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TP 691E
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Study and Reference Guide for the written examination for the **Instrument Rating**

Aeroplane and Helicopter

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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.

Examination	Questions	Time Limit	Pass Mark
INRAT	50 Multiple Choice	3 hours	70%

CONVERSION EXAMINATION – FAA INSTRUMENT RATING – AEROPLANE (FAAIA)

The examination consists of questions on differences between American and Canadian procedures for IFR flight.

Examination	Questions	Time Limit	Pass Mark
FAAIA	20 Multiple Choice	1 hour	70%

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

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 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)

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 affecting preferred routes and altitudes

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 AIRMANSHIP

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*
- *The Pilot's Guide to Human Factors (H34-54/1992E)*
- *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>