asa

80 YEARS

Airline Transport Pilot

2020 TEST PREP

5 FREE ONLINE PRACTICE TESTS
ACTIVATION CODE INCLUDED

Study & Prepare

Pass your test and know what is essential to become a safe, competent pilot—from the most trusted source in aviation training

Airline Transport Pilot
2020 TEST PREP

Study & Prepare

Pass your test and know what is essential to become a safe, competent pilot—from the most trusted source in aviation training

READER TIP

The FAA Knowledge Exam Questions can change throughout the year. Stay current with test changes; sign up for ASA's free email update service at **asa2fly.com/testupdate**

AVIATION SUPPLIES & ACADEMICS
NEWCASTLE, WASHINGTON

Airline Transport Pilot Test Prep
2020 Edition

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059-3153
425.235.1500 | asa2fly.com

Important: This Test Prep should be sold with and used in conjunction with *Computer Testing Supplement for Airline Transport Pilot and Aircraft Dispatcher* (FAA-CT-8080-7D). ASA reprints the FAA test figures and legends contained within this government document, and it is also sold separately and available from aviation retailers nationwide. Order #ASA-CT-8080-7D.

Cover photo: Glasshouse Images/Alamy Stock Photo/Circa Images

ASA-TP-ATP-20-PD
PDF eBook ISBN 978-1-61954-789-6
Print Book ISBN 978-1-61954-788-9

Stay informed of aviation industry happenings

Website asa2fly.com
Updates asa2fly.com/testupdate
Twitter twitter.com/asa2fly
Facebook facebook.com/asa2fly
Blog learntoflyblog.com

About the Contributors

Jackie Spanitz
General Manager
Aviation Supplies & Academics, Inc.

As General Manager of Aviation Supplies & Academics, Jackie Spanitz oversees maintenance and development of more than 1,000 titles and pilot supplies in the ASA product line. Ms. Spanitz has worked with airman training and testing for more than 25 years, including participation in the ACS development committees. Jackie holds a Bachelor of Science degree in aviation technology from Western Michigan University, a Masters degree from Embry Riddle Aeronautical University, and Instructor and Commercial Pilot certificates. She is the author of *Guide to the Flight Review*, and the technical editor for ASA's *Test Prep* and *FAR/AIM* series.

Jim Higgins
Associate Professor of Aviation
University of North Dakota

Jim Higgins is an Associate Professor of Aviation at the University of North Dakota (UND) where he teaches Advanced Aircraft Operations, Transport Category Operations, and Crew Resource Management. Prior to joining the faculty at UND, he was a line pilot and check airman at American Eagle Airlines. Professor Higgins has accumulated over 4,000 hours of flight time primarily in part Part 121 operations.

Andrea Georgio
Associate Professor
Middle Tennessee State University (MTSU)

Andrea Georgiou is an associate professor and the flight dispatch coordinator in the Middle Tennessee State University (MTSU) Aerospace department. She earned a B.S. in aerospace and Masters of aerospace education from MTSU and a Ph.D. in general psychology from Capella University. Dr. Georgiou holds an FAA Aircraft Dispatch certificate and a Private Pilot certificate. She serves as an honors faculty member and teaches a wide range of undergraduate and graduate courses including flight dispatch, aviation laws and regulations, advanced aviation weather, professional pilot, introduction to aerospace, human factors, and aviation industries.

About ASA: Aviation Supplies & Academics, Inc. (ASA) is an industry leader in the development and sale of aviation supplies and publications for pilots, flight instructors, flight engineers, air traffic controllers, flight attendants, aviation maintenance technicians, and drone operators. We manufacture and publish more than 1,000 products, and have been providing trusted and reliable training materials to the aviation industry for 80 years. Visit **asa2fly.com** for a free catalog.

Contents

Continued

Chapter 5 **Weight and Balance**

Chapter 6 **Flight Operations**

Chapter 7 **Emergencies, Hazards, and Flight Physiology**

Chapter 8 **Meteorology and Weather Services**

Cross References

Preface

Welcome to ASA's Test Prep Series. ASA's test books have been helping pilots prepare for the FAA Knowledge Tests for more than 60 years with great success. We are confident that with proper use of this book, you will score very well on any of the Airline Transport Pilot tests.

Begin your studies with a classroom or home-study ground school course, which will involve reading a comprehensive textbook (see the FAA Knowledge Exam References list on page x). Conclude your studies with this Test Prep or comparable software. Read the question, select your choice for the correct answer, then read the explanation. Use the Learning Statement Codes and references that conclude each explanation to identify additional resources if you need further study of a subject. Upon completion of your studies, take practice tests at www.prepware.com (see inside front cover for your free account).

The FAA Airline Transport Pilot questions have been arranged into chapters based on subject matter. Topical study, in which similar material is covered under a common subject heading, promotes better understanding, aids recall, and thus provides a more efficient study guide. Study and place emphasis on those questions most likely to be included in your test (identified by the aircraft and test category above each question). For example: a pilot preparing for the ATP Multi-engine test would focus on the questions marked "ALL" and "ATM"; a pilot preparing for the ATP Single-engine test would focus on the questions marked "ALL" and "ATS"; a pilot preparing for the ATP Helicopter (135) test would focus on the questions marked "ALL" and "RTC"; and candidates for the Dispatcher certificate would focus on the questions marked "ALL" and "ADX."

It is important to answer every question assigned on your FAA Knowledge Test. If in their ongoing review, the FAA authors decide a question has no correct answer, is no longer applicable, or is otherwise defective, your answer will be marked correct no matter which one you chose. However, you will not be given the automatic credit unless you have marked an answer. Unlike some other exams you may have taken, there is no penalty for "guessing" in this instance.

The FAA exams are "closed tests" which means the exact database of questions is not available to the public. The question and answer choices in this book are based on our extensive history and experience with the FAA testing process. You might see similar although not exactly the same questions on your official FAA exam. Answer stems may be rearranged from the A, B, C order you see in this book. Therefore, be careful to fully understand the intent of each question and corresponding answer while studying, rather than memorize the A, B, C answer. You may be asked a question that has unfamiliar wording; studying and understanding the information in this book and the associated references will give you the tools to answer question variations with confidence.

If your study leads you to question an answer choice, we recommend you seek the assistance of a local instructor. We welcome your questions, recommendations or concerns:

Aviation Supplies & Academics, Inc.
7005 132nd Place SE — Voice: 425.235.1500 — Fax: 425.235.0128
Newcastle, WA 98059-3153 — Email: cfi@asa2fly.com — Website: www.asa2fly.com

The FAA appreciates testing experience feedback. You can contact the branch responsible for the FAA Knowledge Exams at:

Federal Aviation Administration
AFS-630, Airman Testing Standards Branch
PO Box 25082
Oklahoma City, OK 73125 — Email: afs630comments@faa.gov

Updates and Practice Tests

Free Test Updates for the One-Year Life Cycle of Test Prep Books

The FAA rolls out new tests as needed throughout the year; this typically happens in June, October, and February. The FAA exams are "closed tests" which means the exact database of questions is not available to the public. ASA combines more than 60 years of experience with expertise in airman training and certification tests to prepare the most effective test preparation materials available in the industry.

You can feel confident you will be prepared for your FAA Knowledge Exam by using the ASA Test Preps. ASA publishes test books each June and keeps abreast of changes to the tests. These changes are then posted on the ASA website as a Test Update.

Visit the ASA website before taking your test to be certain you have the most current information. While there, sign up for ASA's free email Update service. We will then send you an email notification if there is a change to the test you are preparing for so you can review the Update for revised and/or new test information.

www.asa2fly.com/testupdate

We invite your feedback. After you take your official FAA exam, let us know how you did. Were you prepared? Did the ASA products meet your needs and exceed your expectations? We want to continue to improve these products to ensure applicants are prepared, and become safe aviators. Send feedback to: **cfi@asa2fly.com**

Knowledge Exam References

The FAA references the following documents to write the FAA Knowledge Exam questions. You should be familiar with the latest revision for all of these as part of your ground school studies, which you should complete before starting test preparation:

ANA *Aerodynamics for Naval Aviators*

CUG *Aeronautical Chart User's Guide*

Aeronautical Information Manual (AIM)

FAA-H-8083-25 *Pilot's Handbook of Aeronautical Knowledge*

FAA-H-8083-3 *Airplane Flying Handbook*, or FAA-H-8083-21 *Helicopter Flying Handbook*

FAA-H-8083-6 *Advanced Avionics Handbook*

FAA-H-8083-15 *Instrument Flying Handbook*

FAA-H-8083-1 *Aircraft Weight and Balance Handbook*

FAA-H-8083-2 *Risk Management Handbook*

FAA-H-8083-16 *Instrument Procedures Handbook*

FAA-S-ACS-11 *Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards*

AC 00-6 *Aviation Weather*

AC 00-24 *Thunderstorms*

AC 00-30 *Atmospheric Turbulence Avoidance*

AC 00-45 *Aviation Weather Services*

AC 00-54 *Pilot Wind Shear Guide*

AC 20-117 *Hazards Following Ground Deicing & Ground Operations in Conditions Conducive to Aircraft Icing*

AC 91-6 *Water, Slush and Snow on the Runway*

AC 91-43 *Unreliable Airspeed Indication*

AC 91-51 *Effect of Icing on Aircraft Control and Airplane Deice and Anti-Ice Systems*

AC 91-74 *Pilot Guide Flight in Icing Conditions*

AC 135-17 *Pilot Guide-Small Aircraft Ground Deicing*

AC 120-51 *Crew Resource Management Training*

AC 120-100 *Basics of Aviation Fatigue*

AC 120-58 *Pilot Guide for Large Aircraft Ground Deicing*

14 CFR Part 1, 25, 61, 63, 71, 91, 97, 117, 119, 121, 125, 135

49 CFR Part 830

Chart Supplements U.S. (previously Airport/Facility Directory or A/FD)

IFR Enroute High Altitude Chart

IFR Enroute Low Altitude Chart

STAR — Standard Terminal Arrival

U.S. Terminal Procedures

Visit the ASA website for these and many more titles and pilot supplies for your aviation endeavors: **www.asa2fly.com**

ASA Test Prep Layout

The sample FAA questions have been sorted into chapters according to subject matter. Within each chapter, the questions have been further classified and all similar questions grouped together with a concise discussion of the material covered in each group. This discussion material of "Chapter text" is printed in a larger font and spans the entire width of the page. Immediately following the sample FAA Question is ASA's Explanation in *italics*. The last line of the Explanation contains the Learning Statement Code and further reference (if applicable). *See* the EXAMPLE below.

Figures referenced by the Chapter text only are numbered with the appropriate chapter number, i.e., "Figure 1-1" is Chapter 1's first chapter-text figure.

Some Questions refer to Figures or Legends immediately following the question number, i.e., "**8201.** (Refer to Figure 14.)." These are FAA Figures and Legends which can be found in the separate booklet: *Computer Testing Supplement* (CT-8080-XX). This supplement is bundled with the Test Prep and is the exact material you will have access to when you take your computerized test. We provide it separately, so you will become accustomed to referring to the FAA Figures and Legends as you would during the test.

Figures referenced by the Explanation and pertinent to the understanding of that particular question are labeled by their corresponding Question number. For example: the caption "Questions 8245 and 8248" means the figure accompanies the Explanations for both Question 8245 and 8248.

Answers to each question are found at the bottom of each page.

EXAMPLE:

Chapter text

Four aerodynamic forces are considered to be basic because they act upon an aircraft during all flight maneuvers. There is the downward-acting force called WEIGHT which must be overcome by the upward-acting force called LIFT, and there is the rearward-acting force called DRAG, which must be overcome by the forward-acting force called THRUST.

Category rating. This question may be found on tests for these ratings.*

ALL, ATM, ATS, DSP, RTC

8201. (Refer to Figure 14.) The four forces acting on an airplane in flight are

See separate book: *Computerized Testing Supplement* (CT-8080-XX)

A— lift, weight, thrust, and drag.
B— lift, weight, gravity, and thrust.
C— lift, gravity, power, and friction.

Question and answer choices

Lift, weight, thrust, and drag are the four basic aerodynamic forces acting on an aircraft in flight.
(PLT235) — FAA-H-8083-25

Explanation

Answer (B) is incorrect because the force of gravity is always the same number and reacts with the airplane's mass to produce a different weight for almost every airplane. Answer (C) is incorrect because weight is the final product of gravity, thrust is the final product of power, and drag is the final product of friction. Power, gravity, and friction are only parts of the aerodynamic forces of flight.

Code line. FAA Learning Statement Code in parentheses, followed by references for further study.

Incorrect answer explanation. Reasons why answer choices are *incorrect* explained here.

* **Note:** The FAA does *not* identify which questions are on the different ratings' tests. Unless the wording of a question is pertinent to only one rating category, it may be found on *any* of the tests.

ALL = All operations **ATM = Multi-engine operations**
ATS = Single-engine operations **ADX = Dispatcher** **RTC = Rotorcraft**

Chapter 2
Equipment, Navigation and Facilities

Inoperative Equipment

A certificate holder's manual must contain enroute flight, navigation and communication procedures, including procedures for the dispatch, release or continuance of a flight if a required piece of equipment becomes inoperative.

When any required instrument or equipment in an aircraft is inoperative, the airplane cannot be flown unless that aircraft's **Minimum Equipment List (MEL)** allows such a flight.

The pilot-in-command of an aircraft operating IFR in controlled airspace shall report to ATC immediately any malfunction of navigational, approach or communications equipment that occurs in flight. The report must include:

- Aircraft identification;
- Equipment affected;
- Degree to which the capability of the aircraft to operate IFR in the ATC system is impaired; and
- Nature and extent of assistance desired from ATC.

ALL
9407. An approved minimum equipment list or FAA Letter of Authorization allows certain instruments or equipment

A— to be inoperative prior to beginning a flight in an aircraft if prescribed procedures are followed.
B— to be inoperative anytime with no other documentation required or procedures to be followed.
C— to be inoperative for a one-time ferry flight of a large airplane to a maintenance base without further documentation from the operator or FAA with passengers on board.

The Minimum Equipment List and the letter of authorization constitute a supplemental type certificate for the aircraft. The approved Minimum Equipment List must provide for the operation of the aircraft with the instruments and equipment in an inoperable condition (PLT405) — 14 CFR §91.213

ATM, ATS, RTC
9380. What action is necessary when a partial loss of ILS receiver capability occurs while operating in controlled airspace under IFR?

A— Continue as cleared and file a written report to the Administrator if requested.
B— If the aircraft is equipped with other radios suitable for executing an instrument approach, no further action is necessary.
C— Report the malfunction immediately to ATC.

The pilot-in-command of an aircraft operating IFR in controlled airspace shall report to ATC as soon as practical any malfunction of navigational, approach or communication equipment that occurs in flight. (PLT356) — 14 CFR §91.187

Answer (A) is incorrect because any malfunction of approach equipment must be reported in flight, not by a written report. Answer (B) is incorrect because, although another type of instrument approach may be executed if permission is granted by ATC, any malfunction of approach equipment should be reported.

ATM, ATS, RTC
9381. What action should be taken if one of the two VHF radios fail while IFR in controlled airspace?

A— Notify ATC immediately.
B— Squawk 7600.
C— Monitor the VOR receiver.

The pilot-in-command of an aircraft operating IFR in controlled airspace shall report to ATC as soon as practical any malfunction of navigational, approach or communication equipment that occurs in flight. (PLT162) — 14 CFR §91.187

Answer (B) is incorrect because, although you have experienced a communications failure, it is only a partial one. You still have one operational VHF radio and all other radios are working normally, so a squawk of 7600 is not needed. Answer (C) is incorrect because you still have an operable VHF radio for communication, so monitoring of a NAVAID is not needed. The only pilot action required is notification to ATC of the problem.

Answers

9407 [A]   9380 [C]   9381 [A]

ATM, ATS, RTC

9386. While flying IFR in controlled airspace, if one of the two VOR receivers fails, which course of action should the pilot-in-command follow?

A— No call is required if one of the two VOR receivers is operating properly.
B— Advise ATC immediately.
C— Notify the dispatcher via company frequency.

The pilot-in-command of an aircraft operating IFR in controlled airspace shall report to ATC as soon as practical any malfunction of navigational, approach or communication equipment that occurs in flight. (PLT406) — 14 CFR §91.187

Answer (A) is incorrect because any malfunction of a navigational radio should be reported, no matter how slightly it may affect the conduct of the flight. Answer (C) is incorrect because, although this may be a common practice among the air carriers, the regulations require notification to ATC of the malfunction.

ATM, ATS, RTC

9387. While flying in controlled airspace under IFR, the ADF fails. What action is required?

A— Descend below Class A airspace.
B— Advise dispatch via company frequency.
C— Notify ATC immediately.

The pilot-in-command of an aircraft operating IFR in controlled airspace shall report to ATC as soon as practical any malfunction of navigational, approach or communication equipment that occurs in flight. (PLT406) — 14 CFR §91.187

Answer (A) is incorrect because controlled airspace exists far below positive control airspace (base of 18,000 feet MSL), and any loss of a navigational aid should be reported to ATC. Answer (B) is incorrect because, although this may be a common practice among the air carriers, the regulations require notification to ATC of the malfunction.

ATM, ADX

8278. If a required instrument on a multi-engine airplane becomes inoperative, which document required under 14 CFR Part 121 dictates whether the flight may continue en route?

A— A Master Minimum Equipment List for the airplane.
B— Original dispatch release.
C— Certificate holder's manual.

Each certificate holder's manual must contain enroute flight, navigation, and communication procedures for the dispatch, release or continuance of flight if any item of equipment required for the particular type of operation becomes inoperative or unserviceable en route. (PLT436) — 14 CFR §121.135

Pitot-Static Instruments

Modern jet transports usually have three pitot-static systems. There are separate systems for the captain's and co-pilot's instruments plus an auxiliary system that provides a backup for either of the two primary systems. The instruments that require static pressure input are **airspeed, Mach, altitude** and **vertical speed indicators**. In addition, the airspeed and Mach indicators need a source of pitot pressure. Besides the flight instruments, static pressure input is required for the Mach warning, autopilot, flight director, flight recorder and cabin differential pressure. Pitot input is required for all those systems except for cabin differential pressure. The usual source for these non-flight instruments is the auxiliary pitot-static system. *See* Figure 2-1.

Altimeters compare the sea level pressure setting in their window with the outside air pressure sensed through the static system. The difference is displayed as the altitude above sea level. Part of the preflight check is to verify the accuracy of the altimeters. An altimeter should be considered questionable if the indicated altitude varies by more the 75 feet from a known field elevation.

The altimeter setting used by pilots is always the station pressure of the reporting station corrected to sea level. **Station pressure** is the actual pressure at field elevation.

True altitude is the actual height of the aircraft above sea level. This is the same as indicated altitude when standard temperatures exist. When the temperature is warmer than standard, true altitude is higher than indicated altitude. When the temperature is colder than standard day conditions, just the opposite is true. Corrected altitude (approximately true altitude) can be calculated but it is neither practical

Answers

9386 [B] 9387 [C] 8278 [C]

nor useful to do so in most situations. When setting an altimeter, a pilot should just use the appropriate altimeter setting and disregard the effects of nonstandard atmospheric pressures and temperatures.

Pressure altitude is the altitude indicated when the altimeter is set to standard sea level pressure of 29.92" Hg. Density altitude is used in aircraft performance computations. It is pressure altitude corrected for nonstandard temperatures. If the temperature is warmer than standard, density altitude will be higher than pressure altitude.

The local altimeter setting is used when flying below FL180 and the altimeter is 31.00" Hg or less. Special procedures apply when the local pressure is more than 31.00" Hg because most altimeters cannot be set higher than that. In the United States, all altimeters are set to 29.92" Hg when climbing through FL180. Caution: outside the United States the transition altitude is often something other than FL180.

A common reason for altimeter errors is incorrect setting of the altimeter. If the setting in the altimeter is higher than the actual sea level pressure, the altimeter will read higher than the actual altitude. If the setting is too low, the altimeter will read lower than it really is. As a rough rule of thumb, the magnitude of the error is about 1,000 feet for each 1" Hg that the altimeter is off. For example, if the altimeter is set to 29.92" Hg, but the real sea level pressure is 30.57" Hg, the altimeter will read about 650 feet lower than the actual airplane's altitude (30.57 – 29.92 = .65" Hg = 650 feet). In this example, the airplane would be 650 feet higher than the indicated altitude.

Continued

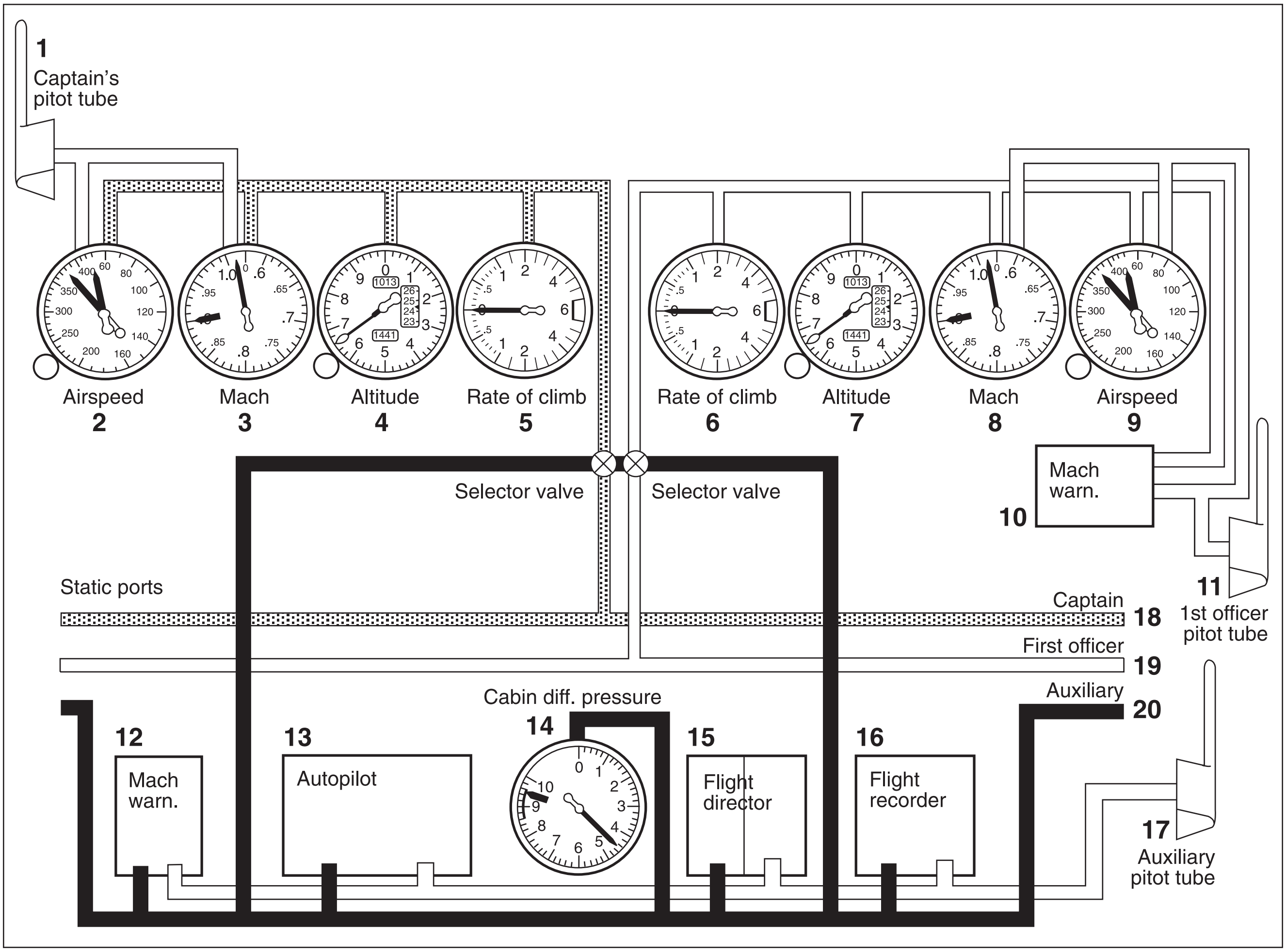


Figure 2-1. Typical pitot-static system

The airspeed indicators compare pitot pressure with static pressure and display the difference as **indicated airspeed**. This indicated airspeed equals the aircraft's actual speed through the air (True Airspeed) only under standard day conditions at sea level. Under almost all flight conditions, true airspeed will be higher than indicated airspeed because of the lower ambient pressures at altitude.

The Machmeter displays aircraft speed as a percentage of the speed of sound. For example, an aircraft cruising at a Mach number of .82 is flying at 82% of the speed of sound. The Machmeter works in a manner similar to the airspeed indicator in that it compares pitot and static pressure, but these inputs are corrected by an altimeter mechanism.

If a pitot tube becomes blocked, the airspeed and Mach indicators will read inaccurately. If pressure is trapped in the pitot line, the airspeed will read inaccurately high as the aircraft climbs, low as it descends, and will be unresponsive to changes in airspeed. The airspeed indicator acts as an altimeter because only the static pressure changes. This situation occurs in icing conditions if both the ram air inlet and the drain hole of the pitot tube become completely blocked by ice.

If the pitot tube is blocked but the static port and the pitot drain hole remain open, the indicated airspeed will drop to zero. The drain pitot tube drain hole allows the pressure in the pitot line to drop to atmospheric and therefore there is no differential between the static and pitot pressures.

Pitot tubes and static ports are electrically heated to prevent ice formations that could interfere with proper operation of the systems. They are required to have "power on" indicator lights to show proper operation. In addition, many aircraft have an ammeter that shows the actual current flow to the pitot and static ports.

Since the magnetic compass is the only direction-seeking instrument in most airplanes, the pilot must be able to turn the airplane to a magnetic compass heading and maintain this heading. It is influenced by magnetic dip which causes northerly turning error and acceleration/deceleration error. When northerly turning error occurs, the compass will lag behind the actual aircraft heading while turning through headings in the northern half of the compass rose, and lead the aircraft's actual heading in the southern half. The error is most pronounced when turning through north or south, and is approximately equal in degrees to the latitude.

The acceleration/deceleration error is most pronounced on headings of east and west. When accelerating, the compass indicates a turn toward the north, and when decelerating it indicates a turn toward the south. The acronym **ANDS** is a good memory aid:

A accelerate

N north

D decelerate

S south

No errors are apparent while on east or west headings, when turning either north or south.

ALL

9174. Which pressure is defined as station pressure?

A— Altimeter setting.
B— Actual pressure at field elevation.
C— Station barometric pressure reduced to sea level.

The pressure measured at a station or airport is "station pressure" or the actual pressure at field elevation. (PLT166) — AC 00-6

Answer (A) is incorrect because altimeter setting is the value to which the scale of a pressure altimeter is adjusted to read field elevation. Answer (C) is incorrect because station barometric pressure reduced to sea level is a method to readily compare station pressures between stations at different altitudes.

ALL

9164. What is corrected altitude (approximate true altitude)?

A— Pressure altitude corrected for instrument error.
B— Indicated altitude corrected for temperature variation from standard.
C— Density altitude corrected for temperature variation from standard.

True altitude is indicated altitude corrected for the fact that nonstandard temperatures will result in nonstandard pressure lapse rates. (PLT023) — AC 00-6

Answer (A) is incorrect because pressure altitude corrected for instrument error is a nonexistent concept. Answer (C) is incorrect because density altitude is pressure altitude corrected for temperature variation from standard. Density altitude is a final figure and not subject to additional adjustments.

ATM, ATS, RTC

9099. When setting the altimeter, pilots should disregard

A— effects of nonstandard atmospheric temperatures and pressures.
B— corrections for static pressure systems.
C— corrections for instrument error.

Pilots should disregard the effect of nonstandard atmospheric temperatures and pressures except that low temperatures and pressures need to be considered for terrain clearance purposes. (PLT166) — AIM ¶7-2-2

Answers (B) and (C) are incorrect because altimeters are subject to instrument errors and to errors in the static pressure system. A pilot should set the current reported altimeter setting on the altimeter setting scale. The altimeter should read within 75 feet of field elevation. If not, it is questionable and should be evaluated by a repair station.

ALL

9173. If the ambient temperature is colder than standard at FL310, what is the relationship between true altitude and pressure altitude?

A— They are both the same, 31,000 feet.
B— True altitude is lower than 31,000 feet.
C— Pressure altitude is lower than true altitude.

True altitude is indicated altitude corrected for the fact that nonstandard temperatures will result in nonstandard pressure lapse rates. In warm air, you fly at a true altitude higher than indicated. In cold air, you fly at a true altitude lower than indicated. Pressure altitude is the altitude indicated when the altimeter is set to the standard sea level pressure (29.92" Hg). In the United States, altimeters are always set to 29.92" Hg at and above 18,000 feet. This question assumes the difference between the pressure altitude and the indicated altitude (local altimeter setting) is not significant enough to reverse the effects of the temperature. (PLT023) — AC 00-6

Answer (A) is incorrect because both true and pressure altitude would be the same at FL310 if the ambient air temperature was standard. Answer (C) is incorrect because pressure altitude would be lower than true altitude in warmer than standard air temperature.

ALL

9173-1. When the temperature is -20°C at 15,000 feet indicated, you know that

A— altimeters automatically compensate for temperature variations.
B— the altimeter is indicating higher than true altitude.
C— the altimeter is indicating lower than true altitude.

The ISA for 15,000 feet is -15°C. When the temperature is colder than standard, the altimeter will indicate higher than true altitude. (PLT023) — AC 00-6

Answers

9174 [B]	9164 [B]	9099 [A]	9173 [B]	9173-1 [B]

ALL

9172. If the ambient temperature is warmer than standard at FL350, what is the density altitude compared to pressure altitude?

A— Lower than pressure altitude.
B— Higher than pressure altitude.
C— Impossible to determine without information on possible inversion layers at lower altitudes.

Pressure altitude is the altitude indicated when the altimeter is set to the standard sea level pressure (29.92" Hg). Density altitude is pressure altitude corrected for nonstandard temperature. A warmer than standard temperature will result in a density altitude higher than the pressure altitude. (PLT023) — AC 00-6

Answer (A) is incorrect because density altitude is higher when air temperature is warmer than standard. Answer (C) is incorrect because density altitude is pressure altitude corrected for nonstandard temperatures. Pressure altitude is based on a standard pressure atmosphere at a particular altitude, and inversion layers at lower levels have no effect on pressure altitude.

ALL

9813. Given

Pressure altitude.. 1,000 ft
True air temperature... 10°C

From the conditions given, the approximate density altitude is

A— 1,000 feet MSL
B— 650 feet MSL
C— 450 feet MSL

1. *Using an E6B flight computer, refer to the right-hand "Density Altitude" window. Note that the scale above the window is labeled air temperature (°C). The scale inside the window itself is labeled pressure altitude (in thousands of feet). Rotate the disc and place the pressure altitude of 1,000 feet opposite an air temperature of 10°C.*
2. *The density altitude shown in the window is 650 feet.*

You can also answer this using an electronic flight computer, such as the CX-3. Select Altitude from the CX-3 FLT menu. (PLT005) — AC 00-6

ALL

9163. En route at FL270, the altimeter is set correctly. On descent, a pilot fails to set the local altimeter setting of 30.57. If the field elevation is 650 feet, and the altimeter is functioning properly, what will it indicate upon landing?

A— 585 feet.
B— 1,300 feet.
C— Sea level.

One inch of Hg pressure is equal to about 1,000 feet of altitude. In the United States, altimeters are always set to 29.92" Hg at and above 18,000 feet. If the altimeter is not reset when descending into an area with a local altimeter setting of 30.57" Hg, an error of 650 feet will result (30.57 – 29.92 = .65 = 650 feet). If the altimeter is set lower than the actual setting, it will read lower than the actual altitude. (PLT166) — AC 00-6

Answer (A) is incorrect because 585 feet is the result of subtracting 65 feet rather than subtracting 650 feet. Answer (B) is incorrect because 1,300 feet is the result of adding 650 feet rather than subtracting 650 feet.

ATM, ATS, RTC

9080. During an en route descent in a fixed-thrust and fixed-pitch attitude configuration, both the ram air input and drain hole of the pitot system become completely blocked by ice. What airspeed indication can be expected?

A— Increase in indicated airspeed.
B— Decrease in indicated airspeed.
C— Indicated airspeed remains at the value prior to icing.

If both the ram air input and the drain hole are blocked, the pressure trapped in the pitot line cannot change and the airspeed indicator may react as an altimeter. The airspeed will not change in level flight even when actual airspeed is varied by large power changes. During a climb the airspeed indication will increase. During a descent the airspeed indication will decrease. (PLT128) — AC 91-43

Answer (A) is incorrect because indicated airspeed will decrease in a descent. Answer (C) is incorrect because indicated airspeed will remain at the same value during level flight.

Answers

9172	[B]	9813	[B]	9163	[C]	9080	[B]

ATM, ATS, RTC

9081. What can a pilot expect if the pitot system ram air input and drain hole are blocked by ice?

A— The airspeed indicator may act as an altimeter.
B— The airspeed indicator will show a decrease with an increase in altitude.
C— No airspeed indicator change will occur during climbs or descents.

If both the ram air input and the drain hole are blocked, the pressure trapped in the pitot line cannot change and the airspeed indicator may react as an altimeter. The airspeed will not change in level flight even when actual airspeed is varied by large power changes. During a climb the airspeed indication will increase. During a descent the airspeed indication will decrease. (PLT337) — AC 91-43

Answer (B) is incorrect because the airspeed indicator will show an increase (not decrease) with an increase in altitude. Answer (C) is incorrect because differential pressure between the pitot tube and static air source changes, and so does indicated airspeed.

ATM, ATS, RTC

9082. If both the ram air input and drain hole of the pitot system are blocked by ice, what airspeed indication can be expected?

A— No variation of indicated airspeed in level flight if large power changes are made.
B— Decrease of indicated airspeed during a climb.
C— Constant indicated airspeed during a descent.

If both the ram air input and the drain hole are blocked, the pressure trapped in the pitot line cannot change and the airspeed indicator may react as an altimeter. The airspeed will not change in level flight even when actual airspeed is varied by large power changes. During a climb the airspeed indication will increase. During a descent the airspeed indication will decrease. (PLT337) — AC 91-43

Answer (B) is incorrect because, during a climb, it will indicate an increase due to the stronger differential pressure in the blocked pitot tube relative to the static vents. Answer (C) is incorrect because indicated airspeed would change with changes in altitude.

ATM, ATS, RTC

9222. How will the airspeed indicator react if the ram air input to the pitot head is blocked by ice, but the drain hole and static port are not?

A— Indication will drop to zero.
B— Indication will rise to the top of the scale.
C— Indication will remain constant but will increase in a climb.

If the pitot tube becomes blocked but pressure is not trapped in the pitot lines, the indicated airspeed will drop to zero since the pitot pressure will be approximately equal to the static pressure. (PLT337) — AC 00-6

Answer (B) is incorrect because the airspeed indication will drop if only the ram air input is blocked. Answer (C) is incorrect because the pressure in the airspeed line will vent out through the hole and the indication will drop to zero.

ATM, ATS, RTC

9934. During a constant-rate climb in IMC above the freezing level, you notice that both the airspeed and altitude are increasing. This indicates the

A— aircraft is in an unusual attitude.
B— gyroscopic instruments have failed.
C— pitot-static system has malfunctioned.

If the pitot tube ram pressure hole and drain hole become obstructed, the airspeed indicator operates like an altimeter as the aircraft climbs and descends. In this situation as the aircraft climbs and the altimeter increases, so will the airspeed indicator. (PLT337) — FAA-H-8083-15

Answer (A) is incorrect because an aircraft in an unusual attitude with an increasing airspeed will result in a decreasing altitude. Answer (B) is incorrect because the airspeed indicator and altimeter operate off the pitot-static system.

Answers

9081	[A]	9082	[A]	9222	[A]	9934	[C]

Electronic Flight Instruments

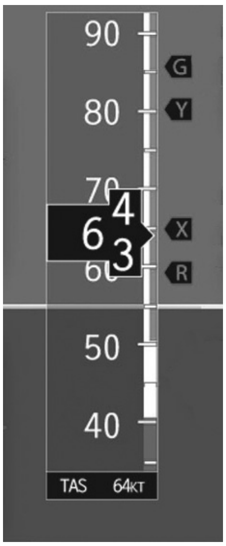
Electronic flight instrument systems integrate many individual instruments into a single presentation called a primary flight display (PFD). Flight instrument presentations on a PFD differ from conventional instrumentation not only in format, but sometimes in location as well. For example, the attitude indicator on the PFD is often larger than conventional round-dial presentations of an artificial horizon. Airspeed and altitude indications are presented on vertical tape displays that appear on the left and right sides of the primary flight display. The vertical speed indicator is depicted using conventional analog presentation. Turn coordination is shown using a segmented triangle near the top of the attitude indicator. The rate-of-turn indicator appears as a curved line display at the top of the heading/navigation instrument in the lower half of the PFD.

Figure 2-2. A typical primary flight display (PFD)

ATM, ATS, RTC

8206. (*See* Figure shown below.) You see the indication in the figure on your PFD, but your standby indicator reads 120 knots and the power is set for 120-knot cruise in level flight. You decide the

A— pitot tube may be plugged with ice or a bug.
B— standby indicator is defective because there is no red 'X' on the speed tape display.
C— airspeed means attitude is incorrect.



Question 8206

The airspeed indicator on the PFD is indicating a TAS of 64 knots. If this instrument had failed, the numbers would be replaced with a large red X. The stand-by airspeed indicator reading 120 knots suggests this instrument is working fine. The line coming out of the pitot tube splits to feed multiple instruments. The most likely culprit is a bug or ice blockage occurring past the split, in the line that feeds the Air Data Computer (ADC) for the PFD. This would allow the stand-by gauge to work properly, but cause the ASI on the PFD to give a false indication. True Airspeed is calculated in the ADC by correcting CAS with OAT probe data, so this explains why the TAS is correspondingly low. The pitot lines need to be cleared; applying pitot heat may or may not help at this point. (PLT524) — FAA-H-8083-6

Answer (B) is incorrect because you cannot assume the standby is failed if you have cruise power and level attitude; the red Xs appear on the speed tape when the ADC fails or when one of the pressure transducers fail. Answer (C) is incorrect because an attitude instrument savvy pilot would discern attitude correctness by cross referencing other instruments and hearing the pitch of the engine would decide that power and a level attitude must be an indicator problem and have nothing to do with attitude correctness.

ALL

9769. Automated flight decks or cockpits

A— enhance basic pilot flight skills.
B— decrease the workload in terminal areas.
C— often create much larger pilot errors than traditional cockpits.

Advanced avionics were designed to increase safety as well as the utility of the aircraft, particularly during increased workload phases, such as in the terminal areas. (PLT524) — FAA-H-8083-6

Answer (A) is incorrect because automation has been shown to erode some flying skills when they are not kept proficient. Answer (C) is incorrect because while automation can make some errors more evident and hide others, it does not result in larger pilot errors than traditional cockpits.

Answers

8206 [A] 9769 [B]

ALL

9769-1. Automated flight decks or cockpits

A— improve basic flight skills.
B— decrease the workload in terminal areas.
C— sometimes hide errors.

Automation can make some errors more evident and hide others. (PLT524) — FAA-H-8083-6

ALL

9769-2. When flying an aircraft with electronic flight displays (EFDs), risk increases

A— if the pilot expects the electronics to enhance flight safety and remove pilot error.
B— when the pilot expects the equipment to malfunction on occasion.
C— if the pilot believes the EFD will compensate for lack of skill and knowledge.

Automation has been shown to erode some flying skills when they are not kept proficient. (PLT524) — FAA-H-8083-6

ALL

9830. Automation has been found to

A— create higher workloads in terminal areas.
B— improve crew situational awareness skills.
C— substitute for a lack of aviation experience.

Advanced avionics were designed to increase safety as well as the utility of the aircraft. Safety is enhanced by enabling better situational awareness. (PLT104) — FAA-H-8083-6

ALL

9853. When a pilot believes advanced avionics enable operations closer to personal or environmental limits,

A— greater utilization of the aircraft is achieved.
B— risk is increased.
C— risk is decreased.

Advanced avionics can sometimes have a negative effect on pilot risk-taking behavior, where more information results in pilots taking more risk than they might be willing to accept without the information. Advanced avionics should be used to increase safety, not risk. (PLT104) — FAA-H-8083-6

ALL

9854. Automation in aircraft has proven

A— to present new hazards in its limitations.
B— that automation is basically flawless.
C— effective in preventing accidents.

Advanced avionics were designed to increase safety as well as the utility of the aircraft. However, the systems are not infallible. While automation does help prevent many existing types of errors, it has also created new kinds of errors. (PLT104) — FAA-H-8083-6

ALL

9855. The lighter workloads associated with glass (digital) flight instrumentation

A— are useful in decreasing flightcrew fatigue.
B— have proven to increase safety in operations.
C— may lead to complacency by the flightcrew.

Risk management is the last of the three flight management skills needed for mastery of the advanced avionics aircraft. The enhanced situational awareness and automation capabilities offered by a glass flight deck vastly expand its safety and utility, especially for personal transportation use. At the same time, there is some risk that lighter workloads could lead to complacency. (PLT104) — FAA-H-8083-2

ALL

9857. Humans are characteristically

A— disposed to appreciate the workload imposed by automation.
B— disposed to expect automation to fail often.
C— poor monitors of automated systems.

Humans are characteristically poor monitors of automated systems. When passively monitoring an automated system for faults, abnormalities, or other infrequent events, humans perform poorly. The more reliable the system is, the worse the human performance becomes. For example, the pilot monitors only a backup alert system, rather than the situation that the alert system is designed to safeguard. It is a paradox of automation that technically advanced avionics can both increase and decrease pilot awareness. (PLT104) — FAA-H-8083-2

Answers

9769-1	[C]	9769-2	[C]	9830	[B]	9853	[B]	9854	[A]	9855	[C]
9857	[C]										