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Barbados Civil Aviation Department

BCAD Document PLAC-060

INSTRUMENT RATING KNOWLEDGE TEST GUIDE

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Subject: INSTRUMENT RATING KNOWLEDGE TEST GUIDE
BCAD PL Advisory Circular PLAC- 060
Date: 07/10/30

PURPOSE

1. (1) The purpose of this Barbados Civil Aviation Department (BCAD) Advisory Circular (PLAC) is to provide guidance for applicants preparing to take Instrument Rating knowledge tests. Appendices provide subject matter outlines, reference material, and sample questions with learning statements.

(2) Barbados Civil Aviation Regulations (BCAR) can be obtained from the Barbados Government printery, Bay Street, St. Michael, Barbados. BCAR General Application & Personnel Licensing Regulations cover the requirements for personnel licensing.

(3) This PLAC can be purchased from the Barbados Civil Aviation Department, Grantley Adams International Airport, Christ Church, Barbados or downloaded from the BCAD website at <http://www.bcad.gov.bb>.

(4) Comments and/or questions regarding this PLAC should be sent to Barbados Civil Aviation Department, Grantley Adams International Airport, Christ Church, Barbados.

INTRODUCTION

2. (1) What is required to become a skilled and effective instrument rated pilot? Although some individuals possess more knowledge and skills than others, no one is a natural-born pilot. Competent pilots become so through study, training, and experience.

(2) This knowledge test guide will answer most questions about taking the Instrument Rating knowledge test by covering the following areas: knowledge test eligibility requirements; knowledge areas on the tests; descriptions of the tests; process for taking a knowledge test; validity of Airman Knowledge Test Reports; use of test aids and materials; cheating or other unauthorized conduct; retesting procedures; and obtaining training and testing publications and general information.

(3) This guide will help applicants in preparing to take one or all of the following tests:

(a) Instrument Rating—Aeroplane (IRA);

(b) Instrument Rating—Aeroplane Conversion (ICL);

(c) Instrument Rating—Aeroplane Validation (IVL);

(d) Instrument Rating—Helicopter (IRH);

(e) Instrument Rating—Helicopter Conversion (ICH);

(f) Instrument Rating—Helicopter Validation (IVH).

(4) This guide is not offered as an easy way to obtain the necessary information for passing the knowledge tests. Rather, the intent of this guide is to define and narrow the field of study to the required knowledge areas included in the tests.

(5) The BCAD airman knowledge tests are a very effective instrument for aviation safety and regulatory compliance. However, these tests can only sample the vast amount of knowledge every pilot needs to operate safely in an ever increasingly complex airspace system.

KNOWLEDGE TEST ELIGIBILITY REQUIREMENTS

3. Individuals pursuing an Instrument Rating should review BCAD Regulations 2007: General Application & Personnel Licensing Regulations – Instrument Rating Requirements; Conversion of foreign instrument rating; and/or Validation of foreign instrument rating. The applicant for an Instrument Rating must be at least 17 years old and have a BCAD Class 1 or 2 medical certificate issued under BCAR appropriate to the level of licence held.

KNOWLEDGE AREAS ON THE TESTS

4. (1) Instrument Rating tests are comprehensive because they must test applicant's knowledge in many subject areas.

(2) Applicants pursuing an instrument rating should review BCAR General Application & Personnel Licensing Regulation – Knowledge areas for the knowledge areas on the tests.

DESCRIPTIONS OF THE TESTS

5. (1) All test questions are the objective, multiple-choice type. Each question can be correctly answered by the selection of a single response. Each test question is independent of other questions; therefore, a correct response to one does not depend upon, or influence, the correct response to another. **The minimum passing score is 75 percent.**

(2) The following tests each contain **60 questions**, and applicants are allowed a **maximum of 2.5 hours** to complete each test.

(a) Instrument Rating—Aeroplane;

(b) Instrument Rating—Helicopter.

(3) The following tests each contain **50 questions**, and applicants are allowed a **maximum of 2.0 hours** to complete each test.

(a) Instrument Rating—Aeroplane Conversion;

(b) Instrument Rating—Aeroplane Validation.

(4) Communication between individuals through the use of words is a complicated process. In addition to being an exercise in the application and use of aeronautical knowledge, a knowledge test is also an exercise in communication since it involves the use of the written language. Since the tests involve written rather than spoken words, communication between the test writer and the person being tested may become a difficult matter if care is not exercised by both parties. Consequently, considerable effort is expended to write each question in a clear, precise manner. Test applicants should be sure to carefully read the instructions given with each test, as well as the statements in each test item.

(5) When taking a test, keep the following points in mind:

(a) Answer each question in accordance with the latest regulations and guidance publications;

(b) Read each question carefully before looking at the possible answers. Test applicants should clearly understand the problem before attempting to solve it;

(c) After formulating an answer, determine which choice corresponds with that answer. The answer chosen should completely resolve the problem;

(d) From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete, erroneous, or represent common misconceptions;

(e) If a certain question is difficult, it is best to mark it for review and proceed to the next question. After answering the less difficult questions, return to those marked for review and answer them. The review marking procedure will be explained to test applicants prior to starting the test. Although the computer should alert test applicants to unanswered questions, applicants should make sure every question has an answer recorded. This procedure will enable test applicants to use the available time to maximum advantage;

(f) When solving a calculation problem, the answer closest to the applicant's solution should be selected. The problem has been checked with various types of calculators; therefore, if the problem has been solved correctly, the applicant's answer will be closer to the correct answer than any of the other choices.

PROCESS FOR TAKING A KNOWLEDGE TEST

6. (1) The first step in the process of taking a knowledge test is to contact the BCAD office. They can provide applicants with information relating to knowledge test prerequisites, required authorizations and endorsements, testing locations, and the appropriate fees. In addition applicants might want to visit the BCAD website at <http://www.bcad.gov.bb>.

(2) The second step in the process of taking a knowledge test is for the applicant to complete the required training and receive an endorsement from an authorized instructor or aviation training organization.

(3) Acceptable forms of endorsement are:

(a) A certificate of graduation or a statement of accomplishment certifying the satisfactory completion of the ground school portion of a course for the certificate or rating sought. The certificate or statement may be issued by an approved aviation training organization;

(b) A written statement or logbook endorsement from an authorized ground or flight instructor certifying that the applicant has completed an applicable ground training or home study course and is prepared to take the knowledge test;

(c) A failed, passed, or expired Airman Knowledge Test Report, provided the airman still has the original Airman Knowledge Test Report in his/her possession;

(d) An "expired test/credit" letter issued by the BCAD (in lieu of a duplicate Airman Knowledge Test Report).

(4) The third step in the process of taking a knowledge test is for the applicant to receive written authorization from BCAD.

(5) The fourth step in taking a knowledge test is to proceed to the BCAD computer test centre. An applicant for a knowledge test must provide proper identification. Testing centre personnel will not begin the test until the test applicant's identification is verified.

(6) Upon completion of the knowledge test, each applicant will receive the Airman Test Report showing their test score. The Airman Knowledge Test Report is certified with an embossed seal to authenticate the validity of the document.

(7) The Airman Test Report lists the learning statement codes for questions answered incorrectly. The total number of codes shown on the test report is not necessarily an indication of the total number of questions answered incorrectly.

(8) The Appendices of this Knowledge Test Guide contain a list of reference materials for applicants to study during their training for the Instrument Rating. The questions on the knowledge test will come from these reference materials. BCAD Advisory Circular PLAC-xxx, Learning Statement Reference Guide for Airman Knowledge Testing, contains learning statements and the corresponding codes for airman knowledge testing. Applicants should match the learning statement codes on their test report to these codes to review their areas of deficiency.

(9) A list of reference materials has been prepared by BCAD to establish specific references for all knowledge standards and is to be used when preparing for an airman knowledge test. The list of reference materials is contained in the Appendix to this Knowledge Test Guide.

(10) An applicant's instructor is required to provide instruction on each of the knowledge areas listed on the Airman Knowledge Test Report and to complete an endorsement of this instruction. The Airman Knowledge Test Report must be presented to the flight test examiner prior to taking the skill test. During the oral portion of the skill test, the examiner is required to evaluate the noted areas of deficiency.

(11) Applicants requiring a duplicate Airman Knowledge Test Report due to loss or destruction of the original, should send a signed request to the Barbados Civil Aviation Department, Grantley Adams International Airport, Christ Church, Barbados.

VALIDITY OF AIRMAN KNOWLEDGE TEST REPORTS

7. Airman Test Reports for the Instrument Rating licence are valid for 24 calendar months. The applicant should plan to complete the skill test during the 24 calendar month validity period. If the Airman Test Report expires before completion of the skill test, the applicant must retake the knowledge test.

USE OF TEST AIDS AND MATERIALS

8. Knowledge test applicants may use aids, reference materials, and test materials within the guidelines listed below. All models of aviation-oriented calculators may be used, including small electronic calculators that perform only arithmetic functions (add, subtract, multiply, and divide). Simple programmable memories, which allow addition to, subtraction from, or retrieval of one number from the memory, are permissible. Also, simple functions, such as square root and percent keys are permissible. The following guidelines apply:

(a) Applicants may use any reference materials provided with the test. In addition, applicants may use scales, straightedges, protractors, plotters, navigation computers, log sheets, holding pattern entry aids, and electronic or mechanical calculators that are directly related to the test;

(b) Manufacturers permanently inscribed instructions on the front and back of such aids, e.g., formulas, conversions, regulations, signals, weather data, holding pattern diagrams, frequencies, weight and balance formulas, and air traffic control procedures are permissible;

(c) BCAD personnel may provide a calculator to applicants and/or deny use of the applicant's personal calculator based on the following limitations:

(i) Prior to, and upon completion of the test, while in the presence of the proctor, applicants must actuate the ON/OFF switch and perform any other function that ensures erasure of any data stored in memory circuits, including removal of batteries;

(ii) The use of electronic calculators incorporating permanent or continuous type memory circuits without erasure capability is prohibited. The proctor may refuse the use of the applicant's calculator when unable to determine the calculator's erasure capability;

(iii) Printouts of data must be surrendered at the completion of the test if the calculator incorporates this design feature;

(iv) The use of magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which pre-written programs or information related to the test can be stored and retrieved is prohibited;

(v) Applicants are not permitted to use any booklet or manual containing instructions related to use of test aids.

(d) Dictionaries are not permitted in the testing area;

(e) The BCAD test proctor makes the final determination relating to test materials and personal possessions applicants may take into the testing area.

CHEATING OR OTHER UNAUTHORIZED CONDUCT

9. Computerized knowledge testing must be carried out in accordance with the strictest security procedures to avoid test compromise. The BCAD Test Proctor will terminate a test at any time that he/she suspects that a cheating incident has occurred. A BCAD investigation will then be conducted. If the investigation determines that cheating or unauthorized conduct has occurred, then any airman licence, certificate, or rating that the applicant holds may be revoked, and the applicant will be prohibited for 1 year from applying for or taking any test for a licence, certificate or rating under BCAR General Application & Personnel Licensing Regulations.

RETESTING PROCEDURES

10. (1) Applicants who receive a grade lower than 75 percent and who wish to retest must present the following to BCAD testing centre personnel when appearing for the purpose of retesting:

(a) A failed Airman Knowledge Test Report;

(b) A written endorsement from an authorized instructor certifying that additional instruction has been given, and the instructor finds the applicant competent to pass the test;

(c) A written authorization from BCAD to retake the test.

(2) Applicants possessing an Airman Knowledge Test Report with a score of 75 percent or higher who decide to retake the test in anticipation of a better score, may retake the test after 30 days from the date their last test was taken. The BCAD will not allow applicants to retake a passed test before the 30-day period has lapsed. Prior to retesting, applicants will be required to surrender their current Airman Test Report to the test proctor. The last test taken will reflect the official final score.

OBTAINING TRAINING AND TESTING PUBLICATIONS AND GENERAL INFORMATION

11. Most of the current BCAD airman training and testing publications can be obtained in electronic format from BCAD at the BCAD website at <http://www.bcad.gov.bb>.

AIRMAN KNOWLEDGE TEST ITEMS

12. Sample questions, and their corresponding learning statements and codes, are contained in the appendix to this test guide. They are representative of questions on airman knowledge tests. These will help airmen become familiar with similar questions found on the airman knowledge tests. The knowledge test is not designed to intimidate any prospective airman; it is designed to measure the level of competency required to receive a BCAD licence, authorisation or rating. The list of reference materials contained in the appendix to this test guide is provided to ensure that instructors and students are able to determine the importance of the subject matter to be taught and learned.

COMPUTER TESTING SUPPLEMENTS

13. The computer testing supplements contain the graphics, legends, and maps that are needed to successfully respond to certain knowledge test items. These supplements will be provided by BCAD test centre personnel during the airman knowledge test.

KNOWLEDGE TEST GUIDES

14. The knowledge test guides describe the knowledge testing policy and procedures for each licence area.

OTHER COMPUTER TESTING INFORMATION

15. Other computer testing information provides specific test information, such as test name, test code (three-digit test identifiers), number of questions, and the time (hours) allotted for each knowledge test. The test identifiers will assist airmen in selecting the proper test for the licence/rating being sought.

SUBJECT MATTER REFERENCE/KNOWLEDGE CODES

16. The appendices of this guide contain the listings of reference materials and sample test questions with related learning statements used for airman knowledge testing. The listings of reference materials and sample questions have been prepared by the BCAD to establish specific references for all knowledge standards. The listings contain reference materials to be used when preparing for all airman knowledge tests. The learning statements contained in BCAD Advisory Circular PLAC-052, should be referred to when reviewing areas of deficiency on airman knowledge test reports.

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E. A. Archer
Director of Civil Aviation

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APPENDIX A

LIST OF INSTRUMENT RATING REFERENCE MATERIALS FOR ALL CERTIFICATIONS

LIST OF REFERENCE MATERIALS

The publications listed below contain study material applicants need to be familiar with when preparing for instrument rating knowledge tests. Most of these publications can be purchased from Barbados Civil Aviation Department or be downloaded from the BCAD web site at <http://www.bcad.gov.bb>. ICAO publications can be purchased from ICAO at <http://www.icao.int>. The latest revision of the listed references should be requested.

(1) Barbados Civil Aviation Regulations (BCAR), in particular:

- (a) BCAR – General Administration and Personnel Licensing
- (b) BCAR – Aircraft Operations
- (c) BCAR – Airworthiness
- (d) BCAR – Instrument and Equipment

(2) ICAO Annexes: 3, 10 Volume II, 11 and 14 (pertinent parts)

(3) ICAO Document 4444: General provisions, Aero Control service, Approach control service, Aerodrome control service, and Flight information and alerting service.

(4) Aeronautical Information Manual (AIM)

(5) Aeronautical Information Publication (AIP) Barbados

(6) Airport/Facility Directory

(7) Enroute Low Altitude Chart

(8) Instrument Approach Procedure Chart

(9) Sectional Aeronautical Chart

(10) FAA AC 00-6—Aviation Weather

(11) FAA AC 00-45—Aviation Weather Services

(12) FAA AC 00-54—Pilot Wind Shear Guide

(13) FAA AC 91-43—Unreliable Airspeed Indication

(14) FAA AC 120-58—Pilot Guide for Large Aircraft Deicing

(15) FAA-H-8083-1—Aircraft Weight and Balance (adopted in cooperation with FAA)

(16) FAA-H-8083-3—Airplane Flying Handbook (adopted in cooperation with FAA)

(17) FAA-H-8083-15—Instrument Flying Handbook (adopted in cooperation with FAA)

(18) FAA-H-8083-23—Seaplane (adopted in cooperation with FAA)

(19) FAA-H-8083-25—Pilot's Handbook of Aeronautical Knowledge (adopted in cooperation with FAA)

(20) FAA-H-8261-1—Instrument Procedures Handbook (adopted in cooperation with FAA)

(21) U.S. Terminal Procedures

APPENDIX A

INSTRUMENT RATING – AEROPLANE (IRA)
INSTRUMENT RATING – HELICOPTER (IRH)

SUBJECT MATTER OUTLINE

The following outlines the major topics and underlying content areas on the Instrument Rating – Aeroplane/Helicopter knowledge tests.

1. Air Law:

    (a) Rules and regulations relevant to flight under IFR;
    (b) Related air traffic services practices and procedures.

2. Aircraft General Knowledge (for the aircraft category being sought):

    (a) use, limitation and serviceability of avionics, electronic devices and instruments necessary for the control and navigation of aeroplanes under IFR and in instrument meteorological conditions;
    (b) use and limitations of autopilot;
    (c) compasses, turning and acceleration errors;
    (d) gyroscopic instruments, operational limits and precession effects;
    (e) practices and procedures in the event of malfunctions of various flight instruments.

3. Flight performance and planning for the aircraft category being sought:

    (a) pre-flight preparations and checks appropriate to flight under IFR;
    (b) operational flight planning;
    (c) preparation and filing of air traffic services flight plans under IFR;
    (d) altimeter setting procedures.

4. Human performance for the aircraft category being sought:

    (a) human performance relevant to instrument flight in aircraft;
    (b) principles of threat and error management;

5. Meteorology for the aircraft category being sought:

    (a) application of aeronautical meteorology;
    (b) interpretation and use of reports, charts and forecasts;
    (c) codes and abbreviations;
    (d) use of, and procedures for obtaining, meteorological information;
    (e) altimetry;
    (f) causes, recognition and effects of icing;
    (g) frontal zone penetration procedures;
    (h) hazardous weather avoidance;
    (i) in the case of helicopter and powered-lift, effects of rotor icing.

APPENDIX A-1

INSTRUMENT RATING – AEROPLANE (IRA)
INSTRUMENT RATING – HELICOPTER (IRH)

SUBJECT MATTER OUTLINE (*cont'd*)

6. Navigation:

   (a) practical air navigation using radio navigation aids;
   (b) use, accuracy and reliability of navigation systems used in departure, en-route, approach and landing phases of flight;
   (c) identification of radio navigation aids.

7. Operation procedures for the aircraft category being sought:

   (a) application of threat and error management to operational principles;
   (b) interpretation and use of aeronautical documentation such as AIP, NOTAM, aeronautical codes and abbreviations, and instrument procedure charts for departure, en-route, descent and approach;
   (c) precautionary and emergency procedures;
   (d) safety practices associated with flight under IFR;
   (e) obstacle clearance criteria.

8. Radiotelephony:

   (a) communication procedures and phraseology as applied to aircraft operations under IFR;
   (b) action to be taken in case of communication failure.

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APPENDIX B

INSTRUMENT RATING – AEROPLANE CONVERSION (ICL)
INSTRUMENT RATING – AEROPLANE VALIDATION (IVL)
INSTRUMENT RATING – HELICOPTER CONVERSION (ICH)
INSTRUMENT RATING – HELICOPTER VALIDATION (IVH)

SUBJECT MATTER OUTLINE

The following outlines the major topics and underlying content areas on the Instrument Rating – Aeroplane/Helicopter Conversion and Validation knowledge tests.

1. Air Law:

    (a) Rules and regulations relevant to flight under IFR;
    (b) Related air traffic services practices and procedures.

2. Meteorology for the aircraft category being sought:

    (a) application of aeronautical meteorology;
    (b) interpretation and use of reports, charts and forecasts;
    (c) codes and abbreviations;
    (d) use of, and procedures for obtaining, meteorological information;
    (e) altimetry;
    (f) causes, recognition and effects of icing;
    (g) frontal zone penetration procedures;
    (h) hazardous weather avoidance;
    (i) in the case of helicopter and powered-lift, effects of rotor icing.

3. Operation procedures for the aircraft category being sought:

    (a) application of threat and error management to operational principles;
    (b) interpretation and use of aeronautical documentation such as AIP, NOTAM, aeronautical codes and abbreviations, and instrument procedure charts for departure, en-route, descent and approach;
    (c) precautionary and emergency procedures;
    (d) safety practices associated with flight under IFR;
    (e) obstacle clearance criteria.

4. Radiotelephony:

    (a) communication procedures and phraseology as applied to aircraft operations under IFR;
    (b) action to be taken in case of communication failure.

APPENDIX C

INSTRUMENT RATING – AEROPLANE (IRA)
INSTRUMENT RATING – HELICOPTER (IRH)
INSTRUMENT RATING – VALIDATION / CONVERSION (IVL), (ICL), (IVH), (ICH)

SAMPLE QUESTIONS LEARNING STATEMENTS AND ANSWERS

1. Which condition would cause the altimeter to indicate a lower altitude than actually flown (true altitude)?
A—Air temperature lower than standard.
B—Atmospheric pressure lower than standard.
C—Air temperature warmer than standard.
Answer C—Recall altimeter – effect of temperature changes.

2. What does the Runway Visual Range (RVR) value, depicted on certain straight in IAP Charts, represent?
A—The slant range distance the pilot can see down the runway while crossing the threshold on glide slope.
B—The horizontal distance a pilot should see when looking down the runway from a moving aircraft.
C—The slant visual range a pilot should see down the final approach and during landing.
Answer B—Recall information on an Instrument Approach Procedures Chart

3. Which instrument provides the most pertinent information (primary) for bank control in straight-and-level flight?
A—Turn and slip indicator.
B—Attitude indicator.
C—Heading indicator.
Answer C— Recall indicating systems - airspeed / angle of attack / attitude / heading / manifold pressure / synchro / EGT

4. Which flight time may be logged as instrument time when on an instrument flight plan?
A—All of the time the aircraft was not controlled by ground references.
B—Only the time you controlled the aircraft solely by reference to flight instruments.
C—Only the time you were flying in IFR weather conditions.
Answer B—Recall regulations – flight / duty time

5. In addition to a VOR receiver and two-way communications capability, which additional equipment is required for IFR operation in Class B airspace?
A—DME and an operable coded transponder having Mode C capability.
B—Standby communications receiver, DME, and coded transponder.
C—An operable coded transponder having Mode C capability.
Answer C—Recall airspace classes - limits / requirements / restrictions / airspeeds / equipment