shear
5 Flight precautions

WEATHER INTERPRETATION
1 Weather systems affecting preferred routes and altitudes

THUNDERSTORMS
1 Conditions for development
2 Structure
3 Classification
4 Hazards – macro-bursts, microbursts
5 Squall lines
6 Flight precautions

AVIATION WEATHER REPORTS
1 Types and times (METAR, SPECI, METAR AUTO, SPECI AUTO)
2 Decoding
3 Pilot report (PIREP)
INSTRUMENTATION, NAVIGATION AND RADIO AIDS

PITOT STATIC SYSTEM
1 Pitot
2 Static
3 Anti-icing
4 Alternate static
5 Sources/errors
6 Blockage

PITOT STATIC INSTRUMENTS
1 Principles
2 Errors

GYROSCOPIC SYSTEMS AND INSTRUMENTS
1 Principles
2 Power sources
3 Errors

MAGNETIC COMPASS
1 Principles
2 Use of the magnetic compass
3 Errors

VOR
1 Serviceability checks / VOT
2 Interpretation and use
3 Limitations

ADF
1 Serviceability checks
2 Interpretation and use
3 Limitations

ILS
1 Basic components – air and ground
2 Principles of operation
3 Limitations
4 Localizer only

GNSS
1 GPS – basic principles – air and ground
2 Limitations
3 Equipment
4 Interpretation
5 RAIM

TRANSPONDER
1 Principles of operation
2 Phraseology and use

OTHER SYSTEMS – BASIC PRINCIPLES AND USE
1 DME
2 RMI
3 VORTAC
4 Radio/radar altimeter
5 Airport Surveillance Radar (ASR)
   Primary and Secondary
6 Area navigation
7 Airborne weather radar
8 Flight Director system
9 Horizontal Situation Indicator (HSI)
10 Lightning detection equipment
   (e.g. stormscope)
11 Controlled Flight into Terrain (CFIT)
HUMAN FACTORS AND AIRMANSHP

AVIATION PHYSIOLOGY
1. Hypoxia/hyperventilation
2. Orientation / disorientation / visual and vestibular illusions
3. Sleep/fatigue

AVIATION PSYCHOLOGY
1. Decision-making process
2. Factors that influence decision-making
3. Situational awareness

PILOT – EQUIPMENT/MATERIALS RELATIONSHIP
1. Controls and displays – errors in interpretation and control, i.e. ADF / VOR RMI
2. Cockpit visibility – seat position.
3. Correct use of charts, checklists, manuals
RECOMMENDED STUDY MATERIAL

- Canadian Aviation Regulations (CARs)
- Aeronautical Information Manual (TC AIM) (TP 14371E)
- Canada Air Pilot (CAP) – (CAP) General pages
- Canada Flight Supplement (CFS)
- En Route Low/High Altitude Charts/Terminal Charts
- Air Command Weather Manual (TP 9352E)
- Air Command Weather Manual (Supplement) (TP 9353E)
- When in Doubt…Small and Large Aircraft – Aircraft Critical Surface Contamination Training (TP 10643E)

Additional references produced by commercial publishers can be obtained through local flying training organizations and bookstores.

Knowledge of the following charts is recommended for pilots intending to fly IFR in the United States:

- Jeppesen En Route and Approach Charts
- National Ocean Survey (NOS) Charts

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