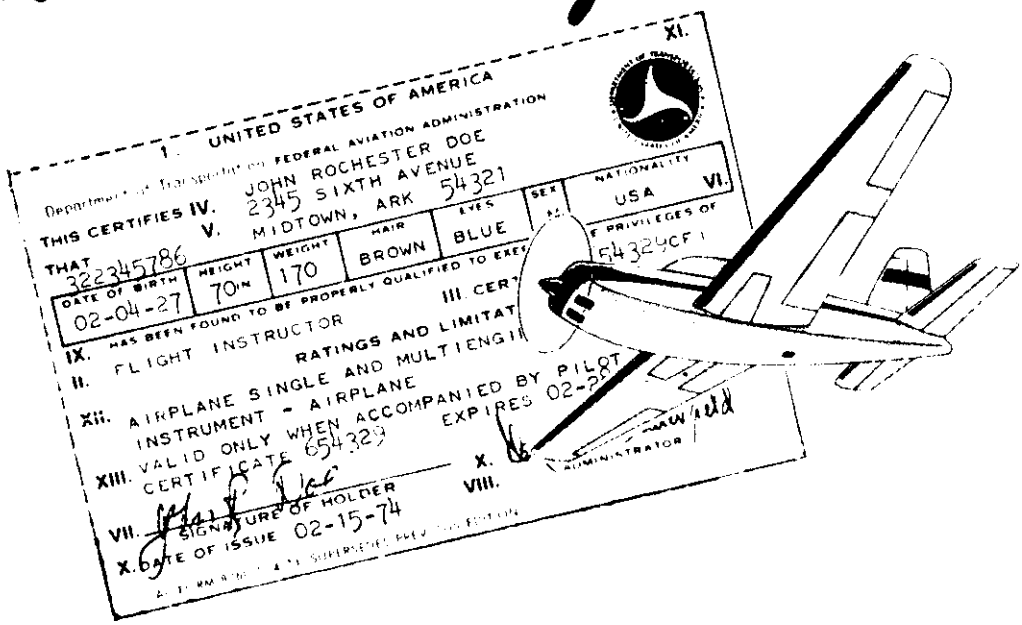
AC 61-72A

FLIGHT INSTRUCTOR AIRPLANE

Written Test Guide



REVISED
1977

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

FLIGHT INSTRUCTOR
AIRPLANE
WRITTEN TEST GUIDE

REVISED 1977

U.S. Department of Transportation
Federal Aviation Administration
Flight Standards Service

PREFACE

This written test guide was prepared by the Flight Standards Service of the Federal Aviation Administration to help applicants meet the aeronautical knowledge requirements for the Flight Instructor Certificate with an Airplane Rating. It supersedes AC 61–72, Flight Instructor-Airplane Written Test Guide, dated 1974.

This guide briefly explains the need for comprehensive instruction and describes the aeronautical knowledge requirements for certification as an airplane flight instructor. Also included is information on the source material that can be used to acquire essential knowledge in the various subject areas. Further, it provides the instructions for taking the official FAA written test, as well as the test items from which the FAA makes selections in composing the airplane flight instructor written tests on aeronautical subjects. The test items and choices of answers in this guide are based on regulations, principles, and practices that were valid at the time this publication was printed. The test items on the official written tests are continually updated; consequently, they may vary somewhat from those contained herein.

This guide is directed primarily toward the *aeronautical* knowledge requirements for the certification of flight instructors. Guidance relating to the fundamentals of instructing is provided in separate publications and except for brief references is not included in this guide.

Comments regarding this publication should be directed to the U.S. Department of Transportation, Federal Aviation Administration, Flight Standards National Field Office, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

CONTENTS

PILOT TRAINING

The Role of the Flight Instructor

All pilot training is directed toward developing competent, efficient, and safe pilots. The more complete a student's understanding of theory and principles, the easier it will be for that person to become a safe, competent pilot. It has long been recognized that ground instruction and flight training go hand in hand. Each complements the other, resulting in a training program which is more meaningful and comprehensive.

Generally, pilots learn by one of two methods. Some learn by rote (by memory alone without investigating fundamental principles), while others acquire knowledge and *understanding* of basic procedures and techniques and *apply* these concepts to the various piloting operations. The latter means of learning is by far the more effective method. Effective pilot training is based on the fact that knowledge and understanding of principles, along with skill, are essential to safety in flight.

The *keystone* of the present-day training concept is the flight instructor—a professional who assumes full responsibility for all phases of a student pilot's required ground and flight training.

How does one become a skilled and effective flight instructor? Although some people possess, to a greater degree than others, those traits that are desirable in an instructor, no one is born a natural instructor. Competent flight instructors become so through study, training, experience, and conscientious effort. Probably more than any other single factor, the flight instructor's own attitude toward flight instruction determines how well the job of teaching is done.

The flight instructor must, of course, be fully qualified as a pilot. Qualifications go far beyond those required for certification as a pilot, however, if success as a professional flight instructor is to be achieved. The instructor must have in addition to piloting skill, a thorough understanding of how learning occurs and how to employ teaching methods that best foster learning. To teach effectively and produce competent, efficient, and safe pilots, the instructor should practice professionalism in the teaching process.

To provide instruction of professional quality, the flight instructor should thoroughly understand all aspects of aeronautical subjects and their relationship to various pilot operations—not just be able to answer the random test items in the certification written test by rote. There can be no substitutes for diligent study to attain the essential knowledge, for unremitting efforts to develop competence, or for continuous review and practice to retain that knowledge and proficiency.

The flight instructor is considered to be an authority on aeronautical matters and is the expert to whom students, and many experienced pilots, submit questions concerning regulations, technical matters, and current operating procedures and techniques. Obviously, to responsibly answer such questions, or resolve related problems, the flight instructor should have sound knowledge of the various aviation subjects.

Even after the new flight instructor has gained the basic knowledge and skills and has been certificated, it is imperative that a continuous effort be made to improve the quality of instruction and to remain abreast of the latest developments in aviation products, regulations, procedures, and practices. To enhance professionalism in the field of flight instruction, the instructor should maintain a current technical library to provide a ready source for reference and research. By obtaining study materials listed in this guide that are beneficial and pertinent to the preparation for initial certification, the prospective flight instructor will be starting a personal aeronautical library that will be useful throughout a career in pilot training.

In addition to giving instruction during flight, the certificated flight instructor is authorized to conduct the required ground instruction for pilot and instructor applicants. In exercising this privilege, the instructor carries the *responsibility* for providing comprehensive training in the appropriate subjects and for ensuring that the trainees acquire sufficient knowledge and understanding of the subjects to qualify for pilot or instructor certification.

FLIGHT INSTRUCTOR CERTIFICATION

Requirements for Training and Testing

To be eligible for an airplane flight instructor certificate, a person must hold a commercial or airline transport pilot certificate with an airplane rating and an instrument rating.

Further, regulations require that an applicant for a flight instructor certificate satisfactorily complete a course of instruction in the fundamentals of instructing, including the subjects of how people learn, teaching and evaluating students, and the development of courses and lesson plans. The possession of a teacher's certificate authorizing employment as a teacher in a public school system, or status as an instructor in a college or university, may be accepted as evidence of having received training in the teaching and learning process.

The certification process requires that the applicant pass the FAA's Fundamentals of Instructing (FOI) Written Test to ensure that the person possesses adequate knowledge of teaching methods as they apply to pilot instruction. Although applicants holding a teacher's certificate or status as an instructor in a college or university are credited with having received training in teaching methods, they are *not exempt* from taking the FOI written test.

If the applicant already holds a valid FAA Flight or Ground Instructor Certificate and is applying for an instructor certificate other than that held, or for the addition of a rating to the certificate, that person *need not* take the FOI test again.

In addition to the requirement for the applicant to be trained and tested in teaching methods, the applicant for a Flight Instructor-Airplane Certificate is required to have received and logged ground instruction *from an authorized ground or flight instructor* in all of the subjects in which ground instruction is required for a private and commercial pilot certificate. To ensure that adequate knowledge of those subjects has been acquired, the instructor applicant must pass the FAA's Flight Instructor-Airplane (FIA) Written Test. Those subjects are outlined in this study guide.

It is not necessary, however, to take the Fundamentals of Instructing Test on the same day as the Flight Instructor-Airplane Written Test, nor is it important which of these tests is taken first.

Finally, after the prescribed written tests have been passed, the certification process requires the applicant to pass a practical test in which competency to instruct students during flight must be demonstrated. This practical test must be satisfactorily completed within 24 months after the date the written tests were passed.

The written tests are administered by all FAA General Aviation District Offices (GADO), Flight Standards District Offices (FSDO), and some Air Carrier District Offices (ACDO) and Flight Service Stations (FSS). The practical test, unlike other flight tests, can be administered only by an FAA Inspector.

As a convenience to the prospective flight instructor, those portions of the present Federal Aviation Regulations pertinent to the general eligibility, flight proficiency, and aeronautical knowledge requirements for the instructor certificate have been included in this guide. *Applicants should be aware, however, that regulations are subject to change.* Any question regarding the currency of these regulation excerpts may be checked with the appropriate FAA Office.

Subject Matter of Written Tests

The Fundamentals of Instructing Written Test and the Flight Instructor-Airplane Written Test are very comprehensive because, to be effective, they must test an applicant's knowledge in many subject areas.

The test on Fundamentals of Instructing contains items involving subjects such as the Learning Process, Elements of Effective Teaching, Student Evaluation, Quizzing and Testing, Course Development, Lesson Planning, and

Classroom Instructing Techniques. These subject areas are extensively discussed in AC 60–14, Aviation Instructor's Handbook, which may be purchased from the Superintendent of Documents, U.S. Government Printing Office. The Fundamentals of Instructing Written Tests contain 60 test items and 4 hours are allowed for completion.

As stated earlier, the required aeronautical knowledge areas of the Flight Instructor-Airplane Written Test include all subjects in which ground instruction is required for private and commercial airplane pilot ratings.

The test items deal with specific subjects such as basic navigation, radio navigation, radio communications, meteorology, aerodynamics, airplane performance, Federal Aviation Regulations, and airplane and powerplant operation. The written test evaluates the applicant for adequate knowledge and grasp of theory to assure that instruction in the specific subject matter will accomplish the goal of each lesson. Many questions require the ability to combine and interrelate knowledge in two or more specific subject areas.

The test items used in the Flight Instructor-Airplane Written Test are included in this study guide. It must be reemphasized, however, that learning to answer these items *solely by rote will not* ensure sufficient knowledge of the subjects, since tests of this nature are merely a sampling of one's knowledge. To acquire complete understanding of the pertinent subjects, the applicant is strongly urged to use the study outline provided herein and thoroughly study the material in referenced publications—then use the test items to review and evaluate one's understanding of the subjects. The Flight Instructor-Airplane Written Tests contain 100 test items and 5 hours are allowed for completing this test.

All test items are the objective, multiple-choice type, and can be answered by the selection of a single response. This type of test conserves the applicant's time, permits greater coverage of subject matter, minimizes the time required for scoring, and eliminates subjective judgment in determining the applicant's grade.

Each item is independent of other test items; that is, a correct response to one test item does not depend upon, or influence, the correct response to another.

Taking the Written Tests

Communication between individuals through the use of words is a complicated process. Since certification tests involve the use of written rather than spoken words, communication between the test writers and the persons being tested may become a difficult matter if care is not exercised by both parties. Consequently, considerable effort is expended to write each test item in a clear, precise manner. Applicants should carefully read the information and instructions given with the tests, as well as the statements in each test item.

Always remember the following when taking the test:

1. There are no "trick" questions. Each statement means exactly what it says. Do not look for hidden meanings. The statement does not concern exceptions to the rule; it refers to the general rule.

2. Carefully read the entire test item, statement, or question before selecting an answer. Skimming and hasty assumptions can lead to a completely erroneous approach to the problem because of failure to consider vital words. Examine and analyze the list of answers or phrases, then select the one that answers the question or completes the statement correctly.

3. Only one of the listed answers given is completely correct. The others may be the result of using incorrect procedures to solve problems, common misconceptions, or insufficient knowledge of the subject. Consequently, many of the incorrect answers may appear to be plausible to those persons whose knowledge is deficient. If the subject matter is adequately understood, the questions should not be difficult to answer correctly.

4. If considerable difficulty is experienced with a particular test item, do not spend too much time on it, but continue with other items which you consider to be less difficult. When all of the easier items are completed, go back and complete those items that were found to be more difficult. This procedure will enable you to use the available time to maximum advantage.

5. In solving problems which require computations or the use of a plotter and computer, select the answer which most nearly agrees with the calculated result. Due to slight differences in navigation computers and small errors that may

exist in the measurement of distances, true courses, etc., it is possible that an exact agreement with available answers will not occur. Sufficient spread is provided between right and wrong answers, however, so that the selection of the answer which is more nearly that of the calculated result will be correct, *provided* correct technique and reasonable care were used in making computations.

Computers and plotters that contain information not directly related to their operation may be used only if that information is obscured by suitable masking material. The use of electronic or mechanical calculators is subject to the following limitations: (a) prior to, and on completion of the test, the applicant must actuate the "ON/OFF" switch to erase any data stored in memory circuits; (b) tape printout of data, if incorporated in the calculator, must be surrendered to the test monitor; and (c) the use of material containing instructions related to operation of the calculator is not permitted.

Applicants may find that certain test questions involving regulations, ATC procedures, etc., are outdated by very recent changes. In these instances, applicants are *given credit* for the test item during the period that it takes to distribute a revised question.

To familiarize you with the procedures for taking the official Flight Instructor-Airplane Written Test, samples of the actual General Instructions, Written Test Application, Question Selection Sheet, and answer sheet are provided in this guide.

After completing the test, your answer sheet is forwarded to the Federal Aviation Administration Aeronautical Center in Oklahoma City, for scoring by electronic computers (ADP). Shortly thereafter, you will receive an Airman Written Test Report which not only includes the grade but also lists, in code, the subject areas in which test items were answered incorrectly. Those subject areas can be determined by reference to the *List of Subject Matter Codes* which accompanies the report. This method provides an essential feedback to you and can be effectively used for further study of the areas in which your knowledge was inadequate.

It must be emphasized here that the *total number* of subject codes shown on the test report is *not* necessarily an indication of the total number of test items answered incorrectly. When one or more questions are missed in a given subject area, the code for that subject appears only once on the grade report.

Retesting After Failure

An applicant who fails the written test may not apply for retesting until 30 days after the date the applicant failed the test. In the case of the *first* failure, however, the person may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that appropriate ground instruction was given to the applicant and the instructor finds that person competent to pass the test. In addition, the written test report of the previously failed test must be presented at the time of retesting.

RECOMMENDED STUDY MATERIALS

The following lists the essential reference materials developed by the *U.S. Department of Transportation*, but does not include all the useful material that is available. Other excellent textbooks, audio-visual training aids, and instructional materials produced commercially may be obtained from various bookstores, and fixed-base operators engaged in flight training.

List of Publications

ADVISORY CIRCULARS

FAA Advisory Circulars inform the aviation public in a systematic way of nonregulatory material of interest. Each circular issued is listed numerically within its subject-number breakdown which corresponds to the subject area of the Federal Aviation Regulations. The identification number (i.e., AC 120–1), the change number of the latest change, if any, to the right of the identification number, the title, and the effective date for each circular are shown. A brief explanation of the contents is given for each listing in AC 00–2, Advisory Circular Checklist and Status of Federal Aviation Regulations.

The checklist AC 00–2, available free of charge, lists advisory circulars that are for sale as well as those distributed free of charge by the Federal Aviation Administration.

When a price is listed after the description of a circular in the checklist, that circular is for sale by the Superintendent of Documents. When (Sub.) is included with the price, the advisory circular is available on a subscription basis only. After your subscription has been entered by the Superintendent of Documents, supplements or changes to the basic document will be provided automatically at no additional charge until the subscription expires. When no price is given the circular is distributed free of charge by FAA.

Request free advisory circulars from:

U.S. Department of Transportation
Publications Section, TAD 443.1
Washington, D.C. 20590

Persons who want to be placed on FAA's mailing list for future circulars should write to:

U.S. Department of Transportation
Distribution Unit, TAD 482.3
Washington, D.C. 20590

It is recommended that the flight instructor applicant obtain Advisory Circulars in at least the following subjects:

Subject Number and Subject Matter	
00	General
20	Aircraft
60	Airmen
70	Airspace
90	Air Traffic Control and General Operations
140	Schools and Other Certificated Agencies
170	Air Navigational Facilities

FLIGHT INSTRUCTOR'S HANDBOOK. AC 61–16A. ($2.00 Sup't. Doc's.) SN 050–011–00031–3. Gives guidance and information to pilots preparing for flight instructor certificates, and for use as a reference by flight instructors. (This publication will be superseded in 1977 by AVIATION INSTRUCTOR'S HANDBOOK, AC 60–14).

FLIGHT TRAINING HANDBOOK. AC 61–21. ($2.10 Sup't. Doc's.) SN 050–007–0008–1. Provides information and direction in the introduction and performance of training maneuvers for student pilots, pilots who are requalifying or preparing for additional ratings, and for flight instructors.

PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE. AC 61–23A. ($5.30 Sup't. Doc's.) SN 050–011–00051–8. Contains essential, authoritative information used in training and guiding private pilots, and covers most subject areas in which an applicant may be tested. Tells how to use the Airman's Information Manual, the data in FAA-approved airplane flight manuals, and the basic instruments.

PLANE SENSE. AC 20–5D. Acquaints the prospective airplane owner with certain fundamentals of owning and operating an airplane. It is free upon request.

PRIVATE PILOT WRITTEN TEST GUIDE. AC 61–32B. ($2.50 Sup't. Doc's. SN 050–011–00056–9. Provides information, guidelines, and sample test items to assist applicants for the Private Pilot Certificate in attaining necessary aeronautical knowledge.

COMMERCIAL PILOT WRITTEN TEST GUIDE. AC 61–71A. ($1.00 Sup't. Doc's.) SN 050–011–00070–4. Reflects current operating procedures and techniques for use of applicants in preparing for the Commercial Pilot-Airplane Written Test.

PILOT'S WEIGHT AND BALANCE HANDBOOK. AC 91–23. ($1.25 Sup't. Doc's.) SN 050–011–00049–6. Provides an easily understood text on aircraft weight and balance. It progresses from an explanation of fundamentals to the application of weight and balance principles in aircraft operations.

WAKE TURBULENCE. AC 90–23D. Presents information on the subject of wake turbulence and suggests techniques that may help pilots avoid the hazards of wingtip vortex turbulence. It is free upon request.

TERRAIN FLYING. AC 91–15. ($1.40 Sup't. Doc's.) SN 050–007–00147–9. Contains observations, opinions, warnings, and advice from veteran pilots regarding flight over various types of terrain throughout the U.S.

MEDICAL HANDBOOK FOR PILOTS. AC 67–2. ($1.45 Sup't. Doc's.) SN 050–007–00254–8. An aviation medicine handbook written in pilots' language that provides guidance on when, and when not, to fly. Emphasizes the fact that a good pilot must be physically fit, psychologically sound, and well trained.

AVIATION WEATHER. AC 00–6A. ($4.55 Sup't. Doc's.) SN 050–007–00283–1. Contains information on weather phenomena for pilots and other flight operations personnel whose interest in meteorology is primarily in its application to flying.

AVIATION WEATHER SERVICES. AC 00–45. ($1.95 Sup't. Doc's.) SN 050–007–00259–9. Supplements AC 00–6A, Aviation Weather, in that it explains the weather service in general and the use and interpretation of reports, forecasts, weather maps, and prognostic charts. Is an excellent source of study for pilot certification examinations.

PRACTICAL AIR NAVIGATION. Provides a comprehensive coverage of subjects and areas dealing with navigation whether it be pilotage, dead reckoning, or radio and celestial navigation. Students who understand the material in this textbook will have no trouble with the navigation problems. This textbook, originally developed by CAA (FAA), may be obtained from many book dealers or from the current publisher, Jeppesen & Co., 8025 East 40th Ave., Denver, Colorado 80209.

DENALT PERFORMANCE COMPUTER. Safety Education Series #8. ($0.70 Sup't. Doc's.) FAA 5.8/2:C 73/2. Density altitude computers for use in aircraft with fixed pitch or variable pitch propellers. They are intended to supplement and *not* replace manufacturers' published performance information.

FEDERAL AVIATION REGULATIONS (FARs). The FAA publishes the Federal Aviation Regulations to make readily available to the aviation community the regulatory requirements placed upon them. These regulations are sold as individual Parts by the Superintendent of Documents.

The more frequently amended Parts are sold on subscription service (that is, subscribers will receive Changes automatically as issued), while the less active Parts are sold on a single-sale basis. Changes to single-sale Parts will be sold separately as issued. Information concerning these Changes will be furnished by FAA through its "Status of the Federal Aviation Regulations, AC 00–44." Instructions for ordering this free status list are given in the front of each single-sale Part.

Check or money order made payable to the Superintendent of Documents should be included with each order. Submit orders for single-sales and subscription Parts on different order forms. No COD orders are accepted. All FAR Parts should be ordered from: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The suggested Parts for study are:

Part 1, *Definitions and Abbreviations.* ($3.00 Sup't. Doc's.)

Part 23, *Airworthiness Standards—Normal, Utility, and Acrobatic Category Airplanes.* ($3.55 Sup't. Doc's.)

Part 61, *Certification: Pilots and Flight Instructors.* ($2.90 Sup't. Doc's.)

Part 71, *Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting Points.* ($0.85 Sup't. Doc's.)

Part 91, *General Operating and Flight Rules.* ($11.30 Sup't. Doc's.)

Part 135, *Air Taxi Operators and Commercial Operators of Small Aircraft.* ($2.50 Sup't. Doc's.)

Part 141, *Pilot Schools.* ($1.15 Sup't. Doc's.)

Part 143, *Ground Instructors.* ($0.45 Sup't. Doc's.)

NATIONAL TRANSPORTATION SAFETY BOARD PART 830. This publication deals with procedures required in the notification and reporting of accidents and lost or overdue aircraft within the United States, its territories, and possessions. It is free upon request from the National Transportation Safety Board, Publications Branch, Washington, D.C. 20594.

AIRMAN'S INFORMATION MANUAL (AIM). Presents in five parts, information necessary for planning and conducting flights within the National Airspace System. Besides providing updated airport and NAVAID data, AIM includes instructional and procedural information. To better serve the needs of the individual pilot, each Part is available on a separate annual subscription basis. They should be ordered from the Superintendent of Documents, U.S. Government Printing Office.

Part 1—*Basic Flight Manual and ATC Procedures.* ($5.00 Sup't. Doc's.) Issued semi-annually. TD 4.12:pt. 1/.

Part 2—*Airport Directory.* ($7.00 Sup't. Doc's.) Issued semi-annually. TD 4.12:pt. 2/.

Parts 3 and 3A—*Operational Data* and *Notices to Airmen.* ($51.05 Sup't. Doc's.) Part 3 is issued every 56 days and Part 3A is issued every 14 days. TD 4.12:pt. 3/, TD 4.12:pt. 3A/.

Part 4—*Graphic Notices—Supplemental Data.* ($14.40 Sup't. Doc's.) Issued quarterly. TD 4.12:pt 4/.

VFR/IFR PILOT EXAM-O-GRAMS. Provide brief explanations of important aeronautical subjects. These include concepts and procedures critical to aviation safety, common misconceptions among pilot applicants, and areas which cause general difficulty in written tests. Exam-O-Grams are free and may be obtained by contacting U.S. Department of Transportation, Federal Aviation Administration, Flight Standards National Field Office, AFS-590, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

AIRPLANE FLIGHT MANUALS AND PILOT'S OPERATING HANDBOOKS. Aircraft manufacturers issue manuals for each aircraft model. They may be obtained from aircraft manufacturing companies or possibly from local airplane dealers and distributors.

How To Obtain Publications Sold by Sup't. Doc's.

NOTICE

Prices shown are those in effect as of April 1977. Prices are subject to change without notice and the prices that will be charged on your order will be those in effect as of the date your order is processed.

1. Use an order form (not a letter unless absolutely necessary) when ordering Government publications. Order forms may be duplicated or obtained *free* upon request from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

2. Send separate orders for subscription and nonsubscription items.

3. Give the exact name, Advisory Circular identification number, and stock number when ordering publications.

4. Send a check or money order for the *exact* amount made out to the Superintendent of Documents; DO NOT SEND CURRENCY. (Include an additional 25% to cover postage for foreign mailing.)

5. If a letter is used to request publications, enclose a self-addressed mailing label.

6. All prices are subject to change. The latest Advisory Circular Checklist and Status of Regu-

lations, AC 00–2, should be consulted for current pricing of publications. It is important that the *correct* amount be enclosed with the order.

CHARTS

The National Ocean Survey publishes and distributes Aeronautical Charts of the United States.

A "Catalog of Aeronautical Charts and Related Publications" which lists prices and information regarding distribution service may be obtained free, upon request, from:

Distribution Division (C44)
National Ocean Survey
Riverdale, Maryland 20840

Orders for specific charts or publications are made to the address given above and should be accompanied by a check or money order made payable to, "NOS, U.S. Department of Commerce."

STUDY OUTLINE

FLIGHT INSTRUCTOR-AIRPLANE KNOWLEDGE AREAS

This study outline is the framework of the basic aeronautical knowledge that the prospective flight instructor is required to know; questions in the FAA written test can be related to one or more of the topics in the outline. This subject matter is predicated on operationally realistic airman activity and meets the requirements specified in Federal Aviation Regulations.

I. FEDERAL AVIATION REGULATIONS

A. Parts 1 and 71: Definitions and Abbreviations; Controlled Airspace.

1. Air commerce
2. Airport traffic area
3. Ceiling
4. Commercial operator
5. Flight level
6. Flight visibility
7. Interstate air commerce
8. Large aircraft
9. Major alteration
10. Major repair
11. Pilot in command
12. Second in command
13. Federal airway
14. Control area
15. Continental control area
16. Control zone
17. Route segment
18. Terminal control area
19. Positive control area

B. Part 23: Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes.

1. Applicability
2. Airplane categories
3. Empty weight
4. Stalling speed
5. Takeoff
6. Landing
7. Spinning
8. Ground and water handling characteristics
9. Flight envelope
10. Design airspeeds
11. Cockpit control knob shape
12. Flight and navigation instruments
13. Powerplant instruments
14. Miscellaneous equipment
15. Airspeed indicating system
16. Magnetic direction indicator
17. Markings and placards
18. Airplane flight manual
19. Approved manual material
20. Operating limitations

C. Part 61: Certification: Pilots and Flight Instructors.

1. Required certificates/ratings
2. Certificates and ratings issued
3. Expired pilot certificates/reissuance
4. Carriage of narcotic drugs/marihuana
5. Duration of pilot certificates
6. Duration of medical certificates
7. General limitations
8. Pilot logbooks
9. Operations during medical deficiency
10. Second in command qualifications
11. Recent experience: Pilot in command
12. Pilot-in-command proficiency check
13. Falsification, reproduction, alteration
14. Glider towing: experience and instruction
15. Change of address
16. Student pilot limitations
17. Private pilot privileges/limitations
18. Commercial pilot privileges/limitations
19. Flight instructor records
20. Flight instructor authorizations and limitations
21. Renewal of flight instructor certificate

D. Part 91: General Operating and Flight Rules—General (Subpart A).

1. Responsibility of pilot in command
2. Pilot in command/more than one pilot
3. Preflight action
4. Flight crewmembers at stations
5. Interference with crewmembers
6. Careless or reckless operation
7. Liquor and drugs
8. Carriage of narcotic drugs
9. Dropping objects
10. Fastening of safety belts
11. Parachutes and parachuting
12. Towing gliders and other objects
13. Portable electronic devices
14. Flight instruction: simulated instruments
15. ATC transponder equipment requirements
16. Civil aircraft: certificates required
17. Aircraft airworthiness
18. Aircraft operating limitations/markings
19. Supplemental oxygen
20. Instrument and equipment requirements
21. Limited/restricted aircraft limitations
22. Ferry flight with one engine inoperative
23. Emergency exits for airplanes
24. Aural speed warning device
25. Altitude alerting system or device
26. Emergency locator transmitters
27. Report: aircraft identification/activity

E. Part 91: General Operating and Flight Rules (Subpart B).

1. Waivers
2. Operating near other aircraft
3. Right-of-way rules
4. Aircraft speed
5. Acrobatic flight
6. Aircraft lights
7. Complying — ATC clearances/instructions
8. ATC light signals
9. Minimum safe altitudes; general
10. Altimeter settings
11. Flight plan; information required
12. Flights between Mexico/Canada/U.S.A.
13. Operation—in vicinity of airport
14. Operation—airport with control tower
15. Operation—airport without control tower
16. Flight in terminal control areas
17. Temporary flight restrictions
18. Flight test areas
19. Restricted and prohibited areas
20. Positive control areas; route segments
21. Operations to/over Cuba
22. Basic VFR weather minimums
23. Special VFR weather minimums
24. VFR cruising altitude or flight level
25. ATC transponder test/inspection

F. Part 91: General Operating and Flight Rules—Maintenance, Preventative Maintenance, and Alterations (Subpart C).

1. General maintenance and alterations
2. Maintenance required
3. Carrying persons after repair/alteration
4. Inspections/progressive inspections
5. Altimeter system tests/inspections
6. Maintenance records/transfer of records
7. Rebuilt engine maintenance records
8. ATC transponder test/inspection

G. Part 135: Air Taxi Operators and Commercial Operators of Small Aircraft.

1. General
2. Rules—ATCO certificate holder
3. Operating rules
4. Crewmember qualifications
5. Aircraft and equipment

II. NATIONAL TRANSPORTATION SAFETY BOARD —PART 830

A. General.

1. Applicability
2. Definitions

B. Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft.

1. Immediate notification
2. Information to be given in notification

C. Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

D. Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft.

III. FAA ADVISORY CIRCULARS

A. Series 00—General.

B. Series 20—Aircraft.

C. Series 60—Airmen.

D. Series 70—Airspace.

E. Series 90—Air Traffic Control and General Operations.

F. Series 120—Air Carrier and Commercial Operators and Helicopters.

G. Series 150—Airports.

H. Series 140—Schools.

I. Series 170—Air Navigation Facilities.

IV. AIRMAN'S INFORMATION MANUAL

A. Part 1: Basic Flight Manual and ATC Procedures.

1. Glossary of aeronautical terms
2. Airport lighting/marking/aids
3. Air navigation radio aids
4. VOR (VHF omnidirectional range)
5. VOR receiver check
6. Distance measuring equipment
7. VHF direction finder
8. Radar
9. Visual approach slope indicator (VASI)
10. Rotating beacons
11. In-runway lightings
12. Runway markings
13. Controlled/uncontrolled airspace
14. Operating at tower and non-tower airports
15. Special use airspace—prohibited, restricted, alert areas, military operations areas
16. Services available to pilots
17. Automatic terminal information service (ATIS)
18. ATC departure/en route/arrival procedures
19. Radar traffic information service
20. Transponder operation
21. Terminal control area
22. Terminal radar program for VFR aircraft
23. Aeronautical advisory stations (UNICOM)
24. Radiotelephone phraseology/technique
25. Traffic/wind direction indicators
26. Weather information/briefing
27. En route flight advisory service
28. Transcribed weather broadcasts
29. Scheduled weather broadcasts
30. In-flight weather advisories
31. Clear air turbulence
32. Thunderstorms
33. Flight plans
34. ADIZ and designated mountainous areas
35. Pilot/controller roles/responsibilities
36. Medical facts for pilots
37. Fatigue
38. Hypoxia
39. Hyperventilation
40. Alcohol
41. Carbon monoxide
42. Good operating practices
43. Emergency procedures

B. Part 2: Airport Directory.

1. Airport/heliport data
2. FSS/weather service telephone numbers

C. Part 3: Operational Data and Notices to Airmen.

1. Radio facility/FSS data
2. Restrictions to en route navigation aids
3. Special notices/special operations
4. VOR receiver check points
5. Notices to Airmen (NOTAMS)
6. NOS aeronautical chart bulletin

D. Part 4: Graphic Notices and Supplemental Data.

1. Terminal radar service areas (TRSAs)
2. Terminal control areas (TCAs)
3. Terminal area graphic notices
4. Parachute jumping areas
5. Military Aerial Refueling Tracks and Olive Branch Routes

V. PHYSIOLOGICAL FACTORS RELATED TO FLIGHT

A. Adjustment to the Flight Environment.

1. Ground habits vs. flight habits
2. Individual differences in pilots
3. Physiological factors important to the pilot

B. Reaction of the Body to Changes in Atmospheric Pressure.

1. Changes in altitude
2. Aerotitis
3. Aerosinusitis

C. Reaction of the Body to Changes in Oxygen Partial Pressure.

1. Hypoxia
2. Causes of carbon monoxide poisoning
3. Time of useful consciousness
4. Cabin pressurization and decompression

D. Self Imposed Stress.

1. Fatigue and its effect on the body
2. Alcohol and its effect on the body
3. Drugs and their effects on the body
4. Scuba diving and its effect on the body
5. Panic causes and prevention—hyperventilation

E. Sensations in Flight.

1. Body sensory systems involved in equilibrium
   a. Eyes
   b. Inner ear
   c. Skeletal muscles
2. Sensory illusions in flight—vertigo spatial disorientation
   a. Flight factors contributing to sensory illusions
   b. Flight factors contributing to visual illusions
   c. Combating sensory illusions

F. Principles and Problems of Vision.

1. Reactions to illumination levels and techniques of seeing
2. Instrument lighting
3. Night vision

G. Noise, Vibration, and Temperature.

H. Oxygen Equipment.

1. Requirements
2. Types of oxygen
3. Storage of oxygen
4. Regulators and masks

VI. AVIATION WEATHER

A. The Earth's Atmosphere.

1. Composition
2. Vertical structure
3. The standard atmosphere
4. Density and hypoxia

B. Temperature.

1. Temperature measurement
2. Heat and temperature
3. Temperature aloft and lapse rates
4. Temperature variation

C. Atmospheric Pressure and Altimetry.

1. Atmospheric pressure measurements
2. Sea level pressure
3. Station pressure
4. Pressure variations
5. Pressure systems
6. Altimeters and altimeter setting
7. Effect of temperature

D. Wind.

1. Basic theory of general circulation
2. Convection
3. Pressure gradient force
4. Coriolis force
5. Friction and mountain effects
6. The jet stream
7. Local and small scale winds
8. Large wind system
9. Wind, pressure systems, and weather
10. Wind shear

E. Moisture.

1. Measurements
   a. Relative humidity
   b. Dewpoint
2. Change of state
3. Cloud formation precipitation
3. Condensation and sublimation products

F. Stability and Instability.

1. Adiabatic process
2. Lapse rates
3. Stability determinations
4. Effects of stability or instability

G. Clouds.
   1. Composition
   2. Formation and structure
   3. Types
   4. Recognition/signposts

H. Airmasses.
   1. Source regions
   2. Classification of airmasses
   3. Airmass modification
   4. Summer and winter airmass weather

I. Fronts.
   1. Structures
   2. Types
   3. Frontal waves and occlusions
   4. Frontolysis and frontogenesis
   5. Associated weather

J. Turbulence.
   1. Convective currents
   2. Obstructions to wind flow
   3. Wind shear
   4. Clear air turbulence
   5. Categories of turbulence intensities
   6. Wake turbulence

K. Icing.
   1. Ice-producing cloud types
   2. Structural ice formation
   3. Frost and ground icing
   4. Types and intensities of in-flight structural icing
   5. Accretion rate of in-flight structural icing
   6. Effects of in-flight structural icing
   7. Structural aircraft icing and frost on the ground
   8. Structural anti-icing and deicing
   9. Instrument and powerplant icing
   10. Fuel and oil anti-icing

L. Thunderstorms.
   1. Conditions necessary for formation
   2. Structure
   3. Classification
   4. Hazards
   5. Information from radar
   6. Tornadoes
   7. Do's and don'ts of thunderstorm flying

M. Common IFR Producers.
   1. Fog
   2. Low stratus clouds
   3. Haze and smoke
   4. Blowing obstructions to vision
   5. Precipitation
   6. Obscured or partially obscured sky

N. The Nation's Aviation Weather Reporting System.
   1. Observations
   2. Meteorological centers and forecast offices
   3. Service outlets
   4. Users

O. Weather Observations.
   1. Surface weather observations
   2. Pilot reports (PIREPS)
   3. Weather radar observations
   4. Upper air observations

P. Weather Charts.
   1. Weather depiction charts
   2. Surface weather charts
   3. Constant pressure charts
   4. Winds aloft charts
   5. Radar summary charts
   6. Prognostic surface and prognostic constant pressure charts
   7. Prognostic significant weather charts
   8. Density altitude chart

Q. Aviation Weather Forecasts.
   1. Terminal forecasts (FT)
   2. Area Forecasts (FA)
   3. Winds aloft forecasts (FD)
   4. TWEB route forecasts and synopsis
   5. In-flight weather advisories (WA)
   6. Severe weather outlooks (AC)
   7. Severe weather forecasts (WW)
   8. Surface analysis and prognoses

R. Services to Pilots.
   1. FSS briefing
   2. Automatic terminal information service
   3. Pilots automatic telephone weather answering service (PATWAS)
   4. Transcribed weather broadcasts (TWEB)
   5. En route flight advisory service
   6. Scheduled weather broadcasts
   7. Request/reply service

VII. AIRPLANE OPERATION

A. General.

1. Preflight/postflight safety practices
2. Flight controls
3. Wings and empennage
4. Fuel system principles
5. Fuel contamination—prevention/elimination
6. Airplane hydraulic systems—airplane electrical systems
7. Wake turbulence—causes/precautions
8. Crosswind takeoff/landing practices
9. Proper loading of the aircraft
10. Recovery from critical flight situations
11. Aircraft operating limitations
12. High-altitude operations/pressurization
13. Use of supplemental oxygen and oxygen equipment
14. Midair collision avoidance precautions
15. Normal/crosswind takeoff/landing practices
16. Maximum performance takeoff/landing
17. Emergency landings
18. Design maneuvering speed
19. Taxiing during strong surface winds
20. Flap operation
21. Retractable landing gear operation
22. Nosewheel steering
23. Oxygen and systems

B. Performance.

1. Takeoff charts
2. Rate-of-climb charts
3. Cruise charts
4. Maximum safe crosswind charts
5. Use of Denalt computer
6. Landing charts
7. Stall speed charts
8. Airspeed correction charts
9. Computing density/pressure altitudes
10. Effect of density altitude on performance
11. Critical performance speeds—"V" speeds
12. Effect of wind and shear on aircraft performance
13. Bank/speed versus rate/radius of turns
14. Stall speed versus altitude or attitude
15. Stall speed versus indicated/true airspeed
16. Obstacle clearance takeoff/landing
17. Best angle-/rate-of-climb
18. Computations of gross weight/useful load
19. Computation of center of gravity
20. V_N flight envelope

VIII. ENGINE OPERATION

A. General.

1. Reciprocating engine principles
2. Carburetion principles
3. Fuel injection principles
4. Lubrication systems
5. Ignition systems
6. Fuel systems
7. Electrical systems
8. Supercharger/turbocharger systems
9. Propeller principles
10. Manifold pressure versus RPM
11. Engine instruments
12. Effect of density altitude

B. Operation.

1. Engine starting/shutdown procedures
2. Detonation causes and effects
3. Carburetor icing and effect of heat
4. Engine operating limitations
5. Use of throttle, propeller, mixture controls
6. Interpreting engine instruments
7. Use of proper fuel
8. Multiengine critical engine

IX. NAVIGATION

A. General.

1. Chart projections used for air navigation
2. Direction on a sphere
3. Distance on a sphere
4. Aeronautical charts
   a. Topographic information
   b. Cultural features
   c. Relief
   d. Aeronautical data
   e. Navigation aids
5. Time zones and 24-hour system
6. Metric conversions

B. Pilotage.

1. Plotting course
2. Identifying landmarks

C. Dead Reckoning.
   1. Measuring courses
   2. Measuring distances
   3. Effect of wind on navigation
   4. Magnetic variation and deviation
   5. True airspeed and groundspeed
   6. True course, magnetic course
   7. Wind direction

D. Wind Triangles (Vectors).
   1. True course and groundspeed
   2. True heading and groundspeed
   3. Magnetic heading and groundspeed
   4. True course and true airspeed
   5. Wind direction and speed

E. Navigation Computer.
   1. Calculator side (slide rule)
      a. Time, speed, distance
      b. Fuel consumption
      c. Conversions-temperatures, speeds, distances, altitudes
      d. Off course corrections
      e. Climbs and descents
      f. Density altitude
   2. Wind face side (vectors)
      a. Courses and headings
      b. Groundspeed and true airspeed
      c. Off course corrections
      d. Wind direction and speed

F. Radio Navigation.
   1. Characteristics of VOR facilities
   2. Tuning VOR receivers
   3. Identifying VOR stations
   4. VOR interpretation/orientation
   5. Intercepting VOR radials
   6. Tracking VOR radials
   7. Groundspeed checks using VOR radials
   8. VOR frequency interference
   9. VOR test signals/VOR receiver checks
   10. Characteristics of ADF facilities
   11. Tuning ADF receivers
   12. Identifying stations used for ADF
   13. ADF/RMI interpretation/orientation
   14. Intercepting ADF/RMI bearings
   15. Tracking ADF/RMI bearings or "homing"
   16. Marker beacons/outer compass locators
   17. Distance measuring equipment (DME)
   18. Transponder use
   19. Emergency locator transmitters
   20. Direction finding (DF)

X. AERODYNAMICS AND PRINCIPLES OF FLIGHT

A. Laws of motion.
   1. Bernoulli
   2. Newton

B. Functions of the Flight Controls.

C. Principles of Airfoils.
   1. Pressure above and below
   2. Relative wind and angle of attack
   3. Downwash
   4. Wingtip vortices

D. Wing Planform.
   1. Area/span/chord
   2. Aspect ratio/taper/sweepback
   3. Effect of planform on stall patterns

E. Forces Acting on an Airplane.
   1. Lift
   2. Drag-induced/parasite
   3. Thrust
   4. Weight
   5. Centrifugal/centrepital

F. Flight Controls/Axes of an Airplane.

G. Lift/Drag During Turns.
   1. Angle of attack
   2. Adverse yaw

H. Lift Versus Angle of Attack.

I. Lift/Thrust Versus Air Density.

J. Types/Effect of Flaps, Spoilers, Divebrakes.

K. Effect of Flaps on Lift/Drag/Trim.

L. Effect of Ice/Snow/Frost on Airfoils.

M. Power Versus Climb/Descent/Level Flight.

N. Gyroscopic Principles.

O. Types and Effects of Drag—Induced/Parasite/Profile.

P. Ground Effect.

Q. Principles of Propellers.

R. Loads/Load Factors.

S. Stability—Static and Dynamic/Longitudinal/Lateral/Directional.
   1. Center of gravity
   2. Center of pressure
   3. Thrust line
   4. Dihedral/sweepback
   5. Downwash

T. Airplane Performance Characteristics.

XI. FLIGHT INSTRUMENTS AND SYSTEMS

A. Attitude Indicator Operation/Errors.

B. Heading Indicator Operation/Errors.

C. Turn Indicator/Coordinator.

D. Altimeter Operation/Errors.

E. Vertical Speed Indicator Operation/Errors.

F. Airspeed Indicator Operation/Errors.

G. Vacuum Systems/Instruments.

H. Pitot/static Systems/Instruments.

I. Magnetic Compass Operation/Errors.

J. Altimeter Setting Procedure/Significance.

K. Pressure Altitude Significance/Obtaining.

L. Gyroscopic Principles.

XII. RADIO COMMUNICATIONS

A. VHF Radio Communication/Phraseology.

B. Position Reporting Procedures.

C. Tower/FSS/En Route Advisories/Instructions.

D. FSS Communications Procedures.

E. Obtaining Emergency Assistance.

F. Lost Procedure When Radio is Inoperative.

G. Use of Proper Communications Frequencies.

XIII. BASIC INSTRUMENT FLYING

A. Components of Attitude Instrument Flying.

B. Pitch, Bank, Power Control.

C. Straight-and-Level Flight.

D. Turns/Turns to Predetermined Headings.

E. Constant Rate Climbs/Descents/Leveloffs.

F. Constant Speed Climbs/Descents/Leveloffs.

G. Magnetic Compass Turns.

H. Effect of Changes in Airspeed.

I. False Sensations in Flight.

Subpart G—Flight Instructors

§ 61.181 *Applicability.*

This subpart prescribes the requirements for the issuance of flight instructor certificates and ratings, the conditions under which those certificates and ratings are necessary, and the limitations upon these certificates and ratings.

§ 61.183 Eligibility requirements: general.

To be eligible for a flight instructor certificate a person must—

(a) Be at least 18 years of age;

(b) Read, write, and converse fluently in English;

(c) Hold—

(1) A commercial or airline transport pilot certificate with an aircraft rating appropriate to the flight instructor rating sought, and

(2) An instrument rating, if the person is applying for an airplane or an instrument instructor rating;

(d) Pass a written test on the subjects in which ground instruction is required by § 61.185; and

(e) Pass an oral and flight test on those items in which instruction is required by § 61.187.

§ 61.185 Aeronautical knowledge.

(a) Present evidence showing that he has satisfactorily completed a course of instruction in at least the following subjects:

(1) The learning process.

(2) Elements of effective teaching.

(3) Student evaluation, quizzing, and testing.

(4) Course development.

(5) Lesson planning.

(6) Classroom instructing techniques.

(b) Have logged ground instruction from an authorized ground or flight instructor in all of the subjects in which ground instruction is required for a private and commercial pilot certificate, and for an instrument rating, if an airplane or instrument instructor rating is sought.

§ 61.187 Flight proficiency.

(a) An applicant for a flight instructor certificate must have received flight instruction, appropriate to the instructor rating sought in the subjects listed in this paragraph by a person authorized in paragraph (b) of this section. In addition, his logbook must contain an endorsement by the person who has given him the instruction certifying that he has found the applicant competent to pass a practical test on the following subjects:

(1) Preparation and conduct of lesson plans for students with varying backgrounds and levels of experience and ability.

(2) The evaluation of student flight performance.

(3) Effective preflight and postflight instruction.

(4) Flight instructor responsibilities and certifying procedures.

(5) Effective analysis and correction of common student pilot flight errors.

(6) Performance and analysis of standard flight training procedures and maneuvers appropriate to the flight instructor rating sought.

(b) The flight instruction required by paragraph (a) of this section must be given by a person who has held a flight instructor certificate during the 24 months immediately preceding the date the instruction is given, who meets the general requirements for a flight instructor certificate prescribed in § 61.183, and who has given at least 200 hours of flight instruction, or 80 hours in the case of glider instruction, as a certificate flight instructor.

§ 61.191 Additional flight instructor ratings.

The holder of a flight instructor certificate who applies for and additional rating on that certificate must—

(a) Hold an effective pilot certificate with ratings appropriate to the flight instructor rating sought.

(b) Have had at least 15 hours as pilot in command in the category and class of aircraft appropriate to the rating sought; and

(c) Pass the written and practical test prescribed in this subpart for the issuance of a flight instructor certificate with the rating sought.

§ 61.35 Written test: prerequisites and passing grades.

(a) An applicant for a written test must--

(1) Show that he has satisfactorily completed the ground instruction or home study course required by this Part for the certificate or rating sought;

(2) Present as personal identification an airman certificate, driver's license, or other official document; and

(3) Present a birth certificate or other official document showing that he meets the age requirement prescribed in this Part for the certificate sought not later than 2 years from the date of application for the test.

(b) The minimum passing grade is specified by the Administrator on each written test sheet or booklet furnished to the applicant.

§ 61.39 Prerequisites for flight tests.

(a) To be eligible for a flight test for a certificate, or an aircraft or instrument rating issued under this Part, the applicant must—

(1) Have passed any required written test since the beginning of the 24th month before the month in which he takes the flight test;

(2) Have the applicable instruction and aeronautical experience prescribed in this Part;

(3) Hold a current medical certificate appropriate to the certificate he seeks or, in the case of a rating to be added to his pilot certificate, at least a third-class medical certificate issued since the beginning of the 24th month before the month in which he takes the flight test;

Subpart D—Private Pilots

§ 61.105 Aeronautical knowledge.

An applicant for a private pilot certificate must have logged ground instruction from an authorized instructor, or must present evidence showing that he has satisfactorily completed a course of instruction or home study in at least the following areas of aeronautical knowledge appropriate to the category of aircraft for which a rating is sought.

(a) *Airplanes.*

(1) The Federal Aviation Regulations applicable to private pilot privileges, limitations, and flight operations, accident reporting requirements of the National Transportation Safety Board, and the use of the "Airman's Information Manual" and the FAA Advisory Circulars;

(2) VFR navigation, using pilotage, dead reckoning, and radio aids;

(3) The recognition of critical weather situations from the ground and in flight and the procurement and use of aeronautical weather reports and forecasts; and

(4) The safe and efficient operation of airplanes, including high density airport operations, collision avoidance precautions, and radio communication procedures.

Subpart E—Commercial Pilots

§ 61.125 Aeronautical knowledge.

An applicant for a commercial pilot certificate must have logged ground instruction from an authorized instructor, or must present evidence showing that he has satisfactorily completed a course of instruction or home study, in at least the following areas of aeronautical knowledge appropriate to the category of aircraft for which a rating is sought.

(a) *Airplanes.*

(1) The regulations of this chapter governing the operations, privileges, and limitations of a commercial pilot, and the accident reporting requirements of the National Transportation Safety Board.

(2) Basic aerodynamics and the principles of flight which apply to airplanes; and

(3) Airplane operations, including the use of flaps, retractable landing gears, controllable propellers, high altitude operation with and without pressurization, loading and balance computations. and the significance and use of airplane performance speeds.

AIRMAN WRITTEN TEST APPLICATION

PRIVACY ACT STATEMENT

The information on this form is required under the authority of the Federal Aviation Act (Section 602). Certification cannot be completed unless the data is complete.

Disclosure of your Social Security Account Number (SSAN) is optional. If you do not supply your SSAN, a substitute number or identifier will be assigned to give your record a unique 9-digit number for internal control of airman records.

If your SSAN has been previously given, it is already in the system. Requests for removal must be in writing. If you do not wish your SSAN on future records, please do not disclose SSAN on airman written test, airman certification, and/or medical certification applications.

Routine uses of records maintained in the system, including categories of users and the purposes of such uses: To determine that airmen are certified in accordance with the provision of the Federal Aviation Act of 1958. Repository of documents used by individual and potential employers to determine validity of airmen qualifications. To support investigative efforts of investigation and law enforcement agencies of Federal, State, and local Governments. Supportative information in court case concerning individual status and/or qualifications in law suits. To provide data for the Comprehensive Airman Information System (CAIS). To provide documents for microfilm and microfiche backup records.

INSTRUCTIONS TO APPLICANT:

- ATTENTION: READ THE FOLLOWING PARAGRAPH CAREFULLY BEFORE COMPLETING THIS APPLICATION:

  WHOEVER, IN ANY MATTER WITHIN THE JURISDICTION OF ANY DEPARTMENT OR AGENCY OF THE UNITED STATES KNOWINGLY AND WILLFULLY FALSIFIES, CONCEALS OR COVERS UP BY ANY TRICK, SCHEME, OR DEVICE A MATERIAL FACT, OR MAKES ANY FALSE, FICTITIOUS OR FRAUDULENT STATEMENTS OR REPRESENTATIONS, OR MAKES OR USES ANY FALSE WRITING OR DOCUMENT KNOWING THE SAME TO CONTAIN ANY FALSE, FICTITIOUS OR FRAUDULENT STATEMENT OR ENTRY, SHALL BE FINED NOT MORE THAN $10,000 OR IMPRISONED NOT MORE THAN 5 YEARS, OR BOTH (U.S. CODE, TITLE 18, SEC. 1001.)

- CERTAIN TEST QUESTIONS INVOLVING REGULATIONS, ATC PROCEDURES, ETC., ARE FREQUENTLY OUTDATED BY VERY RECENT CHANGES. IN THESE INSTANCES, APPLICANTS ARE GIVEN CREDIT FOR THE QUESTION DURING THE PERIOD THAT IT TAKES TO DISTRIBUTE A REVISED QUESTION.

- DO NOT TEAR SHEETS APART.

- TURN TO PAGE 4 AND COMPLETE THE PERSONAL DATA SECTION. BE SURE THAT YOUR SIGNATURE IS ON THE PROPER LINE. BEFORE COMMENCING TEST, READ INSTRUCTIONS FOR MARKING THE ANSWER SHEET.

INSTRUCTIONS TO FAA PERSONNEL:

- REFER TO PAGE 3 OF THE APPLICATION FOR COMPLETION OF THE TIME WAIVER AND SECTION WAIVER BLOCK WHEN REQUIRED.

DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

AIRMAN WRITTEN TEST APPLICATION

DATE OF TEST (MONTH, DAY, YEAR) | TITLE OF TEST | TEST NO.

PLEASE PRINT ONE LETTER IN EACH SPACE—LEAVE A BLANK SPACE AFTER EACH NAME

NAME (LAST, FIRST, MIDDLE) | DATE OF BIRTH (MONTH, DAY, YEAR)

MAILING ADDRESS NO. AND STREET, APT. #, P.O. BOX, OR RURAL ROUTE | DESCRIPTION (HEIGHT, WEIGHT, HAIR, EYES)

CITY, TOWN OR POST OFFICE, AND STATE | ZIP CODE

BIRTHPLACE (City and State, or foreign country) | CITIZENSHIP | SOCIAL SECURITY NO. | IF A SOCIAL SECURITY NUMBER HAS NEVER BEEN ISSUED CHECK THIS BLOCK ⟶ ☐

Is this a retest? ☐ No ☐ Yes, date of last test | Have you taken or are you taking an FAA approved course for this test? ☐ No ☐ Yes (If "yes" give details below)

Graduation date: | NAME OF SCHOOL | CITY AND STATE

CERTIFICATION: I CERTIFY that all of the statements made in this application are true, complete, and correct to the best of my knowledge and belief and are made in good faith. Signature _____

— — DO NOT WRITE IN THIS BLOCK — — FOR USE OF FAA OFFICE ONLY — —

Applicant's identity established by:

CARD A: CATEGORY | TEST NUMBER | TAKE NO. | SECTIONS 1 2 3 4 5 6 7 | EXPIRATION (MONTH, DAY, YEAR)

CARD B: CERTIFICATE/SCHOOL NUMBER | MECH EXP DATE BY SECTION 1 2 3 | ID

FIELD OFFICE DESIGNATION

SIGNATURE of FAA Representative

INSTRUCTIONS FOR MARKING THE ANSWER SHEET. Completely darken only one circle for each question. DO NOT USE (X) OR (✓). Use black lead pencil furnished by examiner. To make corrections, [illegible] answer sheet so erasure marks will not show on page 2. Then erase incorrect response on page 4. On page 2 (copy) mark the incorrect [illegible] with a slash (/). Questions are arranged in VERTICAL sequence as indicated by the arrows.

1 ①②③④	23 ①②③④	45 ①②③④	67 ①②③④	89 ①②③④	111 ①②③④	133 ①②③④
2 ①②③④	24 ①②③④	46 ①②③④	68 ①②③④	90 ①②③④	112 ①②③④	134 ①②③④
3 ①②③④	25 ①②③④	47 ①②③④	69 ①②③④	91 ①②③④	113 ①②③④	135 ①②③④
4 ①②③④	26 ①②③④	48 ①②③④	70 ①②③④	92 ①②③④	114 ①②③④	136 ①②③④
5 ①②③④	27 ①②③④	49 ①②③④	71 ①②③④	93 ①②③④	115 ①②③④	137 ①②③④
6 ①②③④	28 ①②③④	50 ①②③④	72 ①②③④	94 ①②③④	116 ①②③④	138 ①②③④
7 ①②③④	29 ①②③④	51 ①②③④	73 ①②③④	95 ①②③④	117 ①②③④	139 ①②③④
8 ①②③④	30 ①②③④	52 ①②③④	74 ①②③④	96 ①②③④	118 ①②③④	140 ①②③④
9 ①②③④	31 ①②③④	53 ①②③④	75 ①②③④	97 ①②③④	119 ①②③④	141 ①②③④
10 ①②③④	32 ①②③④	54 ①②③④	76 ①②③④	98 ①②③④	120 ①②③④	142 ①②③④
11 ①②③④	33 ①②③④	55 ①②③④	77 ①②③④	99 ①②③④	121 ①②③④	143 ①②③④
12 ①②③④	34 ①②③④	56 ①②③④	78 ①②③④	100 ①②③④	122 ①②③④	144 ①②③④
13 ①②③④	35 ①②③④	57 ①②③④	79 ①②③④	101 ①②③④	123 ①②③④	145 ①②③④
14 ①②③④	36 ①②③④	58 ①②③④	80 ①②③④	102 ①②③④	124 ①②③④	146 ①②③④
15 ①②③④	37 ①②③④	59 ①②③④	81 ①②③④	103 ①②③④	125 ①②③④	147 ①②③④
16 ①②③④	38 ①②③④	60 ①②③④	82 ①②③④	104 ①②③④	126 ①②③④	148 ①②③④
17 ①②③④	39 ①②③④	61 ①②③④	83 ①②③④	105 ①②③④	127 ①②③④	149 ①②③④
18 ①②③④	40 ①②③④	62 ①②③④	84 ①②③④	106 ①②③④	128 ①②③④	150 ①②③④
19 ①②③④	41 ①②③④	63 ①②③④	85 ①②③④	107 ①②③④	129 ①②③④	
20 ①②③④	42 ①②③④	64 ①②③④	86 ①②③④	108 ①②③④	130 ①②③④	
21 ①②③④	43 ①②③④	65 ①②③④	87 ①②③④	109 ①②③④	131 ①②③④	
22 ①②③④	44 ①②③④	66 ①②③④	88 ①②③④	110 ①②③④	132 ①②③④	

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U.S. DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

TITLE	SELECTION NO.
FIA-1A FLIGHT INSTRUCTOR – AIRPLANE	173420

NAME John Rochester Doe

On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number
1	202	26	413	51	504	76	568
2	213	27	417	52	506	77	597
3	215	28	420	53	508	78	605
4	225	29	423	54	510	79	625
5	250	30	426	55	512	80	635
6	271	31	430	56	513	81	645
7	286	32	433	57	515	82	655
8	292	33	4	58	517	83	700
9	301	34	43	59	518	84	710
10	312	35	441	60	520	85	720
11	317	36	444	61	523	86	730
12	322	37	447	62	525	87	745
13	341	38	450	63	527	88	755
14	351	39	452	64	529	89	767
15	370	40	455	65	533	90	770
16	374	41	458	66	537	91	777
17	378	42	461	67	540	92	782
18	382	43	464	68	541	93	786
19	386	44	467	69	542	94	789
20	388	45	470	70	544	95	793
21	390	46	473	71	546	96	795
22	396	47	476	72	547	97	796
23	402	48	479	73	549	98	798
24	407	49	500	74	551	99	799
25	410	50	502	75	554	100	800

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FLIGHT INSTRUCTOR
- AIRPLANE -

QUESTIONS

MAXIMUM TIME ALLOWED FOR TEST: FIVE HOURS

GENERAL INSTRUCTIONS

READ CAREFULLY

1. This book contains 600 questions beginning with number 201. You are required to answer 100 QUESTIONS ONLY.

2. Refer to the QUESTION SELECTION SHEET to determine which 100 questions you are to answer.

3. Mark your answers in the appropriate places on the ANSWER SHEET.

4. All supplementary information required to answer certain questions can be found on the page opposite the question or above the question.

5. DO NOT MARK ON THIS QUESTION BOOK. A plastic overlay sheet is provided to place over performance charts and illustrations. This permits marking on the plastic sheet without defacing the question book.

6. Read each question carefully and select the best answer. Always answer questions in terms of current regulations, procedures, or techniques.

7. The MINIMUM passing grade is 70 percent.

SAMPLE

WARNING

§ WRITTEN TESTS: CHEATING OR OTHER UNAUTHORIZED CONDUCT.

(a) EXCEPT, AS AUTHORIZED BY THE ADMINISTRATOR, NO PERSON MAY --

(1) COPY, OR INTENTIONALLY REMOVE, A WRITTEN TEST UNDER THIS PART;

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(4) TAKE ANY PART OF THAT TEST IN BEHALF OF ANOTHER PERSON;

(5) USE ANY MATERIAL OR AID DURING THE PERIOD THAT TEST IS BEING GIVEN; OR

(6) INTENTIONALLY CAUSE, ASSIST, OR PARTICIPATE IN ANY ACT PROHIBITED BY THIS PARAGRAPH.

(b) NO PERSON WHO COMMITS AN ACT PROHIBITED BY PARAGRAPH (a) OF THESE SECTIONS IS ELIGIBLE FOR ANY AIRMAN OR GROUND INSTRUCTOR CERTIFICATE OR RATING UNDER THIS CHAPTER FOR A PERIOD OF ONE YEAR AFTER THE DATE OF THAT ACT. IN ADDITION, THE COMMISSION OF THAT ACT IS THE BASIS FOR SUSPENDING OR REVOKING ANY AIRMAN OR GROUND INSTRUCTOR CERTIFICATE OR RATING HELD BY THAT PERSON.

1. With certain exceptions, the Continental Control Area extends upward from
   1- 18,000 feet MSL.
   2- 14,500 feet MSL.
   3- 10,000 feet MSL.
   4- the surface.

2. Which statement is true regarding Control Areas?
   1- They have higher basic VFR minimums than Control Zones.
   2- They start at the surface and extend upward to the base of the Continental Control Area.
   3- They start at an altitude of 700 feet or higher above the surface.
   4- They are located at tower-controlled airports only.

3. Low altitude VOR airways extend from
   1- 1,200 feet above the surface upward to 14,500 feet and are 15 miles wide.
   2- 1,200 feet above the surface upward to the Continental Control Area and are 10 nautical miles wide.
   3- 1,200 feet or higher above the surface upward to 18,000 feet MSL and are 8 nautical miles wide.
   4- the surface upward to 18,000 feet MSL and are 4 nautical miles wide.

4. Specific requirements pertinent to operating in an Airport Traffic Area apply only at an airport where
   1- a control tower is in operation.
   2- a Terminal Control Area is established.
   3- a Control Zone is in effect.
   4- an approach control facility is available.

5. Airport Traffic Areas exist only at airports that have
   1- an FSS located on the airport.
   2- radar approach and radar departure.
   3- Direction Finder (DF) service.
   4- operating control towers.

6. Within the contiguous U.S., Control Areas extend upward from either 700 feet or 1,200 feet above the surface to but not including
   1- 18,000 feet MSL.
   2- 3,000 feet AGL.
   3- 24,000 feet MSL.
   4- the base of the Continental Control Area.

7. Within the contiguous U.S., the vertical limit of Control Zones extends from the surface upward to
   1- the base of the Continental Control Area.
   2- but not including 10,000 feet MSL.
   3- but not including 3,000 feet AGL.
   4- infinity.

8. One of the major differences between Control Zones and Control Areas is that all Control Zones
   1- have higher basic VFR weather minimums than Control Areas.
   2- always begin at the surface while Control Areas always begin at 1,200 feet above the surface.
   3- begin at the surface, while all Control Areas begin at an altitude of 700 feet or higher above the surface.
   4- are located around tower-controlled airports only.

9. Commercial pilots are required to have a current and appropriate pilot and medical certificate in their personal possession only when acting as
   1- a flight crewmember for compensation or hire.
   2- pilot in command during operations in interstate commerce.
   3- pilot in command while carrying passengers.
   4- a required pilot flight crewmember.

10. A Second-Class Medical Certificate which was issued on April 10, 1976, permits a commercial pilot to exercise which of the following privileges?

    1- Private pilot privileges until, but not after March 30, 1977.

    2- Commercial pilot privileges until, but not after April 30, 1977.

    3- Commercial pilot privileges until, but not after April 10, 1978.

    4- Private pilot privileges until, but not after April 10, 1977.

11. Suppose a First-Class Medical Certificate was issued to the pilot on Dec. 17, 1975. Select the last date on which this medical certificate is valid for these operations.

    (A) Private pilot operations.
    (B) Commercial pilot operations.
    (C) Airline Transport pilot operations.

    a. June 17, 1976
    b. June 30, 1976
    c. Dec. 17, 1976
    d. Dec. 31, 1976
    e. Jan. 31, 1976
    f. Dec. 31, 1977
    g. Jan. 31, 1977

    The correct matchings are

    1- A-f; B-c; C-a.
    2- A-g; B-e; C-b.
    3- A-f; B-d; C-b.
    4- A-g; B-d; C-a.

12. Which of the following are considered "class ratings?"

    1- Single-engine land; multiengine land; single-engine sea; multiengine sea.

    2- Single and multiengine land; single and multiengine sea; airplane-instrument; airplane "type" ratings.

    3- Single-engine; multiengine; rotorcraft; lighter-than-air.

    4- Airplane; rotorcraft; glider; lighter-than-air.

13. To carry passengers for compensation beyond a 50-mile radius during daylight hours, the pilot in command is required to possess only a Commercial Pilot Certificate and a current

    1- Class III Medical Certificate.

    2- Class II Medical Certificate.

    3- Class II Medical Certificate, as well as have required recent instrument experience.

    4- Class II Medical Certificate, as well as an instrument pilot rating.

14. To act as pilot in command of an airplane equipped with a retractable landing gear, a person is required to do which of the following if no pilot in command time in such an airplane was logged prior to November 1, 1973?

    1- Pass an FAA flight test in such an airplane.

    2- Make three solo takeoffs and landings in such an airplane.

    3- Hold a retractable gear airplane class rating.

    4- Receive flight instruction in such an airplane.

15. To act as pilot in command of an airplane that has more than 200 horsepower, a person is required to do which of the following if no pilot in command time in such an airplane was logged prior to November 1, 1973?

    1- Receive flight instruction in such an airplane.

    2- Hold a 200-horsepower class rating.

    3- Make three solo takeoffs and landings in such an airplane.

    4- Pass an FAA flight test in such an airplane.

16. A pilot is required to hold a category and class rating appropriate to the aircraft being flown, in which of the following operations?

    1- Flight tests given by the Administrator (FAA).

    2- All flights while acting as pilot in command.

    3- Flights for compensation or hire while acting as pilot in command.

    4- All solo flights.

17. Which of the following would be authorized by regulations if a pilot's commercial certificate lists only an airplane, multiengine land class, and DC-3 type rating?

    1- Carrying passengers not for hire in a single-engine airplane.

    2- Carrying passengers for hire in a multiengine airplane.

    3- Operating any large airplane for hire.

    4- Operating any multiengine airplane regardless of its gross weight.

18. A pilot is permitted to log flight time as second in command during what portion of a flight?

    1- All flight time when performing copilot duties in any airplane.

    2- No more than the flight time during which that pilot was the sole manipulator of the controls.

    3- All flight time while acting as second in command in an airplane requiring more than one pilot.

    4- A maximum of one-half the flight time while acting as second in command of an airplane requiring two pilots.

19. Without special authorization from the Administrator, to act as pilot in command of a multiengine turbojet powered airplane under VFR, a certificated pilot is required to hold

    1- an Airline Transport Pilot Certificate.

    2- only a multiengine class rating.

    3- an instrument pilot rating.

    4- a type rating for that airplane.

20. Unless special authorization is obtained from the Administrator, to act as pilot in command of a transport type airplane that has a certificated takeoff weight of more than 12,500 lbs., a certificated pilot flying VFR is required to hold

    1- only a multiengine class rating.

    2- an Airline Transport Pilot Certificate.

    3- a type rating for that airplane.

    4- an instrument pilot rating.

21. Before acting as pilot in command of high performance airplanes, a private or commercial pilot must have logged pilot in command time in such airplanes before November 1, 1973, or have received flight instruction in airplanes with

    1- a certificated maximum gross weight of more than 6,000 pounds.

    2- a cruising speed of more than 200 knots.

    3- more than 200 HP, or retractable landing gear, flaps, and controllable propeller, as the case may be.

    4- a minimum of 185 HP.

22. Unless a pilot has satisfactorily accomplished a biennial flight review or satisfactorily completed a pilot proficiency check within the required period, a private pilot is not authorized to

    1- act as pilot in command of an aircraft unless another pilot is aboard.

    2- act as pilot in command of an aircraft unless a certificated flight instructor is aboard.

    3- act in any capacity as a crewmember of an aircraft.

    4- act as pilot in command of any aircraft.

23. Prior to acting as pilot in command of an aircraft, a pilot must have satisfactorily accomplished a flight review or satisfactorily completed a pilot proficiency check within the preceding

    1- 36 months.
    2- 24 months.
    3- 12 months.
    4- 6 months.

24. If the pilot in command does not meet the night recency of experience requirement, and official sunrise is 0700 CDT, the earliest time of takeoff with passengers aboard should be

    1- 0730 CDT.
    2- 0700 CDT.
    3- 0630 CDT.
    4- 0600 CDT.

25. If the pilot in command does not meet the night recency of experience requirement, and official sunrise is 0630 CDT, the earliest time of takeoff with passengers aboard should be

    1- 0730 CDT.
    2- 0700 CDT.
    3- 0630 CDT.
    4- 0530 CDT.

26. A certificated flight instructor who has not satisfactorily accomplished a biennial flight review or satisfactorily completed a required pilot proficiency check within the required period, is

    1- not authorized to give instruction except to holders of Private Pilot Certificates.

    2- authorized to act as pilot in command, but not for compensation.

    3- not authorized to fly solo.

    4- authorized to fly solo only.

27. Before acting as pilot in command of a large airplane that requires more than one pilot crewmember, a pilot must be type-rated for that specific type airplane and have satisfactorily completed a proficiency or flight check in that type airplane, or an approved simulator, within the preceding

    1- 36 months.
    2- 24 months.
    3- 12 months.
    4- 6 months.

28. Prior to flying an airplane solo, which of the following is one of the requirements that must be met by a pilot who holds a Commercial Pilot Certificate?

    1- Satisfactorily complete a flight review or proficiency check within the preceding 24 months.

    2- Accomplish three takeoffs and landings within the preceding 90 days.

    3- Hold a Second-Class Medical Certificate issued within the preceding 12 months.

    4- Hold an instrument pilot rating.

29. The minimum number of takeoffs and landings that a pilot is required to have made prior to acting as pilot in command of an airplane with passengers aboard is

    1- three.
    2- five.
    3- six.
    4- ten.

30. To meet the recent flight experience requirements for acting as pilot in command when carrying passengers at night, a pilot must have made within the preceding 90 days and at night, at least

    1- three takeoffs and three landings to a full stop in the same category and class of aircraft to be used.

    2- three touch-and-go landings in the same category and class of aircraft to be used.

    3- three takeoffs and three landings (either full stop or touch-and-go).

    4- three takeoffs and three landings to a full stop in the same category, but not necessarily in the same class of aircraft to be used.

31. To act as pilot in command of an airplane towing a glider, the pilot is required to have

    1- logbook endorsements for receipt of ground and flight instruction in gliders and familiarity with techniques and procedures for glider towing.

    2- a Commercial Pilot Certificate with a glider pilot rating.

    3- a logbook record of having made at least three flights in a glider.

    4- at least a Private Pilot Certificate with a glider pilot rating.

32. When a certificated pilot changes permanent mailing address and fails to notify the FAA Airman Certification Branch of the new address, the pilot is entitled to exercise the privileges of the pilot certificate for a period of only

    1- 60 days after the date of the move.

    2- 30 days after the date of the move.

    3- 20 days after the date of the move.

    4- 10 days after the date of the move.

33. Which statement is true regarding private pilot privileges?

    1- Under no circumstances is a private pilot authorized to receive compensation for acting as pilot in command of an airplane.

    2- A private pilot is permitted to share the operating expenses of a flight with the passengers.

    3- A private pilot is authorized to receive compensation for acting as pilot in command of an airplane with passengers aboard if the flight is not in connection with a business venture.

    4- A private pilot is permitted to personally accept a donation for acting as pilot in command of an airplane used in a passenger carrying airlift that is sponsored by a charitable organization.

34. A certificated commercial pilot who carries passengers for hire in an airplane at night is required to have at least

1- a Third-Class Medical Certificate that was issued within the preceding 12 calendar months.

2- a type rating if the airplane is of the multiengine class.

3- a First-Class Medical Certificate.

4- an airplane instrument pilot rating.

35. What night-flight instruction is required for a private pilot to be certificated with an airplane rating without the limitation "night flying prohibited?"

1- 5 hours at night including five takeoffs and landings.

2- 3 hours at night including ten takeoffs and landings.

3- 1 hour at night including five takeoffs and landings.

4- 1 hour at night including three takeoffs and landings.

36. To act as pilot in command of an airplane in a passenger-carrying airlift sponsored by a charitable organization, a private pilot is required to have

1- special authorization from the FAA.

2- logged at least 200 hours of flight time.

3- at least 100 hours of pilot in command time.

4- an instrument pilot rating, if the flights extend beyond a 25-mile radius.

37. Which statement is true concerning a commercial or private pilot who holds a Second-Class Medical Certificate which was issued on May 16, 1976?

1- A certificated commercial pilot may exercise commercial pilot privileges until June 1, 1977, and private pilot privileges until June 1, 1978.

2- A certificated commercial pilot is permitted to exercise commercial pilot privileges until April 30, 1978.

3- A certificated private pilot is permitted to exercise private pilot privileges only until the end of April 30, 1977.

4- A certificated private pilot is permitted to exercise private pilot privileges until May 1, 1977, and student pilot privileges until May 1, 1978.

38. During a night VFR flight in a single-engine land airplane carrying passengers for hire within 25 nautical miles from the departure airport, regulations require that the pilot in command possess at least

1- a Private Pilot Certificate with a single-engine land airplane rating.

2- a Commercial Pilot Certificate with a single-engine land airplane rating and an airplane instrument pilot rating.

3- a Commercial Pilot Certificate with a single-engine land airplane rating.

4- an Airline Transport Pilot Certificate with a single-engine land airplane rating.

39. If an applicant for a Commercial Pilot Certificate with an airplane rating does not hold an instrument pilot rating, what limitations are imposed?

1- Carrying passengers on any cross-country flight in airplanes is prohibited.

2- Flying at night and on cross-country flights in airplanes is prohibited.

3- Carrying passengers in airplanes is prohibited at night.

4- Carrying passengers for hire at night and on cross-country flights of more than 50 NM in airplanes is prohibited.

40. If an applicant for a Commercial Pilot Certificate with an airplane rating does not hold an instrument pilot rating, which of the following is permitted?

1- Carrying passengers for hire on any VFR cross-country flight in airplanes.

2- Flying at night and on cross-country flights in airplanes.

3- Carrying passengers for hire in airplanes during day or night.

4- Carrying passengers for hire at night and on cross-country flights of more than 50 NM in airplanes.

41. Which statement is true regarding the fastening of seatbelts?

1- Seatbelts must be fastened about passengers during takeoffs and landings only, while each required crewmember's seatbelt must be fastened at all times while occupying an assigned station.

2- Seatbelts must be fastened about passengers and required flight crewmembers during takeoff and landing only.

3- Seatbelts must be fastened about passengers during takeoff and landing only, while required flight crewmembers' seatbelts must be fastened during the entire flight.

4- All persons on board must have their seatbelts fastened during the entire flight.

42. As part of the preflight action for a VFR flight away from the vicinity of the departure airport, the pilot in command is required to

1- determine runway lengths of airports of intended use and the airplane's takeoff and landing distance data.

2- remove any portable electronic device that might interfere with navigation equipment.

3- file a flight plan if the flight will enter a Terminal Control Area.

4- check the operation of the emergency locator transmitter.

43. Suppose when receiving radar vectors, you see an airplane approaching on a collision course from your left. Under these circumstances, you should

1- expect the other pilot to abide by regulations and give way to you.

2- wait until ATC issues a new heading or altitude that will ensure adequate separation.

3- take whatever action is necessary to avoid a collision.

4- not deviate from the heading or altitude assigned unless deviation is approved by ATC.

44. To carry passengers for hire on cross-country flights of more than 50 nautical miles from the departure airport, the pilot in command is required to hold at least a Commercial Pilot Certificate and

1- a Category A pilot authorization.
2- a Category II pilot authorization.
3- an instrument pilot rating.
4- a First-Class Medical Certificate.

45. An airplane is required to be equipped with an operable Mode A 4096 transponder with automatic pressure altitude reporting capability when operating in

1- all airspace above 12,500 feet MSL that is not in the Continental Control Area.

2- all airspace above 10,000 feet MSL.

3- controlled airspace above 10,000 feet MSL.

4- controlled airspace above 12,500 feet MSL.

46. Which of the following is required when operating an aircraft towing a glider?

1- A glider pilot rating on the pilot in command's pilot certificate.

2- A Special Purpose Airworthiness Certificate issued by the FAA Administrator.

3- Approval from ATC to tow the glider in a Control Zone.

4- A certificate of waiver issued by the Administrator.

47. Which of the following is required to operate an aircraft towing an advertising banner?

1- Approval from ATC to operate in a control area.

2- A safety link at each end of the towline which has a breaking strength not less than 80% of the aircraft's gross weight.

3- A record of training in towing for the pilot in command.

4- A certificate of waiver issued by the Administrator.

48. No person is permitted to operate a civil airplane unless that airplane has within it certain forms, including at least the

1- Repair and Alteration Form 337, and the Registration Certificate.

2- aircraft and engine logbooks, and the Registration Certificate.

3- operating limitations and an Aircraft Use and Inspection Report, FAA Form 8320-3.

4- operating limitations, the Registration Certificate, and an appropriate, current, and properly displayed Airworthiness Certificate.

49. Which statement is true with respect to formation flights?

1- Parachutes are required to be worn during formation flights.

2- Formation flights are not permitted within controlled airspace.

3- Formation flights are prohibited when carrying passengers for hire.

4- Formation flights must be performed above 1,500 feet AGL.

50. Which of the following is required equipment in an airplane used for all cross-country training flights outside a radius of 50 miles from the airport of departure?

1- Two-way VHF communication radio.

2- Emergency Locator Transmitter (ELT).

3- 4096 transponder.

4- Distance Measuring Equipment (DME).

51. When are the batteries of an Emergency Locator Transmitter (ELT) required to be replaced?

1- At the time of each 100-hour or annual inspection.

2- When 50% of their useful life expires or they were in use for 1 hour.

3- Annually.

4- Every 24 months.

52. If the batteries of the Emergency Locator Transmitter (ELT) have a specified useful life of 18 months, by the end of what period are they required to be replaced or recharged?

1- 9 months.
2- 12 months.
3- 16 months.
4- 18 months.

53. A certificated commercial pilot is permitted to carry persons or property for compensation or hire in which of the following aircraft?

1- Restricted, utility, and limited category aircraft.

2- Limited category aircraft.

3- Utility category aircraft.

4- Restricted category aircraft.

54. When an airplane is being flown over water, under which circumstance must approved flotation gear be readily available to each occupant?

1- When flying beyond power-off gliding distance from shore, whether operating for hire or not.

2- When on a personal flight more than 50 miles from shore.

3- When operating for hire beyond power-off gliding distance from shore.

4- When operating for hire regardless of the distance from shore.

55. Regulations require that supplemental oxygen be provided to each occupant when the airplane is operated above a cabin pressure altitude of

1- 15,000 feet MSL.
2- 14,500 feet MSL.
3- 14,000 feet MSL.
4- 12,500 feet MSL.

56. If one pilot vacates an assigned station at the controls during flight in a pressurized airplane, above what altitude or flight level is the remaining pilot at the controls required to put on and use an oxygen mask?

1- FL 350.
2- FL 240.
3- FL 180.
4- 15,000 feet.

57. No person is permitted to operate a civil airplane unless that airplane has within it certain items, including the

1- record of airworthiness directives.
2- airplane and engine logbooks.
3- Alteration and Repair Form 337.
4- weight and balance information.

58. Unless otherwise authorized, the maximum speed allowed when flying below 10,000 feet MSL is

1- 288 knots.
2- 250 knots.
3- 200 knots.
4- 180 knots.

59. What is the maximum permissible indicated airspeed for operating a reciprocating engine airplane in an Airport Traffic Area which is located within a Terminal Control Area?

1- 250 knots.
2- 180 knots.
3- 200 knots.
4- 156 knots.

60. Unless otherwise authorized, the maximum speed at which a reciprocating engine equipped aircraft should be flown within an Airport Traffic Area is

1- 156 knots.
2- 180 knots.
3- 200 knots.
4- 288 knots.

61. Unless otherwise authorized, what is the maximum speed at which a turbine powered aircraft should be flown within an Airport Traffic Area which is not in a Terminal Control Area?

1- 156 knots.
2- 200 knots.
3- 230 knots.
4- 288 knots.

62. When flying beneath the lateral limits of a Terminal Control Area, the maximum speed authorized is

1- 250 knots.
2- 200 knots.
3- 180 knots.
4- 156 knots.

63. Match the following maximum permissible airspeeds for reciprocating engine aircraft to the airspace in which the speeds apply.

(A) Airport Traffic Areas (located outside TCAs).
(B) Airport Traffic Areas (located inside TCAs).
(C) Beneath the lateral limits of TCAs.
(D) Below 10,000 feet MSL.

a. 156 knots.
b. 180 knots.
c. 200 knots.
d. 250 knots.

The correct matching is

1- A-a; B-d; C-c; D-d.
2- A-a; B-a; C-c; D-d.
3- A-b; B-c; C-d; D-c.
4- A-b; B-a; C-d; D-c.

64. Suppose an airplane is being flown before sunrise and official sunrise is 0730. When are the airplane position lights required to be lighted?

1- The position lights must remain lighted until 0730.
2- The position lights must remain lighted until 0630.
3- The position lights need not be lighted after 0700.
4- The position lights must remain lighted until 0800.

65. Position lights are required to be displayed on all aircraft in flight from

1- 30 minutes before sunset to 30 minutes after sunrise.
2- 1 hour before sunset to 1 hour after sunrise.
3- 1 hour before sunset to 1 hour after sunrise, and any time the flight visibility is less than 1 mile.
4- sunset to sunrise.

66. An alternating red and green light signal from the control tower to an aircraft in flight is an indication that the pilot should

1- depart the traffic pattern and await further instructions.
2- give way to other aircraft and continue circling.
3- execute a missed approach.
4- exercise extreme caution.

67. With respect to aircraft on the surface, what does a flashing green light signal from the control tower mean?

1- Taxi clear of runway in use.
2- Exercise extreme caution.
3- Cleared to taxi.
4- Cleared for takeoff.

68. The minimum altitude at which an airplane may be operated over a structure which is located in a sparsely populated area, is

1- 500 feet above the structure.
2- 1,000 feet above the structure.
3- 500 feet above the ground.
4- 1,000 feet above the ground.

69. During cruising flight at certain high altitudes, the "flight level" is determined by setting the altimeter to

1- 28.82" Hg.
2- 30.00" Hg.
3- 29.92" Hg.
4- the reported altimeter setting of the nearest station.

70. As defined by Federal Aviation Regulations, heights for cruising flight are referred to as "flight levels," starting upward from

1- 29,000 feet MSL.
2- 29,000 feet AGL.
3- 18,000 feet MSL.
4- 18,000 feet AGL.

71. When descending from very high cruising "flight levels," such as FL 250, at what altitude is it first required that the barometric scale be changed from 29.92" Hg to the reported altimeter setting?

1- 14,500 feet MSL.
2- 10,000 feet MSL.
3- 18,000 feet MSL.
4- 17,000 feet MSL.

72. Unless otherwise authorized, two-way radio communication with Air Traffic Control is required at all times when operating within which of the following designated airspace?

1- Control Areas.
2- Airport Traffic Areas.
3- Airport Advisory Areas.
4- Control Zones.

73. Select the true statement pertaining to Airport Traffic Areas.

1- Airport Traffic Areas are depicted on Sectional Aeronautical Charts by a broken line circle.

2- These areas should be avoided unless landing or taking off from airports within the areas, or unless otherwise authorized by Air Traffic Control.

3- When passing over these areas, aircraft are required to be at least 4,000 feet above the surface.

4- To operate within these areas, the pilot must possess at least a Private Pilot Certificate.

74. Suppose an airport without a control tower lies within the Airport Traffic Area of an airport that has an operating tower. According to regulations, ATC authorization is required to land at

1- either airport, as well as to fly through the area.

2- either airport, but not required to fly through the area.

3- the tower-controlled airport only, as well as to fly through the area.

4- the tower-controlled airport only, but not required to fly through the area.

75. Concerning operations within an Airport Traffic Area, when is ATC authorization required?

1- When landing at any airport within that area, but not when flying through that area.

2- When landing at the tower-controlled airport only, but not when flying through that area.

3- When landing only at the tower-controlled airport, and when flying through that area.

4- When landing at any airport within that area, as well as when flying through that area.

76. With regard to operating an airplane within a Group I Terminal Control Area, which of the following statements is true?

1- The airplane must be equipped with an operable VOR receiver, two-way communications radio, and a radar beacon transponder.

2- The pilot in command must hold an instrument pilot rating, and be prepared to be vectored through clouds when necessary.

3- The pilot in command must hold at least a Commercial Pilot Certificate.

4- All of the above requirements must be met.

77. Which statement is true regarding VFR operations in "Terminal Control Areas (TCAs)?"

1- Solo student pilots are not authorized to take off or land at airports that are located within Group I TCAs.

2- When operating within Group II TCAs, VOR receivers are not required.

3- Flight under Visual Flight Rules is not permitted within Group I TCAs.

4- Flight plans are required to be filed prior to operating within Group II TCAs.

78. Unless otherwise authorized, an airplane that is being operated within a Group I Terminal Control Area is required to be equipped with an operable

1- 4096 radar beacon transponder with automatic altitude reporting capability.

2- radar beacon transponder with 64-code capability.

3- ILS receiver and marker beacon receiver.

4- ADF receiver and VOR receiver.

79. Unless otherwise authorized, an airplane operated under VFR within a Group II Terminal Control Area is required to be equipped with an operable

1- DME receiver and at least a 64-code transponder.

2- ILS receiver and a 4096 transponder with Mode C capability.

3- VOR or TACAN receiver and a 4096 transponder.

4- TACAN receiver and a 64-code transponder.

80. For an airplane that has no radar beacon transponder to be operated within a Group III Terminal Control Area, it is required that

1- prior to entry, the pilot inform ATC of the airplane's position, altitude, and proposed flightpath.

2- the airplane be operating on an IFR flight plan.

3- the Group III Terminal Control Area have a Radar Approach Control.

4- the airplane be equipped with Distance Measuring Equipment.

81. When considering Terminal Control Areas (TCAs), pilots should know that

1- takeoffs and landings within Group I TCAs are not authorized unless the pilot holds at least a Private Pilot Certificate.

2- VFR operations are not authorized within Group I TCAs.

3- all pilots operating within TCAs are required to file a flight plan.

4- operable transponders are required when operating within all TCAs.

82. In which type of airspace are flights under VFR prohibited at all times?

1- Positive Control Area.
2- Terminal Control Area.
3- Continental Control Area.
4- Control Zone.

83. Which one of the following designated airspaces requires that two-way radio communications be maintained with ATC, only when the weather is less than VFR minimums?

1- Terminal Control Area.
2- Airport Advisory Area.
3- Airport Traffic Area.
4- Control Zone.

84. When operating an airplane under basic VFR in uncontrolled airspace at an altitude of less than 1,200 feet above the surface, the flight visibility should be at least

1- 1 statute mile.
2- 2 statute miles.
3- 3 statute miles.
4- 5 statute miles.

85. With regard to visibility and airspeed limitations when operating under basic VFR more than 1,200 feet above the surface and at or above 10,000 feet MSL, the flight visibility must be at least

1- 3 miles, and the indicated airspeed may be greater than 250 knots.

2- 5 miles, and the indicated airspeed must be less than 250 knots.

3- 3 miles, and the indicated airspeed must be less than 250 knots.

4- 5 miles, and the indicated airspeed may be greater than 250 knots.

86. To depart under basic VFR weather minimums from an airport that is located within a Control Zone, the weather at that airport must be

1- a ceiling of 1,000 feet or more, and a visibility of at least 3 miles.

2- a visibility of at least 1 mile, regardless of the ceiling.

3- a ceiling that would permit flight at 500 feet below the clouds, and a visibility of 3 miles.

4- such that the pilot can remain clear of clouds and have 1 mile visibility, regardless of the ceiling.

87. To operate within Control Zones, the pilot is required to obtain a clearance from

1- no one, regardless of weather conditions, since such airspace has no control tower.

2- the FSS at all times prior to entering such airspace.

3- ATC prior to entering such airspace, only when the weather is less than basic VFR.

4- ATC prior to entering such airspace, regardless of the weather conditions.

88. When operating an airplane beneath the ceiling within a Control Zone under Special VFR, what minimum distance from clouds and what visibility are required?

1- Clear of clouds, and the ground visibility must be at least 2 miles.

2- Clear of clouds, and the flight visibility must be at least 1 mile.

3- 500 feet beneath clouds, and the flight and ground visibility must be at least 3-5 miles (marginal VFR).

4- 500 feet beneath clouds, and the ground visibility must be at least 1 mile.

89. To operate an airplane under Special VFR within a Control Zone at night, which of the following is required?

1- The Control Zone must have an approach control facility.

2- The ceiling within the Control Zone must be at least 500 feet.

3- The Control Zone must be specifically designated as a night Special VFR Control Zone.

4- The pilot must hold an instrument pilot rating and the airplane must be equipped for instrument flight.

90. When operating an airplane within a Control Zone at night under Special Visual Flight Rules, the pilot in command is required to hold at least

1- a Commercial Pilot Certificate.

2- an airplane instrument pilot rating.

3- a Student Pilot Certificate with a flight instructor endorsement for night flying.

4- a Second-Class Medical Certificate.

91. Which of the following is a requirement for operating an airplane between sunset and sunrise under Special VFR in a Control Zone?

1- The flight must be able to remain at least 500 feet below the clouds.

2- The pilot must hold at least a Commercial Pilot Certificate.

3- The flight visibility must be at least 3 miles.

4- The airplane must be equipped for IFR flight.

92. When operating under VFR at more than 3,000 feet AGL, cruising altitudes to be maintained are based upon the

1- true heading being flown.
2- magnetic heading being flown.
3- magnetic course being flown.
4- true course being flown.

93. The altitudes required to be maintained during VFR cruising flight are based on the

1- true course being flown, and they begin at 3,000 feet above mean sea level.

2- true course being flown, and they begin at more than 3,000 feet above the surface.

3- magnetic course being flown, and they begin at 3,000 feet above mean sea level.

4- magnetic course being flown, and they begin more than 3,000 feet above the surface.

94. When operating an airplane within a Control Zone under Special Visual Flight Rules, the flight visibility is required to be at least

1- 1 statute mile.
2- 2 statute miles.
3- 3 statute miles.
4- 5 statute miles.

95. Suppose the following factors exist when choosing VFR cruising altitudes where the ground elevation is 1,500 feet MSL.

	Leg I	Leg II
True Course	183°	185°
Wind Correction Angle	3° R	5° L
Variation	5° E	4° E
Deviation	+4°	+3°

Select the cruising altitudes that could be used on Leg I and Leg II to comply with regulations.

1- Leg I, 7,500 feet MSL; Leg II, 8,500 feet MSL.

2- Both Leg I and Leg II, 7,500 feet MSL.

3- Leg I, 8,500 feet MSL; Leg II, 7,500 feet MSL.

4- Both Leg I and Leg II, 8,500 feet MSL.

96. Suppose the following factors exist when choosing VFR cruising altitudes for a flight where ground elevation is 2,000 feet MSL.

	Leg I	Leg II
True Course	193°	183°
Wind Correction Angle	5° R	3° L
Magnetic Variation	4° E	5° E
Magnetic Deviation	+3°	+4°

Select the cruising altitudes that would comply with regulations on Leg I and Leg II.

1- 6,500 feet MSL on both legs.

2- 7,500 feet MSL on both legs.

3- 6,500 feet MSL on Leg I; 7,500 feet MSL on Leg II.

4- 7,500 feet MSL on Leg I; 6,500 feet MSL on Leg II.

97. An ATC transponder installed in an airplane must be tested, inspected, and found to comply with regulations before it can be used for operations under Part 91 on

1- VFR or IFR flights, but only below 12,500 feet MSL.

2- VFR flights only, within Terminal Control Areas.

3- IFR flights only, within controlled airspace.

4- VFR or IFR flights in all airspace.

98. An ATC transponder installed in an airplane is not permitted to be used in the U.S.A. unless it has been tested, inspected, and found to comply with regulations within the preceding

1- 24 calendar months.
2- 12 calendar months.
3- 10 days preceding the flight.
4- 10 hours' time in service.

99. If an ATC transponder installed in an airplane has not been tested, inspected, and found to comply with regulations within a specified period, what is the limitation on its use?

1- Its use is permitted anywhere except in Terminal Control Areas.

2- Its use is permitted when outside controlled airspace.

3- Its use is permitted for VFR flight but not for IFR.

4- Its use is not permitted at all.

100. Unless the airplane's 100-hour or annual inspections are repeated or superseded by other inspections, the records of those inspections must be retained by the owner or operator for what period of time?

1- The airplane's lifespan.
2- 2 years.
3- 1 year.
4- 6 months.

101. Airworthiness Directives (ADs) issued for a given airplane, engine, or propeller are considered to be

1- Advisories to Airmen.
2- Advisory Circulars.
3- Service Bulletins.
4- Federal Aviation Regulations.

102. Which statement is true pertaining to Airworthiness Directives (ADs) for a specific airplane?

1- There is no requirement to record compliance with ADs.

2- If the provisions of an AD have not been complied with, the airplane is not considered to be airworthy.

3- Maintenance personnel are personally responsible to see that all ADs are complied with.

4- ADs are nonregulatory in nature.

103. Who is primarily responsible for seeing that an aircraft Airworthiness Directive is complied with?

1- The pilot in command of that aircraft.

2- The maintenance personnel responsible for inspections.

3- The FAA District Office.

4- The owner or operator of that aircraft.

104. When is an airplane required to be test flown prior to being returned to service and prior to carrying passengers?

1- At the completion of each 100-hour or annual inspection of the airplane.

2- When the engine has been overhauled or replaced.

3- When a repair or alteration has changed the airplane's flight or operating characteristics.

4- When additional equipment has been installed in the airplane.

105. Which of the following is true concerning the required maintenance inspections?

1- It is not permissible to substitute one inspection for another.

2- An annual inspection is required even if a progressive inspection system has been approved.

3- An annual inspection may be sutsituted for a 100-hour inspection.

4- A 100-hour inspection may be substituted for an annual inspection.

106. If an alteration or repair substantially affects an airplane's operation in flight, that airplane must be test flown and approved for return to service by an appropriately-rated pilot prior to being operated

1- away from the vicinity of the airport.

2- by a private pilot.

3- for compensation or hire.

4- with passengers aboard.

107. An aircraft maintenance record is required to contain certain information. What information is required to be kept for an indefinite period of time?

1- The signature of the person approving the aircraft for return to service.

2- Completion date of work performed.

3- Description of work performed.

4- Total airframe time-in-service.

108. Whan an aircraft is being sold, what maintenance record information is required to accompany that aircraft?

1- A record of all preventive maintenance performed.

2- The completion dates of all maintenance performed on the aircraft.

3- The current status of all applicable Airworthiness Directives.

4- A description of all work performed on the aircraft.

109. Suppose the maintenance records of the aircraft show that an annual inspection was completed on July 3, 1976. The next 100-hour inspection will be due no later than

1- June 30, 1977.

2- July 31, 1977.

3- The next 100 hours in service.

4- 12 calendar months from the date shown on the Airworthiness Certificate.

110. Which of the following operations is governed by FAR, Part 135?

1- Nonstop sightseeing flights that begin and end at the same airport and do not exceed a 25-mile radius.

2- Operations that carry persons in air commerce for compensation or hire in small aircraft.

3- Student instruction, ferry flights, and aerial work operations such as chemical applications and pipeline patrol.

4- Air carrier operations and emergency mail service conducted under the Federal Aviation Act of 1958.

111. Part 135, Air Taxi and Commercial Operators of Small Aircraft, prescribes rules governing

1- student instruction flights.

2- sightseeing flights within a 25-mile radius of the airport.

3- aerial photography or survey operations.

4- the transportation of mail conducted under a "star route" contract.

112. When operating an airplane which has a certificated takeoff gross weight of less than 12,500 pounds, from one state to another while carrying passengers for hire, the operation is subject to the provisions of

1- FAR Part 91, General Operating and Flight Rules only.

2- FAR Part 121, Certification and Operations: Air Carrier and Commercial Operators of Large Aircraft.

3- FAR Part 123, Certification and Operations: Air Travel Clubs Using Large Aircraft.

4- FAR Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft.

113. The nearest field office of the National Transportation Safety Board should be notified immediately if which of the following occurs?

1- Engine failure.

2- An in-flight collision with another aircraft.

3- Ground damage to the propeller.

4- An in-flight generator/alternator failure.

114. Of the following incidents, which would require that the nearest field office of the National Transportation Safety Board be notified immediately?

1- Damage to a landing gear.

2- A near midair collision.

3- An in-flight generator/alternator failure.

4- Flight control system malfunction or failure.

115. The nearest field office of the National Transportation Safety Board should be notified immediately if which of the following incidents occurs?

1- When evasive action is taken to avoid a midair collision.

2- When an overdue aircraft is thought to have been involved in an accident.

3- When damage to the landing gear or wheels occurs.

4- When damage limited to the wingtips occurs.

116. Certain aircraft incidents are required to be reported immediately to the nearest field office of the National Transportation Safety Board. Of the following incidents, which would require this immediate notification?

1- Damage to a landing gear.
2- A near midair collision.
3- An in-flight generator failure.
4- An in-flight fire.

117. To comply with the National Transportation Safety Board regulation, Part 830, which of the following circumstances would require that the NTSB field office be notified immediately?

1- Any damage to the landing gear resulting from a hard landing.

2- Any violent evasive action necessary to avoid a midair collision.

3- The inability of any required flight crewmembers to perform their normal flight duties because of in-flight illness.

4- Generator failure in flight because of damaged engine accessories.

118. One could find nonregulatory material of aviation interest pertaining to the subject "Airports" under FAA Advisory Circular subject number

1- 150.
2- 90.
3- 70.
4- 20.

119. FAA Advisory Circulars containing subject matter specifically related to "Air Traffic Control and General Operations" are issued under which subject number?

1- 20.
2- 60.
3- 70.
4- 90.

120. FAA Advisory Circulars containing matter covering the subject of "Airspace" are issued under which subject number?

1- 90.
2- 70.
3- 60.
4- 20.

121. FAA Advisory Circulars containing matter covering the subject "Airmen" are issued under which subject number?

1- 20.
2- 60.
3- 70.
4- 90.

122. One could find nonregulatory material of aviation interest pertaining to the subject "Aircraft" under FAA ADvisory Circular subject number

1- 20.
2- 60.
3- 70.
4- 90.

123. FAA Advisory Circulars (some free, others at cost) are available to all pilots and are obtained only by

1- subscribing to the Federal Register.

2- subscribing to Federal Aviation Regulations.

3- ordering those desired as well as future issues.

4- distribution from the nearest FAA District Office.

124. Which statement is true concerning the operation of DME?

1- DME coded identification is transmitted once for each four times the VOR coded identification of a VORTAC is transmitted.

2- Aircraft must have TACAN equipment to obtain distance information from a VORTAC.

3- DME operates on frequencies in the VHF spectrum.

4- Distance information received from DME is the actual horizontal distance from the station.

125. Which statement is true concerning the distance information provided by DME?

1- Distance information is the actual horizontal distance in statute miles.

2- Distance information is the slant range distance in nautical miles.

3- Distance information is the actual horizontal distance and may be in statute or nautical miles, depending on the airborne equipment.

4- Distance information is obtained automatically when a VOR receiver is tuned to a VORTAC.

126. With regard to the operational status of a VORTAC, if a coded identification is received only once every 37 1/2 seconds, it indicates that

1- the DME component only is operative; the VOR component is inoperative.

2- the VOR component only is operative; the DME component is inoperative.

3- neither the VOR component nor the DME component is operating normally.

4- the facility uses voice identification and both VOR and DME components are operating normally.

127. To identify a military airport at night the rotating beacon alternately flashes what colors?

1- Yellow and white, with two quick white flashes between the yellow flashes.

2- Red and white, with two quick red flashes between the white flashes.

3- White and green, with two quick green flashes between the white flashes.

4- Green and white, with two quick white flashes between the green flashes.

128. Which of the following color combinations of a rotating beacon light would identify a military airfield?

1- One white flash and then two quick red flashes.

2- Two quick white flashes and then one green flash.

3- One white flash and then two green flashes.

4- One white flash and then one green flash.

129. When landing at night on a runway which has in-runway lighting installed, if a series of red lights is seen in the centerline lighting, it indicates that

1- there are no taxiway turnoffs until the end of the runway is reached.

2- one-half of the runway remains.

3- 1,000 feet of runway remain.

4- 3,000 feet of runway remain.

130. When landing at night on a runway which has in-runway lighting installed, if a series of alternating red and white lights are seen in the centerline lighting, it indicates that

1- there are no taxiway turnoffs until the end of the runway is reached.

2- one-half of the runway remains.

3- 1,000 feet of runway remain.

4- 3,000 feet of runway remain.

131. What does a series of arrows painted on the approach end of a runway signify?

1- That portion of the runway is not suitable for landing.

2- That runway is a precision instrument approach runway.

3- Landings and takeoffs on that runway must be made in the direction of the arrows.

4- That portion of the runway is the designated touchdown zone.

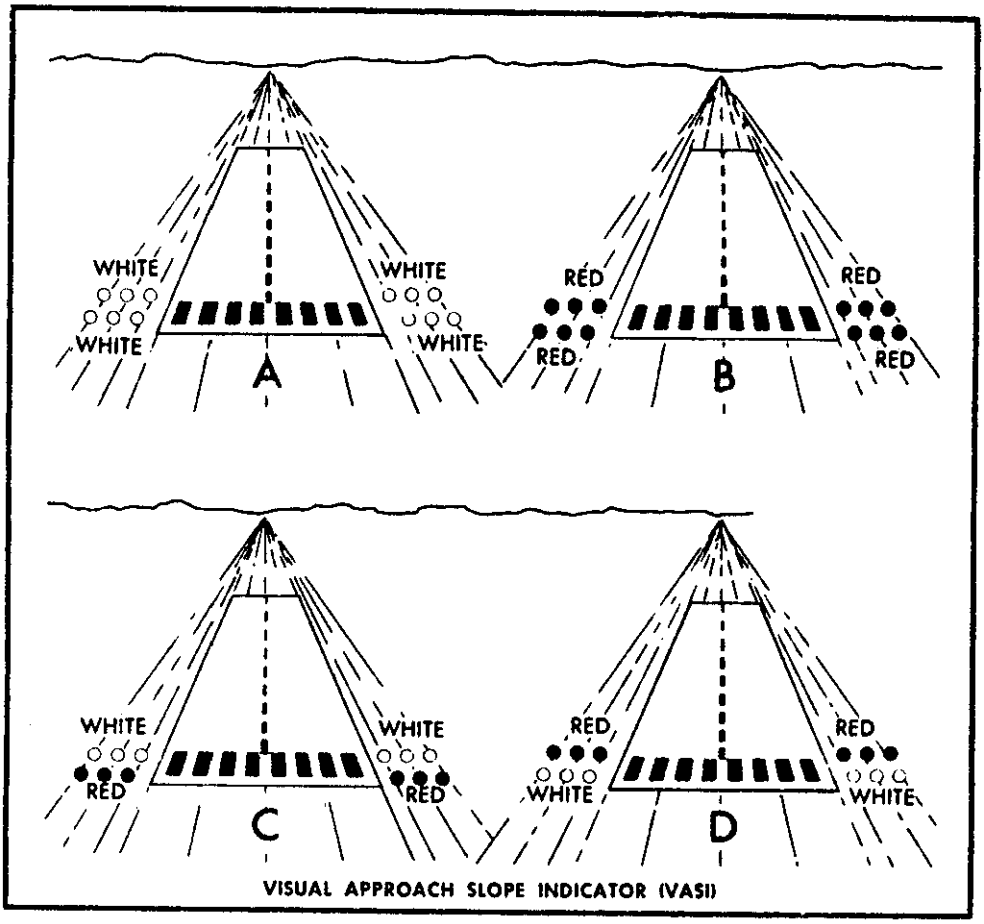
132. A closed runway is identified by which of the following?

1- An "X" is painted on each end of the runway.

2- Yellow chevrons are painted on the runway beyond the threshold.

3- Red lights are placed at the approach end of the runway.

4- The letter "C" is painted after the runway number.



VISUAL APPROACH SLOPE INDICATOR (VASI)

155. Stage I service available under the Terminal Radar Program for VFR aircraft, provides

1- traffic information and limited vectoring to VFR aircraft on a workload-permitting basis.

2- traffic information and headings to fly to join the traffic pattern or to a position behind the preceding aircraft in the approach sequence.

3- traffic information and positive control of all aircraft within the Terminal Control Area (TCA).

4- separation between participating VFR aircraft and all IFR aircraft within the Terminal Radar Service Area (TRSA).

156. Stage III service available under the Terminal Radar Program for VFR aircraft, provides

1- traffic information and limited vectoring to VFR aircraft on a workload-permitting basis.

2- traffic information and headings to fly to join the traffic pattern or to a position behind the preceding aircraft in the approach sequence.

3- separation between participating VFR aircraft and all IFR aircraft within the Terminal Radar Service Area (TRSA).

4- traffic information and positive control of all aircraft within the Terminal Control Area (TCA).

157. Select the true statement regarding VFR flight plans.

1- Control towers automatically forward VFR flight plan departure times to Flight Service Stations.

2- Search and rescue procedures are initiated if a VFR flight plan has not been revised or canceled after 1 hour past ETA.

3- Position reports are mandatory when operating on a filed VFR flight plan.

4- Control towers do not automatically close VFR flight plans.

158. Which of the following is a common symptom of hyperventilation?

1- Decreased breathing rate.

2- Increased vision keenness.

3- An increased sense of well-being.

4- Tingling of the hands, legs, and feet.

159. Which of the following is a common symptom of hyperventilation?

1- Slowed heart beat.
2- Euphoria - sense of well-being.
3- Decreased breathing rate.
4- Dizziness.

160. Which of the following would most likely result in hyperventilation?

1- Excessive carbon dioxide.
2- Insufficient oxygen.
3- Excessive carbon monoxide.
4- Insufficient carbon dioxide.

161. Which of the following would most likely result in hyperventilation?

1- An extreme case of relaxation or sense of well-being.

2- An extremely slow rate of breathing and insufficient oxygen.

3- The excessive consumption of alcohol.

4- Emotional tension, anxiety, or fear.

162. Which of the following statements is true relating to hypoxia?

1- Hypoxia has no effect on night vision below an altitude of 10,000 feet.

2- Nonsmokers experience symptoms of hypoxia at lower levels than heavy smokers.

3- It is possible to predict when and at what flight level hypoxia will occur and how it will manifest itself.

4- The human body has no built-in alarm system to serve as a warning of the onset of hypoxia.

163. Which statement is true regarding carbon monoxide poisoning?

1- A major early symptom of carbon monoxide poisoning is a sense of well-being.

2- Several days may be required to fully recover from carbon monoxide poisoning.

3- The human body has no built-in alarm system to alert one that carbon monoxide poisoning is occurring.

4- Minute quantities of carbon monoxide poisoning are considered harmless.

164. Which statement is true regarding the presence of alcohol within the human body?

1- The human body metabolizes alcohol at a faster rate if buffered with coffee.

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

3- An increase in altitude decreases the adverse effect of alcohol.

4- A small amount of alcohol increases the keenness of vision.

165. In which Part of the Airman's Information Manual would one expect to find information pertaining to "Operational Data and Special Notices?"

1- Part 4.
2- Part 3.
3- Part 2.
4- Part 1.

166. In which Part of the Airman's Information Manual is the list of Flight Service Stations and National Weather Service telephone numbers found?

1- Part 1.
2- Part 2.
3- Part 3.
4- Part 4.

167. To determine locator identifiers for all airports in the U.S.A. having a significant amount of activity, the pilot should refer to which Part of the Airman's Information Manual?

1- Part 4.
2- Part 3.
3- Part 2.
4- Part 1.

168. To determine the location of reported parachute jumping sites, one should refer to

1- National Transportation Safety Board regulation, Part 830.

2- Federal Aviation Regulations, Part 91.

3- Federal Aviation Regulations, Part 105.

4- Airman's Information Manual, Part 4.

169. In which Part of the Airman's Information Manual would one expect to find information pertaining to "Graphic Notices and Supplemental Data?"

1- Part 1.
2- Part 2.
3- Part 3.
4- Part 4.

170. Which Part of the Airman's Information Manual contains graphic information regarding VFR operating procedures within specific Terminal Areas?

1- Part 1.
2- Part 2.
3- Parts 3 and 3A.
4- Part 4.

171. The latest issue of which publication contains the most current information on communication and NAVAID frequencies of specific radio facilities?

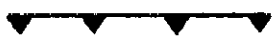
1- The appropriate Terminal Area Chart.

2- The appropriate Low Altitude Enroute Chart.

3- The appropriate Sectional Aeronautical Chart.

4- The appropriate World Aeronautical Chart.

172. Which of the following symbols on a surface weather map represents a stationary front?

1- 

2- 

3-

4- 

173. By referring to isobars on a surface weather map, what can a person determine?

1- Pressure gradient.
2- Temperature changes.
3- Areas of magnetic variation.
4- Areas of precipitation.

174. On a weather depiction chart what weather conditions would be outlined by a scalloped line?

1- Ceiling between 5,000 and 7,000 feet and/or visibility between 5 and 7 miles.

2- Ceiling greater than 3,000 feet and/or visibility greater than 5 miles.

3- Ceiling between 1,000 and 3,000 feet and/or visibility between 3 and 5 miles.

4- Ceiling less than 1,000 feet and/or visibility less than 3 miles.

175. What does this symbol mean on a surface weather map?

1- Cold front aloft.
2- Squall line.
3- Occluded front.
4- High pressure ridge.

176. What is the maximum visibility that will be shown on a weather depiction chart?

1- 7 miles.
2- 6 miles.
3- 5 miles.
4- 3 miles.

177. On a weather depiction chart, what does this information mean?

1- Sky overcast, ceiling 400 feet with top at 1,000 feet, visibility 5 miles, snow.

2- Sky overcast, ceiling variable from 400 feet to 1,000 feet, visibility 5 miles, dust.

3- Sky obscured, ceiling 500 feet, visibility 1/4 mile, snow.

4- Sky broken clouds, ceiling variable from 400 feet to 1,000 feet, snow, wind 5 knots.

178. On a weather depiction chart, what does this information mean?

1- Visibility unlimited, sky overcast, base of clouds variable 100 to 200 feet, wind calm.

2- Visibility less than 1 mile, blowing dust, sky broken clouds.

3- Visibility 1 to 2 miles, blowing sand, sky overcast.

4- Visibility 1/2 mile, snow, sky partially obscured.

179. On a weather depiction chart, areas enclosed by a smooth solid line contain weather conditions that are classified as

1- DVFR.
2- IFR.
3- VFR?
4- MVFR.

180. On a weather depiction chart, areas enclosed by a scalloped line contain weather conditions that are classified as

1- LIFR.
2- IFR.
3- VFR.
4- MVFR.

181. Surface and significant weather prognostic charts are used to assist the pilot in

1- determining the areas where ceilings are less than 1,000 feet and visibilities are less than 3 miles.

2- determining the position of fronts and pressure systems during the preceding 6 hours.

3- estimating the movement, development, and decay of weather patterns which might occur within the following 12 and 24-hour periods.

4- estimating the direction and speed of surface winds and the winds aloft for the following 6 hours.

182. A low level significant weather prognostic chart provides which of the following?

1- An analysis of weather conditions as observed by weather radar.

2- An interpretation of conditions existing in specific areas based on pilot reports.

3- A representation of weather conditions existing at the time of the observation.

4- The weather forecast to exist within a specific time in the future.

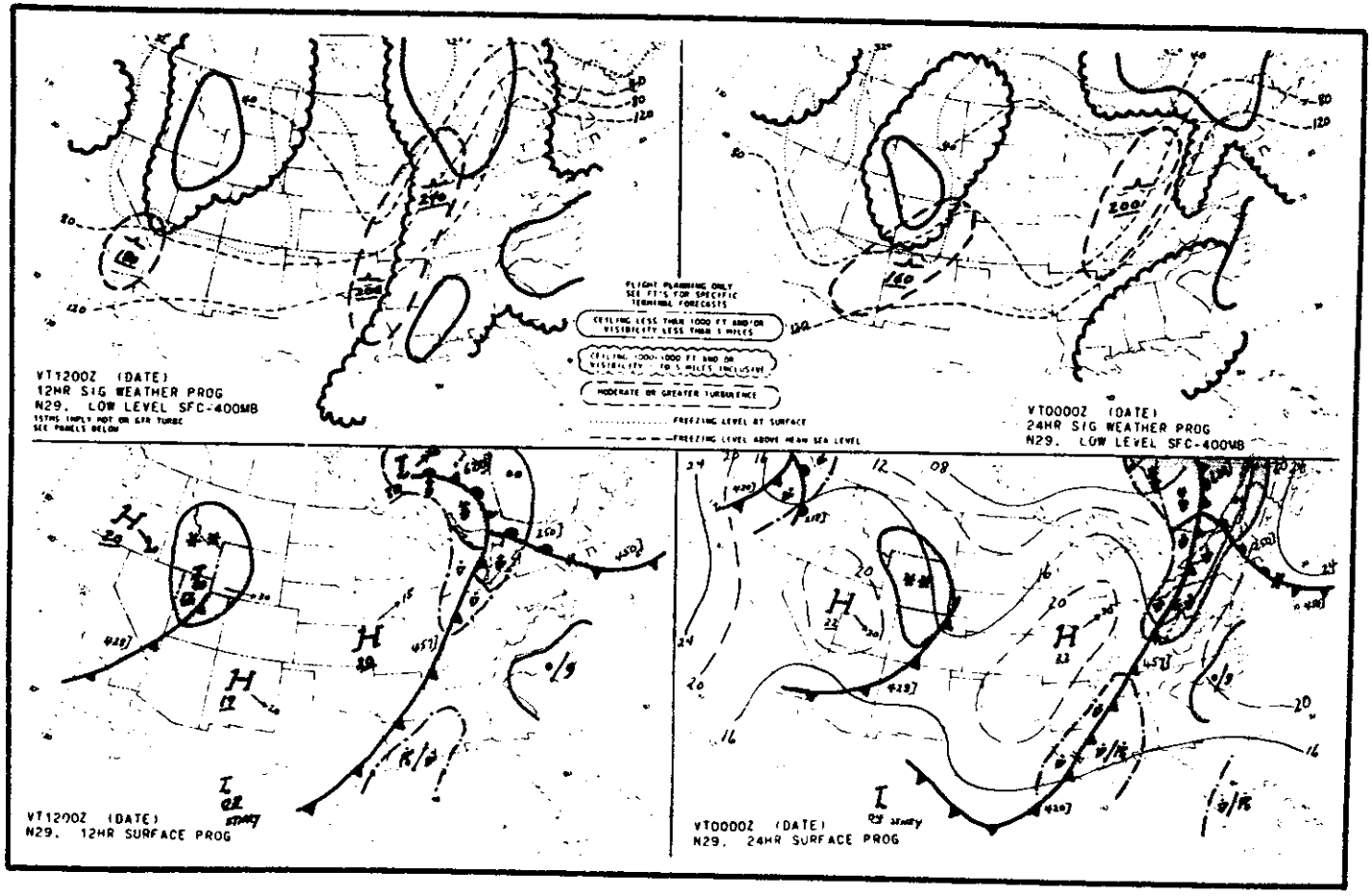
183. The source of information for determining the probability of turbulence aloft is the

1- Significant Weather Prognostic Charts.

2- Aviation Weather Reports.

3- Terminal Forecasts.

4- Area Forecasts.


VT1200Z (DATE)
12HR SIG WEATHER PROG
N29. LOW LEVEL SFC-400MB
VT0000Z (DATE)
24HR SIG WEATHER PROG
N29. LOW LEVEL SFC-400MB
VT1200Z (DATE)
N29. 12HR SURFACE PROG
VT0000Z (DATE)
N29. 24HR SURFACE PROG

133. Assume that an approach is being made to a runway equipped with a Visual Approach Slope Indicator. The designated touchdown zone would be undershot if, throughout the approach, the pilot continued to observe the VASI lights as depicted in which illustration on page 42?

1- A.
2- B.
3- C.
4- D.

134. Assume that a Standard FAA 2-bar VASI is in operation at the airport and the airplane is above the glide slope during the approach. Which illustration (page 42) would most likely depict this situation?

1- Illustration A.
2- Illustration B.
3- Illustration C.
4- Illustration D.

135. Assume that a Standard FAA 2-bar VASI is in operation at an airport and the airplane is on the glide slope during the approach. Which illustration (page 42) would most likely depict this situation?

1- Illustration A.
2- Illustration B.
3- Illustration C.
4- Illustration D.

136. Which color combination of lights on page 42, could not be observed while on final approach to a runway equipped with a Standard 2-bar VASI?

1- A.
2- B.
3- C.
4- D.

137. The designated touchdown zone would be undershot if, throughout the final approach, the pilot continued to observe the VASI lights as depicted in which illustration on page 42?

1- D.
2- C.
3- B.
4- A.

138. Assume that an approach is being made to a runway equipped with a Visual Approach Slope Indicator. The designated touchdown zone would be overshot if, throughout the approach, the pilot continued to observe the VASI lights as depicted in which illustration on page 42?

1- A.
2- B.
3- C.
4- D.

139. If the color combinations shown in illustration A on page 42 were observed during an approach to a runway equipped with a 2-bar VASI, what action should be taken by the pilot?

1- Climb to intercept the glide slope.
2- Momentarily level off to intercept the glide slope.
3- Decrease the rate of descent.
4- Increase the rate of descent.

140. The purpose of designating certain airspace as "Transition Areas" is to

1- enable ATC to control all flights within a given area.
2- separate a Control Zone from control areas.
3- extend the lateral limits of the Control Zone.
4- ensure that IFR flights can remain within controlled airspace for specific operations.

141. The altitude of 14,500 feet MSL is considered to be which of the following?

1- The upper limit of Terminal Control Areas.
2- The upper limit of the Continental Control Area.
3- The upper limit of uncontrolled airspace.
4- The base of the Positive Control Area.

142. The altitude of 14,500 feet MSL is considered to be which of the following?

1- The upper limit of Terminal Control Areas.
2- The level at which Mode C transponders are required.
3- The base of the Continental Control Area.
4- The base of the Positive Control Area.

143. A Transition Area that is designated in conjunction with an airport for which an instrument approach procedure has been prescribed, has a floor located at

1- 3,000 feet AGL.
2- 1,200 feet AGL.
3- 700 feet AGL.
4- the surface.

144. VFR flights are permitted within which of the following airspace without special authorization?

1- Positive Control Areas.
2- Restricted Areas.
3- Airport Advisory Areas.
4- Airport Traffic Areas.

145. Which of the following require the pilot to obtain special authorization prior to conducting flights within the airspace during both VFR and IFR weather conditions?

1- Military Operations Areas (MOA).
2- Airport Advisory Areas.
3- Airport Traffic Areas.
4- Control Zones.

146. As standard operating practice, all inbound traffic to an airport without a control tower should continuously monitor the appropriate facility from a distance of

1- 30 miles out.
2- 25 miles out.
3- 20 miles out.
4- 15 miles out.

147. Within the conterminous United States, the floor of the Positive Control Area is located at

1- 24,000 feet MSL.
2- 18,000 feet MSL.
3- 14,500 feet MSL.
4- 10,000 feet MSL.

148. The altitude of 18,000 feet MSL is considered to be which of the following?

1- The upper limit of Terminal Control Areas.
2- The base of the Continental Control Area.
3- The upper limit of Control Zones.
4- The base of the Positive Control Area.

149. Which of the following require the pilot to obtain special authorization prior to conducting VFR flights within the airspace?

1- Intensive Student Jet Training Areas (ISJTA).
2- Restricted Areas.
3- Military Operations Areas (MOA).
4- Warning areas.

150. Which of the following require the pilot to obtain special authorization prior to conducting VFR flights within the airspace?

1- Restricted Areas.
2- Military Operations Areas.
3- Alert Areas.
4- All of the above areas.

151. Military Operations Areas (MOA) consist of airspace of defined vertical and lateral limits and are established for the purpose of

1- separating certain military training activities from IFR traffic.
2- military services conducting VFR low altitude navigation and tactical training, as well as flight testing.
3- denoting the existence of unusual hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles.
4- providing separation of VFR and IFR civil aircraft from military aircraft.

152. Information explaining the Basic Flight Manual and ATC Procedures required to fly in the U.S. National Airspace System is contained in which part of the Airman's Information Manual?

1- Part 1.
2- Part 2.
3- Parts 3 and 3A.
4- Part 4.

153. In which part of the Airman's Information Manual would one expect to find information pertaining to Basic Flight Manual and ATC Procedures?

1- Part 1.
2- Part 2.
3- Part 3.
4- Part 4.

154. Radar-equipped FAA Air Traffic Control facilities provide radar assistance to

1- only those aircraft which are IFR equipped and flown by an instrument rated pilot.
2- only those aircraft that can be identified by radar and have the equipment for communicating with the radar facility.
3- only those aircraft equipped with at least 4096 code capability transponder.
4- all aircraft within a 50-nautical mile radius of the radar site.

184. On the basis of the surface and significant weather prognostic chart (VT 1200Z) on page 48, which of the following accurately describes the forecast weather in northern Utah and southern Idaho?

1- The cloud base is expected to be 1,200 feet AGL with intermittent snow, and the freezing level is at 4,000 feet MSL.

2- The ceiling is expected to be less than 1,000 feet AGL or visibility less than 3 miles with continuous snow, and the freezing level will be at the surface.

3- The ceiling is expected to be 1,000 to 3,000 feet AGL or visibility 3 to 5 miles, and the freezing level will be at 4,000 feet MSL.

4- The cloud base is expected to be 1,200 feet AGL and the visibility is 3 to 5 miles in occasional snow flurries.

185. According to the significant weather prognostic chart (VT 1200Z) on page 48, which of the following conditions can be expected between the surface and 24,000 feet in southern California?

1- Severe turbulence at all levels up to 18,000 feet and a layer of broken clouds between 1,000 feet and 3,000 feet.

2- Moderate or greater turbulence from the surface to 18,000 feet and no clouds less than 3,000 feet.

3- Severe turbulence below 18,000 feet and no clouds less than 3,000 feet.

4- Moderate turbulence above 18,000 feet and a ceiling between 1,000 and 3,000 feet.

186. On the significant weather prognostic charts on page 48, the cold front extending from Utah southwestward through California is expected to move into central Colorado, New Mexico, and Arizona in approximately

1- 48 hours.
2- 24 hours.
3- 12 hours.
4- 6 hours.

187. On the basis of the significant weather prognostic chart (VT 1200Z) on page 48, at what altitude is the freezing level expected to be in the state of Utah?

1- 18,000 feet MSL.
2- 8,000 feet MSL.
3- 4,000 feet MSL.
4- At the surface.

188. A pilot who wishes to determine the observed temperature-dewpoint spread at FL 180 should refer to which of the following?

1- Winds and temperatures aloft forecast for 18,000 feet.

2- Constant pressure analysis chart for 500 millibars.

3- Significant weather prognostic chart.

4- Stability charts for 18,000 feet.

189. From which of the following can the observed temperature, temperature-dewpoint spread, and winds be determined at specified flight levels?

1- Constant pressure charts.

2- Winds aloft forecasts.

3- Significant weather prognostic charts.

4- Stability charts.

190. When using a constant-pressure chart for planning a flight at 10,000 feet MSL, to which of the following should the pilot refer?

1- 200 mb chart.
2- 500 mb chart.
3- 700 mb chart.
4- 850 mb chart.

191. Suppose the winds aloft forecast for Jackson, Mississippi, appeared as follows:

JAN 9900 9900+19 9900+09 9900+01

Which statement is true concerning the forecast wind?

1- The wind direction is in reference to magnetic north.

2- The wind is expected to exceed 100 knots.

3- The wind is expected to be light and variable.

4- The wind is expected to be 99 knots from the north.

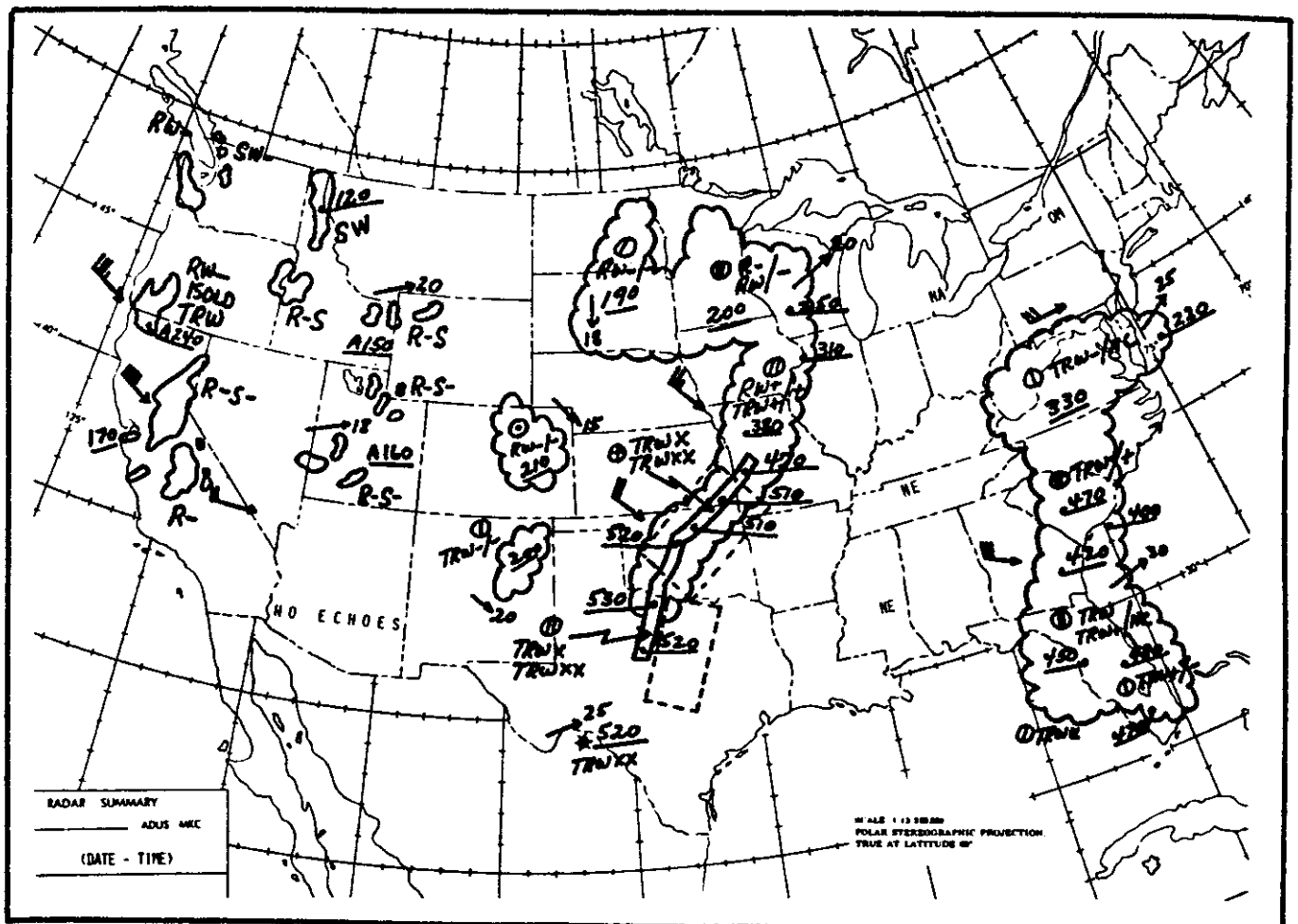
192. Which statement is true regarding Winds and Temperatures Aloft Forecasts?

1- The wind directions are given in true directions.

2- The windspeeds are given in miles per hour.

3- The temperatures are given in degrees Fahrenheit.

4- The temperatures showing neither + nor - should be considered + temperatures at all altitudes.


RADAR SUMMARY
ADUS MIC
(DATE - TIME)
NO ECHOES
POLAR STEREOGRAPHIC PROJECTION
TRUE AT LATITUDE 60°

193. Refer to the Radar Summary Chart on page 50. What is the reported maximum cloud tops at the Texas-Oklahoma border?

1- 53,000 feet.
2- 25,000 feet.
3- 15,200 feet.
4- 5,300 feet.

194. Refer to the Radar Summary Chart on page 50. What is the meaning of the solid boxed outline extending from northern Texas to central Missouri?

1- A line of echoes has been noted within that area.
2- Tops of the echoes are less than 15,300 feet at that location.
3- Light precipitation is occurring at that location.
4- Scattered echoes exist within that area.

195. Refer to the Radar Summary Chart on page 50. Which statement best describes the echoes reported in northeastern New Mexico?

1- Scattered cells are moving southeast at 20 knots.
2- Visibility in the heavy rain showers is less than 1 mile.
3- Echoes are increasing in intensity and maximum tops are less than 20,000 feet.
4- Bases of the cells are at 2,000 feet.

196. In Area Forecasts, cloud heights are given in reference to

1- sea level or ground level.
2- density altitude.
3- pressure altitude.
4- ground level only.

197. Which statement is true in regard to an Area Forecast?

1- An Area Forecast covers an 18-hour period with an additional 12-hour categorical outlook.
2- An Area Forecast is valid for 12 hours with a 6-hour categorical outlook.
3- Area Forecasts contain no information about icing or the freezing level.
4- Each Area Forecast contains a turbulence section.

198. Interpret the following radar weather report:

LIT 1133 AREA 4TRW+/+ 22/100 88/170 196/180 220/115 CELLS 2425 MT 310 AT 162/110

Which statement is true concerning the report?

1- The maximum top of the cells is located 162° and 110 NM from the station (LIT).
2- The visibility is 4 miles in thunderstorms and the intensity of thunderstorms remains unchanged.
3- The cells are moving in a direction of 162° at 10 knots.
4- There are four cells with tops at 10,000 feet, 17,000 feet, and 11,500 feet.

199. Interpret the following radar weather report:

HDO 1132 AREA 2TRW++ 6R-/NC 67/130 308/45 105W CELLS 2240 MT 380 AT 66/54

Which statement is true concerning the report?

1- The area of echoes contains two-tenths coverage of thunderstorms and very heavy rain showers.
2- The area of echoes is moving in a southwesterly direction.
3- The area of echoes is 105 miles west of the station.
4- The visibility is 2 miles in thunderstorms and 6 miles in light rain.

200. Interpret the following radar weather report:

JAN 1935 SPL LN 10TRWX/NC 86/40 164/60 199/115 12W CELLS 2430 MT 440 AT 159/65 D10

Which statement is true concerning the report?

1- The line of echoes is located east through south and is 12 NM wide.
2- The movement of the area of echoes is from the northwest.
3- The maximum top of the cells is 24,300 feet.
4- The cells are moving toward the southeast.

201. The probable freezing level and areas of icing conditions aloft can best be determined by referring to

1- Winds Aloft Forecasts.
2- Terminal Forecasts.
3- Area Forecasts.
4- Aviation Sequence Reports.

202. A visibility entry does not appear in a Terminal Forecast when the visibility is expected to

1- meet the minimum required for VFR operations.

2- be unlimited.

3- be more than 6 miles.

4- be less than the minimum for IFR operations.

203. Terminal Forecasts are issued how many times a day and cover what period of time?

1- Three times daily and are valid for 8 hours with an additional 4-hour categorical outlook.

2- Three times daily and are valid for 24 hours with an additional 6-hour categorical outlook.

3- Two times daily and are valid for 24 hours with an additional 4-hour categorical outlook.

4- Four times daily and are valid for 8 hours.

204. In regard to ceiling and/or visibility, what is the meaning of the term "MVFR" as used in the categorical outlook portion of Terminal and Area Forecasts?

1- A ceiling of 1,000 to 3,000 feet, and/or visibility of 3 to 5 miles.

2- A ceiling of less than 1,000 feet, and/or visibility less than 3 miles.

3- A ceiling of less than 1,000 feet, and/or visibility less than 1 mile.

4- A ceiling of 3,000 to 5,000 feet, and visibility of 5 to 7 miles.

205. Select the true statement pertaining to Terminal Forecasts.

1- Terminal Forecasts do not include surface wind forecasts.

2- A forecast of prevailing visibility appears only if it is expected to be 3 miles or less.

3- Terminal Forecasts include specific information concerning cloud tops, icing, and turbulence.

4- If the speed of the surface wind is forecast to be less than 10 knots, the entire wind group is omitted.

206. When conditionally unstable air with a high moisture content and a very warm surface temperature is forecast, one can expect what type of weather?

1- Continuous heavy precipitation.

2- Strong updrafts and cumulonimbus clouds.

3- Fog and low stratus clouds.

4- Smooth, cloudless skies.

207. Whether clouds will be predominantly stratiform or cumuliform is determined by the

1- degree of stability of the air being lifted.

2- percent of moisture content of the air.

3- source of lift.

4- temperature of the air being lifted.

208. The conditions necessary for the formation of stratus clouds are a cooling action and

1- stable, moist air.

2- unstable, moist air.

3- unstable air containing excess condensation nuclei.

4- stable or unstable air.

209. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

1- unstable air containing excess condensation nuclei.

2- unstable, moist air.

3- stable or unstable air.

4- stable, moist air.

210. When an airmass is stable, which of the following conditions is most likely to exist?

1- Dust, smoke, and haze at the higher levels with good visibility at the surface.

2- Moderate to severe turbulence in lower levels.

3- Towering cumulus and cumulonimbus clouds.

4- Smoke, dust, haze, etc., concentrated in lower levels with resulting poor visibility.

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UA /OV GAG-OKC 1600 FL060 /TP BE18 /SK 060 SCT-BKN /RM LRG TSTM 85W OKC 20 WIDE
UA /OV AMA 27045 1745 FL035 /TP C172 /SK 045 OVC /RM VSBY 7-10
UA /OV MKC 27045 1800 FL030 /TP C150 /RM CELLS FRMG FAST WITH FLAT TOPS
UA /OV DDC 31520 1430 FL030 /TP BE18 /RM LGT HAIL
UA /OV CNU 36050 0830 FL090 /TP AC60 /RM FEW BLDUPS TOPS 50-70
UA /OV HLC 36030 1430 FL085 /TP C411 /RM LRG E-W TSTM 40 E-W 25 N-S
UA /OV OKC-PNC 1030 FL060 /TP C150 /TB SVR TURBC SHORT DURN BTWN LYRS
```

211. Suppose the remarks section of the hourly aviation weather report contains the following coded information:

RADAT 87045

What is the meaning of this information?

1- Relative humidity was 87% and the freezing level (0° C.) was at 4,500 feet MSL.

2- Radar echoes with tops at 45,000 feet were observed on the 087 radial of the VORTAC.

3- A pilot reported thunderstorms 87 DME miles distant on the 045 radial of the VORTAC.

4- Radar echoes were observed at a distance of 87 miles on a bearing of 045°.

212. During preflight preparation, weather reports and forecasts which are not routinely available at the local service outlet (FSS or WSO), can best be obtained by means of the

1- Transcribed Weather Broadcasts (TWEB).

2- Air Route Traffic Control Center (ARTCC).

3- Request/Reply Service.

4- Pilot's Automatic Telephone Answering Service (PATWAS).

213. To best determine observed weather conditions between weather reporting stations, the pilot should refer to

1- Weather Maps.
2- Prognostic Charts.
3- Area Forecasts.
4- Pilot Reports.

214. According to the Pilot Reports above, where was the lowest ceiling reported?

1- 25 miles north and northwest of DDC.
2- Between GAG and OKC.
3- 45 miles west of AMA.
4- 50 miles north of CNU.

215. According to the Pilot Reports above, a pilot reported that

1- the tops of the clouds over CNU were located at 7,000 feet MSL.

2- light hail occurred 20 miles northwest of DDC.

3- clear weather prevailed 85 miles west of OKC.

4- the top of the overcast at AMA was located at 4,500 feet MSL.

216. The Pilot Reports above indicate that a pilot reported which of the following?

1- Severe turbulence 65 miles north of PNC.

2- Clear icing 25 miles west of MKC.

3- Light rain 20 miles northwest of DDC.

4- A large thunderstorm 85 miles west of OKC.

217. The Pilot Reports above indicate that a pilot reported which of the following?

1- Clear icing 25 miles west of MKC.

2- Severe turbulence between OKC and PNC.

3- Clear weather 85 miles west of OKC.

4- Light hail 20 miles south and southeast of DDC.

218. According to the Pilot Reports above, a pilot reported that

1- severe turbulence of short duration was encountered in a Cessna 150 between OKC and PNC.

2- several areas of turbulence were encountered 65 miles from OKC during climb to 15,000 feet.

3- the base of stratus clouds is at 5,000 feet at CNU.

4- the tops of cumulonimbus clouds are at 50,000 feet at CNU.

219. In an aviation weather report, which of the following symbols designate a ceiling when used in connection with a cloud height?

1- M, E, W.
2- -OVC.
3- -BKN.
4- -X.

220. Consider the following aviation weather report:

OKC -X M7 OVC 1 1/2 R+F 990/63/61/3205/980/RF2 RB12

Which of the following is true regarding OKC weather?

1- At the time of the report rain had been occurring for 48 minutes.
2- The visibility was 11 1/2 miles with rain and fog.
3- The visibility varied from 11 miles to 2 miles.
4- Rain started 12 minutes before the report was issued.

221. Consider the following aviation weather report:

OKC -X M7 OVC 1 1/2R+F 990/63/61/3205/980/RF2 RB12

What does the item RF2 mean?

1- Two-tenths of the sky is obscured by rain and fog.
2- The horizontal visibility is 2 miles with rain and fog.
3- The vertical visibility is 200 feet with rain and fog.
4- The runway visual range is 2,000 feet.

222. SIGMET advisories refer to weather phenomena that are potentially hazardous to

1- single-engine and light aircraft only.
2- all aircraft flying in the affected area.
3- small, general aviation type aircraft only.
4- large, air carrier type aircraft only.

223. Individual forecasts for specific routes of flight can be obtained from which of the following weather services?

1- In-Flight Advisories.
2- Area Forecasts.
3- Transcribed Weather Broadcasts (TWEB).
4- Terminal Forecasts.

224. Pilots should know that surface wind direction is given relative to

1- magnetic north in written weather reports and forecasts.
2- true north in scheduled weather broadcasts for all stations except the broadcasting station.
3- true north when received from FSS Airport Advisories or control tower instructions for takeoffs and landings.
4- magnetic north, regardless of the means used to disseminate wind information.

225. If a strong temperature inversion is encountered immediately after takeoff or during an approach to a landing, a potential hazard exists because of turbulence created by

1- strong convective currents.
2- cold air overriding calm, warm air.
3- wind shear.
4- strong surface winds.

226. Hail is most likely to be associated with

1- cumulonimbus clouds.
2- cumulus clouds.
3- cirrocumulus clouds.
4- stratocumulus clouds.

227. Suppose an airport has an elevation of 2,000 feet. Assuming standard lapse rates, if the temperature at this airport is 70° F. and the surface dewpoint temperature is 52° F., the base of the clouds formed by a lifting process would be located at approximately

1- 8,000 feet MSL.
2- 6,000 feet MSL.
3- 4,000 feet MSL.
4- 3,000 feet MSL.

228. Suppose an airport has a sea level elevation. Assuming standard lapse rates, if the temperature at this airport is 80° F. and the surface dewpoint temperature is 62° F., the base of the clouds formed by a lifting process would be located at approximately

1- 8,000 feet MSL.
2- 6,000 feet MSL.
3- 4,000 feet MSL.
4- 3,000 feet MSL.

229. Suppose an airport has an elevation of 4,000 feet. Assuming standard lapse rates, if the temperature at this airport is 60° F. and the surface dewpoint temperature is 42° F., the base of the clouds formed by a lifting process would be located at approximately

1- 8,000 feet MSL.
2- 6,000 feet MSL.
3- 4,000 feet MSL.
4- 5,000 feet MSL.

230. Suppose an airport has an elevation of 1,000 feet. Assuming standard lapse rates, if the temperature at this airport is 70° F. and the surface dewpoint temperature is 52° F., the base of the clouds formed by a lifting process would be located at approximately

1- 8,000 feet MSL.
2- 6,000 feet MSL.
3- 4,000 feet MSL.
4- 5,000 feet MSL.

231. Which statement is true regarding actual air temperature and dewpoint temperature spread?

1- The temperature spread decreases as the relative humidity decreases.
2- The temperature spread decreases as the relative humidity increases.
3- Temperature and dewpoint spread are not related to relative humidity.
4- The temperature spread increases as the relative humidity increases.

232. Which one of the following types of clouds would indicate areas of convective turbulence?

1- Altocumulus standing lenticular clouds.
2- Nimbostratus clouds.
3- Cirrus clouds.
4- Towering cumulus clouds.

233. A moist, cold airmass that is being warmed from below is characterized, in part, by

1- fog and drizzle.
2- showers and thunderstorms.
3- continuous heavy precipitation.
4- smooth air.

234. Radiation fog is most likely to occur with which of the following conditions?

1- Warm, moist air flowing over a cold surface with an 8 to 10 knot wind causing mixing and condensation.
2- Warm, moist air being forced upslope by light winds resulting in the air being cooled and condensed.
3- Low temperature/dewpoint spread, calm wind conditions, the presence of hydroscopic nuclei, low overcast, and favorable topography.
4- High humidity during the early evening, cool cloudless night with light winds, and favorable topography.

235. What causes radiation fog to form?

1- Moist, unstable air being cooled as it is forced up a sloping land surface.
2- The addition of moisture to a mass of cold air as it moves over a body of water.
3- The ground cooling the adjacent air to the dewpoint temperature during conditions of calm air and clear sky.
4- Moist air being warmed by the ground over which it passes.

236. Which of the following is the cause of advection fog?

1- Moist stable air being cooled adiabatically as it moves up sloping terrain.
2- Warm moist air moving over colder ground or water.
3- Terrestrial radiation cooling the ground which in turn cools the air in contact with it.
4- Saturation of cool air as the precipitation falling through it is evaporated.

237. Consider the following airmass characteristics:

A. Smooth air (above the friction level) and fair to poor visibility.

B. Turbulence up to about 10,000 feet and good visibility, except in areas of precipitation.

C. Cumuliform clouds.

D. Stratiform clouds.

E. Stable lapse rate.

F. Unstable lapse rate.

A moist airmass which is colder than the surface over which it passes frequently has which of the above characteristices?

1- A, D, and E.
2- A, D, and F.
3- B, C, and F.
4- B, D, and E.

238. An airmass which is warmer than the surface over which it passes has which of the following characteristics?

A. Smooth air (above the friction level) and poor visibility.

B. Turbulence up to about 10,000 feet and good visibility except in areas of precipitation.

C. Cumuliform clouds.

D. Stratiform clouds and fog.

E. Stable lapse rate.

F. Unstable lapse rate.

A warm moist airmass is frequently characterized by

1- A, D, and E.
2- B, C, and E.
3- A, D, and F.
4- B, D, and E.

239. Which statement is true regarding a cold front occlusion?

1- The air ahead of the warm front is colder than the air behind the overtaking cold front.

2- The air ahead of the warm front is warmer than the air behind the overtaking cold front.

3- The air between the warm front and cold front is colder than either the air ahead of the warm front or the air behind the overtaking cold front.

4- The air ahead of the warm front has the same temperature as the air behind the overtaking cold front.

240. The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with

1- fast-moving warm fronts.
2- squall line thunderstorms.
3- slow-moving warm fronts.
4- slow-moving cold fronts.

241. Which statement is true regarding the use of airborne weather-avoidance radar for the recognition of certain weather conditions?

1- The clear area between intense echoes indicates that visual sighting of storms can be maintained when flying between the echoes.

2- The radar scope provides no assurance of avoiding instrument weather conditions.

3- The avoidance of hail is assured when flying between and just clear of the most intense echoes.

4- Areas of light rain, snow, and minute cloud droplets return significant echoes on the radar scope.

242. Which of the following is considered to be the most hazardous condition associated with thunderstorms?

1- Lightning.
2- Static electricity.
3- St. Elmo's Fire.
4- Wind shear and turbulence.

243. The factor which determines whether the type of cloudiness associated with a front will be predominantly stratiform or cumuliform is the

1- relative humidity of the air behind the front.

2- degree of stability of the air being lifted.

3- dewpoint of the air being lifted.

4- pressure of the air behind the front.

244. What are the standard temperature and pressure values for sea level?

1- 59° C. and 1013.2 millibars.
2- 15° C. and 29.92 inches of mercury.
3- 68° F. and 29.92 millibars.
4- 59° C. and 1013.2 inches of mercury.

245. If the air temperature is +16° C. at an elevation of 3,000 feet MSL and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 14,000 feet MSL.
2- 11,000 feet MSL.
3- 9,000 feet MSL.
4- 7,000 feet MSL.

246. If the temperature at 1,000 feet MSL is +18° C. and a standard (average) temperature lapse rate exists, the freezing level will be located at approximately

1- 10,000 feet MSL.
2- 9,500 feet MSL.
3- 8,500 feet MSL.
4- 7,000 feet MSL.

247. If the air temperature is +10° C. at an elevation of 2,000 feet MSL and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 7,000 feet MSL.
2- 9,000 feet MSL.
3- 11,000 feet MSL.
4- 14,000 feet MSL.

248. If the air temperature is +16° C. at an elevation of 1,000 feet MSL and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 7,000 feet MSL.
2- 9,000 feet MSL.
3- 11,000 feet MSL.
4- 14,000 feet MSL.

249. What causes the counterclockwise flow of air around a low pressure in the Northern Hemisphere?

1- Centrifugal force.
2- Surface friction.
3- Pressure gradient.
4- Coriolis force.

250. In the Northern Hemisphere, what causes the wind to be deflected to the right?

1- Centrifugal force.
2- Coriolis force.
3- The pressure gradient force.
4- Surface friction.

251. Which of the following statements is true with respect to either high or low pressure systems?

1- A low pressure area or trough is an area of descending air.
2- A high pressure area or ridge is an area of descending air.
3- Both high and low pressure areas are characterized by descending air.
4- A high pressure area or ridge is an area of rising air.

252. In the Northern Hemisphere, which of the following is a true statement with regard to the flow of air within a low pressure center?

1- Air flows outward, upward, and counterclockwise.
2- Air flows inward, downward, and counterclockwise.
3- Air flows outward, downward, and counterclockwise.
4- Air flows inward, upward, and counterclockwise.

253. Which statement is true with regard to the general circulation of air associated with a high pressure area in the Northern Hemisphere?

1- Air flows outward, upward, and counterclockwise.
2- Air flows outward, downward, and clockwise.
3- Air flows inward, upward, and clockwise.
4- Air flows inward, downward, and counterclockwise.

254. With respect to pressure systems, which of the following statements is true?

1- A low pressure area or trough is an area of rising air.
2- A high pressure area or ridge is an area of rising air.
3- A low pressure area or trough is an area of descending air.
4- Both high and low pressure areas are characterized by rising air.

255. To maintain the desired ground track when flying directly toward a low pressure center (in the Northern Hemisphere), what heading correction, if any, would most likely be required?

1- A correction to the left would be required.
2- No correction would be required.
3- No correction is necessary, because Coriolis force will tend to keep the airplane on the desired track.
4- A correction to the right would be required.

256. To take advantage of favorable winds on an extended flight from east to west in the Northern Hemisphere, a pilot should plan the course so as to fly

1- south of low pressure areas and north of high pressure areas.

2- north of low pressure areas and south of high pressure areas.

3- north of both low and high pressure areas.

4- south of both low and high pressure areas.

257. To take advantage of favorable winds on an extended flight from west to east in the Northern Hemisphere, a pilot should plan the course so as to fly

1- north of low pressure areas and south of high pressure areas.

2- south of low pressure areas and north of high pressure areas.

3- south of both low and high pressure areas.

4- north of both low and high pressure areas.

258. In the Northern Hemisphere, the outward flow of air from a high pressure area or the inward flow to a low pressure area is deflected to the

1- right in a high pressure area; left in a low pressure area.

2- right in both a high and low pressure area.

3- left in both a high and low pressure area.

4- left in a high pressure area; right in a low pressure area.

259. Suppose a strong temperature inversion exists near the surface. Should this phenomenon be considered hazardous to aircraft?

1- No; temperature inversion near the surface creates smooth air and good visibilities.

2- No; a sudden change in outside air temperature would be the only evidence of a temperature inversion.

3- Yes; a potential hazard exists due to strong, steady downdrafts.

4- Yes; a potential hazard exists due to turbulence created by wind shear.

260. If clouds form as a result of very stable moist air being forced to ascend a mountain slope, the clouds will be

1- cumulus type with considerable vertical development and turbulence.

2- stratus type with little vertical development and little or no turbulence.

3- cumulonimbus with considerable vertical development and heavy rains.

4- cirrus type with no vertical development or turbulence.

261. Which statement is true regarding "standing mountain waves"?

1- They are always indicated by the presence of a lenticular cloud formation.

2- They are sometimes marked by stationary, lens-shaped clouds.

3- They are found on the windward side of the mountain.

4- They are generally stationary over the mountain.

262. When turbulence causes changes in altitude and/or attitude but aircraft control remains positive, that turbulence should be reported as

1- moderate.
2- severe.
3- light.
4- very light.

263. Turbulence that causes unsecured objects in the cockpit or cabin to become dislodged should be reported as

1- severe.
2- moderate.
3- light.
4- very light.

264. Turbulence that causes a pilot to feel a slight strain against seatbelts should be reported as

1- very light.
2- light.
3- moderate chop.
4- moderate.

265. Turbulence that causes a pilot to feel definite strains against the seatbelt or shoulder straps should be reported as

1- severe.
2- moderate.
3- light.
4- very light.

266. When unsecured objects are tossed about the cockpit or cabin due to turbulence, that turbulence should be reported as

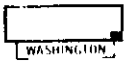
1- very light.
2- moderate.
3- light.
4- severe.

267. Turbulence that causes jolts without appreciable changes in aircraft altitude or attitude should be reported as

1- severe.
2- light chop.
3- moderate chop.
4- very light chop.

268. Which of these aeronautical chart symbols indicates that the radio facility has DME capability?

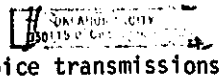
1-
2-
3- 

4- 

269. What is the meaning of this aeronautical chart symbol?

1- That the airport has a control tower and an Airport Traffic Area.
2- That a TCA is established at that airport.
3- That special VFR in fixed-wing aircraft is not permitted within the Control Zone.
4- That a Terminal Radar Service Area surrounds the airport.

270. What is the meaning of the small square in the corner of the radio facility data box shown here that appears on Sectional Aeronautical Charts?



1- Voice transmissions are not available through that frequency.
2- Enroute Flight Advisory Service is available.
3- Transcribed Weather Broadcasts are available.
4- All Standard FSS frequencies are available.

271. To determine the horizontal limits and the base of control areas within the boundaries of the U.S.A., the pilot should refer to

1- a Low Altitude Enroute Chart.
2- a Sectional Aeronautical Chart.
3- a World Aeronautical Chart.
4- a High Altitude Enroute Chart.

272. Which statement is true relating to the blue and magenta colors used to depict airports on Sectional Aeronautical Charts?

1- Airports having air-to-ground communications are shown in blue; airports with no means of communication are shown in magenta.
2- Airports having runways capable of handling large aircraft are shown in blue; all others in magenta.
3- Airports having Airport Traffic Areas are shown in blue; all others in magenta.
4- Airports having concrete runways are shown in blue; all others in magenta.

273. Which of the following statements about longitude and latitude is true?

1- Lines of latitude are drawn from the North Pole to the South Pole.
2- Lines of longitude cross the equator at right angles.
3- Lines of longitude are parallel to the equator.
4- The 0° line of latitude passes through Greenwich, England.

274. Which statement is true with respect to lines of latitude?

1- Latitude lines are used to establish time zones.
2- Latitude lines are used for measuring angular distances east and west of the Prime Meridian.
3- Latitude lines are parallel to the equator.
4- Latitude lines are used for measuring time and distance, but not for measuring direction.

275. Which of the following statements about longitude and latitude is true?

1- Lines of latitude pass through the North and South Poles.
2- Each line of longitude crosses the equator at a different angle.
3- Lines of longitude are parallel to the equator.
4- A degree of latitude at any point on earth is equal to 60 nautical miles.

276. If a given true heading is held constant during a long-distance flight, the airplane will be following a

1- rhumb line, and traveling a shorter distance between two points than when following a great circle route.

2- rhumb line, and traveling a longer distance between two points than when following a great circle route.

3- great circle route, and traveling a longer distance between two points than when following a rhumb line.

4- great circle route, and traveling a shorter distance between two points than when following a rhumb line.

277. When determining the true course in an easterly or westerly direction on a Sectional Aeronautical Chart, the course measurement should be taken at a meridian near the midpoint of the course because

1- the lines of latitude are drawn in an arc.

2- the isogonic lines are not parallel.

3- the angular measurement changes between points due to convergence of the lines of longitude.

4- the magnetic North Pole from which direction is measured, is not located at the geographic North Pole.

278. True course measurements on a Sectional Aeronautical Chart should be made at a meridian near the midpoint of the course because the

1- angles formed by lines of longitude and latitude vary from point to point.

2- isogonic lines are not parallel.

3- lines of latitude vary from point to point.

4- geographic North Pole from which direction is measured, is not located at the magnetic North Pole.

279. Which of the following statements is true in regard to the application of magnetic variation in solving navigation problems?

1- To convert from true course to magnetic heading, add easterly variation to the true course.

2- To convert from true course to magnetic course, subtract easterly variation from the true course.

3- To convert from true course to magnetic course, subtract westerly variation from the true course.

4- To convert from magnetic course to magnetic heading subtract westerly variation from the magnetic course.

280. If the groundspeed is 220 knots, how far will an airplane travel in 3 minutes?

1- 15 NM.
2- 11 NM.
3- 9 NM.
4- 7 NM.

281. One nautical mile is equal to how many statute miles?

1- 1.15 SM.
2- 0.87 SM.
3- 2.15 SM.
4- 1.75 SM.

282. One statute mile is equal to how many nautical miles?

1- 0.87 NM.
2- 1.15 NM.
3- 1.75 NM.
4- 2.15 NM.

283. How many statute miles are equal to 170 nautical miles?

1- 148 SM.
2- 205 SM.
3- 196 SM.
4- 165 SM.

284. How many statute miles are the equivalent of 320 nautical miles?

1- 315 SM.
2- 328 SM.
3- 368 SM.
4- 375 SM.

285. How many nautical miles are the equivalent of 187 statute miles?

1- 152 NM.
2- 167 NM.
3- 162 NM.
4- 172 NM.

286. How many nautical miles are the equivalent of 115 statute miles?

1- 100 NM.
2- 142 NM.
3- 133 NM.
4- 95 NM.

287. How many nautical miles are the equivalent of 100 statute miles?

1- 120 NM.
2- 95 NM.
3- 115 NM.
4- 87 NM.

288. How many nautical miles are the equivalent of 320 statute miles?

1- 256 NM.
2- 291 NM.
3- 278 NM.
4- 312 NM.

289. If an airplane travels 2 nautical miles in 52 seconds, what is the groundspeed?

1- 146 knots.
2- 150 knots.
3- 142 knots.
4- 138 knots.

290. Suppose the airplane has traveled 2 nautical miles in 42 seconds. What is the groundspeed?

1- 171 knots.
2- 182 knots.
3- 185 knots.
4- 165 knots.

291. When an airplane travels 4 nautical miles in 56 seconds, its groundspeed is

1- 225 knots.
2- 257 knots.
3- 232 knots.
4- 265 knots.

292. If an airplane travels 4 nautical miles in 1 minute, what is its groundspeed?

1- 210 knots.
2- 220 knots.
3- 230 knots.
4- 240 knots.

293. If an airplane travels 6 nautical miles in 2 minutes, what is its groundspeed?

1- 180 knots.
2- 200 knots.
3- 160 knots.
4- 190 knots.

294. If an airplane travels 8 nautical miles in 2 1/2 minutes, what is its groundspeed?

1- 188 knots.
2- 192 knots.
3- 182 knots.
4- 197 knots.

295. If the groundspeed is 150 knots, how far will an airplane travel in 1 minute?

1- 0.5 NM.
2- 1.5 NM.
3- 2.5 NM.
4- 4 NM.

296. If the groundspeed is 150 knots, how far will an airplane travel in 2 minutes?

1- 1.5 NM.
2- 2.5 NM.
3- 5 NM.
4- 7.5 NM.

297. Consider the following:

Forecast wind-------- 270°/25 knots
Pressure altitude---- 9,000 feet
Ambient temperature-- -10° C.
Indicated airspeed--- 145 knots
Variation----------- 11° E
True course---------- 170°

With those conditions, what would be the approximate magnetic heading and groundspeed?

1- 185° and 168 knots.
2- 160° and 141 knots.
3- 168° and 166 knots.
4- 179° and 156 knots.

298. Consider the following:

Forecast wind--------- 270°/25 knots
Pressure altitude---- 12,000 feet
Ambient temperature-- -10° C.
Indicated airspeed--- 145 knots
Variation----------- 10° E
True course---------- 200°

With those conditions, what would be the approximate magnetic heading and groundspeed?

1- 208° and 157 knots.
2- 198° and 164 knots.
3- 178° and 141 knots.
4- 218° and 168 knots.

299. Consider the following:

Forecast wind--------- 300°/25 knots
Pressure altitude---- 8,000 feet
Ambient temperature-- -10°C.
Indicated airspeed--- 150 knots
Variation----------- 11° E
True course---------- 150°

With those conditions, what would be the approximate magnetic heading and groundspeed?

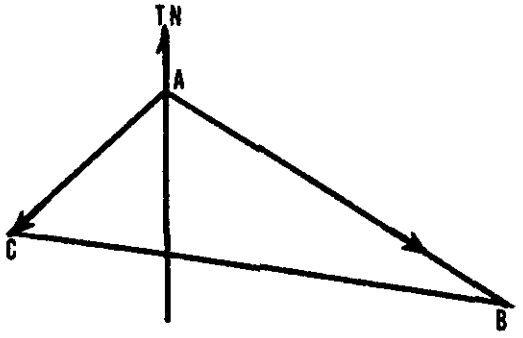
1- 165° and 141 knots.
2- 172° and 168 knots.
3- 143° and 187 knots.
4- 154° and 166 knots.

300. Consider the following:

Forecast wind--------- 120°/25 knots
Pressure altitude---- 8,000 feet
Ambient temperature-- -10° C.
Indicated airspeed--- 145 knots
Variation----------- 11° E
True course---------- 077°

With those conditions, what would be the approximate magnetic heading and groundspeed?

1- 095° and 166 knots.
2- 088° and 156 knots.
3- 072° and 141 knots.
4- 070° and 168 knots.



301. If the illustration above is used to explain the wind triangle, it would be correct to state that

1- line A-B represents true course and true airspeed, and line C-B represents true heading and groundspeed.

2- line A-B represents true heading and groundspeed, and line C-B represents true course and true airspeed.

3- line A-B represents true course and groundspeed, and line C-B represents true heading and true airspeed.

4- line A-B represents true heading and true airspeed, and line C-B represents true course and groundspeed.

302. Consider the following:

Forecast wind---------- 180°/30 knots
Pressure altitude------- 10,000 feet
Ambient temperature----- -05° C.
Indicated airspeed------ 145 knots
Variation--------------- 10° E
True course------------- 170°

With those conditions, what would be the approximate magnetic heading and groundspeed?

1- 178° and 130 knots.
2- 162° and 138 knots.
3- 182° and 139 knots.
4- 192° and 129 knots.

303. Consider the following:

Forecast wind---------- 200°/20 knots
Pressure altitude------- 9,000 feet
Ambient temperature----- -05° C.
Indicated airspeed------ 145 knots
Variation--------------- 12° E
True course------------- 160°

With those conditions, what would be the approximate magnetic heading and groundspeed?

1- 152° and 151 knots.
2- 143° and 165 knots.
3- 167° and 160 knots.
4- 177° and 145 knots.

304. On a cross-country flight, suppose point X is crossed at 1100 and arrival at point Y is planned for 1125. Use the following information to determine the indicated airspeed required to arrive at point Y at the desired time.

Distance between X & Y---- 60 NM
Pressure altitude--------- 8,000 feet
Ambient temperature------- -10° C.
True course-------------- 055°
Forecast wind------------ 090°/25 knots

The required indicated airspeed would be approximately

1- 123 knots.
2- 148 knots.
3- 156 knots.
4- 165 knots.

305. On a cross-country flight, suppose point X is crossed at 1600 and the plan is to reach point Y at 1630. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X & Y--- 60 NM
Forecast wind------------ 120°/25 knots
Pressure altitude-------- 9,000 feet
Ambient temperature------ -10° C.
True course-------------- 090°

The required indicated airspeed would be approximately

1- 125 knots.
2- 142 knots.
3- 135 knots.
4- 156 knots.

306. On a cross-country flight, suppose point X is crossed at 1057 and arrival at point Y is planned for 1122. Use the following information to determine the indicated airspeed required to arrive at point Y at the desired time.

Distance between X & Y--- 56 NM
Pressure altitude-------- 8,000 feet
Ambient temperature------ -10° C.
True course-------------- 055°
Forecast wind------------ 090°/30 knots

The required indicated airspeed would be approximately

1- 156 knots.
2- 160 knots.
3- 134 knots.
4- 144 knots.

307. Suppose on a cross-country flight point X is crossed at 1500 and arrival at point Y is expected at 1530. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X & Y-- 80 NM
Forecast wind---------- 160°/30 knots
Pressure altitude------- 10,000 feet
Ambient temperature----- -10° C.
True course------------ 170°

The required indicated airspeed would be approximately

1- 224 knots.
2- 164 knots.
3- 158 knots.
4- 156 knots.

308. Suppose on a cross-country flight point X is crossed at 1500 and arrival at point Y is expected at 1520. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X & Y-- 67 NM
Forecast wind---------- 160°/30 knots
Pressure altitude------- 10,000 feet
Ambient temperature----- 15° C.
True course------------ 190°

The required indicated airspeed would be approximately

1- 224 knots.
2- 198 knots.
3- 230 knots.
4- 186 knots.

309. Suppose on a cross-country flight point X is crossed at 1000 and arrival at point Y is expected at 1015. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X & Y-- 50 NM
Forecast wind---------- 160°/30 knots
Pressure altitude------- 10,000 feet
Ambient temperature----- - 10° C.
True course------------ 120°

The required indicated airspeed would be approximately

1- 230 knots.
2- 200 knots.
3- 194 knots.
4- 224 knots.

310. On a cross-country flight, suppose point X is crossed at 1600 and it is planned to reach point Y at 1630. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X & Y-- 50 NM
Forecast wind---------- 130°/20 knots
Pressure altitude------- 8,000 feet
Ambient temperature----- -05° C.
True course------------ 100°

The required indicated airspeed would be approximately

1- 118 knots.
2- 112 knots.
3- 106 knots.
4- 90 knots.

311. Suppose on a cross-country flight point X is crossed at 1500 and arrival at point Y is expected at 1515. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X & Y-- 70 NM
Forecast wind---------- 340°/30 knots
Pressure altitude------- 18,000 feet
Ambient temperature----- -20° C.
True course------------ 170°

The required indicated airspeed would be approximately

1- 250 knots.
2- 190 knots.
3- 280 knots.
4- 176 knots.

312. Consider the conditions listed below:

Departure path---------- straight out
Takeoff time------------ 1430Z
Winds during climb------ 180°/30 knots
True course during climb---------- 160°
Airport elevation------- 1,500 feet
True airspeed----------- 125 knots
Rate of climb----------- 500 ft./min.

What would be the distance and time upon reaching 8,500 feet MSL?

1- 30 nautical miles and 1444Z.
2- 25 nautical miles and 1447Z.
3- 23 nautical miles and 1444Z.
4- 20 nautical miles and 1447Z.

313. Consider the conditions listed below:

Departure path-------- straight out
Takeoff time---------- 1420Z
Winds during climb---- 170°/25 knots
True course during climb---------- 120°
Airport elevation----- 1,000 feet
True airspeed--------- 135 knots
Rate of climb--------- 500 ft./min.

What would be the distance and time upon reaching 10,000 feet MSL?

1- 25 nautical miles and 1428Z.
2- 27 nautical miles and 1438Z.
3- 31 nautical miles and 1428Z.
4- 35 nautical miles and 1438Z.

314. If a climb were made at a rate of 700 ft./min. to 6,500 feet MSL, what would be the distance and time flown from the departure airport under these conditions?

Departure path-------- straight out
Takeoff time---------- 1317Z
Airport elevation----- 1,600 feet
Winds during climb---- 155°/27 knots
True course during climb---------- 135°
True airspeed--------- 129 knots

The distance and time to reach 6,500 feet MSL would be

1- 10 nautical miles at 1324Z.
2- 12 nautical miles at 1324Z.
3- 14 nautical miles at 1326Z.
4- 16 nautical miles at 1324Z.

315. Suppose at an altitude of 7,000 feet MSL, the ambient temperature is +10° C. If the calibrated airspeed is 150 knots and the altimeter setting is 29.42, the true airspeed would be approximately

1- 158 knots.
2- 161 knots.
3- 165 knots.
4- 171 knots.

316. Suppose at an altitude of 6,500 feet MSL, the ambient temperature is +10° C. If the calibrated airspeed is 140 knots and the altimeter setting is 29.42, the true airspeed would be approximately

1- 147 knots.
2- 157 knots.
3- 167 knots.
4- 177 knots.

317. Suppose at an altitude of 8,500 feet MSL, the ambient temperature is +05° C. If the calibrated airspeed is 150 knots and the altimeter setting is 29.40, the true airspeed would be approximately

1- 146 knots.
2- 156 knots.
3- 166 knots.
4- 176 knots.

318. Suppose when determining true airspeed the altimeter indicates 8,700 feet when set to 29.92" Hg. If the calibrated airspeed is 145 knots and the ambient temperature is +10° C., the true airspeed is approximately

1- 167 knots.
2- 163 knots.
3- 169 knots.
4- 159 knots.

319. Suppose at an altitude of 12,500 feet MSL, the ambient temperature is -05° C. If the calibrated airspeed is 175 MPH and the altimeter setting is 29.42, the true airspeed would be approximately

1- 185 MPH.
2- 195 MPH.
3- 200 MPH.
4- 220 MPH.

320. Suppose at an altitude of 18,000 feet MSL, the ambient temperature is -30° C. If the calibrated airspeed is 150 knots and the altimeter setting is 29.92, the true airspeed would be approximately

1- 175 knots.
2- 185 knots.
3- 195 knots.
4- 205 knots.

321. Assume a pilot plans to descend from 9,500 feet MSL so as to arrive at 5,000 feet MSL 5 nautical miles from Uptown VORTAC. With a groundspeed of 150 knots and a descent of 500 feet per minute, at what distance from the VORTAC should the descent be started?

1- 27 nautical miles.
2- 22 nautical miles.
3- 17 nautical miles.
4- 15 nautical miles.

322. Assume a pilot plans to begin a descent from 8,500 feet MSL when 20 nautical miles from destination airport. If the groundspeed is 150 knots and it is desired to arrive at 4,500 feet MSL when over the airport, the rate of descent should be

1- 400 feet per minute.
2- 500 feet per minute.
3- 600 feet per minute.
4- 700 feet per minute.

323. Assume a pilot plans to begin descending from 8,500 feet MSL when 15 statute miles from Downtown VORTAC. If the groundspeed is 180 MPH and the pilot wants to arrive over the VORTAC at 6,500 feet MSL, the rate of descent should be

1- 350 feet per minute.
2- 400 feet per minute.
3- 450 feet per minute.
4- 500 feet per minute.

324. Assume that a true heading of 200° has resulted in a ground track of 215°, and a true airspeed of 160 MPH has resulted in a groundspeed of 140 MPH. From this information, the wind would be determined to be from approximately

1- 090° at 43 knots.
2- 145° at 38 knots.
3- 255° at 43 knots.
4- 270° at 38 knots.

325. Assume it is planned to descend from 9,500 feet MSL so as to arrive at 5,000 feet MSL 5 statute miles from Downsouth VORTAC. With a groundspeed of 160 MPH and a descent of 600 feet per minute, at what distance from the VORTAC should the descent be started?

1- 18 statute miles.
2- 20 statute miles.
3- 25 statute miles.
4- 29 statute miles.

326. Suppose after 100 miles are flown from the departure point, the airplane's position is located 10 miles off course. If 100 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 19°.
2- 10°.
3- 12°.
4- 16°.

327. Suppose a true heading of 130° results in a ground track of 120°, with a true airspeed of 150 MPH and a groundspeed of 130 MPH. The wind is from approximately

1- 070° at 25 knots.
2- 090° at 30 knots.
3- 179° at 32 knots.
4- 174° at 27 knots.

328. Assume a true heading of 352° results in a ground track of 340°. With a true airspeed of 145 knots and a groundspeed of 116 knots the wind would be from approximately

1- 025° at 20 knots.
2- 020° at 25 knots.
3- 030° at 40 knots.
4- 040° at 30 knots.

329. Assume a true heading of 240° results in a ground track of 247°. With a true airspeed of 155 knots and a groundspeed of 173 knots, the wind would be from approximately

1- 080° at 17 knots.
2- 090° at 25 knots.
3- 112° at 27 knots.
4- 120° at 30 knots.

330. Suppose after 150 miles are flown from the departure point, the airplane's position is located 10 miles off course. If 75 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 18°.
2- 16°.
3- 09°.
4- 12°.

331. Suppose after 160 miles are flown from the departure point, the airplane's position is located 15 miles off course. If 75 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 21°.
2- 13°.
3- 18°.
4- 23°.

332. Suppose after 160 miles are flown from the departure point, the airplane's position is located 20 miles off course. If 75 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 17°.
2- 23°.
3- 20°.
4- 15°.

333. Suppose after 136 miles are flown from the departure point, the airplane's position is located 12 miles off course. If 68 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 12°.
2- 16°.
3- 10°.
4- 19°.

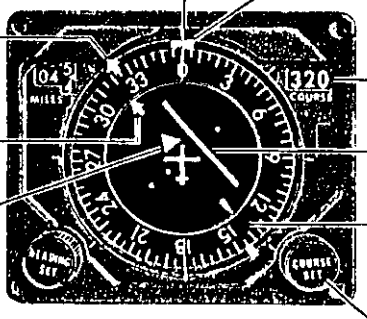
334. Suppose after 244 miles are flown from the departure point, the airplane's position is located 30 miles off course. If 105 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 25°.
2- 12°.
3- 10°.
4- 19°.

335. Suppose after 70 miles are flown from the departure point, the airplane's position is located 22 miles off course. If 85 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 34°.
2- 29°.
3- 26°.
4- 22°.

HORIZONTAL SITUATION INDICATOR (HSI)



UPPER LUBBER LINE
Indicates magnetic heading of aircraft.

BEARING POINTER
Indicates magnetic bearing from aircraft to navigational aid selected.

COURSE ARROW
Indicates course set in Course Selector Window

TO-FROM INDICATOR
Shows whether the course selected, if intercepted and flown, will take you TO or FROM station.

HEADING MARKER
Rotates with the Compass Card. Can be manually set with the Heading Set Knob.

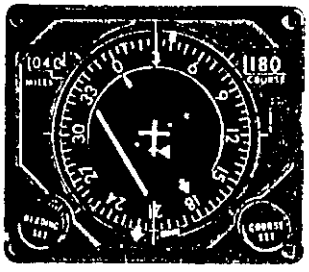
COURSE SELECTOR WINDOW
Selected course is read in this window.

COURSE DEVIATION INDICATOR
Shows position of selected rad-al in relation to aircraft.

ROTATING COMPASS CARD
Actuated by Master Compass System and rotates as the aircraft turns.

COURSE SET KNOB
Used to select any desired course.

A



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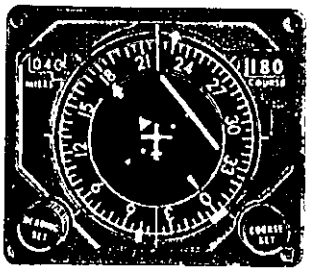

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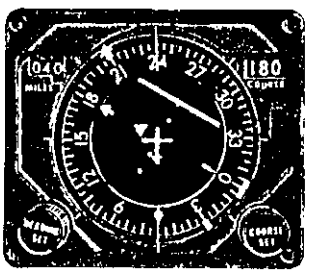
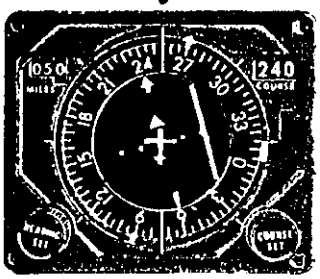
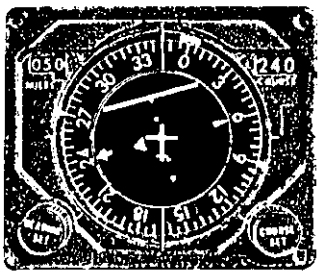


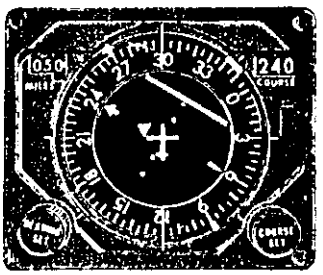
D



E



F



336. Suppose after 150 miles are flown from the departure point, the airplane's position is located 12 miles off course. If 80 miles remain to be flown, what approximate total correction should be made to converge on the destination?

1- 5°.
2- 10°.
3- 18°.
4- 14°.

337. What is the most positive method of identifying all VOR facilities when tuning the receiver?

1- Ensuring that the proper frequency is selected.
2- Listening to voice transmissions by the associated FSS.
3- Checking the Morse code or voice identification.
4- Noting the disappearance of the OFF flag.

338. Which of the following situations would result in "reverse sensing" of a VOR receiver?

1- Flying a heading that is 90° to the selected bearing on the OBS.
2- Failing to change the OBS from the selected inbound course to the outbound course after passing the station.
3- Flying a heading that is reciprocal to the bearing selected on the OBS.
4- Setting the OBS to a bearing that is 90° from the bearing on which the aircraft is located.

339. Refer to page 66. Which illustration indicates that the airplane should be turned 180° to intercept the 360 radial at a 30° angle inbound?

1- A.
2- B.
3- C.
4- E.

340. Refer to page 66. Which illustration indicates that the airplane will intercept the 060 radial at a 75° angle outbound, if the present heading is maintained?

1- C.
2- D.
3- E.
4- F.

341. Refer to page 66. Which illustration indicates that the airplane will intercept the 360 radial at a 60° angle inbound, if the present heading is maintained?

1- C.
2- D.
3- E.
4- B.

342. Refer to page 66. Which statement is true regarding illustration D, if the present heading is maintained?

1- The magnetic bearing to the station is 240°.
2- The airplane is on a magnetic heading of 240°.
3- The airplane will intercept the 240 radial at a 30° angle.
4- The airplane will intercept the 240 radial at a 15° angle.

343. Refer to page 66. Which statement is true regarding illustration A?

1- The airplane is on a magnetic heading of 040°.
2- The magnetic bearing to the station is 220°.
3- The airplane will intercept the 180 radial at a 30° angle.
4- The airplane will intercept the 360 radial at a 30° angle.

344. Refer to page 66. Which statement is true regarding illustration E, if the present heading is maintained?

1- The airplane is on a magnetic heading of 360°.
2- The magnetic bearing to the station is 345°.
3- The airplane will intercept the 240 radial at a 75° angle.
4- The airplane will intercept the 060 radial at a 75° angle.

345. Refer to page 66. Which statement is true regarding illustration F, if the present heading is maintained?

1- The airplane will intercept the 060 radial at a 60° angle.
2- The airplane will intercept the 240 radial at a 45° angle.
3- The magnetic bearing to the station is 300°.
4- The airplane is on a magnetic heading of 030°.

346. While maintaining a magnetic heading of 180° and a true airspeed of 130 knots, the 270 radial of a VOR is crossed at 1137 and the 260 radial at 1144. The approximate time and distance to this station are

1- 38 minutes and 82 nautical miles.
2- 42 minutes and 91 nautical miles.
3- 44 minutes and 96 nautical miles.
4- 45 minutes and 104 nautical miles.

347. While maintaining a heading of 090° and a true airspeed of 140 knots, the 180 radial of a VOR is crossed at 1320 and the 170 radial is crossed at 1322. What are the approximate time and distance to this station?

1- 10 minutes and 31 nautical miles.
2- 12 minutes and 28 nautical miles.
3- 09 minutes and 12 nautical miles.
4- 06 minutes and 10 nautical miles.

348. While maintaining a magnetic heading of 180° and a true airspeed of 140 knots, the 270 radial of a VOR is crossed at 1137 and the 260 radial at 1141. The approximate time and distance to this station are

1- 24 minutes and 56 nautical miles.
2- 42 minutes and 91 nautical miles.
3- 44 minutes and 96 nautical miles.
4- 38 minutes and 82 nautical miles.

349. While maintaining a magnetic heading of 270° and a true airspeed of 130 knots, the 360 radial of a VOR is crossed at 1237 and the 350 radial at 1243. The approximate time and distance to this station are

1- 36 minutes and 78 nautical miles.
2- 42 minutes and 91 nautical miles.
3- 44 minutes and 96 nautical miles.
4- 42 minutes and 104 nautical miles.

350. While maintaining a magnetic heading of 060° and a true airspeed of 130 knots, the 150 radial of a VOR is crossed at 1137 and the 140 radial at 1145. The approximate time and distance to this station are

1- 38 minutes and 82 nautical miles.
2- 42 minutes and 91 nautical miles.
3- 44 minutes and 96 nautical miles.
4- 48 minutes and 104 nautical miles.

351. While maintaining a magnetic heading of 180° and a true airspeed of 130 knots, the 270 radial of a VOR is crossed at 1037 and the 260 radial at 1042. The approximate time and distance to this station are

1- 30 minutes and 65 nautical miles.
2- 42 minutes and 91 nautical miles.
3- 44 minutes and 96 nautical miles.
4- 42 minutes and 104 nautical miles.

352. When a VOT is properly used to check the accuracy of a VOR receiver, the CDI should be centered and the omnibearing and TO-FROM indicator reading

1- 180° FROM, only if the airplane is due north of the VOT.

2- 0° FROM or 180° TO, regardless of the airplane's position from the VOT.

3- 0° TO, only if the airplane is due south of the VOT.

4- 0° TO or 180° FROM, regardless of the airplane's position from the VOT.

353. When checking the accuracy of the airplane's VOR equipment by use of a VOT, the CDI should be centered and the omnibearing should indicate

1- the magnetic bearing to the VOT.

2- the magnetic bearing from the VOT.

3- that the airplane is on the 180 radial.

4- that the airplane is on the 360 radial.

354. When checking the accuracy of the airplane's VOR equipment by use of a VOT, the CDI should be centered and the omnibearing should indicate which of the following?

1- 180° FROM or 0° TO.
2- 090° TO or 270° FROM.
3- 270° TO or 090° FROM.
4- 0° FROM or 180° TO.

355. 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?

1- 18° - 20°.
2- 15° - 18°.
3- 10° - 12°.
4- 5° - 10°.

356. In most VOR receivers, the course deviation indicator is so calibrated that a full-scale deflection is registered when the aircraft's position is on a bearing that is

1- 10° or more from the selected bearing.

2- 5° or more from the selected bearing.

3- 10 NM or more to the left or right of the selected course.

4- 1° from the selected course when near the station and 10° from the selected course at a more distant location.

357. When using dual VOR receivers to check each system against the other, the maximum permissible variation between the two indicated bearings is

1- 2°.
2- 4°.
3- 6°.
4- 8°.

358. Suppose the ADF is tuned to a nondirectional radiobeacon and the relative bearing changes from 270° to 260° in 3 minutes' elapsed time. The time enroute to the station would be approximately

1- 24 minutes.
2- 18 minutes.
3- 12 minutes.
4- 6 minutes.

359. Suppose the ADF is tuned to a nondirectional radiobeacon and the relative bearing changes from 270° to 260° in 2 minutes' elapsed time. The time enroute to the station would be approximately

1- 6 minutes.
2- 12 minutes.
3- 20 minutes.
4- 30 minutes.

360. With a TAS of 120 knots, suppose the relative bearing on an ADF changes from 90° to 80° in 1.5 minutes' elapsed time. The distance to the station would be approximately

1- 18 nautical miles.
2- 15 nautical miles.
3- 12 nautical miles.
4- 9 nautical miles.

361. Suppose the ADF indicates a wingtip bearing change of 5° in 1.5 minutes' elapsed time, and the TAS is 145 knots. What is the approximate distance to the station?

1- 21.8 nautical miles.
2- 43.6 nautical miles.
3- 56.3 nautical miles.
4- 65.0 nautical miles.

362. Suppose the ADF indicates a 5° wingtip bearing change in 2 minutes 30 seconds' elapsed time. If the TAS is 130 knots, the distance to the station would be approximately

1- 65 nautical miles.
2- 45 nautical miles.
3- 25 nautical miles.
4- 15 nautical miles.

363. Suppose the relative bearing on an ADF changes from 270° to 280° in 2 minutes' elapsed time. If the groundspeed is 160 knots, the distance to that station would be approximately

1- 15 nautical miles.
2- 24 nautical miles.
3- 32 nautical miles.
4- 39 nautical miles.

364. Assume the airplane is maintaining a magnetic heading of 172° and when the ADF rereceiver is tuned to a selected radiobeacon the relative bearing is 065°. This indicates that the airplane is crossing the

1- 057° magnetic bearing from that RBn.
2- 237° magnetic bearing from that RBn.
3- 145° magnetic bearing from that RBn.
4- 107° magnetic bearing from that RBn.

365. Suppose the ADF is tuned to a radiobeacon. If the magnetic heading is 295° and the relative bearing is 120°, the magnetic bearing from that radiobeacon would be

1- 315°.
2- 265°.
3- 300°.
4- 235°.

366. Suppose the ADF is tuned to a radiobeacon. If the magnetic heading is 300° and the relative bearing is 130°, the magnetic bearing from that radiobeacon would be

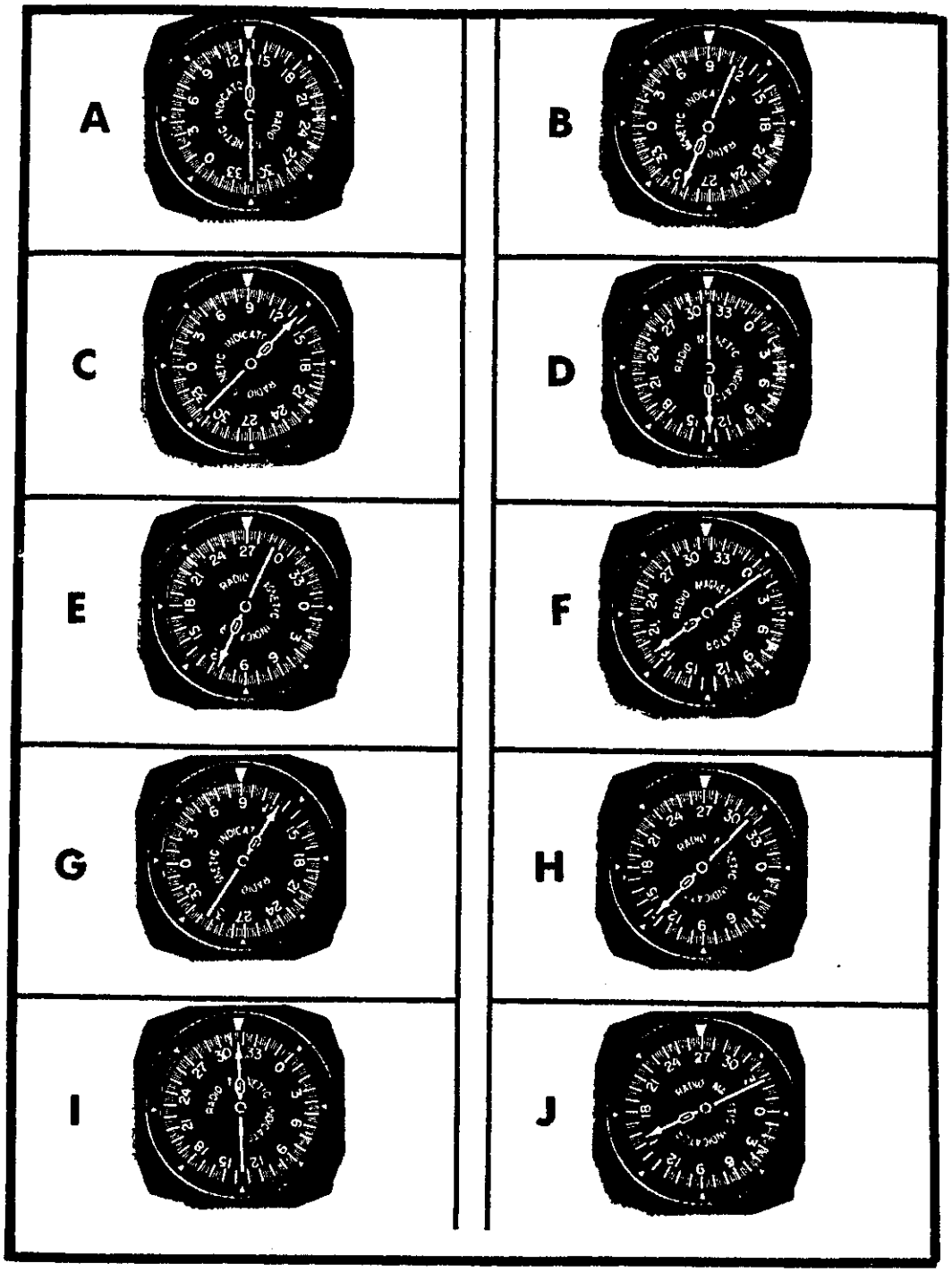
1- 300°.
2- 250°.
3- 290°.
4- 225°.

367. Assume that the airplane is maintaining a magnetic heading of 272°. After tuning the ADF to a nondirectional radiobeacon the relative bearing is 065°. This indicates that the airplane is crossing the

1- 157° magnetic bearing from that radiobeacon.
2- 337° magnetic bearing from that radiobeacon.
3- 245° magnetic bearing from that radiobeacon.
4- 207° magnetic bearing from that radiobeacon.

368. Suppose the ADF is tuned to a nondirectional radiobeacon. If the magnetic heading is 290° and the relative bearing is 130°, the magnetic bearing from that radiobeacon would be

1- 315°.
2- 265°.
3- 240°.
4- 160°.


A
B
C
D
E
F
G
H
I
J

369. On page 70. which of the Radio Magnetic Indicators show that the airplane is located on the 315° magnetic bearing from the station?

1- A only.
2- A and I.
3- I only.
4- A, C, D, and H.

370. Refer to page 70 and determine which illustration listed below shows that an aircraft is outbound on a magnetic bearing of 315° from the station.

1- A.
2- D.
3- F.
4- I.

371. Refer to RMI illustration "E" on page 70. What is the magnetic bearing from the station?

1- 315°.
2- 135°.
3- 355°.
4- 295°.

372. On page 70, which of the Radio Magnetic Indicators show that the airplane is located on the 315° magnetic bearing from the station and getting closer to the station?

1- A and C.
2- C and D.
3- D and H.
4- H and I.

373. Refer to page 70 and determine which illustration listed below would show that an aircraft is inbound on a magnetic bearing of 135° from the station.

1- A.
2- D.
3- F.
4- I.

374. Refer to RMI illustration "C" on page 70. What is the magnetic bearing from the station?

1- 045°.
2- 135°.
3- 270°.
4- 315°.

375. If the relative bearing on an ADF changes from 270° to 260° in 3 minutes 30 seconds' elapsed time, the time enroute to the station would be approximately

1- 09 minutes.
2- 13 minutes.
3- 18 minutes.
4- 23 minutes.

376. Suppose the ADF is tuned to a nondirectional radiobeacon and the relative bearing changes from 270° to 280° in 1 minute's elapsed time. The time enroute to the station would be approximately

1- 15 minutes.
2- 12 minutes.
3- 9 minutes.
4- 6 minutes.

377. Suppose the ADF is tuned to a nondirectional radiobeacon and the relative bearing changes from 90° to 80° in 1.5 minutes' elapsed time. The time enroute to the station would be approximately

1- 6 minutes.
2- 9 minutes.
3- 12 minutes.
4- 15 minutes.

378. Suppose the ADF is tuned to a nondirectional radiobeacon and the relative bearing changes from 90° to 100° in 2.5 minutes' elapsed time. The time enroute to the station would be approximately

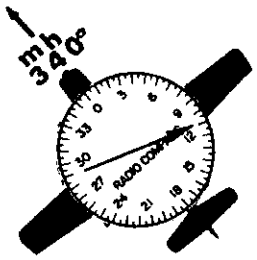
1- 15 minutes.
2- 12 minutes.
3- 9 minutes.
4- 6 minutes.

379. Refer to the illustration above. To intercept an inbound magnetic bearing of 315° to the station at a 030° angle, how many degrees to the left should the airplane be turned?

1- 030°.
2- 050°.
3- 090°.
4- 130°.

380. Based on the illustration above, if the airplane continues to fly on the heading as shown, what bearing from the station would be intercepted at a 45° angle?

1- 080°.
2- 215°.
3- 260°.
4- 315°.



381. Based on the illustration above, if the airplane continues to fly on the magnetic heading as illustrated, what magnetic bearing from the station would be intercepted at a 45° angle?

1- 115°.
2- 135°.
3- 295°.
4- 315°.

382. Based on the illustration above, if the airplane continues to fly on the magnetic heading as illustrated, what magnetic bearing from the station would be intercepted at a 25° angle?

1- 115°.
2- 135°.
3- 295°.
4- 315°.

383. Refer to the illustration above. To intercept the magnetic bearing of 315° from the station at a 045° angle outbound, how many degrees to the right should the airplane be turned?

1- 90°.
2- 50°.
3- 30°.
4- 20°.

384. Which statement is true regarding "tracking" on a desired bearing using ADF during crosswind conditions?

1- To track outbound, heading corrections should be made away from the ADF pointer.

2- To track both inbound and outbound, heading corrections should be made away from the ADF pointer.

3- When on the desired track inbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the nose position.

4- When on the desired track outbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the tail position.

385. Which statement is true regarding "homing" when using ADF during crosswind conditions?

1- Homing to a radio station results in a curved path that leads to the station.

2- Homing is a practical navigation method for flying both to and from a radio station.

3- Homing to a radio station is more practical for long distances than for short distances.

4- Homing to a radio station requires that the ADF have an automatically or manually rotatable azimuth.

386. Which of the following is true regarding the operational testing of ELTs (Emergency Locator Transmitters)?

1- Tests are permitted to last as long as 3 minutes.

2- Airborne tests are not authorized.

3- Tests should be made at 30 minutes past the hour.

4- Tests are mandatory every 10 hours of flight time or within 10 days preceding a flight.

387. To use VHF/DF facilities for assistance in locating an airplane's position, the airplane must have an operative VHF

1- transmitter and receiver.

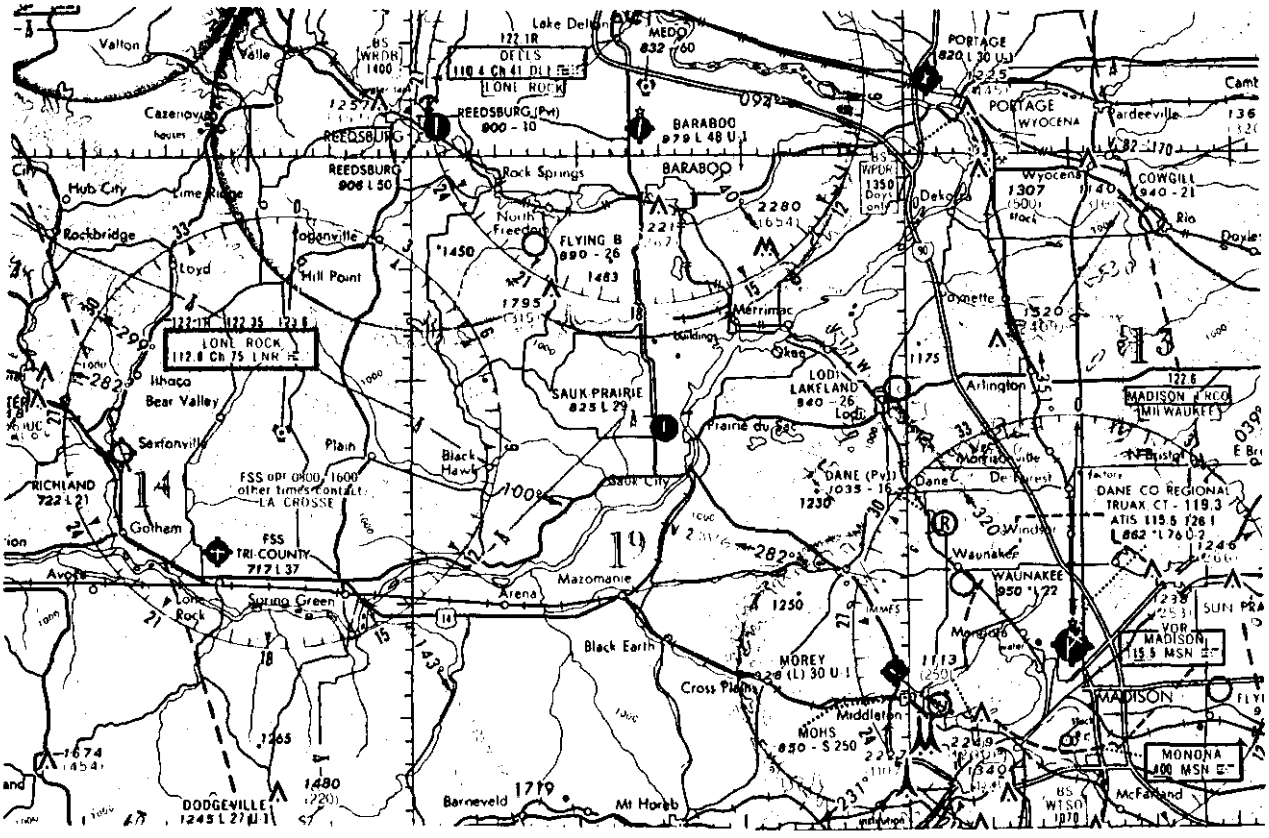
2- transmitter and receiver, and an ADF receiver.

3- transmitter and receiver, and a VOR receiver.

4- transmitter and receiver, and an ELT.

388. To obtain airport advisory service from an FSS, the pilot should contact the facility by transmitting on

1- 122.0 MHz.
2- 121.5 MHz.
3- 122.8 MHz.
4- 123.6 MHz.



389. Refer to the chart above. To close a VFR flight plan when nearing Dane County Regional Airport (lower right), the pilot can do so by transmitting on

1- 122.1 and receiving on 115.5 MHz.
2- 122.6 and receiving on 122.6 MHz.
3- 122.4 and receiving on 122.4 MHz.
4- 123.6 and receiving on 123.6 MHz.

390. Refer to the chart above. When passing Dells VORTAC (top center), the latest Tri-County Airport weather can be obtained through Dells VORTAC by transmitting on

1- 122.2 and receiving on 123.0 MHz.
2- 122.1 and receiving on 110.4 MHz.
3- 110.4 and receiving on 123.6 MHz.
4- 110.4 and receiving on 122.1 MHz.

391. Refer to the chart above. How should a VFR flight plan be "activated" after departing Dane County Regional Airport (lower right)?

1- Contact Madison Flight Service on 115.5 MHz, and request that they activate the flight plan.

2- Contact Madison radio on 122.6 MHz, and request that they activate the flight plan.

3- Ask Truax Tower to activate the flight plan just after takeoff.

4- Contact Dane County departure control on 125.5 MHz after becoming airborne, and request that the flight plan be activated.

392. Refer to the chart above. The appropriate means of obtaining information on the local weather, and runway and approaches in use at Dane Co. Regional Airport (lower right), is to tune to the

1- VFR Advisory Service on the FSS frequency 122.6 MHz.

2- Radar Traffic Information Service on approach control frequency 126.1 MHz.

3- Transcribed Weather Broadcast on the Monona nondirectional radiobeacon frequency 400 kHz.

4- Airport Terminal Information Service on 115.5 or 126.1 MHz.

393. Refer to the chart above. If intending to land at Dane Co. Regional Airport (lower right) when the ceiling is less than 1,000 feet, radio communications should first be established with

1- Truax Tower on 119.3 MHz before entering the traffic pattern.

2- Milwaukee FSS or Madison radio on 122.6 MHz before reaching a point 5 miles from the airport.

3- Madison radio on 115.5 MHz when within a radius of 5 miles from the airport.

4- Madison Tower on 119.3 MHz when 3 miles from the airport.

394. Choose the true statement pertaining to a slip or skid in an airplane.

1- In a right descending turn, if excessive left rudder is applied to compensate for the decreased torque effect, a slip will result.

2- In a left climbing turn, if insufficient right rudder is applied to compensate for the increased torque effect, a slip will result.

3- A skid occurs when too much rudder is applied in the direction opposite the turn.

4- A skid occurs when the rate of turn is too slow for the amount of bank being used.

395. The rate of turn during flight is the primary function of which flight control?

1- Rudder.
2- Elevator.
3- Ailerons.
4- Rudder and elevator.

396. Which statement is true concerning the primary function of each flight control during flight?

1- The ailerons are intended to create an unbalanced drag on the wings to yaw the airplane in the desired direction of turn.

2- The rudder is intended to be used as an elevator to hold the airplane's nose up in steep turns.

3- The elevator is intended to control the rate of turn during steep turns.

4- The ailerons provide a means for controlling the direction and rate of turn.

397. As it applies to airfoils, which statement is in agreement with Bernoulli's Principle?

1- The pressure of a fluid decreases at points where the speed of the fluid increases.

2- The pressure of a fluid increases at points where the speed of the fluid increases.

3- The pressure of a fluid decreases at points where the speed of the fluid decreases.

4- The speed of a fluid increases at points where the pressure of the fluid increases.

398. Choose the true statement pertaining to a slip or skid in an airplane.

1- In a left climbing turn, if insufficient right rudder is applied to compensate for the increased torque effect, a slip will result.

2- A skid occurs when too much rudder is applied in the direction opposite the turn.

3- A skid occurs when the rate of turn is too fast for the amount of bank being used.

4- In a right descending turn, if excessive right rudder is applied to compensate for the decreased torque effect, a slip will result.

399. When increasing the angle of attack of an airfoil, lift is increased because the higher angle of attack (up to the stall angle) results primarily in

1- a decrease in the force of gravity.

2- a decrease in induced drag.

3- a lower pressure on the upper surface of the airfoil.

4- a greater downward deflection of the airflow.

400. An increase in the speed at which an airfoil passes through the air increases lift because

1- the impact pressure of the air on the lower surface of the airfoil creates less positive pressure.

2- the increased speed of the air passing over the airfoil's upper surface decreases the pressure, thus creating a greater pressure differential between the upper and lower surfaces.

3- the increased speed of the airflow creates a lesser pressure differential between the upper and lower airfoil surfaces.

4- the increased velocity of the relative wind increases the angle of attack.

401. In regard to lift, drag, thrust, or weight, which statement is true?

1- Thrust always acts through the center of gravity.

2- The lift force always acts through the center of gravity.

3- The four forces may act through centers which are not in line.

4- All four forces always act through a common center.

402. When the airspeed of an airplane is doubled and the angle of attack is held constant, the drag will be

1- the same as it was initially.
2- less than it was initially.
3- four times as great.
4- twice as great.

403. When the airspeed of an airplane is doubled and the angle of attack remains constant, what is the effect on drag?

1- Drag remains constant.
2- Drag doubles.
3- Drag decreases by one-half.
4- Drag increases four times.

404. The force of lift acting on the airfoil is considered to act through one point which is called the

1- center of rotation.
2- center of gravity.
3- center of pressure.
4- midpoint of the chord.

405. For all practical purposes, which of the following statements is true concerning a stabilized or steady-state descent?

1- Drag is greater than thrust.
2- Thrust is greater than drag.
3- Weight is greater than lift.
4- Lift is equal to weight.

406. Which of the following actions is necessary to make the airplane turn?

1- Change the direction of lift.
2- Yaw the airplane.
3- Change the direction of thrust.
4- Increase the angle of attack.

407. Increasing airspeed while maintaining a constant load factor during a level turn would result in

1- an increase in the radius of turn.
2- the same radius of turn.
3- a decrease in the radius of turn.
4- an increase in centrifugal force.

408. Rotation about the vertical axis of an airplane is known as

1- turning, and is controlled by the use of ailerons.
2- yawing, and is controlled by the use of rudder.
3- rolling, and is controlled by the use of ailerons.
4- pitching, and is controlled by the use of elevators.

409. When the pitch attitude of an airplane is being changed, the airplane rotates about the

1- center of gravity.
2- midpoint of the fuselage.
3- midpoint of the chord line of the wing.
4- center of pressure.

410. Which statement is true about adverse yaw when entering or rolling out of a turn?

1- Adverse yaw can be either toward or away from the direction of turn.
2- Adverse yaw is always away from the direction of turn.
3- Adverse yaw is always toward the direction of turn.
4- Adverse yaw is not a factor when rolling out of a turn.

411. Which of the following should be increased in order to maintain altitude during a medium to steep turn?

1- Power output.
2- Centrifugal force.
3- Angle of attack or airspeed.
4- Angle of bank.

412. When rolling out of a steep-banked turn, what causes the lowered aileron to create more drag than when rolling into the turn?

1- The wing's angle of attack is greater as the rollout is started.
2- The wing being raised is traveling faster through the air than the wing being lowered.
3- The wing being lowered is traveling faster through the air and producing more lift than the wing being raised.
4- The differential in aileron travel is greater.

413. Why is it necessary to increase back elevator pressure to maintain altitude during a medium to steep banked turn?

1- To compensate for the effect of inertia and centrifugal force on the airplane.
2- The rudder's function has been transferred to the elevator as the bank approaches 45°.
3- To keep the airplane's nose moving in the direction of the turn.
4- To compensate for the loss of total lift in the banked attitude.

414. Generally speaking, lift always acts perpendicular to the

1- ground.
2- relative wind.
3- force of gravity.
4- chord line of the wing.

415. The critical angle of attack at which a given airplane stalls is dependent on the

1- airplane's gross weight.
2- airplane's airspeed.
3- degree of bank.
4- design of the wing.

416. Which statement is true in regard to the lift developed by a wing?

1- The sole factor that produces lift is the camber of the top surface of the wing causing reduced air pressure.

2- The sole factor that produces lift is the deflection of air downward causing an equal and opposite reaction upward.

3- Lift results from a pressure differential between the top and bottom of the wing, and from air being deflected downward and forcing the wing upward.

4- Lift results solely from a pressure differential between the top and bottom of the wing, created by the airplane's speed, and is <u>not</u> related to the downward deflection of the air.

417. What effect will a <u>decrease</u> in air density have on lift and drag?

1- Lift and drag will decrease.

2- Lift will decrease and drag will increase.

3- Lift will increase and drag will decrease.

4- Lift and drag will increase.

418. What determines the angle of attack at which a given airplane stalls?

1- Airplane gross weight.
2- True airspeed.
3- Relative wind.
4- Load factor.

419. What precaution is recommended if structural icing should form on the airplane during flight?

1- Avoid abrupt maneuvers.

2- Use a lower than normal airspeed during a climb.

3- Use a lower than normal airspeed on landing approach.

4- Change altitude as slowly as possible to reach warmer air.

420. The maximum rate of climb performance of a given airplane is primarily governed by the

1- available power in excess of that needed for cruising flight.

2- airplane's actual gross weight.

3- wind velocity.

4- total amount of lift.

421. With regard to gyroscopic precession, when a force is applied at a point on the rim of a spinning disc the resultant force acts in which direction and at what point?

1- In the same direction as the applied force, 90° ahead in the plane of rotation.

2- In the opposite direction of the applied force, 90° ahead in the plane of rotation.

3- In the same direction as the applied force, at the point of the applied force.

4- In the opposite direction of the applied force, at the point of the applied force.

422. What is the reason an airplane tends to yaw to the left when the nose is abruptly pitched down with the power on?

1- Asymmetrical thrust of the propeller blades.

2- Gyroscopic reaction of the propeller.

3- Reaction to the engine's torque.

4- Wash-in and washout of the wingtips.

423. The tendency of an airplane to yaw to the left as the nose is suddenly pitched down at a high-power setting is due to the

1- asymmetrical thrust produced by a difference in angle of attack between the ascending and descending blades of the propeller.

2- spiral flow of the prop wash or slipstream striking the left side of the vertical fin.

3- clockwise rotation of the engine and propeller causing an opposite and equal reaction.

4- force applied to the disc of the rotating propeller taking effect 90° ahead in the direction of rotation.

424. Which of the following is a result of ground effect?

1- An increase in the wing's downwash with no increase in angle of attack.

2- An increase in induced drag with no change in angle of attack.

3- An increase in wingtip vortices at a given angle of attack.

4- An increase in lift with no increase in angle of attack.

425. Which statement is true concerning ground effect?

1- A smaller angle of attack can produce the same lift coefficient as a larger angle.

2- With a constant angle of attack the induced drag increases.

3- With a constant angle of attack the wing's downwash increases.

4- At a given angle of attack the wingtip vortices increase.

426. Which would be the most likely problem to arise in regard to ground effect?

1- Retracting the landing gear before a definite climb is established on takeoff.

2- Stalling prematurely during the roundout for landing.

3- Touching down prematurely while rounding out for landing.

4- Lifting off at too great an airspeed during takeoff.

427. Under which situation is ground effect most likely to be encountered?

1- During wind conditions where obstructions produce turbulence.

2- During radiational heating from the ground surface.

3- When flying approximately 100 feet above the surface.

4- When flying within a distance of one wingspan above the surface.

428. When an airplane is flown within ground effect, the phenomenon has a tendency to

1- change the direction of the relative wind, thus producing the same lift coefficient at a smaller angle of attack.

2- increase the induced drag, thus reducing the groundspeed.

3- increase the angle of attack, thus increasing the stall speed.

4- make the wing less efficient, thus requiring a longer ground run for takeoff.

429. What is a common result of ground effect during a takeoff or a landing?

1- Floating during a landing.

2- Stalling prematurely during a landing.

3- Lifting off at a higher-than-normal airspeed.

4- Accelerating at a faster-than-normal rate during a takeoff.

430. When an airplane transitions from straight-and-level flight into a coordinated turn while maintaining a constant altitude, the total lift force must

1- increase; the load factor will decrease.

2- remain constant; the load factor will increase.

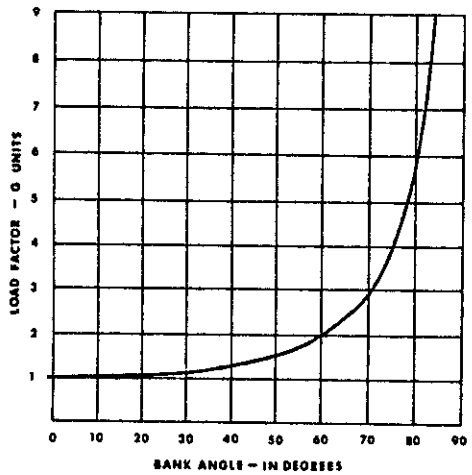
3- remain constant; the load factor will decrease.

4- increase; the load factor will increase.

431. During maneuvering flight such as turns or pullouts from dives, the increased load imposed on the wings is caused by

1- airplane's speed.
2- gravitational force.
3- induced drag.
4- centrifugal force.

LOAD FACTOR CHART



432. Refer to the illustration above. If an airplane has a limit load factor of 3.8, what angle of bank would cause the airplane to exceed that limit?

1- 75°.
2- 72°.
3- 70°.
4- 68°.

433. Refer to the illustration above. If an airplane were flown in a 60° banked turn at a constant altitude, what load factor would result?

1- 1G.
2- 2 G's.
3- 3 G's.
4- 4 G's.

434. Refer to the illustration above. If an airplane were flown in a 75° banked turn at a constant altitude, what load factor would result?

1- 1 G.
2- 2 G's.
3- 3 G's.
4- 4 G's.

435. If an airplane weighs 2,900 lbs., what air load would result if a load factor of 4.4 were imposed on the airplane's structure?

1- 12,760 lbs.
2- 5,800 lbs.
3- 4,350 lbs.
4- 7,860 lbs.

436. If an airplane's gross weight is 3,000 lbs., what is the load acting on this airplane during a level 60° banked turn?

1- 6,000 lbs.
2- 5,500 lbs.
3- 5,000 lbs.
4- 3,500 lbs.

437. If an airplane's gross weight is 2,600 lbs., what is the load acting on this airplane during a level 60° banked turn?

1- 3,500 lbs.
2- 4,500 lbs.
3- 5,000 lbs.
4- 5,200 lbs.

438. If an airplane's gross weight is 2,800 lbs., what is the load acting on this airplane during a level 60° banked turn?

1- 4,000 lbs.
2- 5,200 lbs.
3- 5,400 lbs.
4- 5,600 lbs.

439. The load imposed on the wings of an airplane during a level coordinated turn in smooth air is primarily dependent on the

1- true airspeed.
2- angle of bank.
3- density altitude.
4- rate of turn.

440. Assume an airplane has a normal stalling speed of 62 MPH, but is forced into an accelerated stall at twice that speed. What maximum load factor will result from this maneuver?

1- 1G.
2- 2 G's.
3- 3 G's.
4- 4 G's.

441. During the takeoff and landing roll in a crosswind, most tailwheel type airplanes have a greater tendency to "weathervane" than nosewheel type airplanes. This is because tailwheel types generally have

1- a longer surface exposed to the wind aft of the pivotal point (main wheels).
2- a greater gyroscopic reaction to the engine rotation.
3- the center of gravity located aft of the pivotal point (main wheels).
4- a higher angle of attack on the upwind wing.

442. Which factors involved in power-off glide performance will remain unchanged if the airplane's gross weight is increased?

1- Maximum glide angle.
2- Airspeed for a given glide ratio.
3- Pitch attitude for a given glide ratio.
4- Maximum glide ratio (L/D).

443. Why does a tailwheel type airplane have a tendency to "weathervane" or turn into the wind during ground operations?

1- The engine is higher than the tail, preventing propwash from exerting a force on the vertical fin and rudder.

2- More side surface is exposed to the wind aft of the main wheels than forward of the main wheels.

3- The tailwheel is nonsteerable, so only the rudder can be used for directional control.

4- The CG is located behind the main wheels, thereby creating a greater turning moment.

444. Why is the tendency to "groundloop" greater in tailwheel type airplanes than in nosewheel types? Primarily because in tailwheel types the

1- CG is aft of the main wheels, whereas it is forward of the main wheels in nosewheel types.

2- CG is forward of the main wheels, whereas it is aft of the main wheels in nosewheel types.

3- control of direction is accomplished by use of the rudder only, whereas all nosewheel types have nosewheel steering.

4- pilot's forward vision is obscured when in the three-point attitude, whereas in nosewheel types the pilot has a clear view ahead.

445. Which statement is true concerning the aerodynamic design of most general aviation type airplanes?

1- The center of gravity is below the thrust line.

2- The center of pressure is forward of the center of gravity.

3- The center of gravity is forward of the center of pressure.

4- The thrust line is above the center of drag.

446. The reason an airplane tends to nose down when power is reduced to idle is that the

1- thrust was acting parallel to and above the force of drag.

2- center of pressure is located forward of the center of gravity.

3- center of gravity is located forward of the center of pressure.

4- force of drag acts horizontally and above the thrust line.

447. If the airplane's aft CG limit is exceeded, it will result in

1- higher stalling speeds.

2- higher elevator control forces making it difficult for the pilot to maneuver the airplane.

3- increased longitudinal stability making it difficult for the pilot to change the airplane's attitude.

4- very light elevator control forces which make it easy to inadvertently overstress the airplane.

448. If the airplane's forward CG limit is exceeded, it will affect the flight characteristics of the airplane by producing

1- higher stalling speeds and more longitudinal stability.

2- improved performance since it reduces the induced drag.

3- decreased stability and greater ease in establishing the proper landing and takeoff attitude.

4- very light elevator control forces which make it easy to inadvertently overstress the airplane.

449. To maintain level cruising flight in an airplane which is loaded with the CG at the forward limit, an additional download must be imposed on the horizontal stabilizer. This in turn produces

1- a decrease in drag and results in a faster airspeed.

2- a lesser load that must be supported by the wing.

3- an additional load which the wing must support.

4- a decrease in drag and reduces the stalling speed.

450. When the airplane's main wheels touch the ground during landing, the decelerating force of ground friction creates a nose-down pitching moment. To counteract this moment, tailwheel type airplanes are usually designed to have the CG located

1- midway between the main wheels and the tailwheel.

2- well forward of the main wheels.

3- directly above the main wheels.

4- slightly aft of the main wheels.

451. The indicated airspeed at which an airplane stalls is most affected by the

1- airplane's altitude.
2- airplane's loading.
3- pressure altitude.
4- density altitude.

452. Which of these is the sole action that will result in a stall?

1- Flying at too low an airspeed.

2- Imposing an insufficient load factor.

3- Raising the airplane's nose too high.

4- Exceeding the critical angle of attack.

453. Which statement is true concerning the performance of slips during a landing approach with flaps extended?

1- The indicated airspeed should be less when slipping with flaps.

2- The rate of sink after removing the slip is greater than it would be without flaps.

3- A serious control hazard is created when slipping with flaps.

4- Slipping with flaps should not be attempted because the stall speed is increased significantly.

454. Which statement is true regarding the use of flaps?

1- Conventional airplanes will climb at a faster rate with flaps extended than with flaps retracted.

2- The sudden retraction of flaps will result in little or no loss of altitude if the angle of attack is held constant.

3- The stalling speed with the flaps extended is decreased so the same margin of safety above a stall is provided at a slower approach speed.

4- The primary purpose of flaps is to reduce the approach and landing speed.

455. Asymmetrical thrust produced by a propeller during certain flight conditions is the result of the

1- angle of attack on the descending blade being greater than on the ascending blade.

2- spiraling slipstream created by the rotating propeller.

3- gyroscopic precession created by the rotating propeller.

4- rolling motion of the engine caused by air resisting the propeller's rotation.

456. The amount of yawing tendency caused by "P-factor" is dependent on the

1- rapidity at which the engine power is increased.

2- angle between the propeller shaft and the airplane's climb path.

3- wash-in and washout of the airplane's wingtips.

4- degree to which the vertical fin is offset.

457. "P-factor," which produces a left yawing tendency during certain conditions and flight attitudes, is the result of the

1- descending propeller blade on the right producing more thrust than the ascending blade on the left.

2- force applied to the top of the rotating propeller disc acting 90° in advance of the point it was applied.

3- spiral flow of the air as it is forced rearward by the rotating propeller.

4- clockwise rotation of the engine and propeller rolling the airplane counterclockwise.

458. Which statement is true regarding rudder trim adjustments on an airplane with a reciprocating engine?

1- If power is constant and airspeed is decreased, apply right rudder trim.

2- If power is increased and airspeed is constant, apply left rudder trim.

3- If power is decreased and airspeed is constant, apply right rudder trim.

4- If power is constant and airspeed is increased, apply right rudder trim.

459. If a pilot fails to adjust the fuel/air mixture as altitude is gained, the mixture becomes richer because the

1- volume of air entering the carburetor becomes less while the amount of fuel becomes greater.

2- density of air entering the carburetor becomes less while the amount of fuel remains the same.

3- volume of air and the amount of fuel entering the carburetor become greater.

4- density of air entering the carburetor becomes greater and the pressure of the fuel becomes less.

460. The operating principle of float-type carburetors is based on the

1- increase in air velocity in the throat of a venturi causing an increase in air pressure.

2- measurement of the fuel flow into the induction system.

3- automatic metering of air at the venturi as the aircraft gains altitude.

4- difference in air pressure at the venturi throat and the air inlet.

461. One of the disadvantages of fuel injection systems when compared to float-type carburetors is

1- the uneven distribution of fuel to the cylinders.

2- a slower power response to throttle movement.

3- the possibility of vapor locks during ground operations on hot days.

4- poor control of the fuel/air mixture.

462. Fuel injection systems have certain advantages over float-type carburetor systems. One of these advantages is

1- easier starting when the engine is hot.

2- easier in-flight engine starts.

3- less chance of vapor lock occurring.

4- better flow of fuel.

463. During which stroke of a reciprocating engine is the gaseous mixture expanding within the cylinder?

1- Exhaust stroke.
2- Power stroke.
3- Compression stroke.
4- Intake stroke.

464. Which of these is the main reason that fuel tank vents must be open?

1- To allow proper air pressure within the tanks for maintaining a steady fuel flow.

2- To allow fuel fumes to escape from the tanks, thus eliminating the possibility of the tanks exploding.

3- To allow excess fuel to drain overboard when heat expands the volume of fuel within the tanks.

4- To allow air to enter and prevent moisture from condensing and contaminating the fuel within the tanks.

465. When is vapor lock most likely to occur in an airplane's fuel system?

1- When the engine is operated at high power settings.

2- During ground operations on hot days.

3- When flying at very high density altitudes.

4- During cold, damp days.

466. When refueling an airplane, which of the following would be adequate precautions for eliminating the potential hazard of static electricity?

1- Connect a ground wire from the truck to the ground.

2- Connect a ground wire between the airplane, fuel truck, fuel nozzle, and ground.

3- Strain the fuel through a chamois.

4- Ensure that battery and ignition switches are turned OFF.

467. Prior to starting the engine the manifold pressure gauge usually indicates approximately 29" Hg. This is because the

1- throttle is closed, trapping a high air pressure in the manifold.

2- throttle is in the full open position.

3- pressure within the manifold is the same as atmospheric pressure.

4- pointer on the gauge is stuck at the full power indication.

468. Detonation occurs at high power settings when

1- the fuel mixture explodes instead of burning progressively and evenly.

2- the intake valve opens before the previous charge of fuel has finished burning in the cylinder.

3- the fuel mixture is ignited too early by red-hot carbon deposits in the cylinder.

4- an excessively rich fuel mixture causes extremely slow burning of the fuel.

469. Detonation in an aircraft engine is most likely to occur whenever

1- the fuel being used is of a higher grade than recommended by the engine manufacturer.

2- the engine is operated under conditions which cause the fuel mixture to burn instantaneously.

3- the fuel/air ratio is such that the mixture burns extremely slow.

4- one sparkplug misfires under high compression.

470. If absolutely necessary to "hand prop" an engine, which of the following is adequate to prevent the airplane from moving forward when the engine starts?

1- Have the passenger hold the brakes ON while operating the throttle.

2- Have a qualified person operate the controls and brakes, or chock the wheels and tie the tail down.

3- Set the throttle to the start position and lock the parking brake ON.

4- Head the airplane into the wind, then set the engine controls to a low power position.

471. Completely filling the fuel tanks after the last flight of the day prevents fuel contamination by eliminating the airspace so that

1- rust or corrosive scale cannot form in the tanks.

2- rain, snow, or other moisture cannot accumulate in the tanks.

3- condensation of moist air cannot occur within the tanks.

4- development of micro-organisms is prevented by the fuel.

472. In airplanes that are equipped with controllable pitch propellers, carburetor icing would be first indicated by

1- a reduction in manifold pressure.

2- a decrease in cylinder head temperature.

3- a reduction in engine RPM.

4- engine roughness.

473. Which condition is favorable to the development of induction icing?

1- Temperatures between 0° F. and 32° F. and a relative humidity between 30% and 50%.

2- Temperatures between 32° F. and 70° F. and a relative humidity greater than 50%.

3- Any temperature below freezing and a relative humidity of less than 50%.

4- Temperatures between 32° F. and 50% F. and a relative humidity less than 50%.

474. In an engine equipped with a float-type carburetor, the low temperature that causes carburetor ice is normally the result of

1- vaporization of fuel and expansion of the air in the carburetor.

2- freezing temperature of the air entering the carburetor.

3- low volatility of aviation fuel.

4- compression of air at the carburetor venturi.

475. Wingtip vortices, the dangerous turbulence that might be encountered behind a large airplane, are created only when that airplane is

1- developing lift.
2- heavily loaded.
3- operating at high airspeeds.
4- using high-power settings.

476. Wingtip vortices which trail behind airplanes in flight are caused by the

1- slipstream or propwash of propeller driven airplanes.

2- pressure differential existing between the upper and lower surfaces of the wings.

3- axial flow or jetwash from turbine driven airplanes.

4- propwash, or jetwash, depending on the type and speed of the airplane.

477. To avoid the wingtip vortices of a departing jet during takeoff the pilot should

1- climb above and stay "upwind" of the jet aircraft's flightpath.

2- lift off at a point well past the jet aircraft's rotation point.

3- remain below the flightpath of the jet aircraft.

4- establish a flightpath "downwind" of the vortices.

478. Which statement is true regarding wingtip vortices?

1- When encountering wingtip vortices, the primary hazard is loss of control due to induced roll.

2- Vortices tend to remain level for a period of time before sinking below the generating aircraft's flightpath.

3- Greatest vortex strength is produced when the generating aircraft is heavy, clean, and fast.

4- Trailing vortices tend to move outward and upward from the generating aircraft.

479. Assume you are landing number 2 following a large transport type airplane. Where should your approach and touchdown be in relation to the transport's?

1- Remain above the transport's approach path, and touch down beyond the transport's touchdown point if remaining runway is adequate.

2- Fly below the transport's approach path and touch down on the first portion of the runway.

3- Fly on the same approach path as the transport and touch down in the designated touchdown zone.

4- Descend as quickly as possible to penetrate the wingtip vortices and land behind the transport's touchdown point.

480. Aircraft magnetos depend upon which of the following for electrical energy?

1- Self-contained magnets.
2- Alternators.
3- Generators.
4- Batteries.

481. When operating a high-powered engine, especially one with a supercharger, the use of carburetor heat should be regulated by reference to the

1- cylinder head temperature gauge.

2- manifold pressure, or RPM indicator.

3- carburetor air or mixture temperature gauge.

4- degree of engine roughness.

482. In which airplane category would the limit load factors restrict it to mild acrobatics, including spins?

1- Restricted.
2- Normal.
3- Utility.
4- Standard.

483. Acrobatics, including spins, are prohibited in which aircraft category?

1- Restricted.
2- Utility.
3- Normal.
4- Standard.

484. Mild acrobatics, including spins, are permitted in which aircraft category?

1- Normal.
2- Standard.
3- Restricted.
4- Utility.

485. If a placard in an airplane states its operational category as "utility," it would mean that the airplane may be operated in which of these maneuvers?

1- Mild acrobatics, including spins.

2- Any maneuver that requires an abrupt change in attitude.

3- All types of acrobatics.

4- Any maneuver except acrobatics or spins.

486. In airplanes equipped with constant-speed propellers, which procedure should be used to avoid placing undue stress on the engine components?

1- When power is being decreased, reduce the RPM before reducing the manifold pressure.

2- When power is being increased, increase the RPM before increasing the manifold pressure.

3- When power is being increased, increase the manifold pressure before increasing the RPM.

4- When power is being increased or decreased, the RPM should be adjusted before the manifold pressure.

487. Which of the following precautions should be taken in regard to aircraft oxygen equipment?

1- Use only an approved flame dispenser (torch) to check for leaks in the oxygen system.

2- Do not inspect oxygen systems with greasy hands, rags, or tools.

3- Use medical oxygen for replenishing the airplane's oxygen.

4- Prohibit everyone from smoking in an airplane in which an oxygen system is installed.

488. When rapid decompression occurs above 30,000 feet in a pressurized airplane, what is the pilot's average time of useful consciousness without oxygen and why?

1- 30 seconds because of hypoxia.

2- 1 minute because of the "bends."

3- 1/2 second because of severe lung damage.

4- 3 minutes because of impaired vision.

489. Which of the following occurs when climbing above 28,000 feet in an unpressurized airplane without supplemental oxygen?

1- The oxygen pressure within the lungs cannot be maintained without an increase in inhaled oxygen pressure.

2- The pressure in the middle ear becomes less than the atmospheric pressure in the cabin.

3- Vision improves significantly as altitude increases because carbon dioxide is released from the body.

4- Gases trapped in the body contract and prevent nitrogen from escaping the blood stream.

490. Aircraft cabin pressurization is used when flying above 28,000 feet primarily to

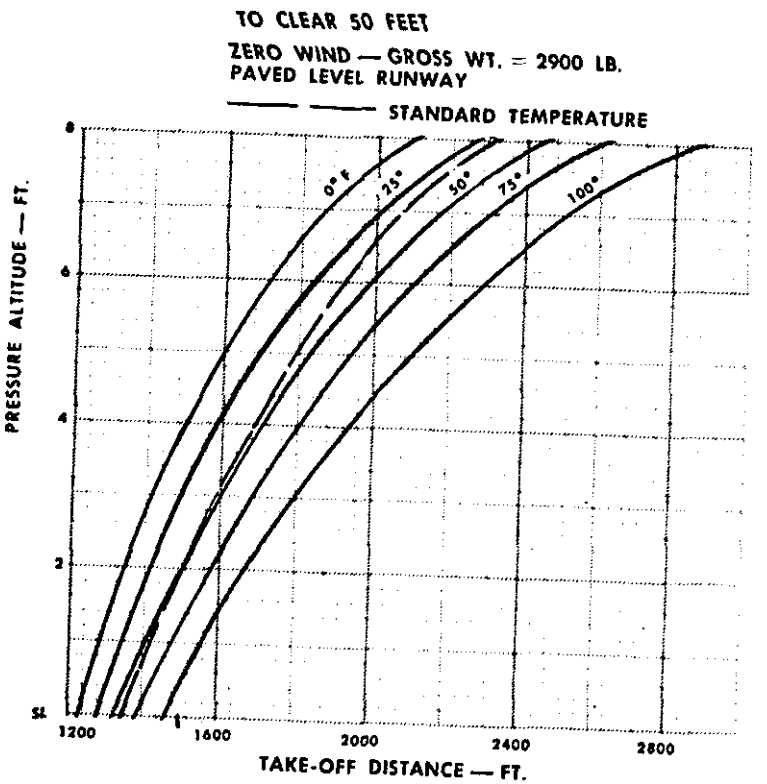
1- equalize the pressure of gases in the body with that of the environmental gas (air).

2- provide for a pressure-breathing oxygen system.

3- release the nitrogen gas that is dissolved in the blood and move it to various parts of the body.

4- provide humidity and temperature control of the cabin.

NORMAL TAKE-OFF



491. When receiving radar vectors, if an airplane is approaching on a collision course from your left, what action should you take, if any?

1- Maintain the assigned heading or altitude unless deviation is approved by ATC.

2- Expect the other pilot to give way as required by regulations.

3- Wait until ATC issues a new heading or altitude that will ensure adequate separation.

4- Take whatever action is necessary to avoid a collision.

492. During the final approach and landing at a relatively high altitude airport, the pilot should use the same indicated airspeed that is used at a sea level airport. In doing so the

1- true airspeed will be lower and the landing distance will be shorter.

2- true airspeed will be the same and the landing distance will be the same.

3- groundspeed will be the same and the landing distance will be the same.

4- groundspeed will be higher and the landing distance will be longer.

493. Using these and associated conditions in the chart on page 84, determine the distance required to take off and clear a 50-foot obstacle.

Pressure altitude----- 1,400 feet
Temperature---------- Standard

The takeoff distance required would be

1- 1,540 feet.
2- 1,600 feet.
3- 1,440 feet.
4- 1,400 feet.

494. Using these and associated conditions in the chart on page 84, determine the distance required to take off and clear a 50-foot obstacle.

Pressure altitude----- 1,650 feet
Temperature---------- 75° F.

The takeoff distance required would be

1- 1,540 feet.
2- 1,600 feet.
3- 1,440 feet.
4- 1,400 feet.

495. Using these and associated conditions in the chart on page 84, determine the distance required to take off and clear a 50-foot obstacle.

Pressure altitude----- 1,900 feet
Temperature---------- 100° F.

The takeoff distance required would be

1- 1,640 feet.
2- 1,540 feet.
3- 1,740 feet.
4- 1,840 feet.

496. Suppose the following conditions exist:

Temperature---------- Standard
Pressure altitude----- 3,500 feet

Under these and the associated conditions in the chart on page 84, the takeoff distance required to clear a 50-foot obstacle is

1- 1,340 feet.
2- 1,440 feet.
3- 2,300 feet.
4- 1,640 feet.

497. Suppose the following conditions exist:

Pressure altitude----- 3,500 feet
Temperature---------- 75° F.

Under these and the associated conditions in the chart on page 84, the takeoff distance required to clear a 50-foot obstacle is

1- 1,640 feet.
2- 1,340 feet.
3- 1,740 feet.
4- 1,840 feet.

498. If the airplane is consuming 12.5 gallons per hour at a cruising altitude of 8,500 feet and the groundspeed is 150 knots, how much fuel is required to travel 450 NM?

1- 37.5 gallons.
2- 34.5 gallons.
3- 30.0 gallons.
4- 29.0 gallons.

499. If the airplane is consuming 11.5 gallons per hour at a cruising altitude of 6,000 feet and the groundspeed is 150 knots, how much fuel is required to travel 450 NM?

1- 29.0 gallons.
2- 30.0 gallons.
3- 37.5 gallons.
4- 34.5 gallons.

SEA LEVEL

HORSEPOWER SETTING - IO-520-B

2000 FEET

MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH	MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
23.2	-	-	-20	75	214	92 15.3	23.0	-	-
21.1	22.8	-		65	185	80 13.35	20.8	22.5	-
18.8	20.2	22.0		55	157	69 11.5	18.6	20.0	21.7
16.6	17.7	19.1		45	128	58 9.7	16.4	17.5	18.9
23.7	-	-	0	75	214	92 15.3	23.4	-	-
21.4	23.1	-		65	185	80 13.35	21.2	22.9	-
19.1	20.5	22.4		55	157	69 11.5	18.9	20.3	22.1
16.8	18.0	19.5		45	128	58 9.7	16.7	17.8	19.2
24.0	-	-	+20	75	214	92 15.3	23.7	-	-
21.7	23.5	-		65	185	80 13.35	21.5	23.2	-
19.4	20.9	22.7		55	157	69 11.5	19.2	20.6	22.5
17.0	18.2	19.8		45	128	58 9.7	16.8	18.0	19.5
24.4	-	-	+40	75	214	92 15.3	24.1	-	-
22.1	23.9	-		65	185	80 13.35	21.8	23.6	-
19.7	21.2	23.1		55	157	69 11.5	19.5	20.9	22.8
17.2	18.5	20.1		45	128	58 9.7	17.1	18.3	19.8
24.8	-	-	+60	75	214	92 15.3	24.5	-	-
22.4	24.2	-		65	185	80 13.35	22.2	24.0	-
20.0	21.5	23.5		55	157	69 11.5	19.8	21.3	23.2
17.5	18.8	20.4		45	128	58 9.7	17.3	18.6	20.1
25.2	-	-	+80	75	214	92 15.3	24.9	-	-
22.8	24.7	-		65	185	80 13.35	22.5	24.4	-
20.2	21.8	23.8		55	157	69 11.5	20.1	21.6	23.5
17.7	19.0	20.6		45	128	58 9.7	17.5	18.8	20.4
25.5	-	-	+100	75	214	92 15.3	25.2	-	-
23.0	-	-		65	185	80 13.35	22.8	24.7	-
20.5	22.1	-		55	157	69 11.5	20.2	21.9	23.8
17.9	19.2	20.9		45	128	58 9.7	17.7	19.0	20.7

4000 FEET

HORSEPOWER SETTING - IO-520-B

6000 FEET

MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH	MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
22.6	-	-	-20	75	214	92 15.3	22.2	-	-
20.5	22.2	-		65	185	80 13.35	20.2	21.7	-
18.3	19.7	21.4		55	157	69 11.5	18.0	19.4	21.0
16.2	17.3	18.7		45	128	58 9.7	15.9	17.0	18.3
23.0	-	-	0	75	214	92 15.3	22.5	-	-
20.8	22.5	-		65	185	80 13.35	20.5	22.1	-
18.6	20.1	21.8		55	157	69 11.5	18.2	19.7	21.3
16.4	17.5	19.0		45	128	58 9.7	16.2	17.2	18.6
23.4	-	-	+20	75	214	92 15.3	-	-	-
21.2	22.8	-		65	185	80 13.35	20.8	22.4	-
18.8	20.3	22.1		55	157	69 11.5	18.5	20.0	21.7
16.7	17.8	19.2		45	128	58 9.7	16.4	17.5	18.8
23.8	-	-	+40	75	214	92 15.3	23.3	-	-
21.5	23.3	-		65	185	80 13.35	21.1	22.8	-
19.2	20.7	22.5		55	157	69 11.5	18.8	20.3	22.0
16.8	18.0	19.6		45	128	58 9.7	16.6	17.7	19.2
24.2	-	-	+60	75	214	92 15.3	23.7	-	-
21.9	23.7	-		65	185	80 13.35	21.4	23.2	-
19.5	21.0	22.8		55	157	69 11.5	19.1	20.6	22.4
17.1	18.3	19.9		45	128	58 9.7	16.8	18.0	10.5
24.5	-	-	+80	75	214	92 15.3	24.0	-	-
22.2	24.0	-		65	185	80 13.35	21.7	23.5	-
19.8	21.3	21.2		55	157	69 11.5	19.4	20.9	22.7
17.3	18.6	20.2		45	128	58 9.7	17.0	18.2	19.8
24.8	-	-	+100	75	214	92 15.3	-	-	-
22.5	24.3	-		65	185	80 13.35	22.0	23.8	-
20.0	21.5	23.5		55	157	69 11.5	19.6	21.1	23.0
17.5	18.8	20.4		45	128	58 9.7	17.2	18.4	20.0

500. Refer to the chart on page 86. When using 65% power at a cruising altitude of 5,000 feet with a groundspeed of 165 knots, what is the maximum distance that can be flown if the flight began with 400 lbs. of fuel?

1- 825 NM.
2- 800 NM.
3- 775 NM.
4- 750 NM.

501. Refer to the chart on page 86. When using 75% power at a cruising altitude of 5,000 feet with a groundspeed of 185 knots, the total amount of fuel required to fly 647 NM would be

1- 290 lbs.
2- 302 lbs.
3- 312 lbs.
4- 322 lbs.

502. Refer to the chart on page 86. When using 65% power at a cruising altitude of 5,000 feet with a groundspeed of 150 knots, the total amount of fuel required to fly 60 NM would be

1- 350 lbs.
2- 320 lbs.
3- 302 lbs.
4- 298 lbs.

503. Refer to the chart on page 86. Assume these conditions exist on a cross-country flight.

Cruising altitude--- 4,000 ft.
Temperature--------- +20° F.
Power settings------ 2300 RPM - 22.8" MP
Groundspeed--------- 150 knots
Distance to fly----- 500 NM

How much fuel is required to accomplish the flight?

1- 202 lbs.
2- 232 lbs.
3- 266 lbs.
4- 296 lbs.

504. Refer to the chart on page 86. If 3.5 hours are required to fly 450 NM when using 65% power at 6,000 feet, what would be the groundspeed and amount of fuel consumed?

1- 129 knots and 46.7 gallons.
2- 129 knots and 40.6 gallons.
3- 134 knots and 46.7 gallons.
4- 134 knots and 40.6 gallons.

505. Refer to the chart on page 86. With an OAT of +50° F., what is the maximum attainable manifold pressure at 2300 RPM at 6,000 feet?

1- 22.8" Hg.
2- 23.0" Hg.
3- 23.2" Hg.
4- 23.7" Hg.

506. Refer to the chart on page 86. When using 65% power at a cruising altitude of 5,000 feet with a true airspeed of 165 knots and a headwind of 30 knots, what is the maximum distance that can be flown if the flight began with 400 lbs. of fuel?

1- 825 NM.
2- 800 NM.
3- 750 NM.
4- 675 NM.

507. Refer to the chart on page 86. When using 75% power at a cruising altitude of 5,000 feet with a true airspeed of 205 knots and a headwind of 20 knots, the total amount of fuel required to fly 647 NM would be

1- 290 lbs.
2- 302 lbs.
3- 312 lbs.
4- 322 lbs.

508. Refer to the chart on page 86. When using 65% power at a cruising altitude of 5,000 feet with a true airspeed of 165 knots and a headwind of 15 knots, the total amount of fuel required to fly 600 NM would be

1- 350 lbs.
2- 320 lbs.
3- 302 lbs.
4- 298 lbs.

509. Refer to the chart on page 86. If using 21" Hg and 2300 RPM at 4,000 feet when OAT is +60° F., what is the maximum duration of flight with 40.5 gallons available?

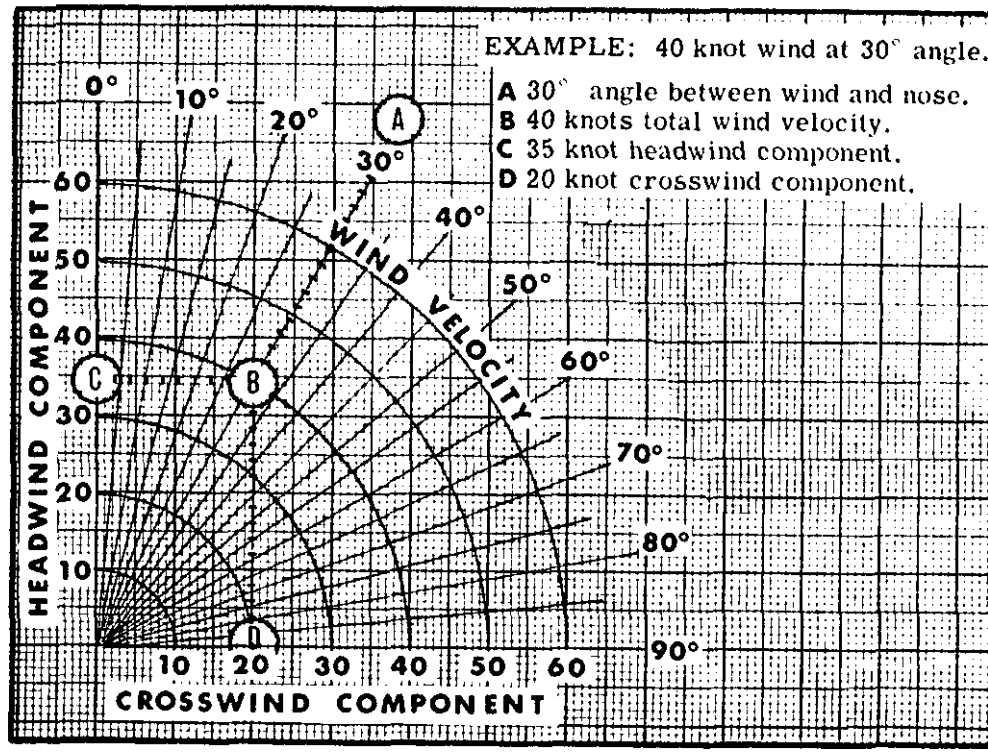
1- 2.1 hours.
2- 2.6 hours.
3- 3.5 hours.
4- 4.5 hours.

510. Refer to the chart on page 86. To fly for 3.5 hours at a cruising altitude of 6,000 feet with only 240 lbs. of fuel available, what is the maximum amount of power that should be used?

1- 45%.
2- 55%.
3- 65%.
4- 75%.

511. Refer to the chart on page 86. When using 65% power at a cruising altitude of 5,000 feet with 400 lbs. of fuel aboard, what is the maximum duration of flight?

1- 3.5 hours.
2- 4.0 hours.
3- 4.5 hours.
4- 5.0 hours.



512. Based on the above chart, which of these wind conditions would exceed 0.2 Vso, if Vso of the airplane is 60 knots?

1- 10 knot wind, 90° to the runway being used.

2- 15 knot wind, 45° to the runway being used.

3- 20 knot wind, 40° to the runway being used.

4- 25 knot wind, 25° to the runway being used.

513. Based on the above chart, which of these wind conditions would exceed 0.2 Vso, if Vso of the airplane is 65 knots?

1- 25 knot wind, 35° to the runway being used.

2- 30 knot wind, 25° to the runway being used.

3- 35 knot wind, 20° to the runway being used.

4- 40 knot wind, 10° to the runway being used.

514. Use the chart above and assume Runway 18 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 Vso, if Vso of the airplane is 55 knots?

1- 160° at 30 knots.
2- 165° at 35 knots.
3- 210° at 20 knots.
4- 240° at 15 knots.

515. Use the above chart and assume Runway 27 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 Vso, if Vso of the airplane is 65 knots?

1- 350° at 10 knots.
2- 320° at 15 knots.
3- 220° at 20 knots.
4- 240° at 25 knots.

516. Use the above chart and assume Runway 21 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 Vso, if Vso of the airplane is 60 knots?

1- 250° at 10 knots.
2- 170° at 20 knots.
3- 190° at 30 knots.
4- 230° at 30 knots.

517. Refer to the above chart. Suppose the airplane being flown has crosswind capability in direct crosswinds up to 12 knots. Which of these wind conditions would exceed the airplane's crosswind capability?

1- A crosswind of 10 knots at a 90° angle.

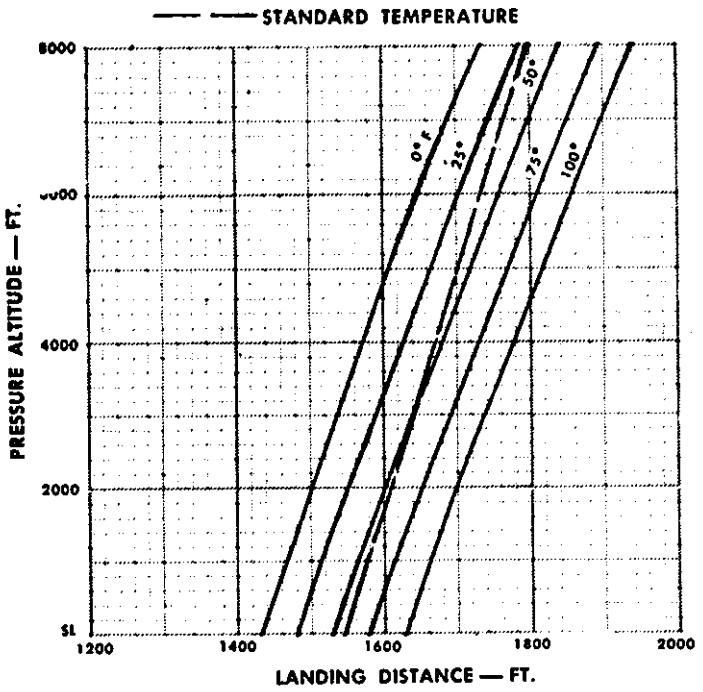
2- A crosswind of 20 knots at a 30° angle.

3- A crosswind of 20 knots at a 40° angle.

4- A crosswind of 15 knots at a 45° angle.

NORMAL LANDING

LANDING DISTANCE OVER 50 FT.
POWER OFF APPROACH
FLAPS — 30°, ZERO WIND
GROSS WEIGHT = 2900 LB.
PAVED LEVEL RUNWAY



518. Use the above chart. If the pressure altitude is 4,200 feet and the ambient temperature is standard, the landing distance with the given conditions would be approximately

1- 1,800 feet.
2- 1,750 feet.
3- 1,675 feet.
4- 1,575 feet.

519. Using the above chart, determine the landing distance under the following conditions:

Pressure altitude----- 5,800 feet
Ambient temperature-- 100° F.

The landing distance with the given conditions would be approximately

1- 1,625 feet.
2- 1,700 feet.
3- 1,850 feet.
4- 1,940 feet.

520. Refer to the above chart. What is the approximate landing distance with the given conditions when the wind is zero, pressure altitude is 3,200 feet, and the temperature is 100° F.?

1- 1,610 feet.
2- 1,710 feet.
3- 1,750 feet.
4- 1,800 feet.

521. Using the above chart, what is the approximate landing distance with the given conditions when the wind is zero, pressure altitude is 3,000 feet, and temperature is 87° F.?

1- 1,615 feet.
2- 1,715 feet.
3- 1,755 feet.
4- 1,800 feet.

522. Use the above chart. Suppose the ambient temperature is 63° F. and the pressure altitude is 2,800 feet. The landing distance with the given conditions would be approximately

1- 1,425 feet.
2- 1,560 feet.
3- 1,650 feet.
4- 1,840 feet.

STALL SPEED CHART
MPH - CAS
4990 POUNDS GROSS WEIGHT

CONFIGURATION	ANGLE OF BANK			
	0°	20°	40°	60°
Gear and Flaps Up	84	87	97	119
Gear Down and Flaps 15°	80	83	93	113
Gear Down and Flaps 45°	76	79	87	108

AIRSPEED CORRECTION TABLE

Flaps 0°		Flaps 15°*		Flaps 45°**	
IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH
80	84	70	78	70	78
100	103	80	88	80	84
120	122	90	94	90	93
140	141	100	103	100	102
160	161	110	113	110	111
180	181	120	121	120	120
200	201	130	131	130	129
220	221	140	141	140	138
240	242	150	151		
		160	161		

* Maximum Flap Speed 160 MPH ** Maximum Flap Speed 140 MPH

Note: CAS is identical to TIAS.

523. Refer to the above charts. With the gear and flaps up, what would be the indicated stall speed, if the angle of bank is 20°?

1- 70 MPH.
2- 83 MPH.
3- 87 MPH.
4- 102 MPH.

524. Refer to the above charts. Suppose the gear is down and the flaps are set at 15°. If the angle of bank is 0°, what would be the indicated stall speed?

1- 88 MPH.
2- 84 MPH.
3- 80 MPH.
4- 71 MPH.

525. Refer to the above charts. If the bank angle is 60°, the gear is down, and the flaps are set at 45°, what would be the indicated stall speed?

1- 84 MPH.
2- 93 MPH.
3- 106 MPH.
4- 110 MPH.

526. Refer to the above charts. What would be the approximate indicated stall speed during a 40° bank with the gear down and flaps set at 15°?

1- 80 MPH.
2- 88 MPH.
3- 90 MPH.
4- 92 MPH.

527. Refer to the above charts. With the gear down and flaps set at 45°, what would be the indicated stall speed if the angle of bank is 40°?

1- 80 MPH.
2- 83 MPH.
3- 87 MPH.
4- 90 MPH.

528. What is calibrated airspeed?

1- Indicated airspeed corrected for air temperature.
2- Indicated airspeed corrected for instrument and installation error.
3- Indicated airspeed corrected for pressure altitude.
4- Indicated airspeed corrected for density altitude.

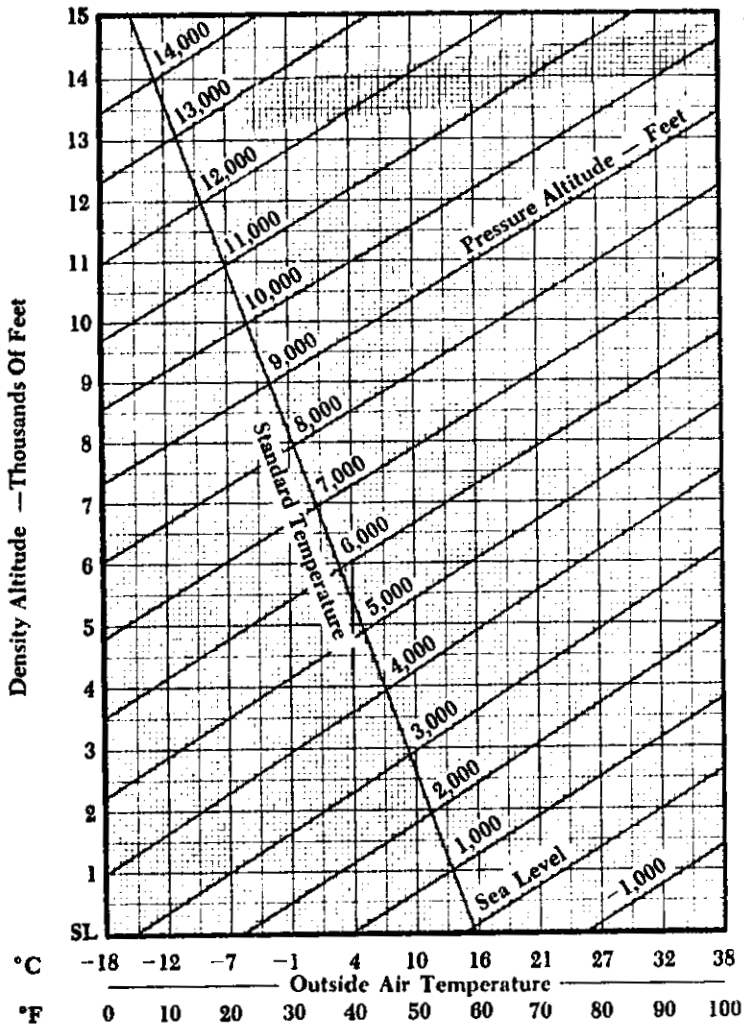
529. Under standard atmospheric conditions, which statement is true regarding pressure altitude (PA) and density altitude (DA)?

1- PA is lower than DA.
2- PA is equal to DA.
3- PA is greater than DA.
4- PA increases with an increase in pressure, while DA decreases as pressure increases.

530. Of the following factors, which would <u>increase</u> the density altitude of a given airport?

1- An increase in air temperature.
2- An increase in atmospheric pressure.
3- A decrease in relative humidity.
4- An increase in altimeter setting.

PRESSURE ALTITUDE AND DENSITY CHART



Altitude Setting in Hg.	Altitude Addition For Obtaining Pressure Altitude
28.0	1,825
28.1	1,725
28.2	1,630
28.3	1,535
28.4	1,435
28.5	1,340
28.6	1,245
28.7	1,150
28.8	1,050
28.9	955
29.0	865
29.1	770
29.2	675
29.3	580
29.4	485
29.5	390
29.6	300
29.7	205
29.8	110
29.9	20
29.92	0
30.0	-75
30.1	-165
30.2	-225
30.3	-350
30.4	-440
30.5	-530
30.6	-620
30.7	-710
30.8	-805
30.9	-895
31.0	-965

531. Refer to the above chart. When the altimeter setting is 30.10 and the temperature is 100° F. at an elevation of 2,595 feet, the density altitude is approximately

1- 2,200 feet.
2- 3,200 feet.
3- 5,400 feet.
4- 6,100 feet.

532. Refer to the above chart. If, during takeoff at an airport having an elevation of 2,223 feet, a temperature of 95° F., and an altimeter setting of 28.90, the airplane would perform as though it were at

1- 6,064 feet MSL.
2- 4,700 feet MSL.
3- 3,200 feet MSL.
4- 2,223 feet MSL.

533. Refer to the above chart. If the ambient temperature and altimeter setting are 75° F. and 29.85, respectively, at an airport having an elevation of 4,695 feet, the density altitude at that airport would be approximately

1- 1,800 feet.
2- 4,600 feet.
3- 4,760 feet.
4- 6,600 feet.

534. Refer to the above chart. If the ambient temperature and altimeter setting are 95° F. and 29.85, respectively, at an airport having an elevation of 4,695 feet, the density altitude at that airport would be approximately

1- 4,695 feet.
2- 6,250 feet.
3- 4,760 feet.
4- 7,800 feet.

535. Suppose at an altitude of 6,500 feet MSL, the current altimeter setting is 30.42. The pressure altitude would be approximately

1- 7,000 feet.
2- 7,500 feet.
3- 6,000 feet.
4- 6,500 feet.

536. Suppose the FSS reports an altimeter setting of 29.75. If the airport elevation is 3,657 feet, the pressure altitude would be approximately

1- 3,480 feet.
2- 3,820 feet.
3- 6,330 feet.
4- 6,670 feet.

537. Suppose the FSS reports an altimeter setting of 29.25. If the airport elevation is 4,207 feet, the pressure altitude at that airport would be approximately

1- 3,480 feet.
2- 4,170 feet.
3- 4,830 feet.
4- 7,525 feet.

538. Suppose at an altitude of 7,500 feet MSL, the nearest FSS reports a current altimeter setting of 30.42. The pressure altitude would be approximately

1- 7,500 feet.
2- 7,000 feet.
3- 6,500 feet.
4- 6,000 feet.

539. Assume that an airplane is flying at a constant power setting and constant indicated altitude. As a result of a decrease in the outside air temperature, the true airspeed will

1- decrease and the true altitude will decrease.
2- decrease and the true altitude will increase.
3- increase and the true altitude will increase.
4- increase and the true altitude will decrease.

540. For each 1,000-foot increase in altitude, the true airspeed increases approximately

1- 10% of the indicated airspeed.
2- 2% of the indicated airspeed.
3- 5% of the indicated airspeed.
4- 3.5% of the indicated airspeed.

541. Assume that an airplane is flying at a constant indicated altitude and a constant power setting. As a result of an increase in the outside air temperature, the true airspeed will

1- increase and the true altitude will increase.
2- increase and the true altitude will decrease.
3- decrease and the true altitude will decrease.
4- decrease and the true altitude will increase.

542. Which statement is true regarding the relationship of true airspeed and indicated airspeed as altitude increases?

1- For a given true airspeed, indicated airspeed increases.
2- For a given true airspeed, indicated airspeed decreases.
3- For a given indicated airspeed, true airspeed decreases.
4- For a given indicated airspeed, true airspeed remains unaffected.

543. Which statement is true regarding the maximum glide distance for a given airplane in a no-wind condition?

1- A lighter gross weight requires a faster glide speed.
2- A lighter gross weight requires a slower glide speed.
3- The gross weight has no effect on the proper glide speed.
4- A heavier gross weight will require a decrease in glide speed.

544. Which statement is true regarding takeoff performance with high density altitude conditions?

1- A higher than normal indicated airspeed is required to produce sufficient lift since the air is less dense.
2- The acceleration rate will increase since the lighter air creates less drag.
3- The acceleration rate is slower because the engine and propeller efficiency is reduced.
4- A shorter distance is required to accelerate to lift-off speed due to the reduced drag of the lighter air.

545. Refer to the airspeed illustration above. "Vfe" is represented by which airspeed?

1- 215 MPH.
2- 150 MPH.
3- 80 MPH.
4- 50 MPH.

546. Refer to the airspeed illustration above. "Vso" is represented by which airspeed?

1- 50 MPH.
2- 70 MPH.
3- 85 MPH.
4- 110 MPH.

547. Refer to the airspeed illustration above. "Vsl" is represented by which airspeed?

1- 70 MPH.
2- 80 MPH.
3- 85 MPH.
4- 110 MPH.

548. Which statement is true regarding the airspeed indicator illustration above?

1- Maneuvering speed is <u>not</u> marked on the face of the instrument.
2- Best angle-of-climb speed is represented by the blue line (110 MPH).
3- Maximum landing gear operating speed is represented by the "top" of the white arc (210 MPH).
4- Maximum structural cruising speed is represented by the "top" of the yellow arc (272 MPH).

549. According to the airspeed indicator illustration above, the maximum speed for normal operation is

1- 250 MPH.
2- 210 MPH.
3- 185 MPH.
4- 150 MPH.

550. Which airspeed on the illustration above represents "Vne"?

1- 150 MPH.
2- 210 MPH.
3- 215 MPH.
4- 272 MPH.

551. Which of the following airspeeds is identified by color coding on an airspeed indicator?

1- The maximum gear operating or extended speed.
2- The maximum structural cruising speed.
3- The design maneuvering speed.
4- The stalling speed for all altitudes and configurations.

552. The symbol which means the stalling speed or the minimum steady flight speed in a specified configuration is

1- Vsl.
2- Vs.
3- Va.
4- Vso.

553. Which symbol designates the airspeed that should not be exceeded after a retractable landing gear is in the down and locked position?

1- V_{FE}.
2- V_{LE}.
3- V_{LO}.
4- V_{LOF}.

554. Which symbol designates the airspeed that should not be exceeded while the retractable landing gear is being extended?

1- V_{LOF}.
2- V_{LO}.
3- V_{LE}.
4- V_{FE}.

555. Which symbol means "maximum flap extended speed?"

1- V_{FE}.
2- V_{LE}.
3- V_{LOF}.
4- V_{FC}.

556. Which statement concerning airplane speed symbols is true?

1- Vx means the best rate-of-climb speed.
2- V_{LE} means the maximum landing safety speed.
3- V_{FE} means the maximum flap extended speed.
4- V_{SO} means the power-on stalling speed with the gear and flaps retracted.

557. Which airspeed symbol means "design maneuvering speed?"

1- V_A.
2- V_{MC}.
3- V_C.
4- V_D.

558. "Maximum landing gear extended speed" is represented by which symbol?

1- V_{LO}.
2- V_{LE}.
3- V_{LOF}.
4- V_{FE}.

559. Operation in excess of an airplane's V_{NE} should be avoided because

1- flutter or excessive load factors could be induced.
2- excessive induced drag could cause structural failure.
3- control effectiveness would be impaired to the point that the airplane would be uncontrollable.
4- the stalling speed would increase to the point that normal maneuvers could not be performed without stalling.

560. Whenever climbing or descending through an inversion or wind shear zone, the pilot should be alert for which of the following changes in airplane performance?

1- A fast rate of climb and a slow rate of descent.
2- A sudden loss of airspeed.
3- A sudden surge of thrust.
4- A sudden decrease in power.

561. Suppose the airplane's maximum glide ratio in calm air is obtained at an airspeed of 80 knots. To obtain the maximum glide when flying into a 40 knot headwind, it would be best to

1- use an airspeed less than 80 knots.
2- maintain an airspeed greater than 80 knots.
3- glide at 80 knots in spite of the wind.
4- extend 10° of flaps and increase the airspeed.

562. In regard to the climb angle, the airplane will climb at

1- a shallower angle while flying downwind than when flying into the wind.
2- the same angle whether flying downwind or upwind.
3- a steeper angle when flying downwind than when flying into the wind.
4- a lesser rate when flying downwind than when flying into the wind.

563. Suppose while flying in a steady wind of 25 knots, the airplane is turned from a direct headwind to a direct tailwind. The indicated airspeed would

1- remain the same but the groundspeed would increase 50 knots.
2- increase 25 knots and the groundspeed would increase 25 knots.
3- decrease 25 knots and the groundspeed would increase 25 knots.
4- increase 50 knots and the groundspeed would increase 25 knots.

564. During a level turn, increasing the airspeed while maintaining a constant load factor would result in

1- a decrease in the radius of turn.
2- an increase in the radius of turn.
3- the same radius of turn.
4- an increase in centrifugal force.

CLIMB SPEEDS

Cruising Climb Speed—Normal rate of power, full throttle with Gear and Flaps Up ..... 130 mph

At 5000 ft. Altitude	GEAR & FLAP UP	GEAR DOWN	GEAR & FLAP DOWN
Best rate of climb speed	102 mph	86 mph	67 mph
Best angle of climb speed	84 mph	75 mph	64 mph

STALL SPEEDS

CONFIGURATION	ANGLE OF BANK			
	0°	20°	40°	60°
Gear and Flaps Up Power Off	71.0 mph	73.2 mph	81.1 mph	100.4 mph
Gear and Flaps Up Power On	63.0 mph	65.0 mph	72.0 mph	89.2 mph
Gear and Flaps Down Power Off	60.0 mph	61.9 mph	68.6 mph	84.9 mph
Gear and Flaps Down Power On	54.0 mph	55.7 mph	61.7 mph	76.5 mph

565. Refer to the illustration above. If "Vx" is maintained during a straight climb with gear and flaps down, how much margin of safety will there be above stalling speed?

1- 20 MPH.
2- 15 MPH.
3- 10 MPH.
4- 5 MPH.

566. Using the above information, determine the airspeed that is recommended by FAA when none is specified by the airplane manufacturer for a short field approach. The proper approach speed is

1- 55-59 MPH.
2- 64-68 MPH.
3- 70-74 MPH.
4- 78-84 MPH.

567. The center of gravity of an airplane can be determined by which of the following methods?

1- Dividing total arms by total moments.
2- Multiplying total weight by total moments.
3- Dividing total moments by total weight.
4- Multiplying total arms by total weight.

568. Suppose the nosewheel of an airplane moves aft during gear retraction. How would this aft movement affect the CG location of that airplane?

1- It would cause the CG location to move aft.
2- It would have no effect on the CG location.
3- It would cause the CG location to move forward.
4- It would cause the CG location to move, but the direction of movement would be unpredictable.

569. Suppose the nosewheel of an airplane moves forward upon gear retraction. Would this forward movement affect the CG location of that airplane?

1- Yes; the CG would move aft.
2- No; the CG would not move.
3- Yes, but the CG movement would be unpredictable.
4- Yes; the CG would move forward.

570. GIVEN:

Total weight-------- 4,385 lbs.
CG location--------- Station 90.0

If 115 lbs. were added at Station 115.0, where would the new CG be located?

1- Station 89.4.
2- Station 90.6.
3- Station 95.8.
4- Station 108.7.

571. GIVEN:

Total weight-------- 6,300 lbs.
CG location--------- Station 97.6
Forward CG limit---- Station 95.0

The maximum weight that could be added to Station 30.0 without exceeding the forward CG limit would be

1- 65 lbs.
2- 240 lbs.
3- 252 lbs.
4- 260 lbs.

572. GIVEN:

Total weight-------- 2,850 lbs.
CG location--------- Station 76.3
Forward CG limit---- Station 74.0

How much weight could be added at Station 24.0 without exceeding the forward CG limit?

1- 180 lbs.
2- 174 lbs.
3- 150 lbs.
4- 131 lbs.

573. GIVEN:

Total weight-------- 2,840 lbs.
Center of gravity--- 30" aft of datum

If 60 lbs. were added at 100" aft of datum, the new CG would be

1- 28.6" aft of datum.
2- 31.4" aft of datum.
3- 40.4" aft of datum.
4- 41.4" aft of datum.

574. GIVEN:

Total weight-------- 8,500 lbs.
CG location--------- Station 105.0

If 145 lbs. were added at Station 135.5, the new CG would be located at Station

1- 105.51.
2- 105.59.
3- 106.79.
4- 106.87.

575. GIVEN:

Total weight-------- 5,000 lbs.
CG location--------- Station 100.0

If 65 lbs. were added at Station 120.0, the new CG would be located at Station

1- 100.25.
2- 100.43.
3- 111.41.
4- 123.00.

576. GIVEN:

Total weight-------- 4,800 lbs.
CG location--------- Station 87.5
Aft CG limit-------- Station 89.0

The maximum weight that could be added to Station 130.0 without exceeding the aft CG limit would be

1- 175 lbs.
2- 220 lbs.
3- 130 lbs.
4- 41 lbs.

577. GIVEN:

Weight "X"-125 lbs. 15" aft of datum
Weight "Y"-150 lbs. 106" aft of datum
Weight "Z"-60 lbs. 200" aft of datum

Based on this information, the center of gravity would be located how far aft of datum?

1- .01".
2- 88.8".
3- 92.7".
4- 19.0".

578. GIVEN:

Weight "D"-157 lbs. 30" aft of datum
Weight "E"-175 lbs. 150" aft of datum
Weight "F"-100 lbs. 190" aft of datum

Based on this information, where would the center of gravity be located?

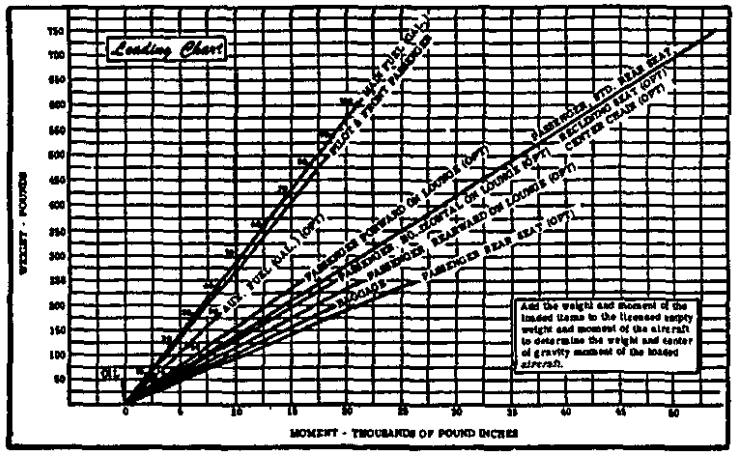
1- 0.86" aft of datum.
2- 85.64" aft of datum.
3- 115.64" aft of datum.
4- 135.02" aft of datum.

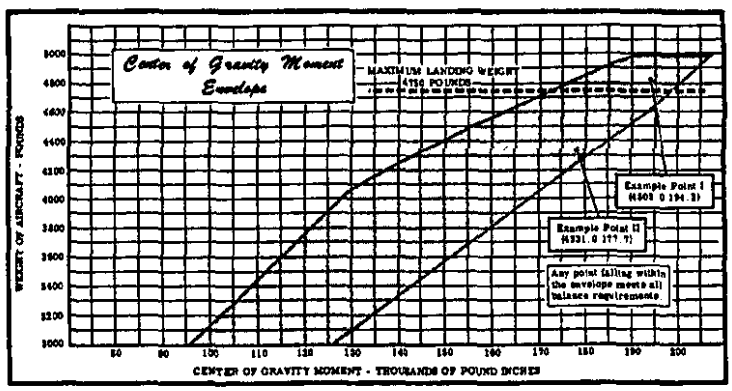
579. GIVEN:

Weight "A"-135 lbs. 17" aft of datum
Weight "B"-175 lbs. 115" aft of datum
Weight "C"-83 lbs. 190" aft of datum

Based on this information, the center of gravity would be located how far aft of datum?

1- 118.60".
2- 97.17".
3- 10.29".
4- .01".





580. GIVEN:

Airplane empty weight----	3,130 lbs.
Empty weight moment------	106.7 (in.lbs/ 1000)
Front seat----------	410 lbs.
Fuel (main tanks)--------	100 gals.
Fuel (auxiliary tanks)---	30 gals.
Oil----------	6 gals.

Based on this information and using the above charts, the CG is determined to be located

1- well forward of the forward CG limit; the weight should be adjusted as necessary prior to flight.

2- near the aft CG limit; the weight should be adjusted as necessary prior to flight.

3- within the CG envelope; no weight adjustment is necessary.

4- well aft of the aft CG limit; the weight should be adjusted as necessary prior to flight.

581. GIVEN:

Airplane empty weight----	3,065 lbs.
Empty weight moment------	117.0 (in. lbs/ 1000)
Front seat----------	410 lbs.
Rear seat (std)----------	400 lbs.
Fuel (main tanks)--------	100 gals.
Fuel (auxiliary tanks)---	30 gals.
Oil----------	6 gals.
Baggage----------	200 lbs.

Based on this information and using the above charts, the CG is determined to be located

1- near the aft CG limit; the weight should be adjusted as necessary prior to flight.

2- well forward of the forward CG limit; the weight should be adjusted as necessary prior to flight.

3- outside the CG limit; the weight should be adjusted as necessary prior to flight.

4- within the CG envelope; no weight adjustment is necessary.

582. Which statement is true regarding the effect of temperature changes on the indications of a sensitive altimeter?

1- colder-than-standard temperatures will place the airplane lower than the altimeter indicates.

2- Warmer-than-standard temperatures will place the airplane lower than the altimeter indicates.

3- Colder-than-standard temperatures will place the airplane higher than the altimeter indicates.

4- Temperature changes, unlike pressure changes, have no effect on the altimeter indications.

583. The reported altimeter setting of a given station is the

1- actual barometric pressure measured at the station.

2- actual barometric pressure measured at sea level.

3- station's barometric pressure converted to mean sea level pressure.

4- station's pressure altitude adjusted for existing temperature.

584. Suppose a flight is made from an area of high pressure into an area of lower pressure without the altimeter setting being adjusted. If a constant indicated altitude is maintained, the altimeter would indicate

1- higher than the actual altitude above sea level.

2- lower than the actual altitude above sea level.

3- the actual altitude above ground level.

4- the actual altitude above sea level.

585. Suppose a flight is made from an area of low pressure into an area of higher pressure without the altimeter setting being adjusted. If a constant indicated altitude were maintained, the altimeter would indicate

1- higher than the actual altitude above sea level.

2- the actual altitude above ground level.

3- the actual altitude above sea level.

4- lower than the actual altitude above sea level.

586. The different colored radials and arcs on an airspeed indicator represent

1- indicated airspeeds.
2- equivalent airspeeds.
3- calibrated airspeeds.
4- true airspeeds.

587. Which statement is true about magnetic deviation of a compass?

1- Deviation is the same for all airplanes in the same locality.

2- Deviation is different on various headings of a given airplane.

3- Deviation is the same for all airplanes on various headings.

4- Deviation is different in a given airplane in different localities.

588. If the altimeter indicates 1,380 feet when set to 29.92, what is the pressure altitude?

1- 1,280 feet.
2- 1,380 feet.
3- 1,480 feet.
4- 1,580 feet.

589. The pressure altitude at a given location is indicated by the altimeter after it is set to

1- the field elevation.
2- the density altitude.
3- 29.92.
4- the current altimeter setting.

590. Generally, when severe turbulence is encountered the airspeed should be reduced to or slightly below the design maneuvering speed, because at that speed the

1- effectiveness of the controls is increased.

2- airplane will stall before an excessive load factor occurs.

3- margin of safety above stall speed is increased.

4- angle of the relative wind resulting from vertical gusts will be less and thus prevent a stall.

591. In the event severe turbulence is encountered in flight, the airplane should be slowed to which of these airspeeds?

1- V_{S1}.
2- V_{LE}.
3- V_{FE}.
4- V_A.

592. To appreciate the significance of pressure altitude, it must be understood that it is

1- the elevation of an airport.

2- the height above sea level.

3- the height above the terrain.

4- the height above a standard datum plane.

593. To obtain best efficiency on constant-speed propellers, which of the following would be an appropriate setting for the given airspeeds?

1- A low RPM setting when at high airspeeds.

2- A high pitch setting when at slow airspeeds.

3- A high RPM setting when at slow airspeeds.

4- A low pitch setting when at high airspeeds.

594. Which one of the following would result in increased efficiency for a controllable propeller?

1- Increasing propeller pitch with no increase in engine power.

2- Decreasing propeller pitch with no increase in engine power.

3- Increasing propeller pitch and increasing engine power.

4- Decreasing propeller pitch and increasing engine power.

595. What is the primary advantage of a constant-speed propeller?

1- To obtain a pitch setting that is suitable for each flight situation and power setting.

2- To maintain a specific engine speed.

3- To control the power output developed by the engine.

4- To obtain and maintain a selected pitch angle of the blades regardless of the flight situation or power setting.

596. If severe turbulence is encountered during flight, the pilot should reduce the airspeed to

1- minimum control speed.
2- design maneuvering speed.
3- never exceed speed.
4- maximum structural cruising speed.

597. The design maneuvering speed of an airplane should be explained as that at which

1- turbulence will cause structural damage to the airplane.

2- unanticipated stalls, resulting from gusts, will be averted.

3- an airplane should be maneuvered in the traffic pattern.

4- full, sudden deflection of the flight controls will not cause structural damage.

598. During cruising flight, when the throttle setting is decreased on an airplane equipped with a constant-speed propeller, the propeller pitch automatically

1- decreases and the RPM decreases.

2- increases and the RPM remains the same.

3- decreases and the RPM remains the same.

4- increases and the RPM increases.

599. When the throttle is advanced on an airplane that is equipped with a constant-speed propeller, the propeller pitch angle automatically

1- increases; the engine RPM also increases.

2- increases; the engine RPM remains the same.

3- decreases; the engine RPM remains the same.

4- decreases; the engine RPM increases.

600. During climb after takeoff in an airplane equipped with a constant-speed propeller, the power output of the engine should be reduced to climb power by decreasing manifold pressure and

1- increasing the RPM by increasing the propeller blade angle.

2- decreasing the RPM by increasing the propeller blade angle.

3- decreasing the RPM by decreasing the propeller blade angle.

4- increasing the RPM by decreasing the propeller blade angle.