



Transport
Canada

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TP 691E
(revised 10/2004)

Study and Reference Guide

Instrument Rating

Aeroplane and Helicopter

Fifteenth Edition

March 2003

Canada

You may reproduce this guide as required and it can be found at
<http://www.tc.gc.ca/civilaviation/general/menu.htm>

GENERAL

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.

All subjects in this guide are considered to be important to applicants for the Instrument Rating. Subjects marked with a bullet (•) are considered essential knowledge.

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

The examination is based on a simulated IFR flight, together with questions of a general nature.

Examination	Questions	Time Limit	Pass Mark
Instrument Rating (INRAT)	50	3 hours	70%

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

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 Requirements 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 Advisory Controlled Airspace

602 – OPERATING AND FLIGHT RULES

- 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
- 602.124 Minimum Altitudes to Ensure Obstacle Clearance
- 602.125 Enroute IFR Position Reports
- 602.126 Take-off Minima
- 602.127 Instrument Approaches
- 602.128 Landing Minima
- 602.129 Approach Ban – General
- 602.130 Approach Ban – Cat III

RADIOCOMMUNICATIONS

- 602.137 Two-way Radiocommunication Failure in IFR Flight

605 – AIRCRAFT REQUIREMENTS

605.18 Power-driven Aircraft - IFR

AIR TRAFFIC CONTROL SERVICES, IFR FLIGHT PROCEDURES

AIR TRAFFIC SERVICES

- 1 Air Traffic Control (ATC) and Advisory Services
- 2 Flight Service Stations (FSS) Available Services
- 3 Clearances and Instructions
- 4 Communications Procedures Departure, En Route, Arrival
- 5 Radar Services – Departure, En Route, Arrival
- 6 IFR Separation – Vertical, Longitudinal, Lateral
- 7 Wake Turbulence

CANADIAN AIRSPACE

- 1 Low Level Controlled Airspace Types, Dimensions, Flight Rules
- 2 Flight Information Regions – Flight Rules, Altimeter setting Procedures
- 3 Classification of Airspace (A.I.P. RAC 2.8)
- 4 Special Use Airspace

ROUTE AND FLIGHT PLANNING

- 1 Publications/Charts – Requirements and Use
- 2 Preferred Routing – Factors Affecting Flight Plan Form
- 4 Flight Log
- 5 Altitude Selection
- 6 Fuel Requirements
- 7 Weather Requirements – Take-off, Landing, Alternate
- 8 NOTAM – Classifications and Interpretation
- 9 Use of Flight Computer

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

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 1000 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, PAR
- 11 Non-Precision Approach – NDB, VOR, DME, LOC, GPS
- 12 Visual/Contact Approach
- 13 Circling Approach
- 14 Missed Approach
- 15 Procedures at Uncontrolled Aerodromes including VFR/IFR conflicts
- 16 Obstacle Clearance (SAFE ALT 100 NM, MSA, Minimum Sector Altitude)
- 17 Approach Ban – Visibility Requirements

CANADA AIR PILOT (CAP)

DEFINITIONS

- 1 Chart Legends – Approach, Aerodrome, Lighting and Symbols
- 2 Altitude Corrections
- 3 Operating Minima
- 4 Aircraft Categories

EMERGENCIES

- 1 Declaration and Cancellation of Emergencies
- 2 Use of Transponder
- 3 Deviation from Clearance
- 4 Equipment Failure

SECTION 2: METEOROLOGY

FUNDAMENTALS OF WEATHER

- 1 Meteorological Services available to Pilots
- 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

ICING

- 1 Formation, Meteorological Factors
- 2 Types and Intensities
- 3 Effects on Aircraft Performance
- 4 Flight Precautions and Avoidance

TURBULENCE

- 1 Mechanical
- 2 Thermal
- 3 Frontal
- 4 Wind Shear
- 5 Flight Precautions

THUNDERSTORMS

- 1 Requirements 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)

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)

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

WEATHER INTERPRETATION

- 1 Weather Systems as they affect Route of Flight and preferred altitude

SECTION 3: INSTRUMENTATION, NAVIATION 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, including 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

GPS

- 1 Basic Principles - Air and Ground
- 2 Limitations

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 Altitude Warning
- 11 Lightning Detection Equipment (e.g. Stormscope)

SECTION 4: FLIGHT OPERATIONS

AIRMANSHIP (AIP – AIR 1.0 AND 2.0)

- 1 Weather Related Problems
- 2 Winter Operations
- 3 Flight in Rain
- 4 Flight Near Thunderstorms
- 5 Wake Turbulence
- 6 Flying Operations in Mountainous Regions
- 7 Volcanic Ash

SECTION 5: HUMAN FACTORS

AVIATION PHYSIOLOGY

- 1 Hypoxia/Hyperventilation
- 2 Orientation/Disorientation (Including Visual and Vestibular Illusions)
- 3 Sleep/Fatigue

AVIATION PSYCHOLOGY

- 1 The 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 such as ADF/VOR RMI
- 2 Cockpit Visibility and Eye-Reference Position/Seat Position.
- 3 Correct Use of Charts, Checklists and Manuals

RECOMMENDED STUDY MATERIAL

- When in Doubt... Small and Large Aircraft - Aircraft Critical Surface Contamination Training (TP 10643E)
- Aircraft Critical Surface Contamination Examination Questions (TP 10615E)
- Air Command Weather Manual (TP 9352E)
- Air Command Weather Manual (Supplement) (TP 9353E)
- Instrument Procedures Manual (TP 2076)
- The Pilot's Guide to Human Factors (H34-54/1992E)
- Aeronautical Information Publication (A.I.P. Canada) (TP 2300E)
- *Canadian Aviation Regulations* (CARs)
- Canada Flight Supplement (CFS)
- Canada Air Pilot (CAP)
- En Route Low/High Altitude Charts/Terminal Charts

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

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>).

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 listed below

Pacific Region

Regional Manager General Aviation
Transport Canada
Suite 620
800 Burrard Street
Vancouver, British Columbia
V6Z 2J8

Telephone: (604) 666-5571
Facsimile: (604) 666-4839

Prairie and Northern Region

General Aviation
Transport Canada
Canada Place, 11th Floor
1100-9700 Jasper Avenue
Edmonton, Alberta
T5J 4E6

Telephone: (780) 495-3869
Facsimile: (780) 495-7449

Regional Manager General Aviation
Transport Canada
344 Edmonton Street
2nd Floor
Winnipeg, Manitoba
R3C 0P6

Telephone: (204) 983-4341
Facsimile: (204) 984-2069

Ontario Region

Regional Manager General Aviation
Transport Canada
4900 Yonge Street
Suite 300
Willowdale, Ontario
M2N 6A5

Telephone: (416) 952-0215
Facsimile: (416) 952-0196

Quebec

Regional Manager General Aviation
Transport Canada
700 Leigh Capreol
Suite 2001
Dorval, Quebec
H4Y 1G7

Telephone: (514) 633-3863
Facsimile: (514) 633-3585

Atlantic Region

Regional Manager General Aviation
Transport Canada
P.O. Box 42
95 Foundry Street
Moncton, New Brunswick
E1C 8K6

Telephone: (506) 851-7131
Facsimile: (506) 851-2563

A complete list may be found on the Internet site.