AVIATION SEMINARS

SINCE 1974

2024

COMMERCIAL PILOT STUDY GUIDE

IMPORTANT INFORMATION FOR SEMINAR PREPARATION
PLEASE READ THIS CAREFULLY!

People attending our courses come to class with wide variations of both knowledge and experience – from those who are still waiting to take their first flight lesson, through those who have been ready for their flight tests for years (private or commercial), but haven't yet completed their FAA knowledge exam. However, our recommendations below are applicable for everyone.

The first thing you will discover is that our course manual is intentionally small. Many test preparation guides have 4 or 5 times as many pages, trying to cover much more information than necessary for the FAA Knowledge Exam. We believe that it is important to obtain all of the knowledge about flying that you can. We do not produce this book with the belief that it will contain all the information you need to know as a pilot, but instead wish to provide you with a study guide that is concise and specific to your FAA Exam. We have written the summaries to be as brief as possible while still providing the necessary background to explain the topic and questions. You'll find that we cover a lot more information and detail in the classroom!

Here's the most effective way to preview this material:

First, you will notice that we have bolded and italicized the correct answer to each of the FAA test questions in the book. We've learned that it is counterproductive to test yourself by reading a question and its selection of answers without first knowing the correct answer.

Second, read through each of the summaries. Directly following each summary, read each question followed by the associated correct answer. Don't bother to read the incorrect answers, and don't worry about slowing down to analyze and study at this time – we simply want you to become familiar with the type of information the FAA wants you to learn, and become exposed to the questions and correct answers. This will help you focus more productively in class, and will help prepare you for additional learning and study. IF YOU DO NOTHING ELSE, AT LEAST READ THROUGH THE BOOK THE DAY BEFORE THE TEST AS DESCRIBED ABOVE. Most people find that this can be done in about 2 hours.

Finally, make sure to take the Aviation Seminars Online Practice Exams after the class. Prior to taking the FAA exam, you should be scoring in the mid-80's on the practice exams.

THANK YOU FOR CHOOSING AVIATION SEMINARS FOR YOUR TEST PREPARATION!

COMMERCIAL PILOT COURSE SUMMARY

Aviation Seminars
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THINGS YOU SHOULD KNOW ABOUT YOUR FAA COMPUTER EXAM

To get the best results on your exam:

As time allows, answer all the questions in the Course Summary BEFORE coming to class, so the instructor can clarify any with which you have trouble. Allow some time Saturday evening for a second review of those questions you missed.

Take some notes as you listen to the lecture, but also keep an eye on the visuals the instructor uses in the presentation.

Complete all your available on-line practice tests.

Take the exam within 3 days after the seminar.

About computer testing:

AVIATION SEMINARS constantly monitors for new areas that the FAA is asking of its current pilot applicants in the knowledge tests.

FAA airman knowledge testing is done by computer only. Two private companies are authorized by the FAA to administer computer tests. A complete list of those companies and their testing sites is available through the FAA's website.

Each FAA-approved computer testing company sets its own fees and maintains a nation-wide, toll-free registration/information telephone number.

There are no minimum flight time requirements to take the Private Pilot knowledge exam. However the applicant must be at least 15 years old at the time they take the written test.

The Commercial Pilot exam has 100 questions, which are chosen from over 900 in the exam database. You are allowed 3.0 hours to complete the exam.

A minimum score of 70% is required to pass the exam.

Bring with you to the test:

- Any failed test report, signed by a certified instructor.
- Government identification which includes current photograph, your signature, residential street address, and proof of age. Non-US citizens should bring passport or immigration green card.
- Evidence of completion of ground school and instructor sign-off. You will receive this at the end of our seminar.
- Flight computer and Plotter. We prefer a manual E6-B for more accurate wind solutions. Directions printed on the computer are allowed during the exam.
- Electronic calculator, if desired. You may be asked to clear the memory.

How to take the test:

Computer tests are designed to be easy to understand and user-friendly, requiring no previous computer experience.

When you arrive at the test center, the test proctor will review your registration information and exam sign-off, and confirm the correct test.

Look through and identify the contents of the "Computerized Testing Supplement" book which your proctor gives you. The most current version in use is FAA-CT-8080-1E. When you are fully confident of how computer testing works, the allotted time for your test will begin.

Testing software allows you to review questions already answered (and change answers if needed), or to skip over a difficult question and return to answer it later. Testing software keeps you advised of time remaining for your test. Use your full time to double-check your answers. Drop us a line on how you did in our CONTACT US portal in our website!

PART 61 - CERTIFICATION OF COMMERCIAL PILOTS

Certificates Required

Pilot certificate must be in your physical possession while acting as pilot in command. (FAR 61.3)

If requested, you must show your certificate to any federal, state, or local law enforcement officer. (FAR 61.3)

Pilot certificates are issued without a specific expiration date. (FAR 61.19)

Medical Certificates Required

A second class medical is required to exercise the privileges of a commercial pilot certificate. BasicMed is not allowed. A second class expires after 12 calendar months, but may be used 60 calendar months for private privileges if issued under the age 40, and 24 months if issued after age 40.

A second-class medical certificate issued to a commercial pilot on April 10, this year, permits the pilot to exercise commercial pilot privileges through April 30, next year. (FAR 61.23)

Medical Certificates (BasicMed)

Although a commercial pilot cannot operate in a commercial operation with BasicMed, we have included the basics of BasicMed in this study guide because the training industry isn't sure what the FAA is asking or will ask commercial pilot applicants in the future about BasicMed.

BasicMed allows a pilot who has previously held a valid "class" medical certificate on or after July 15, 2006, to act as PIC with 3rd class privileges. (Not for hire)

Requirements for BasicMed

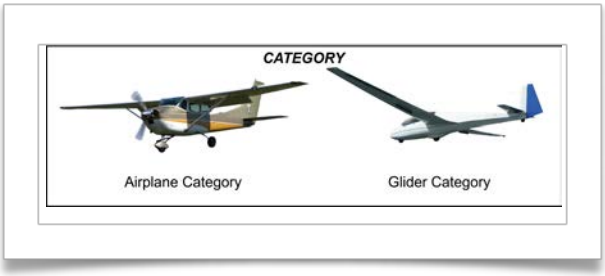
- Must hold a valid state driver's license.
- Must get a basic physical from a licensed physician, then again every 4 years (48 mo)
- Must take the on-line Medical Education Course (MEC) then again every 2 years (24 mos)

Limitations while flying under BasicMed

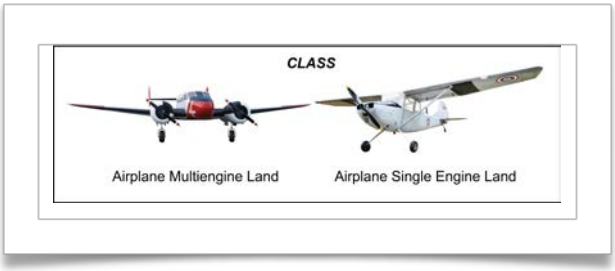
- Cannot use for hire operations.
- Flight in U.S and Bahamas only.
- Maximum altitude 18,000 feet MSL.
- Maximum speed 250 KIAS.
- Maximum occupants 6 (including pilot).
- Maximum aircraft weight 6,000 MTOW.**Aircraft**

Aircraft Ratings

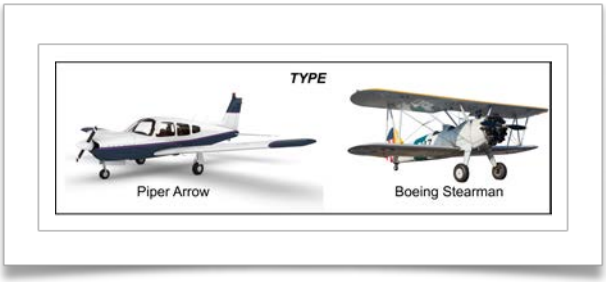
With respect to certification of airmen:
CATEGORY - a broad classification of aircraft (airplane, rotorcraft, glider, and lighter-than-air).



CLASS - airplane class ratings include single engine land, multiengine land, single engine sea, multiengine sea. A category and class rating is required for compensation or hire.



TYPE - a specific make and model, such as Cessna 172 or B-737. A type rating is required to act as pilot in command of an aircraft with gross weight more than 12,500 lbs or Jet. (FAR 61.5)



Pilot Logbooks

Must log the flight time to meet recent flight experience and training requirements.

You may only log as second in command flight time while acting as second in command in an aircraft requiring more than one pilot. (FAR 61.51)

Recent Flight Experience

Pilot in Command (PIC) must have successfully accomplished a flight review within the last 24 calendar months. (FAR 61.56)

To act as pilot in command of a high performance airplane (an engine with more than 200HP) or, a complex airplane (retractable gear, flaps, and controllable pitch prop) must receive flight instruction and have the appropriate endorsement from an authorized instructor. (FAR61.31)

To carry passengers during the day, you need to have made 3 takeoff and landings within the last 90 days in an aircraft of the same category and class. To carry passengers at night, you need to have made 3 takeoff and landings to a full stop at night (one hour after sunset to one hour before sunrise) within the last 90 days in an aircraft of the same category and class.

If you do not meet the night requirement and are carrying passengers, you must land before one hour after sunset. If sunset is 1800, the latest time passengers may be carried is 1859. (FAR 61.57)

Instrument Proficiency

No pilot may act as pilot in command of an aircraft under IFR or in weather conditions less than the prescribed for VFR unless within the past 6 months has logged
six instrument approaches, holding procedures, intercepting and tracking courses, or passed an instrument proficiency check in an aircraft that is appropriate to the aircraft category.

PART 91 - GENERAL OPERATING RULES

Commercial Pilot Privileges

When you obtain a Commercial Pilot Certificate, you are able to get paid for certain pilot services outside of 14 CFR 119. Popular jobs (other than an Air Carrier) are corporate pilots, aerial photography, parachute jump, crop duster, seeding, spray and bird chasing pilots.

Air Carrier is defined as someone who “holds themselves out” to the general public for air transport services. Airlines, Charter, Freight, etc., are examples of Air Carriers.

As a Commercial Pilot, you are never allowed to hold yourself out to the general public unless you or the air carrier you are flying for have an FAA Air Carrier Certificate. (e.g. Part 121 and 135)

For the most part, the FAA Commercial Pilot test does not address those types of operations. That’s why in many test questions you will see the language “other than as an air carrier” quite often.

Compensation for Hire Limitations

To Operate or Operating with respect to aircraft, means to use, cause to use, or authorize to use aircraft and having the authority over initiating, conducting, or terminating a flight.

Commercial pilots could be authorized to conduct non-stop sight-seeing trips, provided they obtain an FAA Letter of Authorization (LOA) from their nearest FSDO office. In this type of operation, you could hold yourself out, but only within the conditions of the LOA.

For sightseeing trips authored by an LOA, you cannot fly more than 25 NM away from the departure airport and can only land back at the original point of departure airport.

It is possible to obtain a commercial pilot certificate without an instrument rating. However, your commercial privileges are severely limited.

A non-instrument rated commercial pilot may not carry passengers for hire at night, or during the daytime on cross-country flights of more than 50 NM.

Preflight Action

PIC required to obtain all available information including runway lengths are adequate at airports of intended use.

Flights not in the vicinity of an airport must also have an alternative course of action if the flight cannot be completed as planned. (FAR 91.103)

Seatbelt Use

Pilots must brief passengers (PAX) about the use of seal belts and other safety related items.

Flight crew-members must wear seat-belts while at their stations, and all occupants must wear seat-belts during takeoff and landing. (FAR 91.107)

Supplemental Oxygen

Part 91- Above 12,500 MSL, flight crew must use oxygen after 30 minutes. 14,000 feet continuously.

Part 135 - Above 10,000 MSL, after 30 minutes. 12,000 feet continuously.

(Watch which FAR the FAA test question is asking about)

Required Equipment for Hire

When beyond power-off gliding distance from shore, you must have approved flotation gear readily available to each occupant.

If operating for hire at night, you must have an anti-collision light system and electric landing light.

Portable electronic devices which may cause interference may not be operated on U.S.-registered civil aircraft being flown under IFR and air carrier operations. (FAR 91.21)

To act as pilot in command of an airplane towing a glider, the tow pilot is required to have a logbook endorsement from an authorized glider instructor certifying ground and flight training in glider operations, and be proficient for safe towing of gliders.(FAR 61.69)

Emergency Locator Transmitter

The maximum time an ELT battery may be operated before being recharged or replaced is 60 minutes (1 hour). ELT's operate on 121.5 and 406 MHZ. (FAR 91.207)

Right Of Way Rules

CONVERGING- the aircraft on the right has the right of way, regardless if it is a helicopter or single or multiengine airplane. The other aircraft must give way.

OVERTAKING- the faster alters course to the right and passes well clear.

AIRCRAFT MAINTENANCE (MX) — General

The owner or operator of an aircraft is primarily responsible for maintaining the aircraft in an airworthy condition. (FAR 91.403)

The validity of the airworthiness certificate is maintained by completing all required maintenance and inspections.
(FAR 91.409)

Annual and 100 Hour Inspections

The aircraft maintenance records (logbooks) contain the date of the last annual inspection and the return-to-service statement.

Every aircraft needs an annual inspection every 12 calendar months. Annual counts as a 100 hour, but not the other way around.

Airworthiness Directives (AD)

Sometimes a condition is discovered in an aircraft whereas a MX issue or parts are found to be dangerous or defective. When the condition affects more than one aircraft, the FAA will often issue an Airworthiness Directive (AD) for that specific type of aircraft by serial numbers.

The AD may require the immediate replacement or inspection of a defective part. There are many conditions and solutions that come with AD's. Virtually every aircraft flying out there today has had at least one in the aircraft's history. It is very common.

AD's fall under regulations of FAR 21,43 and 91. Compliance with AD's is mandatory and is the responsibility of the owner or operator of an aircraft, and must be shown in the aircraft MX records.

A new MX record being used for a rebuilt aircraft engine must include changes as required by an AD.

Other Maintenance Items (MX)

A copy of a large civil aircraft lease must be sent to the FAA in Oklahoma City within 24 hours of its execution. (FAR 91 .23)

A record of preventative maintenance and a description of the work must be entered in the aircraft maintenance records.

Aircraft used in certain commercial operations like Part 135 must adhere to engine Time Between Overhaul (TBO) that part 91 aircraft do not. Often, Part 135 aircraft must also adhere to Service Bulletins (SB) and replace certain parts at specific intervals whether they need replaced or not. These are called "Life Limited Parts."

Examples of life limited parts are the Engine, Propeller and Rotor Blades and Appliances, such as Hydraulic Pumps.

Aircraft MX records must include the current status of all life limited parts.

Carrying Passengers After Alteration

After an aircraft has been repaired or altered in a manner that may have substantially changed its flight characteristics, passengers may not be carried until a flight test is accomplished by at least a Private Pilot. (FAR 91.407)

NTSB Part 830

The operator must immediately notify the NTSB of any accident or incident listed below:

- Any damage which adversely affects structural strength or flight characteristics.
- Any aircraft control malfunction.
- Inability of flight crew-member to perform duties as a result of in-flight injury or illness.
- In-flight (only) fire, including a small electrical fire extinguished immediately.
- Serious injury which requires hospitalization within 7 days for more than 48 hours.

Ground fires, ground propeller strikes or landing gear damage while taxiing does NOT require a report.
(NTSB 830)

FAA Reporting Requirements

If you change your permanent address, you must notify the FAA Airmen Certification Branch within 30 days.

A pilot arrested or convicted of operating a motor vehicle while under the influence of alcohol or drugs is required to provide a written report to the FAA Civil Aviation Security Division (AMC-700) within 60 days after the conviction.

AERONAUTICAL DECISION MAKING (ADM)

ADM is systematic approach to the mental process used by pilots to consistently determine the best course of action in respect to a given set of circumstances.

ADM requires a self-assessment of hazardous attitudes. Five hazardous attitudes are identified and each one recommends an “Antidote” if an attitude is recognized.

1. **Anti-Authority** (Don’t tell me!) these people believe rules and regulations are silly or unnecessary. Antidote; follow the rules, they are usually right.

2. **Impulsivity** (Do something quickly!) this shows up as a “do it now before it gets worse” attitude. Antidote; Not so fast, think, first.

3. **Invulnerability** (It can’t happen to me!) These people believe they have seen it all. It can’t get worse than this. Antidote; It could happen to me.

4. **Macho** (I can do it!) This is an attitude that you can “show theme and do anything. Antidote; Taking chances is foolish.

5. **Resignation** (What’s the use?) These people don’t think they can make a difference. “It’s not my problem, nobody told me”. Antidote; I’m not helpless, I can make a difference.

The ADM steps for making a good decision are:

1. Identifying personal attitudes hazardous to safe flight.
2. Learning behavior modification techniques.
3. Develop good life stress management.
4. Developing risk assessment skills.
5. Using all resources in SRM and CRM situations.
6. Evaluating the effectiveness of one’s ADM skills.

Behavioral Traps can lead a pilot into poor ADM. High time pilots may feel a need to have the “right stuff”. This can lead to practices that are dangerous or illegal. A dangerous tendency or behavior pattern is Get - there- itis.

Risk Management is the part of the decision making process, which relies on situational awareness, problem recognition, and good judgment to reduce the risks associated with each flight.

The **DECIDE** model is a six-step process to help a pilot approach ADM in a logical way.

1. **D**etect The decision maker detects the fact that change has occurred.
2. **E**stimate The decision maker estimates the need to counter or react to the change.
3. **C**hoose The decision maker chooses a desirable outcome (in terms of success) for the flight.
4. **I**dentify The decision maker identifies action which could successfully control the change.
5. **D**o The decision maker takes the necessary. action.
6. **E**valuate The decision maker evaluates the effect(s) of his/her action countering the change.

LAND AND HOLD SHORT OPERATIONS (LAHSO)

Land and Hold Short Operations (LAHSO) is an air traffic control procedure that increases an airports capacity by having a pilot land and then hold short of an intersecting runway or taxiway, or some other designated point on a runway.

Basic VFR must exist for LAHSO (1,000 ft. ceiling and 3 miles visibility). and Student pilots are not allowed to participate in the LAHSO program.

The pilot-in -command has the final authority to accept or decline an LAHSO clearance. A pilot should decline a LAHSO clearance when it will compromise safety.

The Available Landing Distance (ALD) data for LAHSO is published in the Chart Supplement.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5001. COM
Notification to the NTSB is required when there has been substantial damage
A) which requires repairs to landing gear.
B) to an engine caused by engine failure in flight.
C) which adversely affects structural strength or flight characteristics.

5002. COM
NTSB Part 830 requires an immediate notification as a result of which incident?
A) Engine failure for any reason during flight.
B) Damage to the landing gear as a result of a hard landing.
C) Any required flight crew-member being unable to perform flight duties because of illness.

5003. COM
Which incident would require that the nearest NTSB field office be notified immediately?
A) In-flight fire.
B) Ground fire resulting in fire equipment dispatch.
C) Fire of the primary aircraft while in a hangar which results in damage to other property of more than $25,000.

5004. COM
While taxiing for takeoff, a small fire burned the insulation from a transceiver wire. What action would be required to comply with NTSB Part 830?
A) No notification or report is required.
B) A report must be filed with the avionics inspector at the nearest FAA-field office within 48 hours.
C) An immediate notification must be filed by the operator of the aircraft with the nearest NTSB field office.

5005. COM
During flight a fire which was extinguished burned the insulation from a transceiver wire. What action is required by regulations?
A) No notification or report is required.
B) Report must be filed with the avionics inspector at the nearest FAA field office within 48 hours.
C) An immediate notification by the operator of the aircraft to the nearest NTSB field office.

5006. COM
When should notification of an aircraft accident be made to the NTSB if there was substantial damage and no injuries?
A) Immediately.
B) Within 10 days.
C) Within 30 days.

5008. COM
Within how many days of an accident is an accident report required to be filed with the nearest NTSB field office?
A) 2 days.
B) 7 days.
C) 10 days.

5010. COM
Regulations which refer to commercial operators relate to that person who;
A) is the owner of a small scheduled airline.
B) for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, as an air carrier.
C) for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier.

5011. COM
Regulations which refer to operate relate to that person who;
A) acts as pilot in command of the aircraft.
B) is the sole manipulator of the aircraft controls.
C) causes the aircraft to be used or authorizes its use.

5012. COM
Regulations which refer to the operational control of a flight are in relation to;
A) the specific duties of any required crew-member.
B) acting as the sole manipulator of the aircraft controls.
C) exercising authority over initiating, conducting, or terminating a flight.

5018. COM
Commercial pilots are required to have a valid and appropriate pilot certificate in their physical possession or readily accessible in the aircraft when
A) piloting for hire only.
B) acting as pilot in command.
C) carrying passengers only.

5019. COM
Which of the following is considered aircraft class ratings?
A) Transport, normal, utility, and acrobatic.
B) Airplane, rotorcraft, glider, and lighter-than air.
C) Single -engine land, multiengine land. single-engine sea, and multiengine sea.

5020. COM
Does a commercial pilot certificate have a specific expiration date?
A) No, it is issued without a specific expiration date.
B) Yes, it expires at the end of the 24th month after the month in which it was issued.
C) No, but commercial privileges expire if a flight review is not satisfactorily completed each 12 months.

5021. COM
A second-class medical certificate issued to a commercial pilot on April 10, this year, permits the pilot to exercise which of the following privileges?
A) Commercial pilot privileges through April 30, next year.
B) Commercial pilot privileges through April 10, 2 years later.
C) Private pilot privileges through, but not after, March 31, next year.

5021-1. COM
The holder of a commercial pilot certificate while exercising commercial pilot privileges is restricted from operating under BasicMed
A) at anytime.
B) for flights over 18,000 FT MSL.
C) if carrying more than 5 passengers.

5022. COM
When is the pilot in command required to hold a category and class rating appropriate to the aircraft being flown?
A) On flights when carrying another person.
B) All solo flights.
C) On practical tests given by an examiner or FAA Inspector.

5023. COM
Unless otherwise authorized the pilot in command is required to hold a type rating when operating any
A) Aircraft that is certified for more than one pilot.
B) Aircraft of more than 12,500 pounds maximum certified takeoff weight.
C) Multiengine aircraft having a gross weight of . more than 6.000 pounds.

5024. COM
To act as pilot in command of an airplane that is equipped with retractable landing gear, flaps, and controllable-pitch propeller, a person is required to;
A) hold a multiengine airplane class rating.
B) make at least six takeoffs and landings in such an airplane within the preceding 6 months.
C) receive and log ground and flight training in such an airplane, and obtain a logbook endorsement certifying proficiency.

5025. COM
What flight time may a pilot log as second in command?
A) All flight time while acting as second in command in aircraft configured for more than one pilot.
B) Only that flight time during which the second in command is the sole manipulator of the controls.
C) All flight time when qualified and occupying a crew-member station in an aircraft that requires more than one pilot.

5026. COM
What flight time must be shown, in a reliable record, by a pilot exercising the privileges of a commercial certificate?
A) Flight time showing aeronautical training and experience to meet requirements for a certificate or rating.
B) All flight time flown for compensation or hire.
C) Only flight time for compensation or hire with passengers aboard which is necessary to meet the recent flight experience requirements.

5027. COM
If a pilot does not meet the recency of experience requirements for night flight and official sunset is 1900 CST, the latest time passengers should be carried is
A) 1800 CST.
B) 1959 CST.
C) 1900 CST.

5028. COM
Prior to carrying passengers, the pilot in command must have accomplished the required takeoffs and landings in;
A) The same category. class. arid type of aircraft (if a type rating is required).
B) Any category aircraft.
C) The same category and class of aircraft to be used.

5030. COM
No pilot may act as pilot in command of an aircraft under IFR or in weather conditions less than the minimums prescribed for VFR unless that pilot has, within the past 6 months, performed and logged under actual or simulated instrument conditions, at least
A) three instrument approaches and logged 3 hours of instruments.
B) six instrument flights and six approaches.
C) six instrument approaches, holding procedures, intercepting and tracking courses, or passed an instrument proficiency check in an aircraft that is appropriate to the aircraft category.

5032. COM
Pilots who change their permanent mailing address and fail to notify the FAA Airmen Certification Branch of this change are entitled to exercise the privileges of their pilot certificate for a period of
A) 30 days.
B) 60 days.
C) 90 days.

5033. COM
To act as pilot in command of an airplane towing a glider, the tow pilot is required to have
A) a logbook record of having made at least three flights as sole manipulator of the controls of a glider being towed by an airplane.
B) a logbook endorsement from an authorized glider instructor certifying receipt of ground and flight training in gliders, and be proficient with techniques and procedures for safe towing of gliders.
C) at least a private pilot certificate with a category rating for powered aircraft, and made and logged at least three flights as pilot or observer in a glider being towed by an airplane.

5034. COM
To act as pilot in command of an airplane towing a glider, a pilot must have accomplished, within the preceding 12 months, at least
A) three actual glider tows under the supervision of a qualified tow pilot.
B) ten flights as pilot in command of an aircraft while towing a glider.
C) three actual or simulated glider tows while accompanied by a qualified tow pilot.

5039. COM
What limitation is imposed on a newly certificated commercial pilot - airplane, if that person does not hold an instrument rating? The carriage of passengers
A) or property for hire on cross-country flights at night is limited to a radius of 50 NM.
B) for hire on cross-country flights is limited to 50 NM for night flights, but not limited for day flights.
C) for hire on cross-country flights in excess of 50 NM, or for hire at night is prohibited.

5044. COM
What action must be taken when a pilot in command deviates from any rule in 14 CFR part 91?
A) Upon landing, report the deviation to the nearest FAA Flight Standards District Office.
B) Advise ATC of the pilot in command's intentions.
C) Upon the request of the Administrator, send a written report of that deviation to the Administrator.

5045. COM
Who is responsible for determining if an aircraft is in condition for safe flight?
A) A certificated aircraft mechanic.
B) The pilot in command.
C) The owner or operator.

5046. COM
When operating a U.S.-registered civil aircraft, which document is required by regulation to be available in the aircraft?
A) A manufacturer's Operations Manual.
B) A current, approved Airplane Flight Manual.
C) An Owner's Manual.

5047. COM
A pilot in command (PIC) of a civil aircraft may not allow any object to be dropped from that aircraft in flight
A) if it creates a hazard to persons and property.
B) unless the PIC has permission to drop any object over private property.
C) unless reasonable precautions are taken to avoid injury to property.

5049. COM
The required preflight action relative to weather reports and fuel requirements is applicable to
A) IFR flights only.
B) any flight not in the vicinity of an airport.
C) any flight conducted for compensation or hire.

5050. COM
Before beginning any flight under IFR, the pilot in command must become familiar with all available information concerning that flight. In addition, the pilot must
A) be familiar with all instrument approaches at the destination airport.
B) list an alternate airport on the flight plan, and confirm adequate takeoff and landing performance at the destination airport.
C) be familiar with the runway lengths at airports of intended use, and the alternatives available, if the flight cannot be completed.

5051. COM
Required flight crew-members' seat-belts must be fastened;
A) only during takeoff and landing.
B) while the crew-members are at their stations.
C) only during takeoff and landing when passengers are aboard the aircraft.

5052. COM
With U.S. registered civil airplanes, the use of seat-belts is required during movement on the surface, takeoffs and landings for:
A) each person over 2 years of age on board.
B) commercial passenger operations only.
C) safe operating practice, but not required by regulations.

5055. COM
Which is required to operate an aircraft towing an advertising banner?
A) Approval from ATC to operate in Class E airspace.
B) A certificate of waiver issued by the Administrator.
C) A safety link at each end of the towline which has a breaking strength not less than 80 percent of the aircraft's gross weight.

5056. COM
Portable electronic devices which may cause interference with the navigation or communication system may not be operated on a U.S.- registered civil aircraft being flown
A) along Federal airways.
B) within the U.S.
C) in air carrier operations.

5063. COM
In accordance with FAR Part 91, supplemental oxygen must be used by the required minimum flight crew for that time exceeding 30 minutes while at cabin pressure altitudes of;
A) 10,500 feet MSL feet MSL.
B) 12,000 feet MSL feet MSL
C) 12,500 feet MSL feet MSL.

5065. COM
Which is required equipment for powered aircraft during VFR night flights?
A) Anti-collision light system.
B) Gyroscopic direction indicator.
C) Gyroscopic bank-and-pitch indicator.

5066. COM
Which is required equipment for powered aircraft during VFR night flights?
A) Flashlight with red lens, if the flight is for hire.
B) An electric landing light, if the flight is for hire.
C) Sensitive altimeter adjustable for barometric pressure.

5067. COM
Approved flotation gear, readily available to each occupant, is required on each airplane if it is being flown for hire over water,
A) in amphibious aircraft beyond 50 NM from shore.
B) beyond power-off gliding distance from shore.
C) more than 50 statute miles from shore.

5069. COM
The carriage of passengers for hire by a commercial pilot is
A) not authorized in a 'limited' category aircraft.
B) not authorized in a 'utility' category aircraft.
C) authorized in 'restricted' category aircraft.

5070. COM
The maximum cumulative time that an emergency locator transmitter may be operated before the rechargeable battery must be recharged is
A) 30 minutes.
B) 45 minutes.
C) 60 minutes.

5071. COM
No person may operate a large civil aircraft of U.S. registry which is subject to a lease, unless the lessee has mailed a copy of the lease to the FAA Aircraft Registration Branch, Technical Section, Oklahoma City, OK, within how many hours of its execution?
A) 24.
B) 48.
C) 72.

5073. COM
Which is true with respect to formation flights? Formation flights are
A) authorized when carrying passengers for hire, with prior arrangement with the pilot in command of each aircraft in the formation.
B) not authorized when visibilities are less than 3 miles.
C) not authorized when carrying passengers for hire.

5073-1. COM
Which is true with respect to formation flights? Formation flights are;
A) not authorized, when operated so close to another aircraft they can create a collision hazard.
B) not authorized, unless the pilot in command of each aircraft is trained and found competent in formation.
C) authorized when carrying passengers for hire, with prior arrangement with the pilot in command of each aircraft in the formation.

5073-2. COM
Which is true with respect to formation flights? Formation flights are;
A) not authorized, except by arrangement with the pilot in command of each aircraft.
B) not authorized, unless the pilot in command of each aircraft is trained and found competent in formation.
C) authorized when carrying passengers for hire, with prior arrangement with the pilot in command of each aircraft in the formation.

5074. COM
While in flight a helicopter and an airplane are converging at a 90° angle, and the helicopter is located to the right of the airplane. Which aircraft has the right-of-way, and why?
A) The helicopter, because it is to the right of the airplane.
B) The helicopter, because helicopters have the right-of-way over airplanes.
C) The airplane, because airplanes have the right-of-way over helicopters.

5075. COM
Two aircraft of the same category are approaching an airport for the purpose of landing. The right-of-way belongs to the aircraft
A) at the higher altitude.
B) at the lower altitude, but the pilot shall not take advantage of this rule to cut in front of or to overtake the other aircraft.
C) that is more maneuverable, and that aircraft may, with caution, move in front of or overtake the other aircraft.

5076. COM
Airplane A is overtaking airplane B. Which airplane has the right-of-way?
A) Airplane A; the pilot should alter course to the right to pass.
B) Airplane B; the pilot should expect to be passed on the right.
C) Airplane B; the pilot should expect to be passed on the left.

5077. COM
What is the maximum indicated airspeed allowed in the airspace underlying Class B airspace?
A) 156 knots.
B) 200 knots.
C) 230 knots.

5078. COM
Unless otherwise authorized or required by ATC, the maximum indicated airspeed permitted when at or below 2,500 feet AGL within 4 NM of the primary airport within Class C or D airspace is
A) 180 knots.
B) 200 knots.
C) 230 knots.

5079. COM
What is the minimum altitude and flight visibility required for acrobatic flight?
A) 1,500 feet AGL and 3 miles.
B) 2,000 feet MSL and 2 miles.
C) 3,000 feet AGL and 1 mile.

5080. COM
If not equipped with required position lights, an aircraft must terminate flight
A) at sunset.
B) 30 minutes after sunset.
C) 1 hour after sunset.

5091. COM
VFR cruising altitudes are required to be maintained when flying
A) at 3,000 feet or more AGL, based on true course.
B) more than 3,000 feet AGL, based on magnetic course.
C) at 3,000 feet or more above MSL, based on magnetic heading.

5093. COM
Who is primarily responsible for maintaining an aircraft in an airworthy condition?
A) The lead mechanic responsible for that aircraft.
B) Pilot in command or operator.
C) Owner or operator of the aircraft.

5094. COM
Assuring compliance with an Airworthiness Directive is the responsibility of the
A) pilot in command and the FAA certificated mechanic assigned to that aircraft.
B) pilot in command of that aircraft.
C) owner or operator of that aircraft.

5095. COM
After an annual inspection has been completed and the aircraft has been returned to service, an appropriate notation should be made
A) on the airworthiness certificate.
B) in the aircraft maintenance records.
C) in the FAA-approved flight manual.

5096. COM
A standard airworthiness certificate remains in effect as long as the aircraft receives
A) an annual inspection.
B) an annual inspection and a 100-hour inspection prior to their expiration dates.
C) required maintenance and inspections.

5097. COM
If an aircraft's operation in flight was substantially affected by an alteration or repair, the aircraft documents must show that it was test flown and approved for return to service by an appropriately-rated pilot prior to being operated
A) by any private pilot.
B) with passengers aboard.
C) for compensation or hire.

5098. COM
Which is correct concerning preventive maintenance, when accomplished by a pilot?
A) A record of preventive maintenance is not required.
B) A record of preventive maintenance must be entered in the maintenance records.
C) Records of preventive maintenance must be entered in the FAA-approved flight.

5099. COM
An aircraft carrying passengers for hire has been on a schedule of inspection every 100 hours of time in service. Under which condition, if any, may that aircraft be operated beyond 100 hours without a new inspection?
A) The aircraft may be flown for any flight as long as the time in service has not exceeded 110 hours.
B) The aircraft may be dispatched for a flight of any duration as long as 100 hours has not been exceeded at the time it departs.
C) The 100-hour limitation may be exceeded by not more than 10 hours if necessary to reach a place at which the inspection can be done.

5100. COM
Which is true concerning required maintenance inspections?
A) A 100-hour inspection may be substituted for an annual inspection.
B) An annual inspection may be substituted for a 100-hour inspection.
C) An annual inspection is required even if a progressive inspection system has been approved.

5101. COM
An ATC transponder is not to be used unless it has been tested, inspected, and found to comply with regulations within the preceding
A) 30 days.
B) 12 calendar months.
C) 24 calendar months.

5102. COM
Aircraft maintenance records must include the current status of the
A) applicable airworthiness certificate.
B) life-limited parts of only the engine and airframe.
C) life-limited parts of each airframe, engine, propeller, rotor, and appliance.

5103. COM
Which is true relating to Airworthiness Directives (AD's)?
A) AD's are advisory in nature and are, generally, not addressed immediately.
B) Noncompliance with AD's renders an aircraft un-airworthy.
C) Compliance with AD's is the responsibility of maintenance personnel.

5104. COM
A new maintenance record being used for an aircraft engine rebuilt by the manufacturer must include previous
A) operating hours of the engine.
B) annual inspections performed on the engine.
C) changes as required by Airworthiness Directives.

5105. COM
If an ATC transponder installed in an aircraft has not been tested, inspected, and found to comply with regulations within a specified period, what is the limitation on its use?
A) Its use is not permitted.
B) It may be used when in Class G airspace.
C) It may be used for VFR flight only.

5106. COM
To act as pilot-in-command of an airplane with more than 200 horsepower, a person is required to
A) receive and log ground and flight training from a qualified pilot in such an airplane.
B) receive and log ground and flight training from an authorized instructor in such an airplane.
C) obtain an endorsement from a qualified pilot stating that the person is proficient to operate such an airplane.

5107. COM
To serve as pilot in command of an airplane that is certified for more than one pilot crew-member, and operated under part 91, a person must
A) complete a flight review within the preceding 24 calendar months.
B) receive and log ground and flight training from an authorized flight instructor.
C) complete a pilot-in-command proficiency check within the preceding 12 calendar months in an airplane that is type certificated for more than one pilot.

5108. COM
To serve as second in command of an airplane that is certificated for more than one pilot crewmember, and operated under Part 91, a person must:
A) receive and log flight training from an authorized flight instructor in the type of airplane privileges are requested.
B) hold at least a commercial pilot certificate with an airplane category rating.
C) within the last 12 months become familiar with the required information, and perform and log pilot time in the type of airplane for which privileges are requested.

5109. COM
What person is directly responsible for the final authority as to the operation of the airplane?
A) Certificate holder.
B) Airplane owner/operator.
C) Pilot in command.

5110. COM
Operating regulations for U.S. registered civil airplanes require that during movement on the surface takeoffs, and landings, a seat belt and shoulder harness (if installed) must be properly secured about each:
A) flight crew members only.
B) person on board.
C) flight and cabin crew members.

5111. COM
No person may operate an aircraft in simulated instrument flight conditions unless the
A) pilot has filed an IFR flight plan and received an IFR clearance.
B) other control seat is occupied by a safety pilot, who holds at least a private pilot certificate and is appropriately rated.
C) other control seat is occupied by at least an appropriately rated commercial pilot.

5112. COM
If the minimum safe speed for any particular operation is greater than the maximum speed prescribed in 14 CFR part 91, the;
A) operator must have a Letter of Agreement with ATC.
B) operator must have a Memorandum of Agreement (MOA) with the controlling agency.
C) aircraft may be operated at that speed.

5114. COM
What altimeter setting is required when operating an aircraft at 18,000 feet MSL?
A) Current reported altimeter setting of a station along the route.
B) Altimeter setting at the departure or destination airport.
C) 29.92 Inches Hg.

5115. COM
After an ATC clearance has been obtained, a pilot may not deviate from that clearance, unless the pilot
A) receives an amended clearance or has an emergency.
B) is operating VFR on top.
C) requests an amended clearance.

5116. COM
When approaching to land at an airport, without an operating control tower, in Class G airspace, the pilot should
A) enter and fly a traffic pattern at 800 feet AGL.
B) make all turns to the left, unless otherwise indicated.
C) fly a left-hand traffic pattern at 800 feet AGL.

5117. COM
When operating an aircraft in the vicinity of an airport with an operating control tower, in Class E airspace, a pilot must establish communications prior to
A) 5 NM, and up to and including 3,000 feet AGL.
B) 8 NM, and up to and including 3,000 feet AGL.
C) 4 NM, and up to and including 2,500 feet AGL.

5118. COM
When approaching to land at an airport with an ATC facility, in Class D airspace, the pilot must establish communications prior to
A) 4 NM, up to and including 2,500 feet AGL.
B) 10 NM, up to and including 3,000 feet AGL.
C) 30 SM, and be transponder equipped.

5119. COM
Which is true regarding flight operations to or from a satellite airport, without an operating control tower, within the Class C airspace area?
A) Prior to takeoff, a pilot must establish communication with the ATC controlling facility.
B) Aircraft must be equipped with an ATC transponder.
C) Prior to entering that airspace, a pilot must establish and maintain communication with the ATC serving facility.

5120. COM
Which is true regarding flight operations in Class A airspace?
A) May conduct operations under visual flight rules.
B) Aircraft must be equipped with approved distance measuring equipment (DME).
C) Aircraft must be equipped with an ATC transponder and altitude reporting equipment.

5126. COM
A person with a commercial pilot certificate may act as pilot in command of an aircraft carrying persons or property for compensation or hire, if that person
A) holds appropriate category, class ratings, and meets the recent flight experience requirements of 14 CFR part 61.
B) is qualified in accordance with 14 CFR part 61 and with the applicable parts that apply to the operation.
C) is qualified in accordance with 14 CFR part 61 and has passed a pilot competency check given by an authorized check pilot.

5128. COM
To act as pilot in command of a tailwheel airplane without prior experience, a pilot must
A) log ground and flight training from an authorized instructor.
B) pass a competency check and receive an endorsement from an authorized instructor.
C) receive and log flight training from an authorized instructor.

5129. COM
No person may operate an aircraft that has an experimental airworthiness certificate
A) under instrument flight rules (IFR).
B) when carrying property for hire.
C) when carrying persons or property for hire.

5138. COM
Who has the final authority to accept or decline any 'land and hold short' (LAHSO) clearance?
A) Airplane owner/operator.
B) ATC tower controller.
C) Pilot-in-command.

5139. COM
When should pilots decline a 'land and hold short' (LAHSO) clearance?
A) If runway surface is contaminated.
B) When it will compromise safety.
C) Only when the tower controller concurs.

5140. COM
What is the minimum visibility and ceiling required for a pilot to receive a 'land and hold short' clearance?
A) 3 nautical miles and 1,000 feet.
B) 3 statute miles and 1,000 feet.
C) 3 statute miles and 1,500 feet.

5141. COM
A pilot arrested or convicted of operating a motor vehicle while either intoxicated by, impaired by, or under the influence of alcohol or a drug is required to provide a;
A) written report to the FAA Civil Aeromedical Institute (CAMI) within 60 days after the motor vehicle action.
B) written report to the FAA Civil Aviation Security Division (AMC-700) not later than 60 days after the conviction.
C) notification of the conviction to an FAA Aviation Medical Examiner (AME) not later than 60 days after the motor vehicle action.

5800. COM
Which airborne incident would require that the nearest NTSB field office be notified immediately?
A) Cabin door opened in-flight.
B) Flight control system malfunction or failure.
C) Cargo compartment door malfunction or failure.

5801. COM
While taxiing on the parking ramp, the landing gear, wheel, and tire are damaged by striking ground equipment. What action would be required to comply with NTSB Part 830?
A) A report must be filed with the nearest FAA field office within 7 days.
B) An immediate notification must be filed by the operator of the aircraft with the nearest NTSB field office.
C) No notification or report is required.

5802. COM
The required preflight action relative to weather reports and fuel requirements is applicable to
A) IFR flights only.
B) any flight not in the vicinity of an airport.
C) any flight conducted for compensation or hire.

5803. COM
Before beginning any flight under IFR the pilot in command must become familiar with all available information concerning that flight. In addition the pilot must:
A) Be familiar with all instrument approaches at the destination airport.
B) List an alternate airport on the flight plan and confirm adequate takeoff and landing performance at the destination airport.
C) Be familiar with the runway lengths at airports of intended use, weather reports, fuel requirements, and the alternatives available if the flight cannot be completed.

5804. COM
Each required flight crew-member is required to keep his or her shoulder harness fastened
A) during takeoff and landing, unless he or she is unable to perform required duties.
B) while the crew-members are at their stations, unless he or she is unable to perform required duties.
C) during takeoff and landing only when passengers are aboard the aircraft.

5805. COM
Portable electronic devices which may cause interference with the navigation or communication system may not be operated on a U.S.- registered civil aircraft being flown;
A) along Federal airways.
B) within the U.S.
C) in air carrier operations.

5806. COM
Which is true with respect to operating limitations of a 'restricted' category airplane?
A) A 'restricted' category airplane is limited to an operating radius of 25 miles from its home base.
B) A pilot of a 'restricted' category airplane is required to hold a commercial pilot certificate.
C) No person may operate a 'restricted' category airplane carrying passengers or property for compensation or hire.

5965. COM
What period of time must a person be hospitalized before an injury may be defined by the NTSB as a 'serious injury'?
A) 72 hours; commencing within 10 days after date of the injury.
B) 48 hours; commencing within 7 days after date of the injury.
C) 10 days, with no other extenuating circumstances.

5966. COM
In what type of operation, not regulated by 14 CFR part 119, may a commercial pilot act as pilot in command and receive compensation for services?
A) Part-time contract pilot.
B) Nonstop flights within a 25 SM radius of an airport to carry persons for intentional parachute jumps.
C) Nonstop flights within a 25 SM radius of an airport to carry cargo only.

5967. COM
In what type of operation, not regulated by 14 CFR part 119, may a commercial pilot act as pilot in command and receive compensation for services?
A) On-demand, nine or less passenger, charter flights.
B) Crop dusting, spraying, and bird chasing.
C) On-demand cargo flights.

5941. COM
Risk management, as part of the Aeronautical Decision Making (ADM) process, relies on which feature to reduce the risks associated with each flight?
A) The mental process of analyzing all information in a particular situation and making a timely decision on what action to take.
B) Applications of stress management and risk element procedures.
C) Situational awareness, problem recognition, and good judgment.

5942. COM
Aeronautical Decision Making (ADM) is a:
A) Systematic approach to the mental process used by pilots to consistently determine the best course of action for a given set of circumstances.
B) Decision making process which relies on good judgment to reduce risks associated with each flight.
C) Mental process of analyzing all information in a particular situation and making a timely decision on what action to take.

5943. COM
The Aeronautical Decision Making (ADM) process identifies the steps involved in good decision making. One of these steps includes a pilot
A) identifying personal attitudes hazardous to safe flight.
B) developing the 'right stuff' attitude.
C) making a rational evaluation of the required actions.

5944. COM
Examples of classic behavioral traps that experienced pilots may fall into are: trying to
A) assume additional responsibilities and assert PIC authority.
B) promote situational awareness and then necessary changes in behavior.
C) complete a flight as planned, please passengers, meet schedules, and demonstrate the 'right stuff.'

5945. COM
The basic drive for a pilot to demonstrate the 'right stuff' can have an adverse effect on safety, by
A) a total disregard for any alternative course of action.
B) generating tendencies that lead to practices that are dangerous, often illegal, and that may lead to a mishap.
C) imposing a realistic assessment of piloting skills under stressful conditions.

5946. COM
Most pilots have fallen prey to dangerous tendencies or behavior problems at some time. Some of these dangerous tendencies or behavior patterns which must be identified and eliminated include:
A) Deficiencies in instrument skills and knowledge of aircraft systems or limitations.
B) Peer pressure, get-there-itis, loss of positional or situation awareness, and operating without adequate fuel reserves.
C) Performance deficiencies from human factors such as, fatigue, illness or emotional problems.

5947. COM
An early part of the Aeronautical Decision Making (ADM) process involves
A) taking a self-assessment hazardous attitude inventory test.
B) understanding the drive to have the 'right stuff.'
C) obtaining proper flight instruction and experience during training.

5948. COM
Hazardous attitudes which contribute to poor pilot judgment can be effectively counteracted by
A) taking meaningful steps to be more assertive with attitudes.
B) early recognition of hazardous thoughts.
C) redirecting that hazardous attitude so that appropriate action can be taken.

5949. COM
What are some of the hazardous attitudes dealt with in Aeronautical Decision Making (ADM)?
A) Risk management, stress management, and risk elements.
B) Poor decision making, situational awareness, and judgment.
C) Antiauthority (don't tell me), impulsivity (do something quickly without thinking), macho (I can do it).

5950. COM
When a pilot recognizes a hazardous thought, he or she then should correct it by stating the corresponding antidote. Which of the following is the antidote for MACHO?
A) Follow the rules. They are usually right.
B) Not so fast. Think first.
C) Taking chances is foolish.

5951. COM
What is the first step in neutralizing a hazardous attitude in the ADM process?
A) Dealing with improper judgment.
B) Recognition of hazardous thoughts.
C) Recognition of invulnerability in the situation.

5952. COM
What should a pilot do when recognizing a thought as hazardous?
A) Avoid developing this hazardous thought.
B) Develop this hazardous thought and follow through with modified action.
C) Label that thought as hazardous. then correct that thought by stating the corresponding learned antidote.

5953. COM
To help manage cockpit stress, pilots must;
A) condition themselves to relax and think rationally when stress appears.
B) be aware of life stress situations that are similar to those in flying.
C) avoid situations that will improve their abilities to handle cockpit responsibilities.

5954. COM
What does good cockpit stress management begin with?
A) Knowing what causes stress.
B) Good life stress management.
C) Eliminating life and cockpit stress issues.

5955. COM
The passengers for a charter flight have arrived almost an hour late for a flight that requires a reservation. Which of the following alternatives best illustrates the ANTIAUTHORITY reaction?
A) Those reservation rules do not apply to this flight.
B) The pilot can't help it that the passengers are late.
C) If the pilot hurries, he or she may still make it on time.

5956. COM
While conducting an operational check of the cabin pressurization system, the pilot discovers that the rate control feature is inoperative. He knows that he can manually control the cabin pressure, so he elects to disregard the discrepancy. Which of the following alternatives best illustrates the INVULNERABILITY reaction?
A) It's too late to fix it now.
B) He can handle a little problem like this.
C) What is the worst that could happen.

5963. COM
The Decision Model is comprised of a 6-step process to provide a pilot a logical way of approaching Aeronautical Decision Making. These steps are:
A) Detect, estimate, choose, identify, do, and evaluate.
B) Determine, evaluate, choose, identify, do and eliminate.
C) Determine, eliminate, choose, identify, detect. and evaluate.

5957. COM
The pilot and passengers are anxious to get to their destination for a business presentation. Level IV thunderstorms are reported to be in a line across their intended route of flight. Which of the following alternatives best illustrates the IMPULSIVITY
reaction?
A) They want to hurry and get going before things get worse.
B) Thunderstorm won't stop them.
C) They can't change the weather, so they might as well go.

5958. COM
While on an IFR flight a pilot emerges from a cloud to find himself within 300 feet of a helicopter. Which of the following alternatives best illustrates the "MACHO" reaction?
A) He is not too concerned everything will be all right.
B) He flies a little closer just to show him.
C) He quickly turns away and dives to avoid collision.

5959. COM
When a pilot recognizes a hazardous thought he or she then should correct it by stating the corresponding antidote. Which of the following is the antidote for ANTIAUTHORITY?
A) Not so fast. Think first.
B) It won't happen to me. It could happen to me.
C) Don't tell me. Follow the rules. They are usually right.

5960. COM
A pilot and friends are going to fly to an out-of-town football game. When the passengers arrive, the pilot determines that they will be over the maximum gross weight for takeoff with the existing fuel load. Which of the following alternatives best illustrates the RESIGNATION reaction?
A) He can't wait around to de-fuel, they have to get there on time.
B) Well, nobody told him about the extra weight.
C) Weight and balance is a formality forced on pilots by the FAA.

5961. COM
Which of the following is the final step of the Decide Model for effective risk management and Aeronautical Decision Making?
A) Estimate.
B) Eliminate.
C) Evaluate.

5962. COM
Which of the following is the first step of the Decide Model for effective risk management and Aeronautical Decision Making?
A) Detect.
B) Identify.
C) Evaluate.

5XXX FAA AVSEM
You are acting as PIC with a commercial pilot certificate, but not operating under the regulations of 14 CFR 119. Which of these operations are you authorized to conduct?
A) Aerial application and aerial photography.
B) Charter, on-demand passenger carrying flights of 9 persons or less.
C) On-demand cargo flights.

5XXX FAA AVSEM
As a commercial pilot, you decide to start a small business flying no-stop tours to look at Christmas lights during the holiday season. What authorizations, if any, are required for this type of activity?
A) No authorizations or approvals are required if you hold the appropriate category and class ratings of the aircraft that will be flown.
B) You may apply for and receive a Letter of Authorization from a Flight Standards District Office.
C) You must apply to the FAA to receive an exemption to carry passengers at night within a 50NM radius of your departure airport.

AIRSPACE

AIRSPACE CLASSES

CLASS A: Airspace at and above 18,000 MSL. VFR flights are prohibited. All aircraft have altimeters set to 29.92 (reading pressure altitude).

CLASS B: Airspace surrounding “Big” airports. - They are usually about 10,000 feet thick. Altitude and geographic limits are shown on sectional charts by blue solid lines.

To fly in Class B airspace requires:

- A Clearance from ATC
- A transponder with altitude encoding (Mode C) capability when below 10,000 MSL and within 30 NM of the primary airport (transponder also required at and above (10,000 MSL);
- Must be Private pilot to enter some Class B.
- Solo student pilot operations are allowed in some Class B’s with flight instructor endorsement. (FAR 91.131)

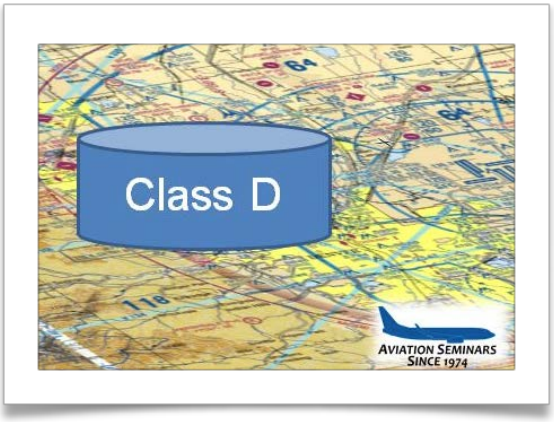
CLASS C: Airspace surrounding regional airports. Altitude and geographic limits are shown on sectional charts by magenta solid lines.

Class C airspace consists of a 4 NM radius inner circle from the surface to 4000 AGL, and an outer circle extending from 5 to 10 NM from 1200 AGL to 4000 AGL. The uncharted Outer Area exists out to 20 NM.

To fly in Class C airspace requires:

- Two-way communication with ATC.
- A transponder with altitude encoding (Mode C) capability.

CLASS D: Airspace at airports that have an operating control tower. Class D is 4 NM and up to and including 2,500 feet AGL. Shown by a blue segmented circle. Class D becomes inactive and becomes Class E when tower is not in operation.



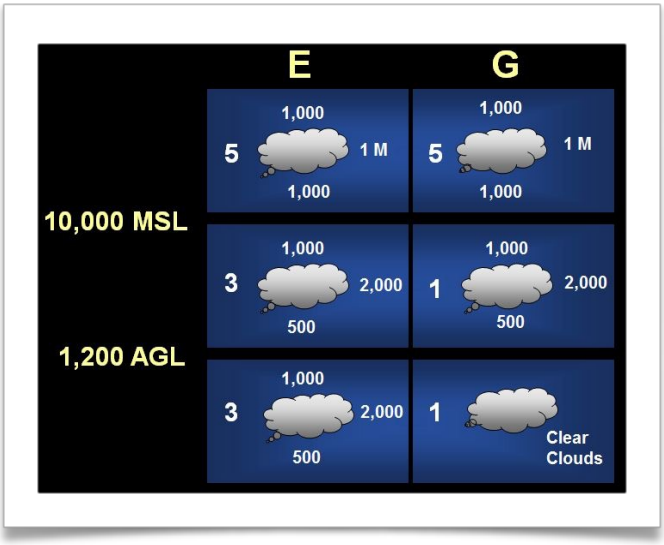
CLASS E: Any controlled airspace not designated as Class A, B, C, or D is considered Class E. It exists up to 17,999 MSL.

Class E could start at the surface, 700 feet AGL or other altitude as depicted.

CLASS G: Any airspace that is not controlled airspace.

Weather Minimums for VFR Traffic

Above 10,000 MSL: Visibility 5 miles. 1000 feet below and above clouds, 1 mile horizontally from clouds.



Below 10,000 MSL: Visibility 3 miles. 500 feet below 1000 feet above, 2000 feet horizontally from clouds. If in Class G airspace (outside controlled airspace) during daytime, clear of clouds and 1SM visibility.

Class D and E airspace that starts at the surface: Ceiling layer must be at least I 000 feet, and visibility must be at least 3 miles. (FAR 91.155)

Special VFR

If operating in VFR in Class D airspace, but the weather is below the minimums allowed for VFR flight (1,000-3) Pilots can request a 'Special VFR' clearance from the tower (ATC).

To be able to be granted such a clearance, the field visibility must be at least 1SM and the pilot must remain clear of clouds.

If a Special VFR is requested at night, the pilot must then be instrument rated and the aircraft must be instrument equipped.

The reason behind this is simple. At night, there is a much higher risk of inadvertently entering the clouds. Accident studies have found pilots without an instrument rating do not do well under these circumstances.

Controlled Airspace

Controlled airspace is where IFR traffic is given clearance to fly through the clouds at specific routes and altitudes, and is given separation from other IFR traffic by ATC.

VFR traffic must maintain minimum visibility and cloud clearance requirements to see and avoid IFR traffic when flying in controlled airspace.

Additionally, VFR traffic must receive a clearance to enter controlled airspace when weather is below basic VFR minimums as prescribed in 91.155.

Federal airways extend from 1,200 AGL up to 18,000 MSL, and extend 4 NM either side of centerline (8NM Wide)

Alert Area

An area where there is a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5009. COM
What designated airspace associated with an airport becomes inactive when the control tower at that airport is not in operation?
A) Class D, which then becomes Class C.
B) Class D, which then becomes Class E.
C) Class B.

5043. COM
Excluding Hawaii, the vertical limits of the Federal Low Altitude airways extend from
A) 700 feet AGL up to, but not including, 14,500 feet MSL.
B) 1,200 feet AGL up to, but not including, 18,000 feet MSL.
C) 1,200 feet AGL up to, but not including, 14,500 feet MSL.

5060. COM
A coded transponder equipped with altitude reporting equipment is required for
1. Class A, Class B, and Class C airspace areas.
2. all airspace of the 48 contiguous U.S. and District of Columbia at and above 10,000 feet MSL (including airspace at and below 2,500 feet above the surface).
A) 1.
B) 2.
C) Both 1 and 2.

5061. COM
In the contiguous U.S., excluding the airspace at and below 2,500 feet AGL, an operable coded transponder equipped with Mode C capability is required in all airspace above
A) 10,000 feet MSL.
B) 12,500 feet MSL.
C) 14,500 feet MSL.

5083. COM
The minimum flight visibility for VFR flight increases to 5 statute miles beginning at an altitude of
A) 14,500 feet MSL.
B) 10,000 feet MSL if above 1,200 feet AGL.
C) 10,000 feet MSL regardless of height above ground.

5085. COM
What is the minimum flight visibility and proximity to cloud requirements for VFR flight, at 6,500 feet MSL, in Class C, D, and E airspace?
A) 1 mile visibility; clear of clouds.
B) 3 miles visibility; 1,000 feet above and 500 feet below.
C) 5 miles visibility; 1,000 feet above and 1,000 feet below.

5088. COM
When operating an airplane for the purpose of takeoff or landing within Class D airspace under special VFR, what minimum distance from clouds and what visibility are required?
A) Remain clear of clouds, and the ground visibility must be at least 1 SM.
B) 500 feet beneath clouds, and the ground visibility must be at least 1 SM.
C) Remain clear of clouds, and the flight visibility must be at least 1 NM.

5089. COM
At some airports located in Class D airspace where ground visibility is not reported, takeoffs and landings under special VFR are
A) not authorized.
B) authorized by ATC if the flight visibility is at least 1 SM.
C) authorized only if the ground visibility is observed to be at least 3 SM.

5090. COM
To operate an airplane under SPECIAL VFR (SVFR) within Class D airspace at night, which is required?
A) The pilot must hold an instrument rating, but the airplane need not be equipped for instrument flight, as long as the weather will remain at or above SVFR minimums.
B) The Class D airspace must be specifically designated as a night SVFR area.
C) The pilot must hold an instrument rating, and the airplane must be equipped for instrument flight.

5114. COM
What altimeter setting is required when operating an aircraft at 18,000 feet MSL?
A) Current reported altimeter setting of a station along the route.
B) Altimeter setting at the departure or destination airport.
C) 29.92 Inches Hg.

5115. COM
After an ATC clearance has been obtained, a pilot may not deviate from that clearance, unless the pilot
A) receives an amended clearance or has an emergency.
B) is operating VFR on top.
C) requests an amended clearance.

5116. COM
When approaching to land at an airport, without an operating control tower, in Class G airspace, the pilot should
A) enter and fly a traffic pattern at 800 feet AGL.
B) make all turns to the left, unless otherwise indicated.
C) fly a left-hand traffic pattern at 800 feet AGL.

5117. COM
When operating an aircraft in the vicinity of an airport with an operating control tower, in Class E airspace, a pilot must establish communications prior to
A) 5 NM, and up to and including 3,000 feet AGL.
B) 8 NM, and up to and including 3,000 feet AGL.
C) 4 NM, and up to and including 2,500 feet AGL.

5119. COM
Which is true regarding flight operations to or from a satellite airport, without an operating control tower, within the Class C airspace area?
A) Prior to takeoff, a pilot must establish communication with the ATC controlling facility.
B) Aircraft must be equipped with an ATC transponder.
C) Prior to entering that airspace, a pilot must establish and maintain communication with the ATC serving facility.

5120. COM
Which is true regarding flight operations in Class A airspace?
A) May conduct operations under visual flight rules.
B) Aircraft must be equipped with approved distance measuring equipment (DME).
C) Aircraft must be equipped with an ATC transponder and altitude reporting equipment.

5565. COM
(Refer to figure 52, area 1) The floor of the Class E airspace above Georgetown Airport (Q61) is at;
A) the surface.
B) 3,823 feet MSL.
C) 700 feet AGL.

5566. COM
(Refer to figure 52, area 7) The floor of Class E airspace over the town of Woodland is
A) 700 feet AGL over part of the town and no floor over the remainder.
B) 1,200 feet AGL over part of the town and no floor over the remainder.
C) both 700 feet and 1,200 feet AGL.

5567. COM
(Refer to figure 52, area 5) The floor of the Class E airspace over University Airport (0O5) is
A) the surface.
B) 700 feet AGL.
C) 1,200 feet AGL.

5568. COM
(Refer to figure 52, area 8) The floor of the Class E airspace over the town of Auburn is
A) 1,200 feet MSL.
B) 700 feet AGL.
C) 1,200 feet AGL.

5575. COM
An alert area is an area in which;
A) there is a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
B) the flight of aircraft is prohibited.
C) the flight of aircraft, while not prohibited, is subject to restriction.

5575-1. COM
What must a pilot be aware of when transitioning an Alert Area?
A) All pilots must contact the controlling agency to ensure adequate aircraft separation.
B) Non-participating aircraft may transit the area as long as they operate in accordance with a waiver.
C) Be aware that the area may contain unusual aeronautical activity or a high volume of pilot training.

5577. COM
When a dashed blue circle surrounds an airport on a sectional aeronautical chart, it will depict the boundary of
A) Special VFR airspace.
B) Class D airspace.
C) Class B airspace

5082-1. COM
Which is true regarding pilot certification requirements for operations in Class B airspace?
A) The pilot in command must hold at least a private pilot certificate with an instrument rating.
B) The pilot in command must hold at least a private pilot certificate.
C) Solo student pilot operations are not authorized.

5082. COM
Which is true regarding flight operations in Class B airspace?
A) The pilot must receive an ATC clearance before operating an aircraft in that area.
B) Flight under VFR is not authorized unless the pilot in command is instrument rated.
C) Solo student pilot operations are not authorized.

5119. COM
Which is true regarding flight operations to or form a satellite airport without an operating control tower within the Class C airspace area?
A) Prior to entering that airspace, a pilot must establish and maintain communication with the ATC serving facility.
B) Aircraft must be equipped with an ATC transponder.
C) Prior to takeoff a pilot must establish communication with the ATC controlling facility.

5120. COM
Which is true regarding flight operations in Class A airspace?
A) May conduct operations under visual flight rules.
B) Aircraft must be equipped with approved distance measuring equipment (DME).
C) Aircraft must be equipped with an ATC transponder and altitude reporting equipment.

5072. COM
What transponder equipment is required for airplane operations within Class B airspace? A transponder;
A) with 4096 code or Mode S, and Mode C capability.
B) is required for airplane operations when visibility is less than 3 miles.
C) with 4096 code capability is required except when operating at or below 1,000 feet AGL under the terms of a letter of agreement.

5125-1 COM
The pilot in command of an aircraft operated under IFR, in controlled airspace, shall report as soon as practical to ATC when;
A) climbing or descending to assigned altitudes.
B) experiencing any malfunctions of navigational, approach, or communications equipment, occurring in flight.
C) requested to contact a new controlling facility.

5993. COM
(Refer to Figure 52, Area 8). The traffic pattern altitude at the Auburn (AUN) airport is 1,000 feet AGL. Can you practice landings under VFR when the AWOS is reporting a ground visibility of 2 miles?
A) Yes, you will be operating in a combination of Class E and G airspace.
B) No, the reported ground visibility must be at least 3 miles
C) No, the Class E airspace extends to the airport surface.

Question 5993 explanation. While at traffic pattern altitude of 1,000 feet AGL, you are in Class E. While flying in Class E, you would need to meet the visibility requirements of Class E (3 miles visibility required)

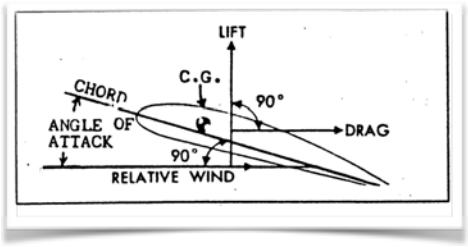
However, the question is asking about the visibility at the airport, which is in Class G (1 mile visibility required)

Therefore, you could still do touch and goes provided while flying in either airspace class, you met the appropriate requirements of each Class E and Class G airspace.

AERODYNAMICS AND AIRCRAFT OPERATION

Definitions

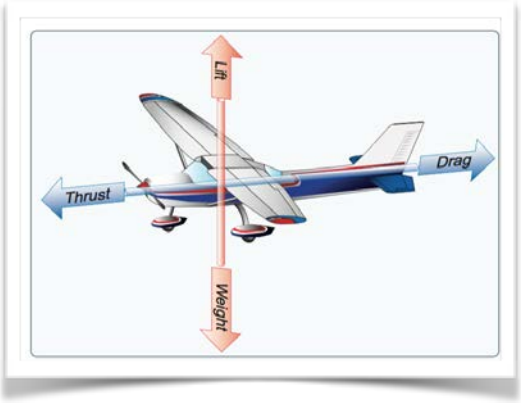
Angle of attack is the angle between the wing chord line and the direction of the relative wind. An increase in angle of attack will increase impact pressure below the wing to increase lift and drag, and will cause the center of pressure to move forward. By changing the angle of attack, the pilot controls the airplane's lift, airspeed and drag.



Chord line is the line between the leading and the trailing edges of the airfoil.

Relative wind is the direction of the airflow with respect to the wing (A) It is also the direction opposite and parallel to the flight path.

Forces Acting On The Aircraft



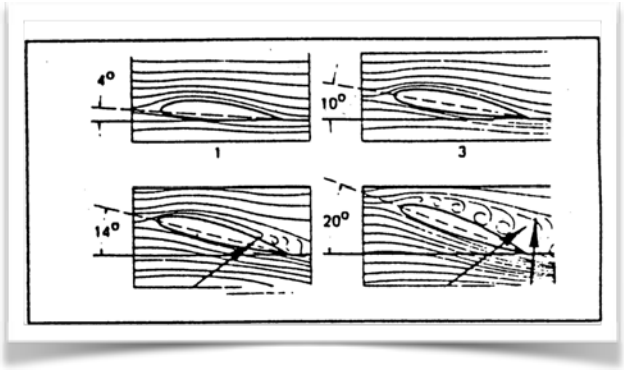
Lift is the differential pressure between the higher air pressure below the wing's surface and the lower air pressure above the wing's surface. It acts perpendicular to the relative wind and flight path.

Drag is the rearward force of wind resistance, and acts parallel to the relative wind.

Thrust is the forward acting force, produced by the propeller. It is equal to drag whenever your airspeed is constant:
Lift equals weight whenever you are in straight and level flight, or climbing or descending at a constant rate.
In steady-state flight (straight and level or steady climb or descent), the sum of the opposing forces is equal to zero.

If airspeed is doubled and the angle of attack remains constant, lift and drag will be four times greater. Conversely, if the airspeed of an aircraft in level flight is cut in half while in level flight, lift and drag will become 1/4 as much.

Angle Of Attack And Stalling Speeds



The angle of attack at which a wing stalls remains constant regardless of weight, dynamic pressure, bank angle, or pitch attitude.

There is a corresponding indicated airspeed required for every angle of attack to generate sufficient lift to maintain altitude.

Indicated stalling speed is increased by added weight, increased load factor and bank angle, decreased power, and is most affected by variations in loading. Turbulent air can cause an Increase in stalling speed when there is an abrupt change in relative wind.

An airplane will spin only after having been stalled. If the CG is too far rearward, stall recovery becomes more difficult and normal spin recovery may become difficult. The airplane may become uncontrollable if the most rearward CG position is exceeded.

Types Of Drag

Drag is comprised of parasite drag and induced drag. As speed increases, parasite drag Increases and induced drag decreases.

The velocity Indicated by points 'A' and 'B' (on next page) shows the maximum L/D speed (lift divided by drag). The maximum L/D speed decreases as weight decreases. Maintaining maximum L/D speed will result in the maximum range and maximum glide distance.

Load factor is the actual load on the wings at any time divided by the weight of the airplane.

Load factor as depicted in a constant altitude turn depends strictly on angle of bank. As long as bank remains constant, load factor is also constant. Figure 5.

If an airplane is listed as utility category, it can perform limited acrobatics, including spins. Example is most C-172's.

Functions Of The Flight Controls

Elevators pitch the airplane about the lateral axis to change the angle of attack.

Rudder controls yaw about the vertical axis, not to turn the airplane, but to overcome adverse yaw produced by the depressed aileron on the high wing.

Wing flaps increase lift and drag. This decreases stalling speed and increases the angle of descent during landing without increasing airspeed.

The proper technique for crosswind takeoffs is to use rudder as required to maintain directional control, aileron pressure into the wind, and a higher-than-normal lift-off speed. During landing, the direction of motion of the airplane and its longitudinal axis should be parallel to the runway.

During gusty wind conditions, make a power-on approach and power-on landing.

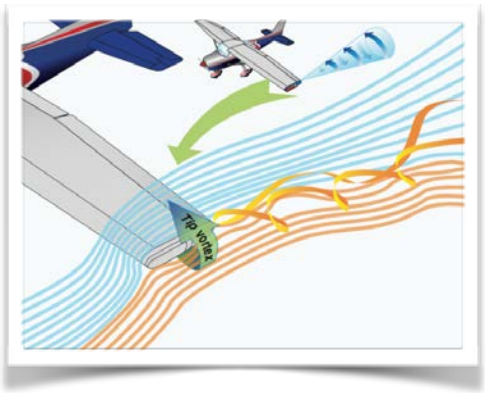
Air Density

High temperatures, high elevations, high humidity, and low atmospheric pressure result in lower air density and decreased performance.

Uphill runway slope will increase takeoff distance.

Regardless of altitude and air density, the indicated airspeed at which an airplane stalls will remain the same. At higher elevations, the airplane will have a higher true airspeed, and a higher groundspeed at touchdown.

Ground Effect



Ground effect cushions the air beneath the wing, increasing lift and decreasing drag.

An airplane leaving ground effect will experience an Increase in induced drag, require more thrust and a greater angle of attack.

Stability

Longitudinal stability (the nose pitching up or down) involves the motion of the airplane about the lateral axis. if the airplane center of gravity is to the rear of its range, the airplane will be unstable about its lateral axis.

If the airplane attitude initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays positive static stability.

If the airplane attitude remains in a new position after the elevator control is pressed forward and released, the airplane displays neutral static stability.

AIRCRAFT AND ENGINE OPERATION

Propellers

Propeller efficiency is the ratio of thrust horsepower to brake horsepower. A fixed pitch propeller can be efficient only at a given combination of airspeed and RPM.

Propellers are ‘twisted’ along the propeller blade that permits a relatively constant angle of attack along its length when in cruising flight.

‘P’ Factor And Torque

A propeller rotating clockwise, as seen from the rear, creates a spiraling slipstream that tends to rotate the airplane to the left around the vertical axis, and to the left around the longitudinal axis as a reaction from the propeller and torque force to the right. (Equal and opposite reaction)

Engine Operation

Dual Ignition, in addition to providing an Increased safety factor, also provides improved engine performance.

Aircraft magnetos receive their electrical energy from magnets and coil. If the ground wire between magnetos and Ignition switch becomes disconnected, the engine cannot be shut down by turning the Ignition switch to the OFF position.

Constant Speed Propellers

A constant speed propeller permits the pilot to select the blade angle for the most efficient performance. Pitch angle of the blades changes through the use of governor-regulated oil pressure so that engine speed remains at selected RPM.

For takeoff or maximum power, a constant-speed propeller should be set to a blade angle that will produce a small angle of attack and high RPM.

When increasing power in an aircraft equipped with a constant speed propeller, avoid high manifold pressure setting with low RPM. First Increase RPM, then manifold pressure. When decreasing power, first decrease manifold pressure, then RPM. (Always keep the propeller in front of the engine)

Engine Cooling

Engine cooling is caused by airflow and is especially dependent on the circulation of lubricating oil. An abnormally high engine oil temperature may be caused by the oil level being too low. Detonation occurs when the unburned charge (fuel) in the cylinders explodes Instead of burning evenly. Detonation may be caused by too lean a mixture.

Preignition is the uncontrolled firing of the fuel/air charge in advance of normal spark ignition.

Fuel Mixture

Fuel/air ratio is the ratio between the weight of fuel and weight of air entering the cylinder.

The main purpose of the fuel/air mixture control is to adjust the fuel flow (in both carburetor and fuel-injected engines) to obtain the proper fuel/air ratio.

The best power mixture is the fuel/air ratio that gives the most power for any given throttle setting.

As you climb out to a higher altitude, if no adjustment is made to the mixture, your mixture will become richer. The density (weight) of the air decreases and the amount of fuel remains the same.

An excessively rich mixture may cause spark plug fouling.

Carburetor heat reduces the density of the air by heating it, and this enriches the fuel/air mixture. It decreases engine horsepower output and increases operating temperatures.

Emergencies And Miscellaneous Information

The four fundamentals involved in maneuvering an aircraft are straight-and-level flight, turns, climbs, and descents.

A detuning of the engine crankshaft counterweights may be caused by rapid opening and closing of the throttle.

If necessary to takeoff from a slushy runway, the freezing of landing gear mechanisms can be minimized by recycling the gear.

In cold weather, crankcase breather lines should receive special attention because they are susceptible to being clogged by ice from crankcase vapors that have condensed and subsequently frozen.

If preheating an aircraft during cold weather operations, preheat the cabin area as well as the engine.

Frequent inspections should be made of aircraft exhaust manifold-type heating systems to minimize the possibility of exhaust gases leaking into the cockpit.

When diverting to an alternate airport because of an emergency, apply rule-of-thumb computations, estimates, and other appropriate shortcuts to divert to the new course as soon as possible.

Minimize the possibility of gear-up landings by completing a pre-landing checklist.

If you lose power immediately after takeoff, maintain a safe airspeed.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5017. COM
If the category of an airplane is listed as utility, it would mean that this airplane could be operated in which of the following maneuvers?
A) Limited acrobatics, excluding spins.
B) Limited acrobatics, including spins, if approved.
C) Any maneuver except acrobatics or spins.

5151. COM
The ratio between the total airload imposed on the wing and the gross weight of an aircraft in flight is known as
A) load factor and directly affects stall speed.
B) aspect load and directly affects stall speed.
C) load factor and has no relation with stall speed.

5152. COM
Load factor is the lift generated by the wings of an aircraft at any given time
A) divided by the total weight of the aircraft.
B) multiplied by the total weight of the aircraft.
C) divided by the basic empty weight of the aircraft.

5152-1 COM
While executing a 60 degree level turn, your aircraft is at a load factor of 2.0. What does this mean?
A) The total load on the aircraft's structure is two times its weight.
B) The load factor is over the load limit.
C) The gust load factor is two times the total load limit.

5153. COM
For a given angle of bank, in any airplane, the load factor imposed in a coordinated constant-altitude turn
A) is constant and the stall speed increases.
B) varies with the rate of turn.
C) is constant and the stall speed decreases.

5154. COM
Airplane wing loading during a level coordinated turn in smooth air depends upon the
A) rate of turn.
B) angle of bank.
C) true airspeed.

5155. COM
In a rapid recovery from a dive, the effects of load factor would cause the stall speed to
A) increase.
B) decrease.
C) not vary.

5156. COM
Refer to Figure 4. If an aircraft with a gross weight of 2,000 pounds was subjected to a 60° constant-altitude bank, the total load would be
A) 3,000 pounds.
B) 4,000 pounds.
C) 12,000 pounds.

5157. COM
While maintaining a constant angle of bank and altitude in a coordinated turn, an increase in airspeed will
A) decrease the rate of turn resulting in a decreased load factor.
B) decrease the rate of turn resulting in no change in load factor.
C) increase the rate of turn resulting in no change in load factor.

5158. COM
Lift on a wing is most properly defined as the
A) force acting perpendicular to the relative wind.
B) differential pressure acting perpendicular to the chord of the wing.
C) reduced pressure resulting from a laminar flow over the upper camber of an airfoil, which acts perpendicular to the mean camber.

5159. COM
While holding the angle of bank constant in a level turn, if the rate of turn is varied the load factor would
A) remain constant regardless of air density and the resultant lift vector.
B) vary depending upon speed and air density provided the resultant lift vector varies proportionately.
C) vary depending upon the resultant lift vector.

5160. COM
The need to slow an aircraft below VA is brought about by the following weather phenomenon:
A) High density altitude which increases the indicated stall speed.
B) Turbulence which causes an increase in stall speed.
C) Turbulence which causes a decrease in stall speed.

5161. COM
In theory, if the airspeed of an airplane is doubled while in level flight, parasite drag will become
A) twice as great.
B) half as great.
C) four times greater.

5161-1 COM
In theory, if the airspeed of an aircraft in level flight is cut in half while in level flight, parasite drag will become
A) one third as much
B) one half as much
C) one fourth as much

5162. COM
As airspeed decreases in level flight below that speed for maximum lift/drag ratio, total drag of an airplane
A) decreases because of lower parasite drag.
B) increases because of increased induced drag.
C) increases because of increased parasite drag.

5163. COM
If the airspeed is increased from 90 knots to 135 knots during a level 60° banked turn, the load factor will
A) increase as well as the stall speed.
B) decrease and the stall speed will increase.
C) remain the same but the radius of turn will increase.

5163-1 COM
A load factor of 1.2 means the total load on an aircraft's structure is 1.2 times its;
A) gross weight.
B) weight limit.
C) gust load factor.

5164. COM
Baggage weighing 90 pounds is placed in a normal category airplane's baggage compartment which is placarded at 100 pounds. If this airplane is subjected to a positive load factor of 3.5 G's, the total load of the baggage would be
A) 315 pounds and would be excessive.
B) 315 pounds and would not be excessive.
C) 350 pounds and would not be excessive.

5165. COM
(Refer to figure 1.) At the airspeed represented by point A, in steady flight, the airplane will
A) have its maximum L/D ratio.
B) have its minimum L/D ratio.
C) be developing its maximum coefficient of lift.

5166. COM
(Refer to figure 1.) At an airspeed represented by point B, in steady flight, the pilot can expect to obtain the airplane's maximum
A) endurance.
B) glide range.
C) coefficient of lift.

5167. COM
Which statement is true relative to changing angle of attack?
A) A decrease in angle of attack will increase pressure below the wing, and decrease drag.
B) An increase in angle of attack will decrease pressure below the wing, and increase drag.
C) An increase in angle of attack will increase drag.

5170. COM
Leaving the carburetor heat on while taking off;
A) leans the mixture for more power on takeoff.
B) will decrease the takeoff distance.
C) will increase the ground roll.

5171. COM
A way to detect a broken magneto primary grounding lead is to
A) idle the engine and momentarily turn the ignition off.
B) add full power, while holding the brakes, and momentarily turn off the ignition.
C) run on one magneto, lean the mixture, and look for a rise in manifold pressure.

5172. COM
Fouling of spark plugs is more apt to occur if the aircraft
A) gains altitude with no mixture adjustment.
B) descends from altitude with no mixture adjustment.
C) throttle is advanced very abruptly.

5173. COM
The most probable reason an engine continues to run after the ignition switch has been turned off is
A) carbon deposits glowing on the spark plugs.
B) a magneto ground wire is in contact with the engine casing.
C) a broken magneto ground wire.

5174. COM
If the ground wire between the magneto and the ignition switch becomes disconnected, the engine
A) will not operate on one magneto.
B) cannot be started with the switch in the BOTH position.
C) could accidentally start if the propeller is moved with fuel in the cylinder.

5175. COM
For internal cooling, reciprocating aircraft engines are especially dependent on
A) a properly functioning cowl flap augmenter.
B) the circulation of lubricating oil.
C) the proper freon/compressor output ratio.

5176. COM
The pilot controls the air/fuel ratio with the
A) throttle
B) manifold pressure
C) mixture control

5179. COM
(Refer to figure 2.) Select the correct statement regarding stall speeds.
A) Power-off stalls occur at higher airspeeds with the gear and flaps down.
B) In a 60° bank the airplane stalls at a lower airspeed with the gear up.
C) Power-on stalls occur at lower airspeeds in shallower banks.

5180. COM
(Refer to figure 2.) Select the correct statement regarding stall speeds. The airplane will stall
A) 10 knots higher in a power-on, 60° bank, with gear and flaps up, than with gear and flaps down.
B) 25 knots lower in a power-off, flaps-up, 60° bank, than in a power-off, flaps-down, wings-level configuration.
C) 10 knots higher in a 45° bank, power-on stall, than in a wings-level stall with flaps up.

5181. COM
Which is true regarding the use of flaps during level turns?
A) The lowering of flaps increases the stall speed.
B) The raising of flaps increases the stall speed.
C) Raising flaps will require added forward pressure on the yoke or stick.

5182. COM
One of the main functions of flaps during the approach and landing is to
A) decrease the angle of descent without increasing the airspeed.
B) provide the same amount of lift at a slower airspeed.
C) decrease lift, thus enabling a steeper-than-normal approach to be made.

5183. COM
Which statement best describes the operating principle of a constant-speed propeller?
A) As throttle setting is changed by the pilot, the prop governor causes pitch angle of the propeller blades to remain unchanged.
B) A high blade angle, or increased pitch, reduces the propeller drag and allows more engine power for takeoffs.
C) The propeller control regulates the engine RPM, and in turn, the propeller RPM.

5184. COM
In aircraft equipped with constant speed propellers and normally-aspirated engines, which procedure should be used to avoid placing undue stress on the engine components? When power is being
A) decreased reduce the RPM before reducing the manifold pressure.
B) increased, increase the RPM before increasing the manifold pressure.
C) increased or decreased, the RPM should be adjusted before the manifold pressure.

5185. COM
Detonation may occur at high-power settings when
A) the fuel mixture ignites instantaneously instead of burning progressively and evenly.
B) an excessively rich fuel mixture causes an explosive gain in power.
C) the fuel mixture is ignited too early by hot carbon deposits in the cylinder.

5186. COM
The uncontrolled firing of the fuel air charge in advance of normal spark ignition is known as
A) instantaneous combustion.
B) detonation.
C) pre-ignition.

5187. COM
Fuel/air ratio is the ratio between the
A) volume of fuel and volume of air entering the cylinder.
B) weight of fuel and weight of air entering the cylinder.
C) weight of fuel and weight of air entering the carburetor.

5188. COM
The mixture control can be adjusted, which
A) prevents the fuel/air combination from becoming too rich at higher altitudes.
B) regulates the amount of air flow through the carburetor's venturi.
C) prevents the fuel/air combination from becoming lean as the airplane climbs.

5189. COM
Which statement is true concerning the effect of the application of carburetor heat?
A) It enriches the fuel/air mixture.
B) It leans the fuel/air mixture.
C) It has no effect on the fuel/air mixture.

5190. COM
Detonation occurs in a reciprocating aircraft engine when
A) there is an explosive increase of fuel caused by too rich a fuel/air mixture.
B) the spark plugs receive an electrical jolt caused by a short in the wiring.
C) the unburned charge in the cylinders is subjected to instantaneous combustion.

5191. COM
Name the four fundamentals involved in maneuvering an aircraft.
A) Power, pitch, bank, and trim.
B) Thrust, lift, turns, and glides.
C) Straight-and-level flight, turns, climbs, and descents.

5194. COM
Why is it necessary to increase back elevator pressure to maintain altitude during a turn? To compensate for the
A) loss of the vertical component of lift.
B) loss of the horizontal component of lift and the increase in centrifugal force.
C) rudder deflection and slight opposite aileron throughout the turn.

5195. COM
To maintain altitude during a turn, the angle of attack must be increased to compensate for the decrease in the
A) forces opposing the resultant component of drag.
B) vertical component of lift.
C) horizontal component of lift.

5196. COM
Stall speed is affected by
A) weight, load factor, and power.
B) load factor, angle of attack, and power.
C) angle of attack, weight, and air density.

5197. COM
A rectangular wing, as compared to other wing planforms, has a tendency to stall first at the
A) wingtip, with the stall progression toward the wing root.
B) wing root, with the stall progression toward the wing tip.
C) center trailing edge, with the stall progression outward toward the wing root and tip.

5198. COM
By changing the angle of attack of a wing, the pilot can control the airplane's
A) lift, airspeed, and drag.
B) lift, airspeed, and CG.
C) lift and airspeed, but not drag.

5199. COM
The angle of attack of a wing directly controls the
A) angle of incidence of the wing.
B) amount of airflow above and below the wing.
C) distribution of pressures acting on the wing.

5200. COM
In theory, if the angle of attack and other factors remain constant and the airspeed is doubled, the lift produced at the higher speed will be
A) the same as at the lower speed.
B) two times greater than at the lower speed.
C) four times greater than at the lower speed.

5201. COM
An aircraft wing is designed to produce lift resulting from a difference in the
A) negative air pressure below and a vacuum above the wing's surface.
B) vacuum below the wing's surface and greater air pressure above the wing's surface.
C) higher air pressure below the wing's surface and lower air pressure above the wing's surface.

5202. COM
On a wing, the force of lift acts perpendicular to and the force of drag acts parallel to the
A) chord line.
B) flight path.
C) longitudinal axis.

5203. COM
Which statement is true, regarding the opposing forces acting on an airplane in steady-state level flight?
A) These forces are equal.
B) Thrust is greater than drag and weight and lift are equal.
C) Thrust is greater than drag and lift is greater than weight.

5204. COM
The angle of attack at which a wing stalls remains constant regardless of
A) weight, dynamic pressure, bank angle, or pitch attitude.
B) dynamic pressure, but varies with weight, bank angle, and pitch attitude.
C) weight and pitch attitude, but varies with dynamic pressure and bank angle.

5205. COM
In light airplanes, normal recovery from spins may become difficult if the
A) CG is too far rearward and rotation is around the longitudinal axis.
B) CG is too far rearward and rotation is around the CG.
C) spin is entered before the stall is fully developed.

5207. COM
If an airplane is loaded to the rear of its CG range, it will tend to be unstable about its
A) vertical axis.
B) lateral axis.
C) longitudinal axis.

5208. COM
At higher elevation airports the pilot should know that indicated airspeed
A) will be unchanged, but groundspeed will be faster.
B) will be higher, but groundspeed will be unchanged.
C) should be increased to compensate for the thinner air.

5209. COM
An airplane leaving ground effect will
A) experience a reduction in ground friction and require a slight power reduction.
B) experience an increase in induced drag and require more thrust.
C) require a lower angle of attack to maintain the same lift coefficient.

5210. COM
If airspeed is increased during a level turn, what action would be necessary to maintain altitude? The angle of attack
A) and angle of bank must be decreased.
B) must be increased or angle of bank decreased.
C) must be decreased or angle of bank increased.

5210-1. COM
To maintain a standard rate turn as the airspeed increases, the bank angle of the aircraft will need to
A) remain constant.
B) increase.
C) decrease

5211. COM
The stalling speed of an airplane is most affected by
A) changes in air density.
B) variations in flight altitude.
C) variations in airplane loading.

5212. COM
An airplane will stall at the same
A) angle of attack regardless of the attitude with relation to the horizon.
B) airspeed regardless of the attitude with relation to the horizon.
C) angle of attack and attitude with relation to the horizon.

5213. COM
(Refer to figure 3.) If an airplane glides at an angle of attack of 10°, how much altitude will it lose in 1 mile?
A) 240 feet.
B) 480 feet.
C) 960 feet.

5215. COM
(Refer to figure 3.) The L/D ratio at a 2° angle of attack is approximately the same as the LID ratio for a
A) 9.75° angle of attack.
B) 10.5° angle of attack.
C) 16.5° angle of attack.

5216. COM
If the same angle of attack is maintained in ground effect as when out of ground effect, lift will
A) increase, and induced drag will decrease.
B) decrease, and parasite drag will increase.
C) increase, and induced drag will increase.

5217. COM
What performance is characteristic of flight at maximum lift/drag ratio in a propeller-driven airplane? Maximum
A) gain in altitude over a given distance.
B) range and maximum distance glide.
C) coefficient of lift and minimum coefficient of drag.

5218. COM
Which is true regarding the forces acting on an aircraft in a steady-state descent? The sum of all
A) upward forces is less than the sum of all downward forces.
B) rearward forces is greater than the sum of all forward forces.
C) forward forces is equal to the sum of all rearward forces.

5219. COM
Which is true regarding the force of lift in steady, unaccelerated flight?
A) At lower airspeeds the angle of attack must be less to generate sufficient lift to maintain altitude.
B) There is a corresponding indicated airspeed required for every angle of attack to generate sufficient lift to maintain altitude.
C) An airfoil will always stall at the same indicated airspeed; therefore, an increase in weight will require an increase in speed to generate sufficient lift to maintain altitude.

5220. COM
During the transition from straight and level flight to a climb, the angle of attack is increased and lift
A) is momentarily decreased.
B) remains the same.
C) is momentarily increased.

5221. COM
(Refer to figure 4.) What is the stall speed of an airplane under a load factor of 2 G's if the unaccelerated stall speed is 60 knots?
A) 66 knots.
B) 74 knots.
C) 84 knots.

5222. COM
(Refer to figure 4.) What increase in load factor would take place if the angle of bank were increased from 60° to 80°?
A) 3 G’s.
B) 3.5 G’s.
C) 4G’s.

5223. COM
To generate the same amount of lift as altitude is increased, an airplane must be flown at
A) the same true airspeed regardless of angle of attack.
B) a lower true airspeed and a greater angle of attack.
C) a higher true airspeed for any given angle of attack.

5224. COM
To produce the same lift while in ground effect as when out of ground effect, the airplane requires
A) a lower angle of attack.
B) the same angle of attack.
C) a greater angle of attack.

5225. COM
As the angle of bank is increased, the vertical component of lift
A) decreases and the horizontal component of lift increases.
B) increases and the horizontal component of lift decreases.
C) decreases and the horizontal component of lift remains constant.

5226. COM
If the airplane attitude remains in a new position after the elevator control is pressed forward and released, the airplane displays
A) neutral longitudinal static stability.
B) positive longitudinal static stability.
C) neutral longitudinal dynamic stability.

5227. COM
Longitudinal dynamic instability in an airplane can be identified by
A) bank oscillations becoming progressively steeper.
B) pitch oscillations becoming progressively steeper.
C) Trilatitudinal roll oscillations becoming progressively steeper.

5206. COM
Recovery from a stall in any airplane becomes more difficult when its
A) center of gravity moves forward.
B) elevator trim is adjusted nosedown.
C) center of gravity moves aft.

5228. COM
Longitudinal stability involves the motion of the airplane controlled by its
A) rudder.
B) elevator.
C) ailerons.

5229. COM
What changes in airplane longitudinal control must be made to maintain altitude while the airspeed is being decreased?
A) Increase the angle of attack to produce more lift than drag.
B) Increase the angle of attack to compensate for the decreasing lift.
C) Decrease the angle of attack to compensate for the increasing drag.

5230. COM
If the airplane attitude initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays
A) positive dynamic stability.
B) positive static stability.
C) neutral dynamic stability.

5231. COM
(Refer to figure 5.) The horizontal dashed line from point C to point E represents the
A) ultimate load factor.
B) positive limit load factor.
C) airspeed range for normal operations.

5232. COM
(Refer to figure 5.) The vertical line from point E to point F is represented on the airspeed indicator by the
A) upper limit of the yellow arc.
B) upper limit of the green arc.
C) blue radial line.

5233. COM
(Refer to figure 5.) The vertical line from point D to point G is represented on the airspeed indicator by the maximum speed limit of the
A) green arc.
B) yellow arc.
C) white arc.

5235. COM
Propeller efficiency is the
A) ratio of thrust horsepower to brake horsepower.
B) actual distance a propeller advances in one revolution.
C) ratio of geometric pitch to effective pitch.

5236. COM
A fixed-pitch propeller is designed for best efficiency only at a given combination of
A) altitude and RPM.
B) airspeed and RPM.
C) airspeed and altitude.

5237. COM
The reason for variations in geometric pitch (twisting) along a propeller blade is that it
A) permits a relatively constant angle of incidence along its length when in cruising flight.
B) prevents the portion of the blade near the hub from stalling during cruising flight.
C) permits a relatively constant angle of attack along its length when in cruising flight.

5238. COM
A propeller rotating clockwise as seen from the rear, creates a spiraling slipstream. The spiraling slipstream, along with torque effect, tends to rotate the airplane to the
A) right around the vertical axis, and to the left around the longitudinal axis.
B) left around the vertical axis, and to the right around the longitudinal axis.
C) left around the vertical axis, and to the left around the longitudinal axis.

5239. COM
When the angle of attack of a symmetrical airfoil is increased, the center of pressure will
A) have very limited movement.
B) move aft along the airfoil surface.
C) remain unaffected.

5271. COM
A detuning of engine crankshaft counterweights is a source of over-stress that may be caused by
A) rapid opening and closing of the throttle.
B) carburetor ice forming on the throttle valve.
C) operating with an excessively rich fuel/air mixture.

5298. COM
The best power mixture is that fuel/air ratio at which
A) cylinder head temperatures are the coolest.
B) the most power can be obtained for any given throttle setting.
C) a given power can be obtained with the highest manifold pressure or throttle setting.

5299. COM
Detonation can be caused by
A) a 'rich' mixture.
B) low engine temperatures.
C) using a lower grade of fuel than recommended.

5300. COM
What effect, if any, would a change in ambient temperature or air density have on gas turbine engine performance?
A) As air density decreases, thrust increases.
B)As temperature increases, thrust increases.
C) As temperature increases, thrust decreases.

5503. COM
When diverting to an alternate airport because of an emergency, pilots should
A) rely upon radio as the primary method of navigation.
B) climb to a higher altitude because it will be easier to identify checkpoints.
C) apply rule-of-thumb computations, estimates, and other appropriate shortcuts to divert to the new course as soon as possible.

5505. COM
Which maximum range factor decreases as weight decreases?
A) Altitude.
B) Airspeed.
C) Angle of attack.

5604-1.
Structural damage or failure is more likely to occur in smooth air at speeds above
A) VNO
B) VA
C) VNE

5606. COM
Applying carburetor heat will
A) not affect the mixture.
B) lean the fuel/air mixture.
C) enrich the fuel/air mixture.

5607. COM
An abnormally high engine oil temperature indication may be caused by
A) a defective bearing.
B) the oil level being too low.
C) operating with an excessively rich mixture.

5608. COM
What will occur if no leaning is made with the mixture control as the flight altitude increases?
A) The volume of air entering the carburetor decreases and the amount of fuel decreases.
B) The density of air entering the carburetor decreases and the amount of fuel increases.
C) The density of air entering the carburetor decreases and the amount of fuel remains constant.

5609. COM
Unless adjusted, the fuel/air mixture becomes richer with an increase in altitude because the amount of fuel
A) decreases while the volume of air decreases.
B) remains constant while the volume of air decreases.
C) remains constant while the density of air decreases.

5610. COM
The basic purpose of adjusting the fuel/air mixture control at altitude is to
A) decrease the fuel flow to compensate for decreased air density.
B) decrease the amount of fuel in the mixture to compensate for increased air density.
C) increase the amount of fuel in the mixture to compensate for the decrease in pressure and density of the air.

5611. COM
At high altitudes, an excessively rich mixture will cause the
A) engine to overheat.
B) fouling of spark plugs.
C) engine to operate smoother even though fuel consumption is increased.

5653. COM
Frequent inspections should be made of aircraft exhaust manifold-type heating systems to minimize the possibility of
A) exhaust gases leaking into the cockpit.
B) a power loss due to back pressure in the exhaust system.
C) a cold-running engine due to the heat withdrawn by the heater.

5654. COM
To establish a climb after takeoff in an aircraft equipped with a constant-speed propeller, the output of the engine is reduced to climb power by decreasing manifold pressure and
A) increasing RPM by decreasing propeller blade angle.
B) decreasing RPM by decreasing propeller blade angle.
C) decreasing RPM by increasing propeller blade angle.

5655. COM
When taxiing during strong quartering tailwinds, which aileron positions should be used?
A) Neutral.
B) Aileron up on the side from which the wind is blowing.
C) Aileron down on the side from which the wind is blowing.

5656. COM
While taxiing a light, high-wing airplane during strong quartering tailwinds, the aileron control should be positioned
A) neutral at all times.
B) toward the direction from which the wind is blowing.
C) opposite the direction from which the wind is blowing.

5664. COM
Which type of approach and landing is recommended during gusty wind conditions?
A) A power-on approach and power-on landing.
B) A power-off approach and power-on landing.
C) A power-on approach and power-off landing.

5665. COM
A proper crosswind landing on a runway requires that, at the moment of touchdown, the
A) direction of motion of the airplane and its lateral axis be perpendicular to the runway.
B) direction of motion of the airplane and its longitudinal axis be parallel to the runway.
C) downwind wing be lowered sufficiently to eliminate the tendency for the airplane to drift.

5667. COM
To develop maximum power and thrust, a constant-speed propeller should be set to a blade angle that will produce a
A) large angle of attack and low RPM.
B) small angle of attack and high RPM.
C) large angle of attack and high RPM.

5668. COM
For takeoff, the blade angle of a controllable-pitch propeller should be set at a
A) small angle of attack and high RPM.
B) large angle of attack and low RPM.
C) large angle of attack and high RPM.

5766. COM
During preflight in cold weather, crankcase breather lines should receive special attention because they are susceptible to being clogged by
A) congealed oil from the crankcase.
B) moisture from the outside air which has frozen.
C) ice from crankcase vapors that have condensed and subsequently frozen.

5767. COM
Which is true regarding preheating an aircraft during cold weather operations?
A) The cabin area as well as the engine should be preheated.
B) The cabin area should not be preheated with portable heaters.
C) Hot air should be blown directly at the engine through the air intakes.

5768. COM
If necessary to take off from a slushy runway, the freezing of landing gear mechanisms can be minimized by
A) recycling the gear.
B) delaying gear retraction.
C) increasing the airspeed to VLE before retraction.

NAVIGATION

Sectional Charts

Navigating under VFR from one point to another when ground references are not visible for pilotage, pilots can use ‘Dead Reckoning” using time, airspeed and distance to navigate.

When planning a flight, true course measurements should be made at a meridian near the midpoint of the course because the angles formed by lines of longitude and latitude vary from point to point.

Maximum elevation figures show the maximum elevation (terrain or obstacle) for that quadrangle.

Obstructions are shown as 1245 ft MSL, (297) ft AGL. Example shows the top of the tower is at 1,245 feet MSL and is 297in height from the ground.

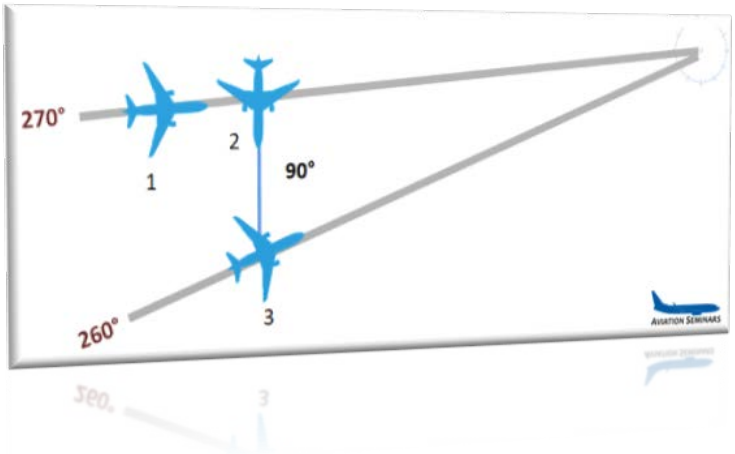
Military Training Routes

IR-527 and VR-578 with a 3 digit numbers are Instrument (IR) or Visual (VR) military training routes with flights above 1500 feet AGL at speeds in excess of 250 knots.

If the IR or VR military training routes have 4 numbers (IR-4322) it indicates flights are <u>below</u> 1,500 feet AGL.

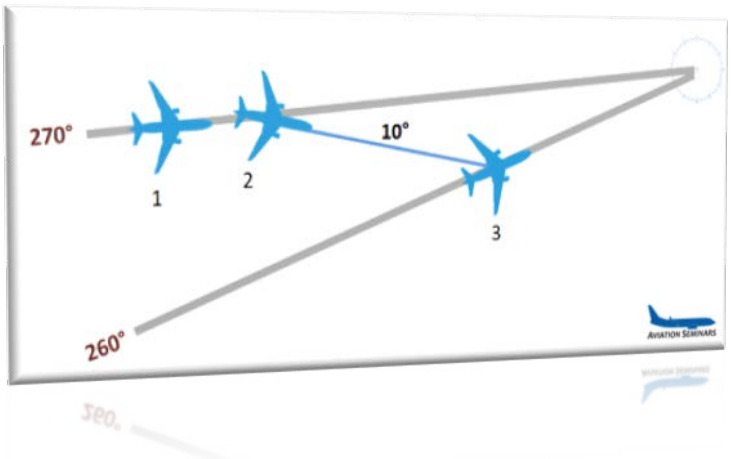
COMPUTATIONS

Time To Station - Wingtip Method



While flying on a radial (Position 1)
Turn perpendicular to the station (Position 2)
Determine the time to change wingtip bearing to the station by one (1) degree, and multiply that by 60. If it takes 2.5 minutes to change from the 270 radial to the 260 radial, that is .4 minutes per degree or 2.5 minutes X 60 = 15 minutes to the station.

Time To Station - Isosceles Triangle Method



When inbound toward a station (Position 1)
Turn 5 to 20 degrees off course (Position 2)
The amount of time it takes to change bearing to the station by 10 degrees (example shows 270-260) is equal to the time to the station.

Correction Angle To Converge At Station

If you have flown off course, and must determine the heading correction necessary to converge on your destination, first compute the correction necessary to parallel the course, then add the angle necessary to converge on your destination in the distance remaining. Remember that 1 degree of azimuth at 60 miles distance is 1 mile off course.

EXAMPLE: If your distance off course is 6 miles after having flown 45 miles, that is the same as 8 miles off course in 60 miles, so you must turn 8 degrees to parallel the course. if your destination is 120 miles away and you are 6 miles off course, that is the same as being 3 miles off course in 60 miles, so you must turn an additional 3 degrees to converge on your destination.

VOR (VHF Omnidirectional Range)

All radio aids are oriented to magnetic direction.

Radials are magnetic bearings emanating outwards from a station. To assure proper sensing (Fly to Needle) always make sure you are flying in the direction of the ambiguity indicator (TO-FROM)

A reverse sensing situation would result if the pilot flew a heading that is reciprocal to the bearing selected on the OBS. Example, flying to the VOR with a FROM indication and vice versa.

VOR Components

Omnibearing selector (OBS) enables you to select the course you wish to fly. This selector should always agree with your course. If reading a VOR indicator, imagine your aircraft on the same heading as the OBS. Reverse sensing will occur if you fly a heading that Is the reciprocal to the bearing selected on the OBS.

TO-FROM flag tells you, if flying the course selected, whether you are getting closer TO or farther FROM the station.

LEFT-RIGHT needle tells you, if flying the course selected, to turn right or left to center the needle and put you on course. A full scale deflection of the left-right needle indicates 10 degrees or more off course.

VOR Accuracy Tests

To test the VOR using a VOR test frequency (VO1~), the VOR should Indicate your aircraft on the 360 radial. The LEFT-RIGHT needle should center with OBS of 360 and FROM flag, and OBS of 180 and TO flag. Allowable tolerance is + /- 4 degrees.

To test the VOR while on the ground and using a designated checkpoint, move the aircraft to the designated area on the airport. Set the OBS on the designated radial. Regardless of aircraft heading, the LEFT-RIGHT needle (CDI) should center within plus or minus 4 degrees of that radial with a FROM indication.

To test the VOR while airborne, fly over the designated airborne checkpoint. The needle should center within 6 degrees of the selected radial.

HSI (Horizontal Situation indicator)

An HSI is basically a Heading Indicator with a VOR slapped on it's face.

To read an HSI, draw a VOR, then the course line (OBS setting), then whether going TO or FROM, and whether left or right of course. After you have determined airplane location, draw airplane on proper heading. Bearing pointer also shows your position.

GPS

A consideration when using a hand-held GPS for VFR navigation is the position accuracy may degrade without notification.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5999-1. COM
What procedure could a pilot use to navigate under VFR from one point to another when ground references are not visible?
A) Dead reckoning.
B) Pilotage.
C) VFR is not allowed in these circumstances.

5466.* COM
An airplane descends to an airport under the following conditions:
Cruising altitude 6,500 ft
Airport elevation 700 ft
Descends to 800 ft AGL
Rate of descent 500 ft/min
Average true airspeed 110 kts
True course 335°
Average wind velocity 060° at 15 kts
Variation 3°W
Deviation +2°
Average fuel consumption 8.5 gal/hr

Determine the approximate time, compass heading, distance, and fuel consumed during the descent.
A) 10 minutes, 348°, 18 NM, 1.4 gallons.
B) 10 minutes, 355°, 17 NM, 2.4 gallons.
C) 12 minutes, 346°, 18 NM, 1.6 gallons.

****SOLUTION TO THESE TYPE OF QUESTIONS:***

1. Calculate the time to descend:
Time = vertical distance÷ vertical speed
Where vertical distance = 6,500 - 1,500 = 5,000 feet
Time = 5,000 feet÷ 500 FPM = **10 minutes** = 0.1667 hr

2. Compute the fuel requirement:
8.5 gal/hr x 0.1667 hr = **1.42 gallons**

3. Calculate true heading (TH = TC + WCA):
335° + 8° = 343° TH

4. Calculate compass heading (CH = TH + Var + Dev):
343° + 3° + 2° = **348°CH**

5. Calculate the wind correction angle and ground speed using an E6B or wind triangle:
TAS = 110 kts
WCA = 8° right
Ground speed = **108 knots.**

6. Compute distance flown:
Distance = 108 knots x 0.1667 hour = **18 NM.**

5467.* COM
An airplane descends to an airport under the following conditions:
Cruising altitude 7,500 ft.
Airport elevation 1,300 ft
Descends to 800 ft AGL
Rate of descent 300 ft/min
Average true airspeed 120 kts
True course 165°
Average wind velocity 240° at 20 kts
Variation 4°E
Deviation -2°
Average fuel consumption 9.6 gal/hr

Determine the approximate time, compass heading, distance, and fuel consumed during the descent.
A) 16 minutes, 168°, 30 NM, 2.9 gallons.
B) 18 minutes, 164°, 34 NM, 3.2 gallons.
C) 18 minutes, 168°, 34 NM, 2.9 gallons.

5468.* COM
An airplane descends to an airport under the following conditions:
Cruising altitude 10,500 ft
Airport elevation 1,700 ft
Descends to 1,000 ft AGL
Rate of descent 600 ft/mm
Average true airspeed 135 kts
True course 263°
Average wind velocity 330° at 30 kts
Variation 7°E
Deviation +3°
Average fuel consumption 11.5 gal/hr

Determine the approximate time, compass heading, distance, and fuel consumed during the descent.
A) 9 minutes, 274°, 26 NM, 2.8 gallons.
B) 13 minutes, 274°, 28 NM, 2.5 gallons.
C) 13 minutes, 271°, 26 NM, 2.5 gallons.

5469. COM
If fuel consumption is 80 pounds per hour and groundspeed is 180 knots, how much fuel is required for an airplane to travel 460 NM?
A) 205 pounds.
B) 212 pounds.
C) 460 pounds.

5470. COM
If an airplane is consuming 95 pounds of fuel per hour at a cruising altitude of 6,500 feet and the groundspeed is 173 knots, how much fuel. is required to travel 450 NM?
A) 248 pounds.
B) 265 pounds.
C) 284 pounds.

5471. COM
If an airplane is consuming 12.5 gallons of fuel per hour at a cruising altitude of 8,500 feet and the groundspeed is 145 knots, how much fuel is required to travel 435 NM?
A) 27 gallons.
B) 34 gallons.
C) 38 gallons.

5472. COM
If an airplane is consuming 9.5 gallons of fuel per hour at a cruising altitude of 6,000 feet and the groundspeed is 135 knots, how much fuel is required to travel 490 NM?
A) 27 gallons.
B) 30 gallons.
C) 35 gallons.

5473. COM
If an airplane is consuming 14.8 gallons of fuel per hour at a cruising altitude of 7,500 feet and the groundspeed is 167 knots, how much fuel is required to travel 560 NM?
A) 50 gallons.
B) 53 gallons.
C) 57 gallons.

5474. COM
If fuel consumption is 14.7 gallons per hour and groundspeed is 157 knots, how much fuel is required for an airplane to travel 612 NM?
A) 58 gallons.
B) 60 gallons.
C) 64 gallons.

5475. COM
GIVEN:
True course 105°
True heading 085°
True airspeed 95 kts
Groundspeed 87 kts

Determine the wind direction and speed.
A) 020° and 32 knots.
B) 030° and 38 knots.
C) 200° and 32 knots.

5476. COM
GIVEN:
True course 345°
True heading 355°
True airspeed 85 kts
Groundspeed 95 kts

Determine the wind direction and speed. ,
A) 095° and 19 knots.
B) 113° and 19 knots.
C) 238° and 18 knots.

5477. COM
You have flown 52 miles, are 6 miles off course, and have 118 miles yet to fly. To converge on your destination, the total correction angle would be
A) 3°.
B) 6°.
C) 10°.

5478. COM
GIVEN:
Distance off course 9 mi
Distance flown 95 mi
Distance to fly 125 mi

To converge at the destination, the total correction angle would be
A) 4°
B) 6°.
C) 10°.

5479. COM
True course measurements on a Sectional Aeronautical Chart should be made at a meridian near the midpoint of the course because the
A) values of isogonic lines change from point to point.
B) angles formed by isogonic lines and lines of latitude vary from point to point.
C) angles formed by lines of longitude and the course line vary from point to point.

5481. COM
GIVEN:
Wind 175° at 20 kts
Distance 135 NM
True course 075°
True airspeed 80 kts
Fuel consumption 105 lb/hr

Determine the time en route and fuel consumption.
A) 1 hour 28 minutes and 73.2 pounds.
B) 1 hour 38 minutes and 158 pounds.
C) 1 hour 40 minutes and 175 pounds.

5500. COM
Which situation would result in reverse sensing of a VOR receiver?
A) Flying a heading that is reciprocal to the bearing selected on the OBS.
B) Setting the OBS to a bearing that is 90° from the bearing on which the aircraft is located.
C) Failing to change the OBS from the selected inbound course to the outbound course after passing the station.

5501. COM
To track outbound on the 180 radial of a VOR station, the recommended procedure is to set the OBS to
A) 360° and make heading corrections toward the CDI needle.
B) 180° and make heading corrections away from the CDI needle.
C) 180° and make heading corrections toward the CDI needle.

5502. COM
To track inbound on the 215 radial of a VOR station, the recommended procedure is to set the OBS to
A) 215° and make heading corrections toward the CDI needle.
B) 215° and make heading corrections away from the CDI needle.
C) 035° and make heading corrections toward the CDI needle.

5506. COM
(Refer to figure 17.) Which illustration indicates that the airplane will intercept the 060 radial at a 60° angle inbound, if the present heading is maintained?
A) 6.
B) 4.
C) 5.

5507. COM
(Refer to figure 17.) Which statement is true regarding illustration 2, if the present heading is maintained? The airplane will
A) cross the 180 radial at a 45° angle outbound.
B) intercept the 225 radial at a 45° angle.
C) intercept the 360 radial at a 45° angle inbound.

5508. COM
(Refer to figure 17.) Which illustration indicates that the airplane will intercept the 060 radial at a 75° angle outbound, if the present heading is maintained?
A) 6.
B) 4.
C) 5.

5509. COM
(Refer to figure 17.) Which illustration indicates that the airplane should be turned 150° left to intercept the 360 radial at a 60° angle inbound?
A) 1.
B) 2.
C) 3.

5510. COM
(Refer to figure 17.) Which is true regarding illustration 4, if the present heading is maintained? The airplane will
A) cross the 060 radial at a 15° angle.

B) intercept the 240 radial at a 30° angle.
C) cross the 180 radial at a 75° angle.

5522. COM
If the relative bearing changes from 090° to 100° in 2.5 minutes of elapsed time, the time en route to the station would be
A) 12 minutes.
B) 15 minutes.
C) 18 minutes.

5524. COM
GIVEN:
Wing tip bearing change 10°
Elapsed time between bearing change 4 min
Rate of fuel consumption 11 gal/hr

Calculate the fuel required to fly to the station.
A) 4.4 gallons.
B) 8.4 gallons.
C) 12 gallons.

5525. COM
GIVEN:
Wingtip bearing change 5°
Elapsed time between bearing change 6 min
Rate of fuel consumption 12 gal/hr

The fuel required to fly to the station is
A) 8.2 gallons.
B) 14.4 gallons.
C) 18.7 gallons.

5526. COM
GIVEN:
Wingtip bearing change 15°
Elapsed time between bearing change 6 min
Rate of fuel consumption 8.6 gal/hr

Calculate the approximate fuel required to fly to the station.
A) 3.44 gallons.
B) 6.88 gallons.
C) 17.84 gallons.

5527. COM
GIVEN:
Wingtip bearing change 15°
Elapsed time between bearing change 7.5 mm
True airspeed 85 kts
Rate of fuel consumption 9.6 gal/hr

The time, distance, and fuel required to fly to the station is
A) 30 minutes; 42.5 miles; 4.80 gallons.
B) 32 minutes..48 miles; 5.58 gallons.
C) 48 minutes; 48 miles; 4.58 gallons.

5528. COM
While maintaining a constant heading, a relative bearing of 15° doubles in 6 minutes. The time to the station being used is
A) 3 minutes.
B) 6 minutes.
C) 12 minutes.

5531. COM
While maintaining a constant heading, a relative bearing of 10° doubles in 5 minutes. If the true airspeed is 105 knots, the time and distance to the station being used is approximately
A) 5 minutes and 8.7 miles.
B) 10 minutes and 17 miles.
C) 15 minutes and 31.2 miles.

5532. COM
When checking the course sensitivity of a VOR receiver, how many degrees should the OBS be rotated to move the CDI from the center to the last dot on either side?
A) 5° to 10°.
B) 10° to 12°.
C) 18° to 20°.

5533. COM
An aircraft 60 miles from a VOR station has a CDI indication of one-fifth deflection, this represents a course centerline deviation of approximately
A) 6 miles.
B) 2 miles.
C) 1 mile.

5544. COM
Inbound on the 040 radial, a pilot selects the 055 radial, turns 15° to the left, and notes the time. While maintaining a constant heading, the pilot notes the time for the CDI to center is 15 minutes. Based on this information, the ETE to the station is
A) 8 minutes.
B) 15 minutes.
C) 30 minutes.

5551. COM
How should the pilot make a VOR receiver check when the aircraft is located on the designated checkpoint on the airport surface?
A) Set the OBS on 180° plus or minus 4°; the CDI should center with a FROM indication.
B) Set the OBS on the designated radial. The CDI must center within plus or minus 4° of that radial with a FROM indication.
C) With the aircraft headed directly toward the VOR and the OBS set to 000°, the CDI should center within plus or minus 4° of that radial with a TO indication.

5552. COM
When using VOT to make a VOR receiver check, the CDI should be centered and the OBS should indicate that the aircraft is on the

A) 090 radial.
B) 180 radial.
C) 360 radial.

5553. COM
When the CDI needle is centered during an airborne VOR check, the omnibearing selector should read
A) within 4° of the selected radial.
B) within 6° of the selected radial.
C) 0° TO, only if you are due south of the VOR.

5555. COM
For IFR operations off established airways, ROUTE OF FLIGHT portion of an IFR flight plan should list VOR navigational aids which are no more than
A) 40 miles apart.
B) 70 miles apart.
C) 80 miles apart.

5564. COM
Which is true relating to the blue and magenta colors used to depict airports on Sectional Aeronautical Charts?
A) Class E airports are shown in blue; Class C and D are magenta.
B) Class B airports are shown in blue; Class D and E are magenta.
C) Class E airports are shown in magenta; Class B, C, and D are blue.

5585. COM
(Refer to figure 52, point 4) The terrain at the obstruction approximately 8 NM east southeast of the Lincoln Airport is approximately how much higher than the airport elevation?
A) 376 feet.
B) 827 feet.
C) 1,135 feet.

5569. COM
(Refer to figure 53, point 1) This thin black shaded line is most likely
A) an arrival route.
B) a military training route.
C) a state boundary line.

5570. COM
(Refer to figure 53, point 2) The 16 indicates
A) an antenna top at 1,600 feet AGL.
B) the maximum elevation figure for that quadrangle.
C) the minimum safe sector altitude for that quadrangle.

5583. COM
(Refer to figure 52, point 6) Van Vleck Airport is
A) an airport restricted to use by private and recreational pilots.
B) a restricted military stage field within restricted airspace.
C) a nonpublic use airport.

5587. COM
(Refer to figure 54, point 6) The Class C airspace at Metropolitan Oakland International (OAK) which extends from the surface upward has a ceiling of
A) both 2,100 feet and 3,000 feet MSL.
B) 8,000 feet MSL.
C) 2,100 feet AGL.

5999-2. COM
What is a consideration when using a hand-held GPS for VFR navigation?
A) Position accuracy may degrade without notification.
B) RAIM capability will be maintained for entire flight.
C) Waypoints will still be accurate even if database is not current.

5122-3. COM
When navigating using only VOR/DME based RNAV, selection of a VOR NAVAID that does not have DME service will
A) result in loss of RNAV capability.
B) have no effect on navigation capability.
C) not impact navigation provided enough GPS satellites are operating.

5574-3. COM
If a military training route has flights operating at or below 1,500 feet AGL, it will be designated by
A) VR and a three digit number only.
B) IR or VR and a four digit number.
C) IR or VR and a three digit number

INSTRUMENTS

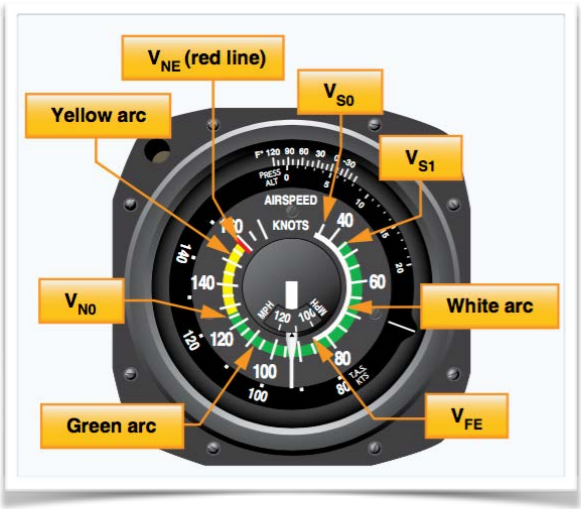
Pitot Static System

The pitot tube provides impact pressure for only the airspeed indicator.

The static vents provide information to the altimeter, vertical speed indicator and airspeed indicator.

In TAA aircraft, pitot static inputs are received by the air data computer (ADC). If the ADC fails, the airspeed indicator will be affected.

Airspeed Indicator



Airspeed indicator markings show:

Vso = is defined as POWER-OFF stalling speed, flaps and landing gear in landing position (bottom of white arc).
Vs1 = is defined as the calibrated POWER-OFF stalling speed or the minimum steady flight speed at which the aircraft is controllable in a specified configuration.(bottom of green arc)
White Arc = Flap operating range (White Arc)
Vfe = Maximum flap extended speed.
Green Arc = Normal operating range.
Vno = Maximum Structural Cruising speed (Top of Green Arc)
Yellow Arc = Caution Range - Smooth air only.
Vne = Never Exceed speed. (Red Line) Speeds above Vne should be avoided because design limit load factors may be exceeded, if gusts are encountered.

Other V-Speeds

Airspeeds not marked on the airspeed Indicator:
Vf = Design Flap speed.
Vle = Maximum Landing Gear Extended speed.
Va = Maneuvering speed. The highest safe airspeed for abrupt control deflection or for operation in turbulence or severe gusts.
Vs = The stalling speed or the minimum steady flight speed at which the airplane is controllable.

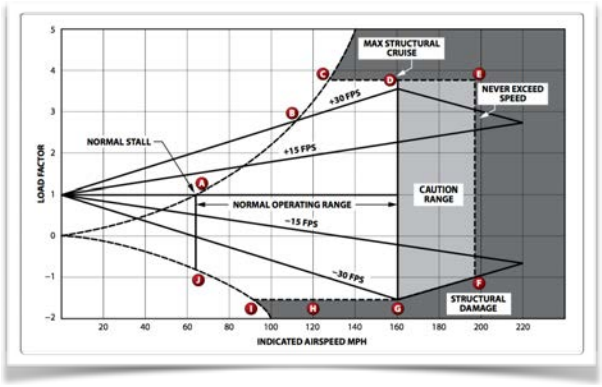
True Airspeed and Calibrated Airspeed

True airspeed is best described as calibrated airspeed corrected for altitude and non-standard temperature.

Calibrated airspeed is best described as indicated airspeed corrected for installation and instrument error.

Mach Speed

The ratio of an airplane's true airspeed to the speed of sound in the same atmospheric conditions is known as Mach speed. Mach .80 would be 80% of the speed of sound.



Exceeding critical Mach speed can result in serious aircraft control difficulties.

Velocity -vs- Load Factor
Refer to Figure 5.

The horizontal dashed line from point **C** to point **E** represents the positive limit load factor.

The vertical line from point **E** to point **F** is represented on the airspeed indicator by the upper limit of the yellow arc.

The vertical line from point **D** to point **G** is represented on the airspeed indicator by the maximum speed limit of the green arc.

Altimeter

Pressure Altitude can be determined by setting the altimeter to 29.92" Hg and reading the altimeter. All aircraft above FL180 should have altimeter set to 29.92 indicating pressure altitude.

A decrease in air temperature will increase the density of the air and decrease the density altitude of a given airport. If the altimeter setting isn't adjusted for the change in pressure, the altimeter will read higher than the field elevation.

Magnetic Compass

Magnetic Variation is the angle between true north and magnetic north, and is found on Sectional charts. It is shown by a dashed magenta line.

Compass Deviation is the angle between magnetic north and compass north (where the compass points).

Deviation varies for different headings of the same aircraft.

Errors in the compass include:
Turning error - Turning on a south heading In either direction, the compass will lead your turn. Turning on a north heading in either direction, the compass will lag your turn. (Useful saying - The South Leads)

Acceleration error - On an east or west heading, if you accelerate, the compass turns north; if you decelerate, the compass turns south. (Useful Saying - ANDS = Accelerate North Decelerate South)

Turn & Slip Indicator and Turn Coordinator

The operational difference between the turn coordinator and the turn-and-slip indicator is the turn coordinator indicates roll rate, rate of turn, and coordination; the turn-and-slip indicator indicates rate of turn and coordination.

An advantage of an electric turn coordinator if the airplane has a vacuum system is that It is a backup in case of vacuum system failure.

Rate and Radius

Basics:

As airspeed increases, Turn Radius increases and Turn Rate decreases.

As airspeed decreases, Turn Radius decreases and Turn Rate increases.

You can "walk" a full circle a lot faster than you can "run" a full circle!

In a level coordinated turn, the load factor Is only a function of angle of bank. 60 degrees of bank in any aircraft (while maintaining altitude) = 2G's.

A standard rate of turn is 3 degrees per second, taking 2 minutes to turn 360 degrees.

Increasing bank angle will decrease the radius of turn and increase the rate of turn.

Increasing airspeed will increase the radius of turn and decrease the rate of turn.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5013. COM
Which is the correct symbol for the stalling speed or the minimum steady flight in a specified configuration?
A) VS.
B) VS1.
C) VSO.

5014. COM
Which is the correct symbol for the stalling speed or the minimum steady flight speed at which the airplane is controllable?
A) Vs
B) Vs1
C) Vso

5015. COM
FAR Part 1 defines Vf, as
A) design flap speed.
B) flap operating speed.
C) maximum flap extended speed.

5016. COM
FAR Part 1 defines Vle as
A) maximum landing gear extended speed.
B) maximum landing gear operating speed.
C) maximum leading edge flaps extended speed.

5177. COM
Which airspeed would a pilot be unable to identify by the color coding of an airspeed indicator?
A) The never-exceed speed.
B) The power-off stall speed.
C) The maneuvering speed.

5177-2 COM
What could be one result of exceeding critical Mach number?
A) Propeller stall.
B) Reduction in drag.
C) Aircraft control difficulties.

5178. COM
Which statement is true about magnetic deviation of a compass? Deviation
A) varies over time as the agonic line shifts.
B) varies for different headings of the same aircraft.
C) is the same for all aircraft in the same locality.

5192. COM
To increase the rate of turn and at the same time decrease the radius, a pilot should
A) maintain the bank and decrease airspeed.
B) increase the bank and increase airspeed.
C) increase the bank and decrease airspeed.

5193. COM
Which is correct with respect to rate and radius of turn for an airplane flown in a coordinated turn at a constant altitude?
A) For a specific angle of bank and airspeed, the rate and radius of turn will not vary.
B) To maintain a steady rate of turn, the angle of bank must be increased as the airspeed is decreased.
C) The faster the true airspeed, the faster the rate and larger the radius of turn regardless of the angle of bank.

5268. COM
What is an operational difference between the turn coordinator and the turn-and-slip indicator? The turn coordinator
A) is always electric; the turn-and-slip indicator is always vacuum-driven.
B) indicates bank angle only; the turn-and-slip indicator indicates rate of turn and coordination.
C) indicates roll rate, rate of turn, and coordination; the turn-and-slip indicator indicates rate of turn and coordination.

5269. COM
What is an advantage of an electric turn coordinator if the airplane has a vacuum system for other gyroscopic instruments?
A) It is a backup in case of vacuum system failure.
B) It is more reliable than the vacuum-driven indicators.
C) It will not tumble as will vacuum-driven turn indicators.

5270. COM
If a standard rate turn is maintained, how long would it take to turn 360°?
A) 1 minute.
B) 2 minutes.
C) 3 minutes.

5604. COM
Why should flight speeds above VNE be avoided?
A) Excessive induced drag will result in structural failure.
B) Design limit load factors may be exceeded, if gusts are encountered.
C) Control effectiveness is so impaired that the aircraft becomes uncontrollable.

5605. COM
Maximum structural cruising speed is the maximum speed at which an airplane can be operated during
A) abrupt maneuvers.
B) normal operations.
C) flight in smooth air.

5601. COM
Calibrated airspeed is best described as indicated airspeed corrected for
A) instrument error.
B) non-standard temperature.
C) installation and instrument error.

5602. COM
True airspeed is best described as calibrated airspeed corrected for
A) non-standard temperature.
B) altitude and non-standard temperature.
C) installation or instrument error.

5604-1. COM
Structural damage or failure is more likely to occur in smooth air at speeds above
A) Vno
B) Va
C) Vne

5999-3. COM
You are flying an aircraft equipped with an electronic flight display and the air data computer fails. What instrument is affected?
A) ADS-B in capability.
B) Airspeed indicator.
C) Attitude indicator

5231. COM
(Refer to Figure 5)
The horizontal dashed line from point C to point E represents the
A) ultimate load factor.
B) positive limit load factor.
C) airspeed range for normal operations.

5232. COM
(Refer to Figure 5)
The vertical line from point E to point F is represented on the airspeed indicator by the
A) upper limit of the yellow arc.
B) upper limit of the green arc.
C) blue or red radial line.

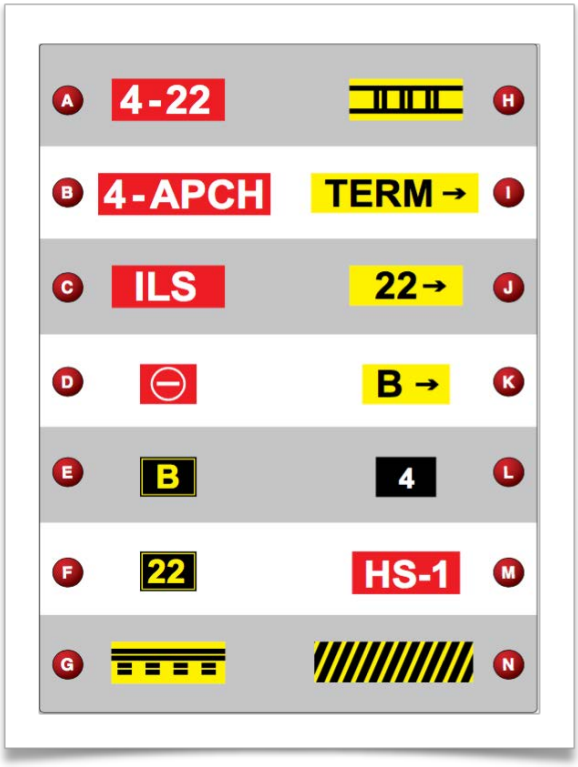
5233. COM
The vertical line from point D to point G is represented on the airspeed indicator by the maximum speed limit of the
A) green arc.
B) white arc.
C) yellow arc.

5408. COM
An airplane is located at an airport with an elevation of 5,000 feet MSL and a temperature of 90 degrees F. The altimeter is set to airport elevation. Later that night the temperature plummets to 50 degrees F. Unless the altimeter setting is changed, it will read
A) 4,800 feet
B) 5,000 feet
C) 5,200 feet

5740. COM
To determine pressure altitude prior to takeoff, the altimeter should be set to
A) the current altimeter setting.
B) 29.92'' Hg and the altimeter indication noted.
C) the field elevation and the pressure reading in the altimeter setting window noted.

AERONAUTICAL INFORMATION MANUAL

Runway Markings



Refer to Figure 51.

A. Runway sign for 4-22
B. Runway 4 Approach Area sign.
C. ILS Critical Hold sign.
D. No Entry for aircraft sign.
E. Taxiway Bravo sign.
F. Runway 22 sign.
G. Runway Safety (Runway Hold) Obstacle Free Zone.
H. ILS Critical Hold marki
I. Inbound Destination sign to terminal.
J. Outbound Destination sign to runway 22.
K. Destination sign to taxiway Bravo.
L. Runway Distance Remaining sign (4,000 ft)
M. Hot Spot location.
N. Taxiway Ending marker.

Airport and Aircraft Lighting

Operation of the airport rotating beacon during the daytime indicates the weather in the Class D airspace is below basic VFR minimums.

Pilots are required to have their anti-collision light system operating during all types of operations, both day and night.

Hot Spots are high risk areas on an airport surface area found in the Chart Supplement.

VASI (Visual Approach Slope Indicator)

If approaching a runway served by VASI, always stay at or above the glide-slope.

CTAF (Common Traffic Advisory Frequency)

CTAF is the common frequency to be used when departing or arriving at an airport that does not have an operating control tower.

CTAF frequencies are listed on sectional charts and in the Chart Supplement for each airport.

Transponder Operation

An operable transponder with Mode C capability is required within 30 NM of the primary airport of Class B airspace when below 10,000 .MSL, in Class C airspace, and at and above 10,000 MSL (excluding the airspace at or below 2500 feet AGL).

Flight Diversions

When diverting to an alternate airport because of an emergency, apply rule-of-thumb computations and other appropriate shortcuts to divert to the new course as soon as possible.

Turbulence and Wake Turbulence

When turbulence is encountered during the approach to a landing, the pilot should increase the airspeed slightly above normal approach speed to attain more positive control.

Wake turbulence refers to tornado-like vortices generated by the wingtips of large airplanes. It is created only whenever the airplane's wings are producing lift.

The primary hazard of wake turbulence is loss of control because of induced roll.

The greatest vortex strength occurs when the generating aircraft is heavy, clean, and slow.

Wake turbulence tends to sink below the flight path of the generating aircraft, and into the flight path of aircraft operating below the aircraft generating the turbulence.

Remain above the flight path of an aircraft generating wake turbulence. On takeoff, rotate and become airborne prior to reaching the jet's flightpath until able to turn clear of its wake. On landing, land beyond its touchdown point.

Crosswind Techniques

With regard to the technique required for a crosswind correction on takeoff, a pilot should use rudder as required to maintain directional control, aileron pressure into the wind, and higher than normal lift-off airspeed in both conventional and nosewheel-type airplanes.

Collision Avoidance

While in the vicinity of a VOR, exercise sustained vigilance to avoid other aircraft that may be converging on the VOR from other directions.

If another aircraft is on a collision course with your aircraft, there will be no apparent relative motion between your aircraft and the other aircraft.

Scan for other aircraft in the daytime by systematically focusing on different segments of vision field for short intervals.

Haze causes traffic to appear to be farther away than actual distance.

Physiological Factors

Alcohol

Judgment and decision-making abilities can be adversely affected by even small amounts of alcohol.

You can fly only if you are not under the influence of alcohol and your blood alcohol level is below .04%.

Hypoxia

Hypoxia Is a result of Insufficient oxygen reaching the brain.

Hypoxia susceptibility due to the inhalation of carbon monoxide increases as attitude increases.

Hyperventilation

Hyperventilation is a lack of carbon dioxide as a result of rapid or extra breathing.

Common symptoms of hyperventilation include drowsiness, tingling of the hands, legs and feet.

Remedy hyperventilation by slowing your breathing rate to reduce the output of carbon dioxide.

Spatial Disorientation

Spatial disorientation is a temporary confusion resulting from misleading information being sent to the brain by various sensory organs.

You are most likely to experience somatogravic illusion during a rapid acceleration during take-off.

The best way to overcome the effects of spatial disorientation is to rely on the aircraft instrument indications.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5272. COM
How can you determine if another aircraft is on a collision course with your aircraft?
A) The nose of each aircraft is pointed at the same point in space.
B) The other aircraft will always appear to get larger and closer at a rapid rate.
C) There will be no apparent relative motion between your aircraft and the other aircraft.

5657. COM
(Refer to figure 51.) The pilot generally calls ground control after landing when the aircraft is completely clear of the runway. This is when the aircraft
A) passes the red symbol shown in illustration D.
B) is on the dashed-line side of illustration G.
C) is past the solid-line side of illustration G.

5658. COM
(Refer to figure 51.)
Illustration ‘D’ would most likely be found
A) upon exiting all runways prior to calling ground control.
B) at an intersection where a roadway may be mistaken as a taxiway.
C) near the approach end of ILS runways.

5659. COM
(Refer to figure 51.) While clearing an active runway, you are most likely clear of the ILS critical area when you pass which sign?
A) Illustration D.
B) Illustration G.
C) Illustration H.

5660. COM
(Refer to figure 51.) Which symbol does not directly address runway incursion with other aircraft?
A) Illustration D.
B) Illustration G.
C) Illustration H.

5661. COM
With regard to the technique required for a crosswind correction on takeoff, a pilot should use
A) aileron pressure into the wind and initiate the lift-off at a normal airspeed in both tailwheel-and nosewheel-type airplanes.
B) right rudder pressure, aileron pressure into the wind, and higher than normal lift-off airspeed in both tricycle- and conventional-gear airplanes.
C) rudder as required to maintain directional control, aileron pressure into the wind, and higher than normal lift-off airspeed in both conventional- and nosewheel-type airplanes.

5662. COM
When turbulence is encountered during the approach to a landing, what action is recommended and for what primary reason?
A) Increase the airspeed slightly above normal approach speed to attain more positive control.
B) Decrease the airspeed slightly below normal approach speed to avoid over-stressing the airplane.
C) Increase the airspeed slightly above normal approach speed to penetrate the turbulence as quickly as possible.

5663. COM
If you experience an engine failure in a single-engine aircraft after takeoff, you should
A) establish the proper glide attitude.
B) turn into the wind.
C) adjust the pitch to maintain Vy.

5748. COM
Pilots are required to have the anti-collision light system operating
A) anytime an engine is in operation.
B) anytime the pilot is in the cockpit.
C) during all types of operations, both day and night.

5749. COM
When in the vicinity of a VOR which is being used for navigation on VFR flights, it is important to
A) make 90° left and right turns to scan for other traffic.
B) exercise sustained vigilance to avoid aircraft that may be converging on the VOR from other directions.
C) pass the VOR on the right side of the radial to allow room for aircraft flying in the opposite direction on the same radial.

5750. COM
Choose the correct statement regarding wake turbulence.
A) Vortex generation begins with the initiation of the takeoff roll.
B) The primary hazard is loss of control because of induced roll.
C) The greatest vortex strength is produced when the generating airplane is heavy, clean, and fast

5751. COM
During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazard of wingtip vortices by
A) being airborne prior to reaching the jet's flightpath until able to turn clear of its wake.
B) maintaining extra speed on takeoff and climbout.
C) extending the takeoff roll and not rotating until well beyond the jet's rotation point.

5752. COM
Which procedure should you follow to avoid wake turbulence if a large jet crosses your course from left to right approximately 1 mile ahead and at your altitude?
A) Make sure you are slightly above the path of the jet.
B) Slow your airspeed to VA and maintain altitude and course.
C) Make sure you are slightly below the path of the jet and perpendicular to the course.

5753. COM
To avoid possible wake turbulence from a large jet aircraft that has just landed prior to your takeoff, at which point on the runway should you plan to become airborne?
A) Past the point where the jet touched down.
B) At the point where the jet touched down, or just prior to this point.
C) Approximately 500 feet prior to the point where the jet touched down.

5754. COM
When landing behind a large aircraft, which procedure should be followed for vortex avoidance?
A) Stay above its final approach flightpath all the way to touchdown.
B) Stay below and to one side of its final approach flightpath.
C) Stay well below its final approach flightpath and land at least 2,000 feet behind.

5757. COM
As hyperventilation progresses a pilot can experience
A) decreased breathing rate and depth.
B) heightened awareness and feeling of well being.
C) symptoms of suffocation and drowsiness.

5758. COM
To scan properly for traffic, a pilot should
A) slowly sweep the field of vision from one side to the other at intervals.
B) concentrate on any peripheral movement detected.
C) use a series of short, regularly spaced eye movements that bring successive areas of the sky into the central visual field.

5759. COM
Which is a common symptom of hyperventilation?
A) Drowsiness.
B) Decreased breathing rate.
C) Euphoria. A sense of well-being.

5760. COM
Which would most likely result in hyperventilation?
A) Insufficient oxygen.
B) Excessive carbon monoxide.
C) Insufficient carbon dioxide.

5761. COM
Hypoxia is the result of which of these conditions?
A) Excessive oxygen in the bloodstream.
B) Insufficient oxygen reaching the brain.
C) Excessive carbon dioxide in the bloodstream.

5762. COM
To overcome the symptoms of hyperventilation, a pilot should
A) swallow or yawn.
B) slow the breathing rate.
C) increase the breathing rate.

5763. COM
Which is true regarding the presence of alcohol within the human body?
A) A small amount of alcohol increases vision acuity.
B) An increase in altitude decreases the adverse effect of alcohol.
C) Judgment and decision-making abilities can be adversely affected by even small amounts of alcohol.

5763-4. COM
You attended a party last night and consumed several glasses of wine. You are planning to fly
your aircraft home and have been careful to make sure 8 hours have passed since your last alcoholic
drink. You can make the flight now only if you are not under the influence of alcohol and your blood
alcohol level is
A) below .04%.
B) below .08%.
C) 0.0%.

5764. COM
Hypoxia susceptibility due to inhalation of carbon monoxide increases as
A) humidity decreases.
B) altitude increases.
C) oxygen demand increases.

5765. COM
To best overcome the effects of spatial disorientation, a pilot should
A) rely on body sensations.
B) increase the breathing rate.
C) rely on aircraft instrument indications.

5998. COM
You are most likely to experience somatogravic illusion during
A) a rapid descent.
B) deceleration upon landing.
C) rapid acceleration during takeoff.

5999. COM
You are preflight planning in the morning before an afternoon flight. Where would you find information regarding an “airport surface hot spot”?
A) Call the Automated Flight Service Station.
B) In the Chart Supplements U.S. (formerly Airport/ Facility Directory).
C) In the NOTAMs during your preflight briefing.

5503. COM
When diverting to an alternate airport because of an emergency, pilots should
A) rely upon radio as the primary method of navigation.
B) climb to a higher altitude because it will be easier to identify checkpoints.
C) apply rule-of-thumb computations, estimates, and other appropriate shortcuts to divert to the new course as soon as possible.

5983-2. COM
(Refer to Figure 61.) Ground control has instructed you to taxi from Alfa to Foxtrot to the active runway. According to the sign in the figure, which direction would you turn at this intersection to comply
with ATC?
A) No turn is required.
B) The turn will be made to the right.
C) The turn will be made to the left.

PERFORMANCE

Pressure Altitude And Density Altitude

Performance tables of an aircraft for takeoff and climb are based on pressure and density altitude.

Pressure altitude is indicated altitude corrected for non-standard pressure. It is determined by setting 29.92 In the altimeter setting window.

Density altitude is pressure altitude corrected for non-standard temperature. Performance tables for most aircraft are based on density altitude. Find density altitude using the E6B computer.

NOTE CONCERNING GRAPHS

Some graph charts have a sample shown on the chart. Use the sample to review the proper method of entering the chart and reading the data.

Read all notes. if the chart has a note regarding temperature, wind, aircraft configuration variations, percentage of distance, etc., expect a question that will require you to use the note.

Count off the graph scale very closely. The vertical and horizontal scale are usually different.

When you enter a graph, enter with the curves or tangent lines. Once you have found the data mark point, read the answers straight out.

NOTE CONCERNING TABULAR CHARTS

These charts are entered with certain known numbers and the answers are read directly as numbers.

Read all notes. Most test questions will require that all notes be used to get a correct answer.

There are many numbers on these charts. Use a straight edge to ensure you are reading the correct data.

If a question uses numbers that are in-between the numbers given on the chart, be sure to interpolate. Do not round off numbers.

If your interpolation is a midpoint interpolation, you can average the two numbers. If you must Interpolate between four numbers, (between two temperatures and two aircraft weights), if it is a midpoint Interpolation, you can again just average the four numbers.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5234. COM
The performance tables of an aircraft for takeoff and climb are based on
A) pressure/density altitude.
B) cabin altitude.
C) true altitude.

5306. COM
GIVEN:
Pressure altitude 12,000 ft
True air temperature +50 °F

From the conditions given, the approximate density altitude is
A) 11,900 feet.
B) 14,130 feet.
C) 18,150 feet

5307. COM
GIVEN:
Pressure altitude 5,000 ft
True air temperature +30 °C

From the conditions given, the approximate density altitude is
A) 7,800 feet.
B) 8,100 feet.
C) 8,800 feet.

5308. COM
GIVEN:
Pressure altitude 6,000 ft
True air temperature +30 °F

From the conditions given, the approximate density altitude is
A) 9,000 feet.
B) 5,500 feet.
C) 5,000 feet.

5309. COM
GIVEN:
Pressure altitude 7,000 ft
True air temperature +15 °C

From the conditions given, the approximate density altitude is
A) 5,000 feet.
B) 8,500 feet.
C) 9,500 feet.

5451. COM
(Refer to figure 8.)
GIVEN:
Fuel quantity 47 gal
Power-cruise (lean) 55 percent

Approximately how much flight time would be available with a night VFR fuel reserve remaining?
A) 3 hours 8 minutes
B) 3 hours 22 minutes
C) 3 hours 43 minutes

5452. COM
(Refer to figure 8.)
GIVEN:

Fuel quantity 65 gal
Best power (level flight) 55 percent

Approximately how much flight time would be available with a day VFR fuel reserve remaining?
A) 4 hours 17 minutes.
B) 4 hours 30 minutes.
C) 5 hours 4 minutes.

5453. COM
(Refer to figure 8.) Approximately how much fuel would be consumed when climbing at 75 percent power for 7 minutes?
A) 1.82 gallons.
B) 1.97 gallons.
C) 2.15 gallons.

5454. COM
(Refer to figure 8.) Determine the amount of fuel consumed during takeoff and climb at 70 percent power for 10 minutes.
A) 2.66 gallons.
B) 2.88 gallons.
C) 3.2 gallons.

5455. COM
(Refer to figure 8.) With 38 gallons of fuel aboard at cruise power (55 percent), how much flight time is available with night VFR fuel reserve still remaining?
A) 2 hours 34 minutes.
B) 2 hours 49 minutes.
C) 3 hours 18 minutes.

5456. COM
(Refer to figure 9.)
(Refer to figure 9.) Using a normal climb, how much fuel would be used from engine start to 12,000 feet pressure altitude?

Aircraft weight 3,800 lb
Airport pressure altitude 4,000 ft
Temperature 26 °C
A) 46 pounds.
B) 51 pounds.
C) 58 pounds.

5457. COM
(Refer to figure 9.) Using a normal climb, how much fuel would be used from engine start to 10,000 feet pressure altitude?

Aircraft weight 3,500lb
Airport pressure altitude 4,000 ft
Temperature 21 °C

A) 23pounds.
B) 31 pounds.
C) 35 pounds.

5458. COM
(Refer to figure 10.) Using a maximum rate of climb, how much fuel would be used from engine start to 6,000 feet pressure altitude?

Aircraft weight 3,200lb
Airport pressure altitude 2,000 ft
Temperature 27 °C

A) 10 pounds.
B) 14 pounds.
C) 24 pounds.

5459. COM
(Refer to figure 10.) Using a maximum rate of climb, how much fuel would be used from engine start to 10,000 feet pressure altitude?

Aircraft weight 3,800lb
Airport pressure altitude 4,000 ft
Temperature 30 °C

A) 28 pounds.
B) 35 pounds.
C) 40 pounds.

5460. COM
(Refer to figure 11.) If the cruise altitude is 7,500 feet, using 64 percent power at 2,500 RPM, what would be the range with 48 gallons of usable fuel?
A) 635 miles.
B) 645 miles.
C) 810 miles.

5461. COM
(Refer to figure 11.) What should be the endurance at an altitude of 7,500 feet, using 52 percent power?
NOTE: (With 48 Gallons fuel-no reserve)

A) 6.1 Hours
B) 7.7 Hours
C) 8.0 Hours

5462. COM
(Refer to figure 11.) What would be the approximate true airspeed and fuel consumption per hour at an altitude of 7,500 feet, using 52 percent power?
A) 103 MPH TAS, 7.7 GPH.
B) 105 MPH TAS, 6.1 GPH.
C) 105 MPH TAS, 6.2 GPH.

5463. COM
(Refer to figure 12.)
GIVEN:
Pressure altitude 18,000 ft
Temperature -21 °C
Power 2,400 RPM - 28” MP
Recommended lean mixture
usable fuel 425 lb

What is the approximate flight time available under the given conditions? (Allow for VFR day fuel reserve.)
A) 3 hours 46 minutes.
B) 4 hours 1 minute.
C) 4 hours 31 minutes.

5464. COM
(Refer to figure 12.)
GIVEN:
Pressure altitude 18,000 ft
Temperature -41 °C
Power 2,500 RPM - 26” MP
Recommended lean mixture
Usable fuel 318 lb

What is the approximate flight time available under the given conditions? (Allow for VFR night fuel reserve.)
A) 2 hours 27 minutes.
B) 3 hours 12 minutes.
C) 3 hours 42 minutes.

5465. COM
(Refer to figure 12.)
GIVEN:
Pressure altitude 18,000 ft
Temperature - 1 °C
Power 2,200 RPM - 20” MP
Best fuel economy
usable fuel 344 lb

What is the approximate flight time available under the given conditions? (Allow for VFR day fuel reserve.)
A) 4 hours 50 minutes.
B) 5 hours 20 minutes.
C) 5 hours 59 minutes.

5482. COM
Aircraft weight 3,400 lb
Airport pressure altitude 6,000 ft
Temperature at 6,000 feet 10 °C

Using a maximum rate of climb under the given conditions, how much fuel would be used from engine start to a pressure altitude of 16,000 feet?

A) 43 pounds.
B) 45 pounds.
C) 49 pounds.

5483. COM
(Refer to figure 13.)
Aircraft weight 4,000 lb
Airport pressure altitude 2,000 ft
Temperature. at 2,000 feet 32 °C

Using a maximum rate of climb under the given conditions, how much time would be required to climb to a pressure altitude of 8,000 feet?
A) 7 Minutes
B) 8.4 Minutes
C) 11.2 Minutes

5484. COM
Aircraft weight 3,700 lb
Airport pressure altitude 4,000 ft
Temperature at 4,000 feet 21 “C

Using a normal climb under the given conditions, how much fuel would be used from engine start to a pressure altitude of 12,000 feet?
A) 30 pounds.
B) 37 pounds.
C) 46 pounds.

5485. COM
(Refer to figure 14.)

GIVEN:
Weight 3,400 lb
Airport pressure altitude 4,000 ft
Temperature at 4,000 feet 14 “C

Using a normal climb under the given conditions, how much time would be required to climb to a pressure altitude of 8,000 feet?
A) 4.8 minutes.
B) 5 minutes.
C) 5.5 minutes.

5486. COM
(Refer to figure 15.)

GIVEN:
Airport pressure altitude 4,000 ft
Airport temperature 12 °C
Cruise pressure altitude 9,000 ft
Cruise temperature -4 °C

What will be the distance required to climb to cruise altitude under the given conditions?
A) 6 miles.
B) 8.5 miles.
C) 11 miles.

5487. COM
(Refer to figure 15.)

Airport pressure altitude 2,000 ft
Airport temperature 20 °C
Cruise pressure altitude 10,000 ft
Cruise temperature 0 °C

What will be the fuel, time, and distance required to climb to cruise altitude under the given conditions?
A) 5 gallons, 9 minutes, 13 NM.
B) 6 gallons, 11 minutes, 16 NM.
C) 7 gallons, 12 minutes, 18 NM.

5614. COM
What effect does an uphill runway slope have on takeoff performance?
A) Increases takeoff speed.
B) Increases takeoff distance.
C) Decreases takeoff distance.

5615. COM
(Refer to figure 31.) Rwy 30 is being used for landing. Which surface wind would exceed the airplane's crosswind capability of 0.2 VSO, if VSO is 60 knots?
A) 260° at 20 knots.
B) 275° at 25 knots.
C) 315° at 35 knots.

5616. COM
(Refer to figure 31.) If the tower-reported surface wind is 010° at 18 knots, what is the crosswind component for a Rwy 08 landing?
A) 7 knots.
B) 15 knots.
C) 17 knots.

5617. COM
(Refer to figure 31.) The surface wind is 180° at 25 knots. What is the crosswind component for a Rwy 13 landing?
A) 19 knots.
B) 21 knots.
C) 23 knots.

5618. COM
(Refer to figure 31.) What is the headwind component for a Rwy 13 takeoff if the surface wind is 190° at 15 knots?
A) 7 knots.
B) 13 knots.
C) 15 knots.

5619. COM
(Refer to figure 32.)
GIVEN:
Temperature 75 °F
Pressure altitude 6,000 ft
Weight 2,900 lb
Headwind 20 kts

To safely take off over a 50-foot obstacle in 1,000 feet, what weight reduction is necessary?
A) 50 pounds.
B) 100 pounds.
C) 300 pounds.

5620. COM
(Refer to figure 32.)
GIVEN:
Temperature 50 °F
Pressure altitude 2,000 feet
Weight 2,700 lb
Wind Calm

What is the total takeoff distance over a 50-foot obstacle?
A) 650 feet.
B) 1050 feet.
C) 800 feet.

5621. COM
(Refer to figure 32.)
GIVEN:
Temperature 100 °F
Pressure altitude 4,000 ft
Weight 3,200 lb
Wind Calm

What is the ground roll required for takeoff over a 50-foot obstacle?
A) 1,180 feet.
B) 1,350 feet.
C) 1,850 feet.

5622. COM
(Refer to figure 32.)
Temperature 30 °F
Pressure altitude 6,000 ft
Weight 3,300 lb
Headwind 20 kts

What is the total takeoff distance over a 50-foot obstacle?
A) 1,100 feet.
B) 1,300 feet.
C) 1,500 feet.

5623. COM
(Refer to figure 33.)
GIVEN:
Weight 4,000 lb
Pressure altitude 5,000 ft
Temperature 30 °C

What is the maximum rate of climb under the given conditions?
A) 655 ft/min.
B) 702 ft/min.
C) 774 ft/min.

5624. COM
(Refer to figure 33.)
GIVEN:
Weight 3,700 lb
Pressure altitude 22,000 ft
Temperature -10 °C

What is the maximum rate of climb under the given conditions?
A) 305 ft/min.
B) 320 ft/min.
C) 384 ft/min.

5625. COM
(Refer to figure 34.)
GIVEN:
Pressure altitude 6,000 ft
Temperature +3 °C
Power 2,200 RPM - 22 inches MP
Usable fuel available 465 lb

What is the maximum available flight time under the conditions stated?
A) 6 hours 27 minutes.
B) 6 hours 39 minutes.
C) 6 hours 56 minutes.

5626. COM
(Refer to figure 34.)
GIVEN:
Pressure altitude 6,000 ft
Temperature -17 °C
Power 2,300 RPM - 23 inches MP
Usable fuel available 370 lb

What is the maximum available flight time under the conditions stated?
A) 4 hours 20 minutes.
B) 4 hours 30 minutes.
C) 4 hours 50 minutes.

5627. COM
(Refer to figure 34.)
GIVEN:
Pressure altitude 6,000 ft
Temperature .+13 °C
Power 2,500 RPM - 23 inches MP
Usable fuel available 460 lb

What is the maximum available flight time under the conditions stated?
A) 4 hours 58 minutes.
B) 5 hours 7 minutes.
C) 5 hours 12 minutes.

5628. COM
(Refer to figure 35.)
GIVEN:
Temperature 70 °F
Pressure altitude Sea level
Weight. 3,400 lb
Headwind 16 kts

Determine the approximate ground roll.
A) 689 feet.
B) 716 feet.
C) 1,275 feet.

5629. COM
(Refer to figure 35.)
GIVEN:
Temperature 85 °F
Pressure altitude 6,000 ft
Weight 2,800 lb
Headwind 14 kts

Determine the approximate ground roll.
A) 742 feet.
B) 1,280 feet.
C) 1,480 feet.

5630. COM
(Refer to figure 35.)
GIVEN:
Temperature 50 °F
Pressure altitude Sea level
Weight 3,000 lb
Headwind 10 kts

Determine the approximate ground roll.
A) 425 feet.
B) 636 feet.
C) 836 feet.

5631. COM
(Refer to figure 35.)
GIVEN:
Temperature 80 °F
Pressure altitude 4,000 ft
Weight 2,800 lb
Headwind 24 kts

What is the total landing distance over a 50-foot obstacle?
A) 1,125 feet.
B) 1,250 feet.
C) 1,325 feet.

5740. COM
To determine pressure altitude prior to takeoff, the altimeter should be set to
A) the current altimeter setting.
B) 29.92 inches Hg and the altimeter indication noted.
C) the field elevation and the pressure reading in the altimeter setting window noted.

5997. COM
(Refer to Figure 32.) Determine the approximate runway length necessary for takeoff.

Given:
Temperature = 40°F
Pressure altitude = 4,000 ft
Weight = 3,200 lbs
Headwind = 15 kts

A) 1,300 feet.
B) 850 feet.
C) 950 feet.

WEIGHT AND BALANCE

Definitions

Empty Weight includes the airframe and powerplant, unusable fuel, hydraulic fluid, and un-drainable oil, or in some aircraft, all of the oil.

Useful Load consists of the pilot, passengers, usable fuel, oil and baggage. Fuel weighs 6 lbs per gallon, and oil weighs 7.5 lbs/gal.

As items are installed in the aircraft in addition to the original equipment, allowable useful load is decreased.

The Datum line is an arbitrary point from which all measurements of arm are measured. If all index units are positive, the location of the datum is at the nose, or out in front of the airplane.

Arm is the distance in inches from the datum line to the center of gravity of each item.

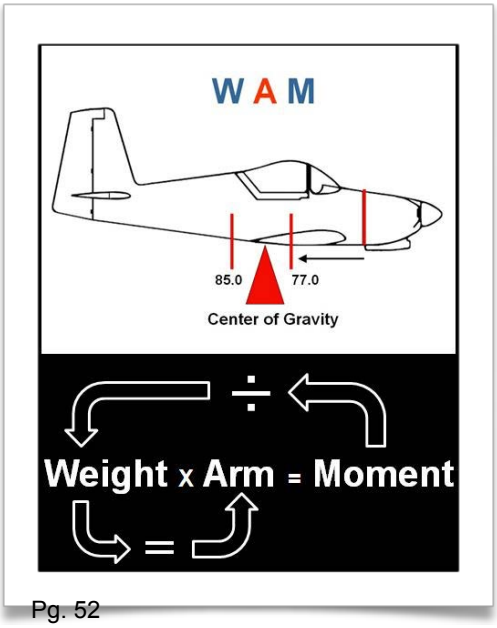
Moment is a number derived by multiplying the weight of an item by the distance from the datum line (arm).

Weight X Arm = Moment.

To find the loaded center of gravity, add the moments for all items, including the empty aircraft. Divide this by the total loaded weight.

If the center of gravity (CG) is aft of limits the airplane will be less stable about its lateral axis, and stall recovery becomes progressively more difficult.

To find the new center of gravity after fuel burnout, subtract the weight of the fuel from the loaded aircraft weight, and the moment of the fuel burned from the loaded moment. Divide the new moment by the new weight to get the new CG position.



Given:
Weight A: 155 pounds at 45 inches aft of datum
Weight B: 165 ponds at 145 inches aft of datum
Weight C: 95 pounds at 185 inches aft of datum

Based on this information, where would the CG be located aft of datum?

A - 86.0 inches.
B - 116.8 inches
C - 125.0 inches

Given:
Weight A: 155 pounds at 45 inches aft of datum
Weight B: 165 ponds at 145 inches aft of datum
Weight C: 95 pounds at 185 inches aft of datum

Based on this information, where would the CG be located aft of datum?

A - 86.0 inches.
B - 116.8 inches
C - 125.0 inches

W		A		M
155	X	45	=	6,975
165	X	145	=	23,925
155	X	45	=	6,975
415 lbs				**48,475 lbs-in**

Moments ÷ Total Weight = CG Location

48,475 lbs ÷ 415 = **116.8**

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5632. COM
When computing weight and balance, the empty weight includes the weight of the airframe, engine(s), and all items of operating equipment permanently installed. Empty weight also includes
A) the unusable fuel, full operating fluids, and full oil.
B) all usable fuel, maximum oil, hydraulic fluid, but does not include the weight of pilot, passengers, or baggage.
C) all usable fuel and oil, but does not include any radio equipment or instruments that were installed by someone other than the manufacturer.

5633. COM
If all index units are positive when computing weight and balance, the location of the datum would be at the
A) centerline of the main wheels.
B) nose, or out in front of the airplane.
C) centerline of the nose or tailwheel, depending on the type of airplane.

5634. COM
The CG of an aircraft can be determined by which of the following methods?
A) Dividing total arms by total moments.
B) Multiplying total arms by total weight.
C) Dividing total moments by total weight.

5635. COM
The CG of an aircraft may be determined by
A) dividing total arms by total moments.
B) dividing total moments by total weight.
C) multiplying total weight by total moments.

5636. COM
GIVEN:
Weight A. 155 pounds at 45 inches aft of datum
Weight B. 165 pounds at 145 inches aft of datum
Weight C. 95 pounds at 185 inches aft of datum

Based on above information, where would the CG be located aft of datum?
A) 86.0 inches.
B) 116.8 inches.
C) 125.0 inches.

Solution:

Arm is the aft of datum value for each item:
Weight x Arm = Moment
155 x 45 = 6,975 for A
165 x 145 = 23,925 for B
95 x 185 = 17,575 for C

Totals 415 lbs 48,475 Moment

Moments÷ Total Weight = CG Location
48,475÷ 415 = **116.8 inches.**

5637. COM
GIVEN:
Weight A. 140 pounds at 17 inches aft of datum
Weight B. 120 pounds at 110 inches aft of datum
Weight C. 85 pounds at 210 inches aft of datum

Based on above information, the CG would be located how far aft of datum?
A) 89.11 inches.
B) 96.89 inches.
C) 106.92 inches.

Solution:

Arm is the aft of datum value for each item:
Weight x Arm = Moment
140 x 17 = 2,380 for A
120 x 110 = 13,200 for B
85 x 210 = 17,850 for C

Totals 345 lbs 33,430 Moment

Moments÷ Total Weight = CG Location
33,430÷ 345 = **96.89 inches.**

5638. COM
GIVEN:
Weight A. 135 pounds at 15 inches aft of datum
Weight B. 205 pounds at 117 inches aft of datum
Weight C. 85 pounds at 195 inches aft of datum

Based on above information, the CG would be located how far aft of datum?
A) 100.2 inches.
B) 109.0 inches.
C) 121.7 inches.

Solution:

Arm is the aft of datum value for each item:
Weight x Arm = Moment
135 x 15 = 2,025 for A
205 x 117 = 23,985 for B
85 x 195 = 16,575 for C

Totals 425 lbs 42,585 Moment

Moments÷ Total Weight = CG Location
42,585÷ 425 = **100.2 inches.**

5639. COM
GIVEN:
Weight A. 175 pounds at 135 inches aft of datum
Weight B. 135 pounds at 115 inches aft of datum
Weight C. 75 pounds at 85 inches aft of datum

The CG for the combined weights would be located how far aft of datum?
A) 91.76 inches.
B) 111.67 inches.
C) 118.24 inches.

Solution:

Arm is the aft of datum value for each item:
Weight x Arm = Moment
175 x 135 = 23,625 for A
135 x 115 = 15,525 for B
75 x 85 = 6,375 for C

Totals 385 lbs 45,525 Moment

Moments÷ Total Weight = CG Location
45,525÷ 385 = **118.25 inches.**

5646. COM
GIVEN:
Total weight 4,137 lb
CG location station 67.8
Fuel consumption 13.7 GPH
Fuel CG station 68.0

After 1 hour 30 minutes of flight time, the CG would be located at station
A) 67.79.
B) 68.79.
C) 70.78.

Solution:

1. Find the weight change: 13.7 GPH for 1.5 hours = 20.55 gal (20.55 gal x 6 lbs/gal = 123.3 lbs)

2. New total weight is (4,137 - 123.3 = 4,013.7)

3. The distance between the CG and the fuel arm is (68.0 - 67.8 = .2)

4. Place the values in the formula and cross multiply:
(123.3÷ 4013.7 = CG change÷ .2 = 24.66 = 4013.7)

5. Divide to determine CG change:
(24.66/4013.7 = CG change = .00614)
123.3÷ 4013.7 = CG change÷ .2 = .00614 inches

6. Calculate the new CG: Original CG 67.80000 - CG change .00614 = New CG **67.79386.**

5647. COM
An aircraft is loaded with a ramp weight of 3,650 pounds and having a CG of 94.0, approximately how much baggage would have to be moved from the rear baggage area at station 180 to the forward baggage area at station 40 in order to move the CG to 92.0?

A) 52.14 pounds.
B) 62.24 pounds.
C) 78.14 pounds.

Solution:

Determine the amount of weight to be moved:
Weight shifted ÷ Total weight = change in CG (94 - 92)÷

Distance weight shifted (180 - 40)
Weight to be shifted÷ 3,650 lbs = 2.0÷ 140
3,650 x 2÷ 140 = 7,300÷ 140 = **52.143.**

5648. COM
An airplane is loaded to a gross weight of 4,800 pounds, with three pieces of luggage in the rear baggage compartment. The CG is located 98 inches aft of datum, which is 1 inch aft of limits. If luggage which weighs 90 pounds is moved from the rear baggage compartment (145 inches aft of datum) to the front compartment (45 inches aft of datum), what is the new CG?
A) 96.13 inches aft of datum.
B) 95.50 inches aft of datum.
C) 99.87 inches aft of datum.

Solution:

1. Change in CG = Weight shifted x Distance shifted÷ Total weight (90 x (145 - 45)÷ 4800 = 1.875 inches

2. Since the weight shifted forward, the CG also moves forward. The 1.875-inch change is subtracted from the original CG.

New CG = 98.0 - 1.875 = **96.13 inches.**

5649. COM
GIVEN:
Total weight 3,037 lb
CG locationstation 68.8
Fuel consumption 12.7 GPH
Fuel CG station 68.0

After 1 hour 45 minutes of flight time, the CG would be located at station
A) 68.77.
B) 68.83.
C) 69.77.

Solution:

1. Find the weight change: 12.7 GPH for 1.75 hours = 22.23 gal (22.23 gal x 6 lbs/gal = 133.35 lbs)

2. New total weight is 3,037 - 133.35 = 2,903.65

3. The distance between the CG and the fuel arm is 68.8 - 68.0 = .8

4. Place the values in the formula and cross multiply: 133.35÷ 2903.65 = CG change÷ .8 = 106.68 = 2903.65 (CG change)

5. Divide to determine the CG change: 106/68/2903.65 = CG change =.03674 inches.

6. Calculate the new CG: Original CG 68.80000 + CG change .03674 = New CG **68.83674.**

5650. COM
(Refer to figure 38.)
GIVEN:
Empty weight (oil is included) 1,271 lb
Empty weight moment (in-lb/1,000) 102.04
Pilot and copilot 400 lb
Rear seat passenger 140 lb
Cargo 100 lb
Fuel 37 gal

Is the airplane loaded within limits?
A) Yes, the weight and CG is within limits.
B) No, the weight exceeds the maximum allowable.
C) No, the weight is acceptable, but the CG is aft of the aft limit.

5651. COM
(Refer to figure 38.)
GIVEN:
Empty weight (oil is included) 1,271 lb
Empty weight moment (in-lb/1,000) 102.04
Pilot and copilot 260 lb
Rear seat passenger 120 lb
Cargo 60 lb
Fuel 37 gal

Under these conditions, the CG is determined to be located
A) within the CG envelope.
B) on the forward limit of the CG envelope.
C) within the shaded area of the CG envelope.

5652. COM
(Refer to figure 38.)
GIVEN:
Empty weight (oil is included) 1,271 lb
Empty weight moment (in-lb/1,000) 102.04
Pilot and copilot 360 lb
Cargo 340 lb
Fuel 37 gal

Will the CG remain within limits after 30 gallons of fuel has been used in flight?
A) Yes, the CG will remain within limits.
B) No, the CG will be located aft of the aft CG limit.
C) Yes, but the CG will be located in the shaded area of the CG envelope.

5682. COM
With respect to using the weight information given in a typical aircraft owner's manual for computing gross weight, it is important to know that if items have been installed in the aircraft in addition to the original equipment, the
A) allowable useful load is decreased.
B) allowable useful load remains unchanged.
C) maximum allowable gross weight is increased.

WEATHER THEORY

Temperature, Pressure And Moisture

Every physical process of weather is a result of a heat exchange from the sun.

Standard Temperature at Sea Level is 15C. It is supposed to decrease at a rate of 2 degrees C per 1,000 feet. We call that the Standard Lapse Rate.

The standard temperature for any altitude can be determined by subtracting 2C from 15C for each 1,000 feet above sea level. Called International Standard Atmosphere (ISA)

The standard temperature (ISA) at 10,000 = -5C.
The standard temperature (ISA) at 20,000 = -25C

The Standard Sea Level Pressure (SLP) is 29.92" Hg. Pressure decreases at a rate of 1 inch per 1,000 feet.

Dewpoint is the temperature to which the air must be cooled to become saturated. Relative humidity (given in percent) is the amount of moisture in the air compared to the amount the air could hold at that temperature.

Colder air cannot hold as much moisture as warmer air. So as the temperature and dewpoint spread decreases, relative humidity increases, until eventually it condenses. (Becomes visible as fog or clouds)

**That is why pilots must keep an eye on the "dewpoint spread' taking-off in the early evening with a close temperature/dewpoint. Close spreads could result in the field going IFR as the evening temperature continued to decrease closer to the dewpoint.*

As air temperature increases, density altitude will increase.

Moisture is added to unsaturated air by the process of evaporation and sublimation.

Evaporation mainly occurs with the sun.
Sublimation is defined as moisture going from a solid (glacier) into a gas (water vapor). An excellent example of this is wind blowing across a glacier.

Determining Cloud Height

Do determine the approximate altitude in which convective clouds will form, take the surface temperature and decrease it at a rate of 2.5°C per 1,000 feet.

Assume the temperature at an airport at 2,000 feet MSL is 10°C and the dewpoint is 1°C?

Answer can be found by dividing the convergence into the temperature spread.

(10 - 1)÷ 2.5 = 3.6 x 1,000 = 3,600 feet baseif the temperature at 2,000 feet MSL is 10°C and the dewpoint is 1°C? +2,000 feet MSL = **5,600 feet MSL.**

Wind

Differences in temperature create differences in pressure. These pressure differences causes wind in a 24/7 attempt to reach equilibrium.

The difference in surface wind and winds aloft is primarily due to friction between the wind and the surface.

Coriolis Force

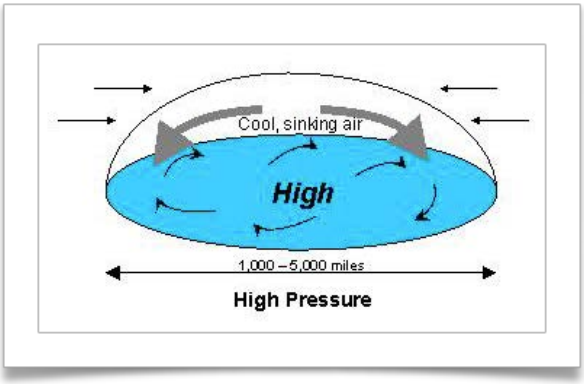
Because of the rotation of the earth, the Coriolis force tends to counterbalance the horizontal pressure gradient. The Coriolis force deflects air to the RIGHT in the Northern Hemisphere.

Pressure differences cause wind. Above 2,000 feet AGL, wind flow is parallel to the isobars due to the Coriolis force.

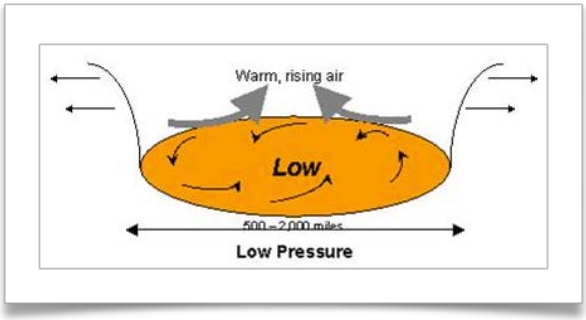
When isobars are close together they indicate a strong pressure gradient and stronger winds.

Pressure Systems

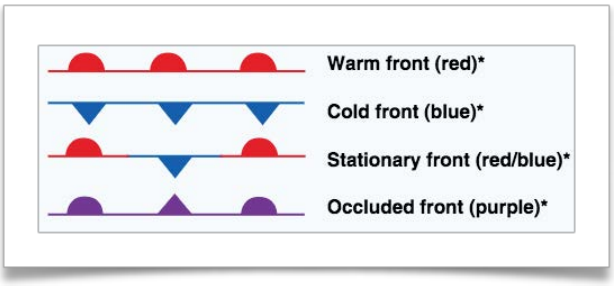
A HIGH pressure area or ridge is an area of anti-cyclone type air that is sinking, descending, moving outward, and clockwise.



A LOW pressure area or trough is an area of cyclone type air that is rising, ascending, moving inward, and counter-clockwise. Wind velocities near the low are greater than farther away and is generally associated with unfavorable weather conditions.



Fronts



A FRONT is a boundary between two masses that differs in temperature, wind, pressure and moisture content.

Warm Front is warmer air taking over colder air.

Cold Front is colder air taking over warmer air. The characteristics of a cold air mass moving over a warm surface are cumuliform clouds, turbulence, and good visibility.

Stationary Front is a front with both colder and warmer characteristics, neither strong enough to take over the other. They have little or no movement.

Occluded Front is is a cold front overtaking a stationary front and plowing under both fronts.The air ahead of the warm front is warmer than the air behind the overtaking cold front.

Stability

**Gouge Note: Know the following characteristics of Stable and Unstable air and you will hit this part of the FAA exam out of the ballpark!*

Stability of the atmosphere can be determined by "vertical" movement through the atmosphere, determined the ambient (actual) temperature lapse rate.

If the (actual) Lapse Rate cools LESS than the Standard Lapse Rate, the atmosphere is said to be more STABLE.

Stable air forced upward will cause a structure of stratus-type clouds, poor visibility, steady precipitation with little vertical development and little or no turbulence. (Think Seattle Washington and the Northwest)

If the (actual) Lapse Rate cools MORE than the Standard Lapse Rate, the atmosphere is said to be more UNSTABLE.

Warming from below makes the air rise, decreasing the stability of an air mass. An unstable atmosphere usually exists within a warm, humid air mass.

Unstable air forced upward will cause a structure of clouds with considerable vertical development and associated turbulence. (Cumulonimbus CB) Think of thunderstorms in the desert Southwest in the summer.

**There has been actual lapse rates recorded as high as 8C per 1,000 feet (as a reference). On that unstable day, thunderstorms were topping out in excess of 70,000 feet.*

Temperature Inversions

A temperature inversion exists where there Is an INCREASE in temperature as altitude is increased. The atmosphere is said to be 'Super Stable.' Cooler air at the surface doesn't rise, so it just sits near the surface, sometimes trapping fog and pollutants near the surface.

These surface based inversions are most favorable for formation on **clear, cool nights with calm or light wind** allowing the warmer air of the previous day to rise up and escape into the upper atmosphere during the night.

Lenticular Clouds

Standing lenticular clouds are stationary lens or almond shaped clouds that show little or no movement, but contain very strong winds and turbulence.

One of the most dangerous features of mountain waves is the turbulent area in and below rotor clouds, and on the leeward side when flying into the wind.

Wind Shear

Wind shear is a change in wind direction and/ or speed in a horizontal or vertical direction.

It may be encountered during periods of strong temperature inversion and near thunderstorms, and at any level. Outside the cloud, shear turbulence can be encountered 20 miles laterally from a severe storm.

A strong wind shear can be expected on the low-pressure side of a jetstream core where the speed at the core is stronger than 110 knots.

During an approach, wind shear can be recognized by monitoring the power and vertical velocity required to remain on the proper glidepath. A sudden decrease in headwind will cause a loss in airspeed equal to the decrease in wind velocity.

The low-level wind shear Alert System (LLWAS) provides wind data and software process to detect the presence of a change in wind direction and/or speed within a very short distance above the airport.

Turbulence

Flying in turbulence, adjust airspeed to that recommended for rough air (Va Speed) Control airspeed with power, maintain wings level, and accept variations of altitude.

Light turbulence momentarily causes slight, erratic changes in attitude and/or altitude. Moderate turbulence causes changes in altitude and/or attitude, but the aircraft control remains positive.

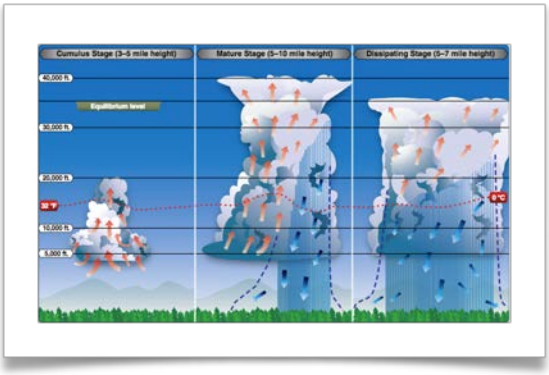
Turbulence that is encountered above 15,000 AGL and not associated with cloudiness should be reported as clear air turbulence.

Rain and Thunderstorms

Virga is best described as streamers of precipitation trailing beneath clouds which evaporates before reaching the ground. Virga can produce dangerous wind shear conditions at the surface.

The three ingredients needed to form a thunderstorm are unstable air, high humidity, and a lifting action (convective or orographic).

Cumulonimbus (CB) clouds have the greatest turbulence. Extreme turbulence is indicated by very frequent lightning and roil clouds.



Lifecycle Stages of a Thunderstorm

CUMULUS Stage - Continuous updrafts extend from the earth to above the cloud tops.

MATURE Stage - Updrafts and downdrafts are present. This stage is also recognized by rain beginning to fall at the surface. The thunderstorm reaches its greatest intensity.

DISSIPATING Stage - Comprised of downdrafts.

Convective currents are most active on warm summer afternoons when winds are light.

Lightning is always associated with thunderstorms. Otherwise, it couldn't be a "thunder" storm.

Hail is most likely to be associated with cumulonimbus clouds (CB) and hailstones may be encountered in clear air up to 20 miles from the anvil of a thunderstorm.

Squall lines are a non-frontal narrow band of active thunderstorms that often develop ahead of a cold front. Squall line thunderstorms produce the most severe weather conditions, such as destructive winds, heavy hail, and tornadoes.

A squall is defined as sudden increases in windspeed of at least 16 knots to a sustained speed of 22 knots or more for at least 1 minute.

Airborne radar provides no assurance of avoiding instrument weather conditions.

An intense radar echo should be avoided by a distance of at least 20 miles. if you must fly between intense echoes, have a minimum of 40 miles between echoes.

Icing

Freezing rain is caused by rain falling from air which has a temperature of more than 32 degrees F into air having a temperature of 32 degrees F or less.

Ice pellets at the surface or in flight are evidence that freezing rain exists at a higher altitude. Ice pellets encountered during flight normally are evidence a warm front is about to pass.

Frost causes the airplane to stall at an angle of attack that is lower than normal.

Fog

Fog produced by frontal activity is a result of saturation due to evaporation of precipitation.

Radiation fog occurs with warm, moist air over low, flatland areas on clear, calm nights.

Advection fog occurs when an air mass moves inland from the coastline during the winter. It can appear suddenly during day or night, and is more persistent than radiation fog.

Steam fog forms mainly over a water area in the winter when cold, dry air passes over warmer water.

Winds of greater than 15 knots may tend to lift fog into low stratus clouds, improving ground visibilities.

High Altitude Weather

The tropopause is characterized by an abrupt change in temperature lapse rate. It remains relatively constant then on up through the stratosphere.

The Jetstream is an area of strong winds that occurs at the tropopause (averaging about 37,000 feet)

The strength and location of the jet stream is normally weaker and farther North in the summer.
In the winter months in the middle latitudes, the jet stream shifts toward the South and it's speed increases.

Clear Air Turbulence (CAT) can be expected on the polar side of a jetstream, or on the low pressure side of a curving jetstream, and is sometimes identified visually by long streaks of cirrus clouds.

Lifted Index

The lifted index is the value of a parcel of air near the surface and "lifting" it to 500 millibars. As the air is 'lifted,' it cools by expansion. The temperature the parcel would have been at 500 millibars is then subtracted from the existing 500 millibar (mb) temperature to find the LIFTED INDEX.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5301. COM
Every physical process of weather is accompanied by or is the result of
A) a heat exchange.
B) the movement of air.
C) a pressure differential.

5302. COM
What is the standard temperature at 10,000 feet?
A) -5 °C.
B) -15 °C.
C) +5 °C.

5303. COM
What is the standard temperature at 20,000 feet?
A) -15°C
B) -20 °C
C) -25°C

5304. COM
Which conditions are favorable for the formation of a surface based temperature inversion?
A) Clear, cool nights with calm or light wind.
B) Area of unstable air rapidly transferring heat from the surface.
C) Broad areas of cumulus clouds with smooth, level bases at the same altitude.

5305. COM
What are the standard temperature and pressure values for sea level?
A) 15 °C and 29.92 inches Hg.
B) 59 °F and 1013.2 inches Hg.
C) 15 °C and 29.92 Mb.

5310. COM
What causes wind?
A) The Earth's rotation.
B) Air mass modification.
C) Pressure differences.

5311. COM
In the Northern Hemisphere, the wind is deflected to the
A) right by Coriolis force.
B) right by surface friction.
C) left by Coriolis force.

5312. COM
Why does the wind have a tendency to flow parallel to the isobars above the friction level?
A) Coriolis force tends to counterbalance the horizontal pressure gradient.
B) Coriolis force acts perpendicular to a line connecting the highs and lows.
C) Friction of the air with the Earth deflects the air perpendicular to the pressure gradient.

5313. COM
The wind system associated with a low-pressure area in the Northern Hemisphere is
A) an anticyclone and is caused by descending cold air.
B) a cyclone and is caused by Coriolis force.
C) an anticyclone and is caused by Coriolis force.

5314. COM
With regard to windflow patterns shown on surface analysis charts; when the isobars are
A) close together, the pressure gradient force is slight and wind velocities are weaker.
B) not close together, the pressure gradient force is greater and wind velocities are stronger.
C) close together, the pressure gradient force is greater and wind velocities are stronger.

5315. COM
What prevents air from flowing directly from high-pressure areas to low-pressure areas?
A) Coriolis force.
B) Surface friction.
C) Pressure gradient force.

5316. COM
While flying cross-country, in the Northern Hemisphere, you experience a continuous left crosswind which is associated with a major wind system. This indicates that you
A) are flying toward an area of generally unfavorable weather conditions.
B) have flown from an area of unfavorable weather conditions.
C) cannot determine weather conditions without knowing pressure changes.

5317. COM
Which is true with respect to a high or low pressure system?
A) A high-pressure area or ridge is an area of rising air.
B) A low-pressure area or trough is an area of descending air.
C) A high-pressure area or ridge is an area of descending air.

5318. COM
Which is true regarding high- or low-pressure systems?
A) A high-pressure area or ridge is an area of rising air.
B) A low-pressure area or trough is an area of rising air.
C) Both high- and low-pressure areas are characterized by descending air.

5319. COM
When flying into a low-pressure area in the Northern Hemisphere, the wind direction and velocity will be from the
A) left and decreasing.
B) left and increasing.
C) right and decreasing.

5320. COM
Which is true regarding actual air temperature and dewpoint temperature spread? The temperature spread
A) decreases as the relative humidity decreases.
B) decreases as the relative humidity increases.
C) increases as the relative humidity increases.

5321. COM
The general circulation of air associated with a high-pressure area in the Northern Hemisphere is
A) outward, downward, and clockwise.
B) outward, upward, and clockwise.
C) inward, downward, and clockwise.

5322. COM
Virga is best described as
A) streamers of precipitation trailing beneath clouds which evaporates before reaching the ground.
B) wall cloud torrents trailing beneath cumulonimbus clouds which dissipate before reaching the ground.
C) turbulent areas beneath cumulonimbus clouds.

5323. COM
Moisture is added to a parcel of air by
A) sublimation and condensation.
B) evaporation and condensation.
C) evaporation and sublimation.

5324. COM
Ice pellets encountered during flight normally are evidence that
A) a warm front has passed.
B) a warm front is about to pass.
C) there are thunderstorms in the area.

5325. COM
What is indicated if ice pellets are encountered at 8,000 feet?
A) Freezing rain at higher altitude.
B) You are approaching an area of thunderstorms.
C) You will encounter hail if you continue your flight.

5326. COM
Ice pellets encountered during flight are normally evidence that
A) a cold front has passed.
B) there are thunderstorms in the area.
C) freezing rain exists at higher altitudes.

5327. COM
When conditionally unstable air with high moisture content and very warm surface temperature is forecast, one can expect what type of weather?
A) Strong updrafts and stratonimbus clouds.
B) Restricted visibility near the surface over a large area.
C) Strong updrafts and cumulonimbus clouds.

5328. COM
What is the approximate base of the cumulus clouds if the temperature at 2,000 feet MSL is 10 °C. and the dewpoint is 1 °C?
A) 3,000 feet MSL.
B) 4,000 feet MSL.
C) 6,000 feet MSL.

5329. COM
If clouds form as a result of very stable, moist air being forced to ascend a mountain slope, the clouds will be
A) cirrus type with no vertical development or turbulence.
B) cumulus type with considerable vertical development and turbulence.
C) stratus type with little vertical development and little or no turbulence.

5330. COM
What determines the structure or type of clouds which will form as a result of air being forced to ascend?
A) The method by which the air is lifted.
B) The stability of the air before lifting occurs.
C) The relative humidity of the air after lifting occurs.

5331. COM
Refer to the excerpt from the following METAR report:
KTUS 08004KT 4SM HZ 26/04 A2995 RMK RAE36
At approximately what altitude AGL should bases of convective-type cumuliform clouds be expected?
A) 4,400 feet.
B) 8,800 feet.
C) 17,600 feet.

5332. COM
What are the characteristics of stable air?
A) Good visibility; steady precipitation; stratus clouds.
B) Poor visibility; steady precipitation; stratus clouds.
C) Poor visibility; intermittent precipitation; cumulus clouds.

5333. COM
Which would decrease the stability of an air mass?
A) Warming from below.
B) Cooling from below.
C) Decrease in water vapor.

5334. COM
From which measurement of the atmosphere can stability be determined?
A) Atmospheric pressure.
B) The ambient lapse rate.
C) The dry adiabatic lapse rate.

5335. COM
What type weather can one expect from moist, unstable air, and very warm surface temperatures?
A) Fog and low stratus clouds.
B) Continuous heavy precipitation.
C) Strong updrafts and cumulonimbus clouds.

5336. COM
Which would increase the stability of an air mass?
A) Warming from below.
B) Cooling from below.
C) Decrease in water vapor.

5337. COM
The conditions necessary for the formation of stratiform clouds are a lifting action and
A) unstable, dry air.
B) stable, moist air.
C) unstable, moist air.

5338. COM
Which cloud types would indicate convective turbulence?
A) Cirrus clouds.
B) Nimbostratus clouds.
C) Towering cumulus clouds.

5339. COM
The presence of standing lenticular altocumulus clouds is a good indication of
A) lenticular ice formation in calm air.
B) very strong turbulence.
C) heavy icing conditions.

5340. COM
The formation of either predominantly stratiform or predominantly cumuliform clouds is dependent upon the
A) source of lift.
B) stability of the air being lifted.
C) temperature of the air being lifted.

5341. COM
Which combination of weather-producing variables would likely result in cumuliform-type clouds, good visibility, and showery rain?
A) Stable, moist air and orographic lifting.
B) Unstable, moist air and orographic lifting.
C) Unstable, moist air and no lifting mechanism.

5342. COM
What is a characteristic of stable air?
A) Stratiform clouds.
B) Fair weather cumulus clouds.
C) Temperature decreases rapidly with altitude.

5343. COM
A moist, unstable air mass is characterized by
A) poor visibility and smooth air.
B) cumuliform clouds and showery precipitation.
C) stratiform clouds and continuous precipitation.

5343-1. COM
What are the characteristics of an unstable atmosphere?
A) A cool, dry air mass.
B) A warm, humid air mass.
C) Descending air in the northern hemisphere

5344. COM
When an air mass is stable, which of these conditions are most likely to exist?
A) Numerous towering cumulus and cumulonimbus clouds.
B) Moderate to severe turbulence at the lower levels.
C) Smoke, dust, haze, etc., concentrated at the lower levels with resulting poor visibility.

5345. COM
Which is a characteristic of stable air?
A) Cumuliform clouds.
B) Excellent visibility.
C) Restricted visibility.

5346. COM
Which is a characteristic typical of a stable air mass?
A) Cumuliform clouds.
B) Showery precipitation.
C) Continuous precipitation.

5347. COM
Which is true regarding a cold front occlusion? The air ahead of the warm front
A) is colder than the air behind the overtaking cold front.
B) is warmer than the air behind the overtaking cold front.
C) has the same temperature as the air behind the overtaking cold front.

5348. COM
Which are characteristics of a cold air mass moving over a warm surface?
A) Cumuliform clouds, turbulence, and poor visibility.
B) Cumuliform clouds, turbulence, and good visibility.
C) Stratiform clouds, smooth air, and poor visibility.

5349. COM
The conditions necessary for the formation of cumulonimbus clouds are a lifting action and
A) unstable, dry air.
B) stable, moist air.
C) unstable, moist air.

5350. COM
Fog produced by frontal activity is a result of saturation due to
A) nocturnal cooling.
B) adiabatic cooling.
C) evaporation of precipitation.

5351. COM
What is an important characteristic of wind shear?
A) It is present at only lower levels and exists in a horizontal direction.
B) It is present at any level and exists in only a vertical direction.
C) It can be present at any level and can exist in both a horizontal and vertical direction.

5352. COM
Hazardous wind shear is commonly encountered
A) near warm or stationary frontal activity.
B) when the wind velocity is stronger than 35 knots.
C) in areas of temperature inversion and near thunderstorms.

5353. COM
Low-level wind shear may occur when
A) surface winds are light and variable.
B) there is a low-level temperature inversion with strong winds above the inversion.
C) surface winds are above 15 knots and there is no change in wind direction and windspeed with height.

5354. COM
If a temperature inversion is encountered immediately after takeoff or during an approach to a landing, a potential hazard exists due to
A) wind shear.
B) strong surface winds.
C) strong convective currents.

5355. COM
GIVEN:
Winds at 3,000 feet AGL are 30 kts
Surface winds Calm

While approaching for landing under clear skies a few hours after sunrise, one should
A) allow a margin of approach airspeed above normal to avoid stalling.
B) keep the approach airspeed at or slightly below normal to compensate for floating.
C) not alter our approach airspeed, these conditions are nearly ideal.

5356. COM
Convective currents are most active on warm summer afternoons when winds are
A) light.
B) moderate.
C) strong.

5357. COM
When flying low over hilly terrain, ridges, or mountain ranges, the greatest potential danger from turbulent air currents will usually be encountered on the
A) leeward side when flying with a tailwind.
B) leeward side when flying into the wind.
C) windward side when flying into the wind.

5358. COM
During an approach, the most important and most easily recognized means of being alerted to possible wind shear is monitoring the
A) amount of trim required to relieve control pressures.
B) heading changes necessary to remain on the runway centerline.
C) power and vertical velocity required to remain on the proper glidepath.

5359. COM
During departure, under conditions of suspected low-level wind shear, a sudden decrease in headwind will cause
A) a loss in airspeed equal to the decrease in wind velocity.
B) a gain in airspeed equal to the decrease in wind velocity.
C) no change in airspeed, but groundspeed will decrease.

5360. COM
Which situation would most likely result in freezing precipitation? Rain falling from air which has a temperature of
A) 32 °F or less into air having a temperature of more than 32 °F.
B) 0 °C or less into air having a temperature of 0 °C or more.
C) more than 32 °F into air having a temperature of 32 °F or less.

5361. COM
Which statement is true concerning the hazards of hail?
A) Hail damage in horizontal flight is minimal due to the vertical movement of hail in the clouds.
B) Rain at the surface is a reliable indication of no hail aloft.
C) Hailstones may be encountered in clear air several miles from a thunderstorm.

5362. COM
Hail is most likely to be associated with
A) cumulus clouds.
B) cumulonimbus clouds.
C) stratocumulus clouds.

5363. COM
The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with
A) slow-moving warm fronts which slope above the tropopause.
B) squall lines.
C) fast-moving occluded fronts.

5364. COM
Of the following, which is accurate regarding turbulence associated with thunderstorms?
A) Outside the cloud, shear turbulence can be encountered 50 miles laterally from a severe storm.
B) Shear turbulence is encountered only inside cumulonimbus clouds or within a 5-mile radius of them.
C) Outside the cloud, shear turbulence can be encountered 20 miles laterally from a severe storm.

5365. COM
If airborne radar is indicating an extremely intense thunderstorm echo, this thunderstorm should be avoided by a distance of at least
A) 20 miles.
B) 10 miles.
C) 5 miles.

5366. COM
Which statement is true regarding squall lines?
A) They are always associated with cold fronts.
B) They are slow in forming, but rapid in movement.
C) They are nonfrontal and often contain severe, steady-state thunderstorms.

5367. COM
Which statement is true concerning squall lines?
A) They form slowly, but move rapidly.
B) They are associated with frontal systems only.
C) They offer the most intense weather hazards to aircraft.

5368. COM
Select the true statement pertaining to the life cycle of a thunderstorm.
A) Updrafts continue to develop throughout the dissipating stage of a thunderstorm.
B) The beginning of rain at the Earth's surface indicates the mature stage of the thunderstorm.
C) The beginning of rain at the Earth's surface indicates the dissipating stage of the thunderstorm.

5369. COM
What visible signs indicate extreme turbulence in thunderstorms?
A) Base of the clouds near the surface, heavy rain, and hail.
B) Low ceiling and visibility, hail, and precipitation static.
C) Cumulonimbus clouds, very frequent lightning, and roll clouds.

5370. COM
Which weather phenomenon signals the beginning of the mature stage of a thunderstorm?
A) The start of rain.
B) The appearance of an anvil top.
C) Growth rate of cloud is maximum.

5371. COM
What feature is normally associated with the cumulus stage of a thunderstorm?
A) Roll cloud.
B) Continuous updraft.
C) Beginning of rain at the surface.

5372. COM
During the life cycle of a thunderstorm, which stage is characterized predominately by downdrafts?
A) Mature.
B) Developing.
C) Dissipating.

5373. COM
What minimum distance should exist between intense radar echoes before any attempt is made to fly between these thunderstorms?
A) 20 miles.
B) 30 miles.
C) 40 miles.

5373-3. COM
You are avoiding thunderstorms that are in your flightpath. You are over 20 miles from the cell however, you are under the anvil of the cell. Is this a hazard?
A) No, you are at a safe distance from the cell.
B) Yes, hail can be discharged from the anvil.
C) Yes, this is still in the area of dissipation.

5374. COM
Which in-flight hazard is most commonly associated with warm fronts?
A) Advection fog.
B) Radiation fog.
C) Precipitation-induced fog.

5375. COM
Which is true regarding the use of airborne weather-avoidance radar for the recognition of certain weather conditions?
A) The radarscope provides no assurance of avoiding instrument weather conditions.
B) The avoidance of hail is assured when flying between and just clear of the most intense echoes.
C) The clear area between intense echoes indicates that visual sighting of storms can be maintained when flying between the echoes.

5376. COM
A situation most conducive to the formation of advection fog is
A) a light breeze moving colder air over a water surface.
B) an air mass moving inland from the coastline during the winter.
C) a warm, moist air mass settling over a cool surface under no-wind conditions.

5377. COM
Advection fog has drifted over a coastal airport during the day. What may tend to dissipate or lift this fog into low stratus clouds?
A) Nighttime cooling.
B) Surface radiation.
C) Wind 15 knots or stronger.

5378. COM AVSEM
What lifts advection fog into low stratus clouds, possibly improving ground visibility?
A) Nighttime cooling.
B) Dryness of the underlying land mass.
C) Surface winds of approximately 15 knots or stronger.

5379. COM
In what ways do advection fog, radiation fog, and steam fog differ in their formation or location?
A) Radiation fog is restricted to land areas; advection fog is most common along coastal areas; steam fog forms over a water surface.
B) Advection fog deepens as windspeed increases up to 20 knots; steam fog requires calm or very light wind; radiation fog forms when the ground or water cools the air by radiation.
C) Steam fog forms from moist air moving over a colder surface; advection fog requires cold air over a warmer surface; radiation fog is produced by radiational cooling of the ground.

5380. COM
With respect to advection fog, which statement is true?
A) It is slow to develop, and dissipates quite rapidly.
B) It forms almost exclusively at night or near daybreak.
C) It can appear suddenly during day or night, and it is more persistent than radiation fog.

5381. COM
Which feature is associated with the tropopause?
A) Constant height above the Earth.
B) Abrupt change in temperature lapse rate.
C) Absolute upper limit of cloud formation.

5382. COM
A common location of clear air turbulence is
A) in an upper trough on the polar side of a jet stream.
B) near a ridge aloft on the equatorial side of a high-pressure flow.
C) south of an east/west oriented high-pressure ridge in its dissipating stage.

5383. COM
The jet stream and associated clear air turbulence can sometimes be visually identified in flight by
A) dust or haze at flight level.
B) long streaks of cirrus clouds.
C) a constant outside air temperature.

5384. COM
During the winter months in the middle latitudes, the jet stream shifts toward the
A) north and speed decreases.
B) south and speed increases.
C) north and speed increases.

5385. COM
The strength and location of the jet stream is normally
A) weaker and farther north in the summer.
B) stronger and farther north in the winter.
C) stronger and farther north in the summer.

5405. COM
What wind conditions would you anticipate when squalls are reported at your destination?
A) Rapid variations in windspeed of 15 knots or more between peaks and lulls.
B) Peak gusts of at least 35 knots combined with a change in wind direction of 30° or more.
C) Sudden increases in windspeed of at least 16 knots to a sustained speed of 22 knots or more for at least 1 minute.

5439. COM
The difference found by subtracting the temperature of a parcel of air theoretically lifted from the surface to 500 millibars and the existing temperature at 500 millibars is called the
A) lifted index.
B) negative index
C) positive index.

5444. COM
A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or attitude should report it as
A) light chop.
B) light turbulence.
C) moderate turbulence.

5445. COM
When turbulence causes changes in altitude and/or attitude, but aircraft control remains positive, that should be reported as
A) light.
B) severe.
C) moderate.

5446. COM
Turbulence that is encountered above 15,000 feet AGL not associated with cumuliform cloudiness, including thunderstorms, should be reported as
A) severe turbulence.
B) clear air turbulence.
C) convective turbulence.

5447. COM
Which type of jetstream can be expected to cause the greater turbulence?
A) A straight jetstream associated with a low-pressure trough.
B) A curving jetstream associated with a deep low-pressure trough.
C) A jetstream occurring during the summer at the lower latitudes.

5448. COM
A strong wind shear can be expected
A) in the jetstream front above a core having a speed of 60 to 90 knots.
B) if the 5 °C isotherms are spaced between 7° to 10° of latitude.
C) on the low-pressure side of a jetstream core where the speed at the core is stronger than 110 knots.

5449. COM
The Low-level wind shear Alert System (LLWAS) provides wind data and software process to detect the presence of a:
A) rotating column of air extending from a cumulonimbus cloud.
B) change in wind direction and/or speed within a very short distance above the airport.
C) downward motion of the air associated with continuous winds blowing with an easterly component due to the rotation of the Earth.

5450. COM
One of the most dangerous features of mountain waves is the turbulent areas in and
A) below rotor clouds.
B) above rotor clouds.
C) below lenticular clouds.

5669. COM
A pilot is entering an area where significant clear air turbulence has been reported. Which action is appropriate upon encountering the first ripple?
A) Maintain altitude and airspeed.
B) Adjust airspeed to that recommended for rough air.
C) Enter a shallow climb or descent at maneuvering speed.

5741. COM
Which is the best technique for minimizing the wing-load factor when flying in severe turbulence?
A) Change power settings, as necessary, to maintain constant airspeed.
B) Control airspeed with power, maintain wings level, and accept variations of altitude.
C) Set power and trim to obtain an airspeed at or below maneuvering speed, maintain wings level, and accept variations of airspeed and altitude.

5990. COM
As air temperature increases, density altitude will
A) decrease.
B) increase.
C) remain the same.

5991. COM
There is a high pressure system that is located south of your planned route in the Northern Hemisphere on a west-to-east cross-country flight. To take advantage of favorable winds, you would plan your route
A) on the north side of the high pressure area.
B) on the south side of the high pressure area.
C) through the middle of the high pressure area.

WEATHER REPORTS AND FORECASTS

Graphical Forecasts for Aviation (GFA)

Graphical Forecasts for Aviation (GFA) provide necessary aviation weather information that give pilots a more complete picture of the weather that may impact flight within the continental U.S. (CONUS).

There is no GFA chart on the new 8080-1E Supplement.

Weather Depiction Chart (Report)

The weather depiction chart provides a graphic display of both VFR and IFR weather conditions for the valid time of the chart.

There is no Weather Depiction chart on the new 8080-1E Supplement.

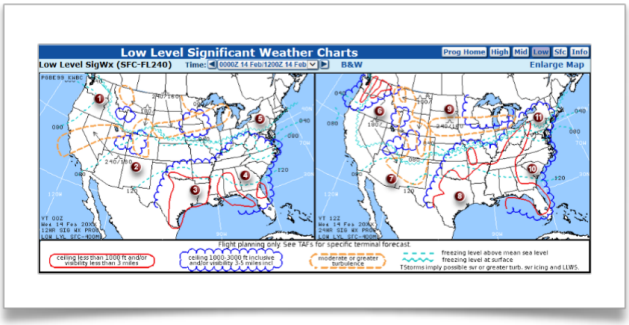
Surface Analysis Chart (Report)

The Surface Analysis Chart depicts actual frontal positions, pressure patterns, temperature, dewpoint, wind, weather, and obstructions to vision at the valid time of the chart.

Isobars are depicted by solid lines and indicate lines of equal pressure. Close spacing of isobar lines indicates strong pressure gradient (Wind). Dashed lines indicate that the pressure gradient is weak.

There is no Surface Analysis chart on the new 8080-1E Supplement.

Low Level Significant Weather Prognostic Chart (Forecast)



The Low Level Significant Weather Prognostic Chart forecasts conditions up to 24,000 feet MSL

Match up the line symbols to the correct answer for questions regarding Figure 71.

High Level Significant Weather Prognostic Chart (Forecast)

The High Level Significant Weather Prognostic Chart forecasts conditions from 24,000 feet MSL up to 63,000 feet MSL.

Forecasts areas of Turbulence, Cumulonimbus, Tropopause height and location and strength of the Jet Stream.

Small scalloped lines indicate cumulonimbus clouds, icing, and moderate or greater turbulence.

The minimum vertical wind shear value critical for probable moderate or greater turbulence is 6 knots per 1,000 feet.

There is no High Level chart on the new 8080-1E Supplement.

Constant Pressure Chart (Report)

The Constant Pressure chart shows observed temperature, wind, and temperature/dewpoint spread at specified flight levels.

Hatching on the chart indicates wind speeds of between 70 and 110 knots.

The minimum vertical wind shear for probable moderate or greater turbulence is 6 knots per 1,000 feet.

Winds Aloft forecast

The winds aloft forecast shows direction (true), velocity, (knots) and temperature (C).

Area Forecast

An Area Forecast (in conjunction with GFA's, METARS, SIGMET's, etc.) is used to determine forecast en route weather and to interpolate conditions at airports that do not issue a TAF.

All Area Forecasts (FA) are issued by the Aviation Weather Center (AWC). FAs are prepared 3 times a day in the conterminous U.S.

METAR
(Meteorological Terminal Aerodrome Report)

Cloud heights are always above the surface. When determining thickness of layers based on a pilot report, be sure to convert cloud height to MSL by adding the field elevation. Pilot reports are always MSL.

VIRGA - is precipitation beneath clouds, which evaporates before reaching the ground.

SQUALLS - If reported at your destination, you should expect sudden increases in wind speed of at least 1 5 knots to a suit

TAF - Terminal Aerodrome Forecast

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KHOU 061734Z 0618/0718 16014G22KT P6SM
VCSH BKN018 BKN035 FM070100 17010KT
P6SM BKN015 OVC025 FM070500 17008KT
4SM BR SCT008 OVC012 FM071000 18005KT
3SM BR OVC007 FM071500 23008KT 5SM BR
VCSH SCT008 OVC015
```

KHOU - 4 letter identifier
061734Z - Issued (6th Day at 1734Z)
0618/0718 - Valid (6th Day 1800Z - 7th Day 1800Z.
16014G22KT - Surface winds 160 degrees (true) at 14 knots - Gusts of 22 knots.
P6SM - Prevailing Visibility at least 6SM.
VCSH - Showers in vicinity.
BKN018 - Broken cloud base at 1,800 feet AGL
BKN035 - Broken cloud base at 3,500 feet AGL
FM070100 - From 7th day at 0100Z.
17010KT - Wind from 170 degrees (true) at 10 Knots.
P6SM - Prevailing Visibility at least 6SM.
BKN015 - Broken cloud base at 1,500 feet AGL.
OVC025 - Overcast clouds at 2,500 feet AGL.
FM070500 - From 7th day at 0500Z
17008KT - Wind from 170 degrees at 8 Knots.
4SM - 4 statute miles visibility.
BR - Mist (remember baby rain)
SCT008 - Scattered clouds at 800 feet AGL
OVC012 - Overcast clouds at 1,200 feet AGL
FM071000 - From 7th day at 1000Z
18005KT - Wind from 180 degrees at 5 knots.
3SM - 3 statute miles visibility.
BR - Mist (remember baby rain)
OVC007 - Overcast clouds at 700 feet AGL.
FM071500 - From 7th day 1500Z.
23008KT - Wind from 230 degrees (true) at 8 knots.
5SM - Visibility 5 statue miles.
BR - Mist (remember baby rain)
VCSH - Showers in vicinity.
SCT008 - Scattered clouds at 800 feet AGL.
OVC015 - Overcast clouds at 1,500 feet AGL.

A TAF is issued four (4) times a day and is usually valid for 24 hours.

The abbreviation “SKC” means the sky is clear of clouds. A wind shown as “VRB” means the direction is variable. Visibility shown as P6SM means visibility it is expected to be more than 6 statute miles.

The abbreviation “PROB” means probability and is followed by a percentage number. PR0B402102 means there is a 40% chance between 2100Z and 0200Z for the forecast weather to occur.

Radar Summary Charts

Radar summary charts show lines and cells of hazardous thunderstorms for the conterminous U.S., covering areas without reported observed weather.

There is no Radar Summary chart on the new 8080-1E Supplement.

WEATHER ADVISORIES

Inflight Advisories

In-Flight Weather Advisories like SIGMET’s are a single source of information that provide information like volcanic eruptions, that are occurring or expected to occur.

AIRMET advisories include less severe conditions which may be hazardous, particularly to light aircraft.

SIGMET advisories include weather potentially hazardous to all aircraft.

CONVECTIVE SIGMET consist of either an observation and a forecast or just a forecast for tornadoes, activity, or hail greater than or equal to 3/4 inch diameter.

Flight Service Stations broadcast AIRMETs and Non-Convective SIGMETs at I 5 minutes and 45 minutes past the hour for the first hour after issuance. .

The most current reports and forecasts for enroute and destination weather information for IFR flight are available at all FSS's, WSOs and WSFOs.

Telephone Information Briefing Service **(TIBS)** provides continuous recording of meteorological and aeronautical information by telephone.

Pilot Reports are the best way to determine observed weather conditions between weather reporting stations.

TEST QUESTIONS (Use Test Supplement 8080-1E)

*NOTE: CORRECT ANSWER IN **BOLD** ITALICS*

5398. COM
During preflight preparation, weather report forecasts can best be obtained by means of contacting the
A) pilot's automatic telephone answering service.
B) air route traffic control center.
C) weather forecast office (WFO)

5399. COM
The most current en route and destination weather information for an instrument flight should be obtained from
A) Flight service.
B) ATIS broadcast.
C) NOTAM's.

5400. COM
The Hazardous In-flight Weather Advisory Service (HIWAS) is a broadcast service over selected VORs that provides:
A) SIGMETs and AIRMET at 15 minutes and 45 minutes past the hour for the first hour after issuance.
B) continuous broadcast of in-flight weather advisories.
C) SIGMETs, CONVECTIVE SIGMETs and AIRMETs at 15 minutes and 45 minutes past the hour.

5401. COM
The Telephone Information Briefing Service (TIBS) provided by AFSSs includes
A) weather information service on a common frequency (122.0 mHz).
B) recorded weather briefing service for the local area, usually within 50 miles and route forecasts.
C) continuous recording of meteorological and/or aeronautical information available by telephone.

5402. COM
The remarks section of the Aviation Routine Weather Report (METAR) contains the following coded information. What does it mean?

RMK FZDZB42 WSHFT 30 FROPA

A) Freezing drizzle with cloud bases below 4,200 feet.
B) Freezing drizzle below 4,200 feet and wind shear
C) Wind shift at three zero due to frontal passage.

5403. COM
What is meant by the Special METAR weather observation for KBOI?

SPECI KBOI 091854Z 32005KT 1 1/2SM RA BR OVC007 17/16 A2990 RMK RAB12

A) Rain and fog obscuring two-tenths of the sky; rain began at 1912Z.
B) Rain and mist obstructing visibility; rain began at 1812Z.
C) Rain and overcast at 1200 feet AGL.

5404. COM
The station originating the following METAR observation has a field elevation of 3,500 feet MSL. If the sky cover is one continuous layer, what is the thickness of the cloud layer? (Top of overcast reported at 7,500 feet MSL).

METAR KHOB 151250Z 17006KT 4SM OVC005 13/11 A2998

A) 2,500 feet
B) 3 ,500 feet.
C) 4,000 feet.

5406. COM
What significant cloud coverage is reported by this pilot report?

MOB UA/OV 15NW MOB 1340Z/SK OVC 025/045 OVCO9O

A) Three (3) separate overcast layers exist with bases at 250. 7,500 and 9,000 feet.
B) The top of the lower overcast is 2,500 feet. base and the top of second overcast layer is 4,500 and 9,000 feet, respectively.
C) The base of the second overcast layer is 2.500 feet; top of second overcast layer is 7,500 feet: base of third layer is 9,000 feet

5407. COM
To best determine observed weather conditions between weather reporting stations, the pilot should refer to
A) pilot reports.
B) Area Forecasts.
C) prognostic charts.

5409. COM
What is the meaning of the terms PROB40 2102 +TSRA as used in a Terminal Aerodrome Forecasts (TAF)?
A) Probability of heavy thunderstorms with rain showers below 4000 feet at time 2102.
B) Between 2100Z and 0200Z there is a forty percent (40%) probability of thunderstorms with heavy rain.
C) Beginning at 2102Z forty percent (40%) probability of heavy thunderstorms and rain showers.

5410. COM
What does the contraction VRB in the Terminal Aerodrome Forecast (TAF) mean?
A) Wind speed is variable throughout the period.
B) Cloud base is variable.
C) Wind direction is variable.

5411. COM
Which statement pertaining to the following Terminal Aerodrome Forecast (TAF) is true?

KMEM 091135Z 0915 15005KT 5SM HZ BKN060 FM1600 VRB04KT P6SM SKC

A) WND in the valid period implies surface winds are forecast to be greater than 5 KTS
B) wind direction is from 160° at 4 KTS and reported visibility is 6 status miles.
C) SKC in the valid period indicates no significant weather and sky clear.

5412.
In the following METAR/TAF for HOU, what is the ceiling and visibility forecast on the 7th day of the month at 0600Z?

KHOU 061734Z 0618/0718 16014G22KT P6SM VCSH BKN018 BKN035 FM070100 17010KT P6SM BKN015 OVC025 FM070500 17008KT 4SM BR SCT008 OVC012 FM071000 18005KT 3SM BR OVC007 FM071500 23008KT 5SM BR VCSH SCT008 OVC015

A) Visibility 6 miles with a broken ceiling at 15,000 feet MSL.
B) 4 nautical miles of visibility and an overcast ceiling at 700 feet MSL.
C) 4 statute miles visibility and an overcast ceiling at 1,200 feet AGL.

5413. COM
Terminal Aerodrome Forecasts (TAF) are issued how many times a day and cover what period of time?
A) Four times daily and are usually valid for a 24 hour period.
B) Six times daily and are usually valid for a 24 hour period including a 4-hour categorical outlook.
C) Four times daily and are valid for 12 hours including a 6-hour categorical outlook.

5414. COM
To best determine general forecast weather conditions covering a flight information region, the pilot should refer to
A) Graphical Forecasts for Aviation (GFA).
B) Weather Depiction Charts.
C) Satellite Maps.

5414-1. COM
Aviation Area Forecasts (FAs) for the contiguous U.S. are used in conjunction with inflight aviation weather advisories to interpolate
A) temperatures and winds aloft.
B) conditions at airports for which no TAFs are issued.
C) radar precipitation and intensity levels.

5416. COM
In-flight Aviation Weather Advisories include what type of information?
A) Forecasts for potentially hazardous flying conditions for en route aircraft.
B) State and geographic areas with reported ceilings and visibility's below VFR minimums.
C) IFR conditions, turbulence, and icing within a valid period for the listed states.

5417. COM
What type of Inflight Weather Advisories provides an en route pilot with information regarding the possibility of moderate icing, moderate turbulence, winds of 30 knots or more at the surface and extensive mountain obscurement?
A) Convective SIGMETs and SIGMETs.
B) Severe Weather Forecast Alerts (AWW) and SIGMETs.
C) AIRMETs and Center Weather Advisories (CWA).

5418. COM
What single reference contains information regarding expected a volcanic eruption, that is occurring or expected to occur?
A) In-Flight Weather Advisories.
B) Terminal Area Forecasts (TAF).
C) Weather Depiction Chart.

5419. COM
The National Aviation Weather Center prepares FA's for the contiguous U.S.
A) twice each day.
B) three times a day.
C) every 6 hours unless significant changes in weather require it more often.

5422. COM
SIGMET's are issued as a warning of weather conditions which are hazardous
A) to all aircraft.
B) particularly to heavy aircraft.
C) particularly to light airplanes.

5423. COM
Which correctly describes the purpose of Convective SIGMET's (WST)?
A) They consist of an hourly observation of tornadoes, significant thunderstorm activity, and large hailstone activity.
B) They contain both an observation and a forecast of all thunderstorm and hailstone activity. The forecast is valid for 1 hour only.
C) They consist of either an observation and a forecast or just a forecast for tornadoes, significant thunderstorm activity, or hail greater than or equal to 3/4 inch in diameter.

5424. COM
What values are used for Winds Aloft Forecasts?
A) True direction and MPH.
B) True direction and knots.
C) Magnetic direction and knots.

5425. COM
On a Surface Analysis Chart, the solid lines that depict sea level pressure patterns are called
A) isobars.
B) isogons.
C) millibars.

5426. COM
Dashed lines on a Surface Analysis Chart, if depicted, indicate that the pressure gradient is
A) weak.
B) strong.
C) unstable.

5427. COM
Which chart provides a ready means of locating observed frontal positions and pressure centers?
A) Surface Analysis Chart.
B) Constant Pressure Analysis Chart.
C) Weather Depiction Chart.

5428. COM
On a Surface Analysis Chart, close spacing of the isobars indicates
A) weak pressure gradient.
B) strong pressure gradient.
C) strong temperature gradient.

5429. COM
The Surface Analysis Chart depicts
A) frontal locations and expected movement, pressure centers, cloud coverage, and obstructions to vision at, the time of chart transmission.
B) actual frontal positions, pressure patterns, temperature, dewpoint, wind, weather, and obstructions to vision at the valid time of the chart.
C) actual pressure distribution, frontal systems, cloud heights and coverage, temperature, dewpoint, and wind at the time shown on the chart.

5430. COM
Which provides a graphic display of both VFR and IFR weather?
A) Surface Weather Map.
B) Radar Summary Chart.
C) Weather Depiction Chart.

5431. COM
When total sky cover is few or scattered, the height shown on the Weather Depiction Chart is the
A) top of the lowest layer.
B) base of the lowest layer.
C) base of the highest layer.

5432. COM
What information is provided by the Radar Summary Chart that is not shown on other weather charts?
A) Lines and cells of hazardous thunderstorms.
B) Ceilings and precipitation between reporting stations.
C) Areas of cloud cover and icing levels within the clouds.

5433. COM
Which weather chart depicts conditions forecast to exist at a specific time in the future?
A) Freezing Level Chart.
B) Weather Depiction Chart.
C) 12-Hour Significant Weather Prognostication Chart.

5434. COM
What weather phenomenon is implied within an area enclosed by small scalloped lines on a U.S. High-Level Significant Weather Prognostic Chart?
A) Cirriform clouds, light to moderate turbulence, and icing.
B) Cumulonimbus clouds, icing, and moderate or greater turbulence.
C) Cumuliform or standing lenticular clouds, moderate to severe turbulence, and icing.

5435. COM
The U.S. High-Level Significant Weather Prognostic Chart forecasts significant weather for what airspace?
A) 18,000 feet to 45,000 feet.
B) 24,000 feet to 45,000 feet.
C) 24,000 feet to 63,000 feet.

5436. COM
What is the upper limit of the Low Level Significant Weather Prognostic Chart?
A) 30,000 feet.
B) 24,000 feet.
C) 18,000 feet.

5440. COM
Hatching on a Constant Pressure Analysis Chart indicates
A) hurricane eye.
B) windspeed 70 knots to 110 knots.
C) windspeed 110 knots to 150 knots.

5441. COM
What flight planning information can a pilot derive from Constant Pressure Analysis Charts?
A) Winds and temperatures aloft.
B) Clear air turbulence and icing conditions.
C) Frontal systems and obstructions to vision aloft.

5442. COM
From which of the following can the observed temperature, wind, and temperature/ dewpoint spread be determined at a specified altitude?
A) Stability Charts.
B) Winds Aloft Forecasts.
C) Constant Pressure Analysis Charts.

5443. COM
The minimum vertical wind shear value critical for probable moderate or greater turbulence is
A) 4 knots per 1,000 feet.
B) 6 knots per 1,000 feet.
C) 8 knots per 1,000 feet.

5560. COM
Weather Advisory Broadcasts, including Severe Weather Forecast Alerts (AWW), Convective SIGMETs, and SIGMETs, are provided by
A) ARTCCs on all frequencies, except emergency, when any part of the area described is within 150 miles of the airspace under their jurisdiction.
B) AFSSs on 122.2 MHz and adjacent VORs, when any part of the area described is within 200 miles of the airspace under their jurisdiction.
C) selected low-frequency and/or VOR navigational aids. aids.

5988. COM
What is the thickness of the cloud layer given a field elevation of 1,500 feet MSL with tops of the overcast at 7,000 feet MSL?

METAR KHOB 151250Z 17006KT 4SM OVC010 13/11 A2998

A) 4,500 feet.
B) 6,500 feet.
C) 5,500 feet.

5989. COM
What is the bottom of the lowest overcast layer in the following pilot report?

KMOB UA /OV APE230010/TM 1515/FL085/TP BE20/ SK BKN065/WX FV03SM HZ FU/TQ 20/TB LGT

A) There is not a defined ceiling in this report.
B) There is a layer reported at 8,500 feet.
C) There is a broken layer at 6,500 feet.