AC 143-3

BASIC GROUND INSTRUCTOR

Written Test Guide

1980

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

BASIC GROUND INSTRUCTOR

WRITTEN TEST GUIDE

1980

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
OFFICE OF FLIGHT OPERATIONS

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Washington, D.C. 20402

PREFACE

The Federal Aviation Administration has developed this guide to help applicants prepare for the Basic Ground Instructor Written Test. It cancels AC 143-1E, Ground Instructor Written Test Guide, Basic-Advanced, dated 1976.

This guide outlines the aeronautical knowledge requirements for a Basic Ground Instructor, informs the applicant of source material that can be used to acquire this knowledge, and includes test items and illustrations representative of those used in the FAA Basic Ground Instructor Written Test.

The test items in this guide are based on regulations, principles, and practices that were current at the time this publication was printed. Test items in the FAA written tests are updated as the need arises, consequently, FAA written test items may vary from those contained in this guide.

The FAA does not supply the correct answers to questions included in this guide. Students should determine the answers by research and study, by working with instructors, or by attending ground schools. The FAA is not responsible for the contents of commercial reprints of this publication nor the accuracy of answers they may list.

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.

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BASIC GROUND INSTRUCTOR WRITTEN TEST GUIDE

INTRODUCTION

THE ROLE OF THE GROUND 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.

How does one become a skilled and effective ground 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 ground instructors become so through study, training, experience, and conscientious effort. Probably more than any other single factor, the ground instructor's own attitude toward ground instruction determines how well the job of teaching is done.

The ground instructor must, of course, be fully qualified. Qualifications go far beyond those required for certification, however, if success as a professional ground instructor is to be achieved.

The instructor must have 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 ground 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 to retain that knowledge.

The ground 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. Obviously, to responsibly answer such questions, or resolve related problems, the ground instructor should have sound knowledge of the various aviation subjects.

Even after the new ground instructor has gained the basic knowledge 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 ground 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 ground instructor will be starting a personal aeronautical library that will be useful throughout a teaching career in aviation.

GROUND INSTRUCTOR CERTIFICATION

Required Tests

To be certificated as a Basic Ground Instructor, the applicant must pass the FAA's Fundamentals of Instructing (FOI) and the Basic Ground Instructor Written Test. However, if an applicant already holds a valid FAA Ground or Flight 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.

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

The Basic Ground Instructor written 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.

TYPE OF TEST QUESTIONS

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 judgement 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.

The Basic Ground Instructor Written Test contains 80 test items and 4 hours are allowed for completing this test.

Taking The Test

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.

The applicant taking the Basic Ground Instructor Written Test will be supplied a question book containing several hundred questions, a question selection sheet which indicates the specific questions to be answered, and an Airman Written Test Application (AC Form 8080-3) which contains the answer sheet.

To familiarize you with the procedures for taking the official FAA written test, samples of the General Instructions, Written Test Application, Question Selection Sheet, and answer sheet are provided in this guide.

Also included in this guide are questions which are representative of those in the official BGI question book.

Applicants are encouraged to adhere to the following guidelines when taking the test:

1. Answer only the 80 questions whose numbers appear on your question selection sheet.

2. 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.

3. Carefully read the entire test item, statement, or question before selecting an answer. Skimming and hasty assumptions can lead to a completely erroneous interpretation of 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.

4. Only one of the listed answers given is completely correct. The others may be the result of 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.

5. 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.

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.

The written tests are administered by FAA-General Aviation District Offices (GADO), Flight Standards District Offices (FSDO), and some Air Carrier District Offices (ACDO). In addition, certain designated individuals, some associated with privately owned organizations, have been given the authority to administer the FAA written tests.

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. 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, audiovisual 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. The FAA issues Advisory Circulars to inform the aviation public in a systematic way of nonregulatory material of interest. Many of the study materials in this guide are issued as Advisory Circulars. Before ordering any FAA publication, it is advisable to obtain a copy of:

AC 00-2 (latest revision) -- Advisory Circular Checklist.

AC 00-2 includes the most current prices on the FAA publications which are cost items, information regarding their availability, and instructions for ordering them from the Superintendent of Documents. All free advisory circulars are also listed in the Advisory Circular Checklist. To obtain a free copy of AC 00-2, send the request to:

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

AVIATION INSTRUCTOR'S HANDBOOK, AC 60-14. SN 050-011-00072-1. The objective of this handbook is to provide aviation instructors with comprehensive, accurate, and easily understood information about learning and teaching, and to relate this information to their task of conveying aeronautical knowledge and skill to students.

PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE. AC 61-23A. SN 050-011-00051-8. Contains authoritative information used in training pilots, and most subject areas in which an applicant may be tested. This publication is in the process of being revised.

FLIGHT TRAINING HANDBOOK, AC 61-21A. SN 050-007-00504-1. 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.

PRIVATE PILOT-AIRPLANE WRITTEN TEST GUIDE, AC 61-32C. SN 050-011-00075-5. Provides information, guidelines, and includes representative test items used in FAA written tests to assist applicants for the Private Pilot Certificate in attaining necessary aeronautical knowledge.

COMMERCIAL PILOT-AIRPLANE WRITTEN TEST GUIDE, AC 61-71B. SN 050-007-00482-6. Reflects current operating procedures and techniques for use of applicants in preparing for the Commercial Pilot-Airplane Written Test.

FLIGHT INSTRUCTOR-AIRPLANE WRITTEN TEST GUIDE, AC 61-72B. SN 050-007-00501-6. Outlines the aeronautical knowledge requirements for certification as an airplane flight instructor, outlines source material for study, and includes representative test items used in FAA written tests.

AVIATION WEATHER, AC 00-6A. 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 00-45A. SN 050-007-00392-7. 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.

MEDICAL HANDBOOK FOR PILOTS, AC 67-2. 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.

PILOT'S WEIGHT AND BALANCE HANDBOOK, AC 91-23A. SN 050-007-00405-2. 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 from FAA upon request.

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

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 Federal Aviation Regulations, AC 00-44 (latest revision)." The status list is free upon request.

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.

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

Part 61, Certification: Pilots and Flight Instructors.

Part 71, Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting Points.

Part 91, General Operating and Flight Rules.

Part 141, Pilot Schools.

Part 143, Ground Instructors.

FLIGHT INFORMATION/OPERATIONAL PUBLICATIONS

AIRMAN'S INFORMATION MANUAL (AIM): BASIC FLIGHT INFORMATION AND ATC PROCEDURES. This manual is designed to provide airmen with basic flight information and ATC procedures for use in the National Airspace System (NAS) of the U.S. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the Air Traffic Control System, and information on safety, accident and hazard reporting. (Subscription, Supt. Docs.) TD 4.12: Pt. 1/.

This manual is complemented by other operational publications which are available upon separate subscription. These publications are:

GRAPHIC NOTICES AND SUPPLEMENTAL DATA -- A publication containing a tabulation of Parachute Jump Areas; Special Notice Area Graphics; Terminal Area Graphics; Terminal Radar Service Area (TRSA) Graphics; and other data, as required, not subject to frequent change. This publication is issued quarterly. (Subscription, Supt. Docs.) TD 4.12: Pt. 4/.

NOTICES TO AIRMEN (Class II) -- A publication containing current Notices to Airmen (NOTAMs) which are considered essential to the safety of flight as well as supplemental data affecting the other operational publications listed here. This publication is issued every 14 days. (Subscription, Supt. Docs.) TD 4.12/2:

AIRPORT/FACILITY DIRECTORY, ALASKA SUPPLEMENT, PACIFIC SUPPLEMENT -- These publications contain information on airports, communications, navigational aids, instrument landing systems, VOR receiver checkpoints, FSS/Weather Service telephone numbers, and various other pertinent special notices. These publications are available upon subscription from the National Ocean Survey (NOS), Distribution Division (C-44), Riverdale, Maryland 20840.

NATIONAL TRANSPORTATION SAFETY BOARD, PART 830--RULES PERTAINING TO THE NOTIFICATION AND REPORTING OF AIRCRAFT ACCIDENTS OR INCIDENTS AND OVERDUE AIRCRAFT, AND PRESERVATION OF AIRCRAFT WRECKAGE, MAIL, CARGO, AND RECORDS. This publication is free upon request from the National Transportation Safety Board, Publications Branch, Washington, D.C. 20594.

VFR/IFR PILOT EXAM-O-GRAMS. Brief, timely, and graphic articles developed and published on a continuing basis. They are nondirective in nature and are issued as an information service, particularly to individuals interested in FAA Airman Written Tests. They relate to concepts, practices, and procedures critical to aviation safety, common mis-

conceptions among pilot applicants, and areas which cause difficulty in written tests. Exam-O-Grams are available free of charge but are limited to a single copy per request. Requests for placement on the mailing list should be addressed to:

U.S. Department of Transportation
Flight Standards National Field Office
Examinations Standards Branch, AFO-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. Applicants should find these manuals helpful in their study program for becoming familiar with aircraft performance charts.

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.

How to Obtain Publications Sold by Superintendent of Documents.

1. Use an order form (not a letter unless absolutely necessary) when ordering Government publications. Order forms may be duplicated from page 7 or obtained free upon request from:

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6. All prices are subject to change. The latest Advisory Circular Checklist, AC 00-2, should be consulted for current pricing of publications. It is important that the correct amount be enclosed with the order.

AERONAUTICAL 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."

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Part 61—Certification: Pilots and Flight Instructors

Subpart A—General

§ 61.1 Applicability.

(a) This Part prescribes the requirements for issuing pilot and flight instructor certificates and ratings, the conditions under which those certificates and ratings are necessary, and the privileges and limitations of those certificates and ratings.

* * * * * *

§ 61.3 Requirements for certificates, rating, and authorizations.

* * * * * *

(d) *Flight instructor certificate.* Except for lighter-than-air flight instruction in lighter-than-air aircraft, and for instruction in air transportation service given by the holder of an Airline Transport Pilot Certificate under § 61.169, no person other than the holder of a flight instructor certificate issued by the Administrator with an appropriate rating on that certificate may—

(1) Give any of the flight instruction required to qualify for a solo flight, solo cross-country flight, or for the issue of a pilot or flight instructor certificate or rating;

(2) Endorse a pilot logbook to show that he has given any flight instruction; or

(3) Endorse a student pilot certificate or logbook for solo operating privileges.

* * * * * *

§ 61.5 Certificates and ratings issued under this Part.

(a) The following certificates are issued under this Part:

(1) Pilots certificates:
- (i) Student pilot.
- (ii) Private pilot.
- (iii) Commercial pilot.
- (iv) Airline transport pilot.

(2) Flight instructor certificates.

* * * * * *

(c) The following ratings are placed on flight instructor certificates where applicable:

(1) Aircraft category ratings:
- (i) Airplane.
- (ii) Rotorcraft.
- (iii) Glider.

(2) Airplane class ratings:
- [(i) Single-engine.
- [(ii) Multiengine.]

(3) Rotorcraft class ratings:
- (i) Helicopter.
- (ii) Gyroplane.

(4) Instrument ratings:
- (i) Instrument—airplane.
- (ii) Instrument—helicopter.

* * * * * *

§ 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.

* * * * * *

§ 61.37 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;

(2) Give to another, or receive from another, any part of copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(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 whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefor, under this chapter for a period of one year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

§ 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;

(4) Except for a flight test for an airline transport pilot certificate, meet the age requirement for the issuance of the certificate or rating he seeks; and

(5) Have a written statement from an appropriately certificated flight instructor certifying that he has given the applicant flight instruction in preparation for the flight test within 60 days preceding the date of application, and finds him competent to pass the test and to have satisfactory knowledge of the subject areas in which he is shown to be deficient by his FAA airman written test report. However, an applicant need not have this written statement if he—

(i) Holds a foreign pilot license issued by a contracting State to the Convention on International Civil Aviation that authorizes at least the pilot privileges of the airman certificate sought by him;

(ii) Is applying for a type rating only, or a class rating with an associated type rating; or

§ 61.49 Retesting after failure.

An applicant for a written or flight test who fails that test may not apply for retesting until after 30 days after the date he failed the test. However, in the case of his first failure he may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that he has given flight or ground instruction as appropriate to the applicant and finds him competent to pass the test.

Excerpts

Subpart D—Private Pilots

Excerpts

§ 61.101 Applicability.

This subpart prescribes the requirements for the issuance of private pilot certificates and ratings, the conditions under which those certificates and ratings are necessary, and the general operating rules for the holders of those certificates and ratings.

§ 61.103 Eligibility requirements: general.

To be eligible for a private pilot certificate, a person must—

(a) Be at least 17 years of age, except that a private pilot certificate with a free balloon or a glider rating only may be issued to a qualified applicant who is at least 16 years of age;

(b) Be able to read, speak, and understand the English language, or have such operating limitations placed on his pilot certificate as are necessary for the safe operation of aircraft, to be removed when he shows that he can read, speak, and understand the English language;

(c) Hold at least a current third-class medical certificate issued under Part 67 of this chapter, or, in the case of a glider or free balloon rating, certify that he has no known medical defect that makes him unable to pilot a glider or free balloon, as appropriate;

(d) Pass a written test on the subject areas on which instruction or home study is required by § 61.105;

(e) Pass an oral and flight test on procedures and maneuvers selected by an FAA inspector or examiner to determine the applicant's competency in the flight operations on which instruction is required by the flight proficiency provisions of § 61.107; and

(f) Comply with the sections of this Part that apply to the rating he seeks.

§ 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.

(b) *Rotorcraft.*

(1) The accident reporting requirements of the National Transportation Safety Board and the Federal Aviation Regulations applicable to private pilot privileges, limitations, and helicopter or gyroplane operations, as appropriate;

(2) The use of aeronautical charts and the magnetic compass for pilotage, and elementary dead reckoning, and the use of radio aids;

(3) 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 helicopters or gyroplanes, as appropriate, including high density airport operations.

(c) *Gliders.*

(1) The accident reporting requirements of the National Transportation Safety Board and the Federal Aviation Regulations applicable to glider pilot privileges, limitations, and flight operations;

(2) Glider navigation, including the use of aeronautical charts and the magnetic compass;

(3) Recognition of weather situations of concern to the glider pilot, and the procurement and use of aeronautical weather reports

and forecasts; and

Excerpts

(4) The safe and efficient operation of gliders, including ground and aero tow procedures, signals, and safety precautions.

* * * * * *

Subpart E—Commercial Pilots

§ 61.121 Applicability.

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

§ 61.123 Eligibility requirements: general

To be eligible for a commercial pilot certificate, a person must—

(a) Be at least 18 years of age;

[(b) Be able to read, speak, and understand the English language, or have such operating limitations placed on his pilot certificate as are necessary for safety, to be removed when he shows that he can read, speak, and understand the English language;]

(c) Hold at least a valid second-class medical certificate issued under Part 67 of this chapter, or, in the case of a glider or free balloon rating, certify that he has no known medical deficiency that makes him unable to pilot a glider or a free balloon, as appropriate;

(d) Pass a written examination appropriate to the aircraft rating sought on the subjects in which ground instruction is required by § 61.125;

(e) Pass an oral and flight test appropriate to the rating he seeks, covering items selected by the inspector or examiner from those on which training is required by § 61.127; and

(f) Comply with the provisions of this subpart which apply to the rating he seeks.

§ 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 perfcrmance speeds.

(b) *Rotorcraft.*

(1) The regulations of this chapter which apply to the operations, privileges, and limitations of a commercial rotorcraft pilot, and the accident reporting requirements of the National Transportation Safety Board;

(2) Meteorology, including the characteristics of air masses and fronts, elements of weather forecasting, and the procurement and use of aeronautical weather reports and forecasts;

(3) The use of aeronautical charts and the magnetic compass for pilotage and dead reckoning, and the use of radio aids for VFR navigation; and

(4) The safe and efficient operation of helicopters or gyroplanes, as appropriate to the rating sought.

(c) *Gliders.*

(1) The regulations of this chapter pertinent to commercial glider pilot operations, privilege, and limitations, and the accident reporting requirements of the National Transportation Safety Board;

(2) Glider navigation, including the use of aeronautical charts and the magnetic compass, and radio orientation;

(3) The recognition of weather situations of concern to the glider pilot 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 gliders, including ground and aero tow pro-

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cedures, signals, critical sailplane performance speeds, and safety precautions.

* * * * * *

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.

●●●●●

Excerpts

Part 143—Ground Instructors

Excerpts

§ 143.1 Applicability.

This Part prescribes the requirements for issuing ground instructor certificates and associated ratings and the general operating rules for the holders of those certificates and ratings.

§ 143.3 Application and issue.

(a) An application for a certificate and rating, or for an additional rating, under this Part, is made on a form and in a manner prescribed by the Administrator. However, a person whose ground instructor certificate has been revoked may not apply for a new certificate for a period of one year after the effective date of the revocation unless the order of revocation provides otherwise.

(b) An applicant who meets the requirements of this Part is entitled to an appropriate certificate with ratings naming the ground school subjects that he is authorized to teach.

(c) Unless authorized by the Administrator, a person whose ground instructor certificate is suspended may not apply for any rating to be added to that certificate during the period of suspension.

(d) Unless the order of revocation provides otherwise, a person whose ground instructor certificate is revoked may not apply for any ground instructor certificate for one year after the date of revocation.

* * * * * *

§ 143.9 Eligibility requirements: general.

To be eligible for a certificate under this Part, a person must be at least 18 years of age, be of good moral character, and comply with § 143.11.

§ 143.11 Knowledge requirements.

Each applicant for a ground instructor certificate must show his practical and theoretical knowledge of the subject for which he seeks a rating by passing a written test on that subject.

* * * * * *

§ 143.15 Tests: general procedures.

(a) Tests prescribed by or under this Part are given at times and places, and by persons, designated by the Administrator.

(b) The minimum passing grade for each test is 70 percent.

§ 143.17 Retesting after failure.

An applicant for a ground instructor rating who fails a test under this Part may apply for retesting—

(a) After 30 days after the date he failed that test; or

(b) Upon presenting a statement from a certificated ground instructor, rated for the subject of the test failed, certifying that he has given the applicant at least five hours additional instruction in that subject and now considers that he can pass the test.

* * * * * *

STUDY OUTLINE

BASIC GROUND INSTRUCTOR 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, Title 14, Code of Federal Regulations (CFR).

I. FEDERAL AVIATION REGULATIONS

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

1. Airport traffic area
2. Ceiling
3. Flight time
4. Flight visibility
5. Pilot in command
6. Federal airway
7. Controlled area
8. Continental control area
9. Control zone
10. Terminal control area
11. 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. Preflight action
3. Careless or reckless operation
4. Liquor and drugs
5. Dropping objects
6. Fastening of safety belts
7. Parachutes and parachuting

8. Portable electronic devices
9. ATC transponder equipment requirements
10. Civil aircraft: certificates required
11. Aircraft airworthiness
12. Towing gliders and other objects
13. Pilot in command/more than one pilot
14. Flight instruction: simulated instruments
15. Flight crewmembers at stations
16. Carriage of narcotic drugs
17. Altitude alerting system or device
18. Aircraft operating limitations/markings
19. Supplemental oxygen
20. Instrument and equipment requirements
21. Limited/restricted aircraft limitations
22. Emergency locator transmitters (ELT)

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

1. Waivers
2. Operating near other aircraft
3. Right-of-way rules
4. Aircraft speed restrictions
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. Operating--in vicinity of airport
13. Operation--airport with control tower
14. Operation--airport without control tower
15. Flight in terminal control areas (TCA)
16. Temporary flight restrictions
17. Flight test areas
18. Restricted and prohibited areas
19. Positive control areas; route segments
20. Operations to/over Cuba
21. Basic VFR weather minimums
22. Special VFR weather minimums
23. VFR cruising altitude or flight level

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

II. TITLE 49--TRANSPORTATION, 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 and General Operating Rules.
F. Series 140--Schools and Other Certificated Agencies.
G. Series 170--Navigational Facilities.

IV. FLIGHT INFORMATION/OPERATIONAL PUBLICATIONS

A. AIM--Basic Flight Information and ATC Procedures.

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

B. Graphic Notices and Supplemental Data

1. Parachute jumping areas
2. Military training routes
3. Special operations-military refueling, tracks and areas
4. Terminal area graphic notices
5. Terminal radar service areas (TRSAs)

C. Notices to Airmen (NOTAMS)

1. Specials

D. Airport/Facility Directory

1. Airport/heliport data/seaplane bases
2. VOR receiver checkpoints
3. FSS-CS/T and national weather service telephone numbers
4. Aeronautical chart bulletin
5. Special notices

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
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
4. 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. Air Masses.

1. Source regions
2. Classification of air masses
3. Air mass modification
4. Summer and winter air mass 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. Obstructions to Vision.

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 office
3. Service outlets
4. Users

O. Weather Observations.

1. Surface weather observations
2. Pilot weather 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 charts

Q. Aviation Weather Forecasts.

1. Terminal forecasts (FT)
2. Area forecasts (FA)
3. Winds & temperatures aloft forecasts (FD)
4. TWEB route forecasts and synopses
5. In-flight weather advisories (WA, WS, WST)
6. Severe weather outlooks
7. Severe weather forecasts
8. Surface analyses and prognoses

R. Services to Pilots.

1. FSS briefing
2. Automatic terminal information service (ATIS)
3. Pilot's automatic telephone weather answering service (PATWAS)
4. Transcribed weather broadcasts (TWEB)
5. En route flight advisory service
6. Scheduled weather broadcasts

S. Determining Cloud-Height From Reports.

T. Information in a Weather Briefing.

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. Landing charts
6. Stall speed charts
7. Airspeed correction charts
8. Computing density/pressure altitudes
9. Effect of density altitude on performance
10. Critical performance speeds -- "V" speeds
11. Effect of wind and shear on aircraft performance
12. Bank/speed versus rate/radius of turns
13. Stall speed versus altitude or attitude
14. Stall speed versus indicated/true airspeed
15. Obstacle clearance takeoff/landing
16. Best angle-/rate-of-climb
17. Computations of gross weight/ useful load
18. Computation of center of gravity

VIII. ENGINE OPERATION

A. General.

1. Reciprocating engine principles
2. Carburetion principles
3. Carburetor/fuel injection principles
4. Carburetor heat effect on mixture
5. Lubrication systems
6. Electrical systems/units
7. Ignition systems/units

8. Fuel 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/preignition 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

IX. NAVIGATION

A. General.

1. Sectional chart interpretation
   a. Topographic information
   b. Symbols/obstruction heights/elevations
   c. Relief
   d. Aeronautical data
   e. Navigation aids
   f. Controlled airspace and special use airspace markings
2. Time zones and 24-hour system

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/Navigation Computer Principles.

1. True course and groundspeed
2. True heading and groundspeed
3. Magnetic heading and groundspeed
4. True course and true airspeed
5. Time, speed, distance, fuel consumed
6. Density altitude
7. Conversions-temperatures, speeds, distances, altitudes

E. 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 interpretation/orientation
14. Intercepting ADF bearings
15. Tracking ADF bearings or "homing"
16. Nondirectional radiobeacons
17. Distance measuring equipment
18. Transponder use
19. Emergency locator beacons (ELT)
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. Pressures 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/centripetal

F. Flight Controls/Axes of an Airplane.

G. Lift/Drag During Turns.

1. Angle of attack
2. Adverse yaw/aileron drag

H. Lift Versus Angle of Attack.

I. Lift/Thrust Versus Air Density.

J. Types/Effect of Flaps, Spoilers.

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/Torque Effect.

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

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. Pitot/Static Systems/Instruments.

H. Magnetic Compass Operation/Errors.

I. Altimeter Setting Procedure/Significance.

J. Pressure Altitude Significance/Obtaining.

K. 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. Use of Proper Communications Frequencies.

XIII. MANEUVERING BY INSTRUMENTS

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. Magnetic Compass Turns.

G. Effect of Changes in Airspeed.

H. False Sensations in Flight.

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: Sample

* 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.
11/29/79	Basic Ground Instructor	757805

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

NAME (LAST, FIRST, MIDDLE): Doe, John R.

DATE OF BIRTH (MONTH / DAY / YEAR): 03 / 16 / 53

MAILING ADDRESS NO. AND STREET, APT. #, P.O. BOX, OR RURAL ROUTE: 1575 South 18th Street

DESCRIPTION

HEIGHT	WEIGHT	HAIR	EYES
70"	160	Br	Br

CITY, TOWN OR POST OFFICE, AND STATE: Pine Bluff, Arkansas — ZIP CODE: 71659

BIRTHPLACE (City and State, or foreign country)	CITIZENSHIP	SOCIAL SECURITY NO.	IF A SOCIAL SECURITY NUMBER HAS NEVER BEEN ISSUED CHECK THIS BLOCK ⟶
Louisville, Ky	U.S.A.	411 23 2677	☐

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: Seneca Flying Service — CITY AND STATE: Little Rock, Ark.

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: John R. Doe

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

Applicant's identity established by: Driver License

CARD A											CARD B						
CATEGORY	TEST NUMBER	TAKE NO.	SECTIONS 1	2	3	4	5	6	7	EXPIRATION MONTH DAY YEAR	CERTIFICATED SCHOOL NUMBER	MECH EXP DATE BY SECTION 1	2	3	ID	FIELD OFFICE DESIGNATION	SIGNATURE of FAA Representative
																2-06	James R. Jones

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, open 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 response with a slash (/). Questions are arranged in VERTICAL sequence as indicated by the arrows.

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

DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

BGI-1A

USE WITH QUESTION BOOK BGI-1.

TITLE

Basic Ground Instructor

TEST NO. 757805

NAME John R. Doe

NOTE: IT IS PERMISSIBLE TO MARK ON THIS SHEET

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	21	312	41	458	61	556
2	207	22	316	42	460	62	560
3	209	23	323	43	469	63	562
4	213	24	334	44	479	64	564
5	218	25	345	45	483	65	572
6	223	26	347	46	493	66	581
7	226	27	360	47	501	67	585
8	237	28	366		504	68	593
9	242	29	Sample		508	69	595
10	249	30		50	509	70	606
11	254	31	388	51	518	71	611
12	256	32	400	52	525	72	618
13	258	33	417	53	530	73	620
14	268	34	424	54	534	74	621
15	275	35	435	55	536	75	622
16	277	36	441	56	538	76	625
17	285	37	443	57	541	77	630
18	292	38	446	58	545	78	633
19	294	39	452	59	553	79	636
20	304	40	455	60	555	80	638

FOR OFFICIAL USE ONLY

WRITTEN TEST SUBJECT MATTER CODES

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
FLIGHT AND GROUND INSTRUCTOR KNOWLEDGE
Written Test Subject Matter Codes

Excerpts

42 A

USE ONLY TO IDENTIFY CODES, not as study outline, since all certificate and rating areas are combined. To determine the subject areas you missed, compare subject matter codes on your Airman Written Test Report, with coded items on this list. The total number of questions you missed is NOT reflected by the number of subject matter codes shown on the test report, since ONE OR MORE questions may have been asked in each item.

FEDERAL AVIATION REGULATIONS

PARTS 1; 71: DEFINITIONS/CONTROLLED AIRSPACE

A01 - Air commerce
A02 - Airport traffic area
A03 - Ceiling
A04 - Commercial operator
A05 - Flight level
A06 - Flight visibility
A07 - Interstate air commerce
A08 - Large aircraft
A09 - DH, MCA, MDA, MEA, MOCA, MRA, RVR
A10 - Major alteration
A11 - Major repair
A12 - Pilot in command
A13 - Second in command
A14 - Federal airway
A15 - Control area
A16 - Continental control area
A17 - Control zone
A18 - Route segment
A19 - Terminal control area
A20 - Positive control area

PART 61: CERTIFICATION: PILOTS/FLIGHT INSTRUCTORS

B01 - Required certificates/ratings
B02 - Certificates and ratings issued
B03 - Expired pilot certificates/reissuance
B04 - Carriage of narcotic drugs/marihuana
B05 - Duration of pilot certificates
B06 - Duration of medical certificates
B07 - General limitations
B08 - Pilot logbooks
B09 - Operations during medical deficiency
B10 - Second in command qualifications
B11 - Recent experience: Pilot in command
B12 - Pilot in command proficiency check
B13 - Falsification, reproduction, alteration
B14 - Change of address
B15 - Glider towing: experience/instruction
B16 - Private pilot privileges/limitations
B17 - Commercial pilot privileges/limitations
B18 - Instrument rating requirements

PART 91: GENERAL OPERATING RULES-SUBPART A

C01 - Responsibility of pilot in command
C02 - Pilot in command - more than one pilot
C03 - Preflight action
C04 - Flight crewmembers at stations
C05 - Interference with crewmembers
C06 - Careless or reckless operation
C07 - Liquor and drugs
C08 - Flights between Mexico/United States
C09 - Dropping objects
C10 - Fastening of safety belts
C11 - Parachutes and parachuting
C12 - Towing: gliders or other than gliders
C13 - Portable electronic devices
C14 - Simulated instrument and flight tests
C15 - ATC transponder equipment requirements
C16 - VOR equipment check for IFR operations
C17 - Fuel requirements - IFR conditions
C18 - Civil aircraft: certificates required
C19 - Special authorizations - foreign aircraft
C20 - Aircraft airworthiness
C21 - Aircraft operating limitations/markings
C22 - Supplemental oxygen
C23 - Instrument and equipment requirements
C24 - Flight recorders; cockpit voice recorders
C25 - Automatically reported altitude/pilot's reference
C26 - Transport airplane weight limitation
C27 - Maximum weights for airplanes in Alaska
C28 - Limited/restricted aircraft limitations
C29 - Experimental aircraft limitations
C30 - Special rules for foreign civil aircraft
C31 - Ferry flight with one engine inoperative
C32 - Emergency exits for airplanes
C33 - Aural speed warning device
C34 - Altitude alerting system or device
C35 - Emergency locator transmitters
C36 - Report: aircraft identification/activity

PART 91: GENERAL FLIGHT RULES-SUBPART B

D01 - Waivers
D02 - Operating near other aircraft
D03 - Right-of-way rules
D04 - Aircraft speed
D05 - Acrobatic flight
D06 - Aircraft lights
D07 - Complying - ATC clearances/instructions
D08 - ATC light signals
D09 - Minimum safe altitudes; general
D10 - Altimeter settings
D11 - Flight plan; information required
D12 - Operation - in vicinity of airport
D13 - Operation - airport with control tower
D14 - Operation - airport without tower
D15 - Flight in terminal control areas
D16 - Temporary flight restrictions
D17 - Flight test areas
D18 - Restricted and prohibited areas
D19 - Positive control areas; route segments
D20 - Jet advisory areas
D21 - Operations to, or over, Cuba
D22 - Flight limitation - space flight recovery
D23 - Operation: aircraft of Cuban registry
D24 - Flight restriction - Presidential/parties
D25 - Basic VFR weather minimums
D26 - Special VFR weather minimums
D27 - VFR cruising altitude or flight level
D28 - ATC clearance/flight plan required (IFR)
D29 - Takeoff/landing under IFR
D30 - Limitations-instrument approach procedure
D31 - Minimum altitudes for IFR operations
D32 - IFR cruising altitude/flight level
D33 - Course to be flown (IFR)
D34 - IFR radio communications
D35 - IFR two-way communications failure
D36 - Malfunction reports (IFR)
D37 - ATC transponder test/insoection

Written Test Subject Matter Codes (Continued) Excerpts

PART 91: MAINTENANCE, PREVENTATIVE MAINTENANCE, AND ALTERATIONS-SUBPART C

E01 - General maintenance and alterations
E02 - Maintenance required
E03 - Carrying persons after repair/alteration
E04 - Inspections/progressive inspection
E05 - Altimeter system tests/inspections
E06 - Maintenance records/transfer of records
E07 - Rebuilt engine maintenance records
E08 - ATC transponder test/inspection

PART 91: LARGE AND TURBINE-POWERED MULTIENGINE AIRPLANES-SUBPART D

F01 - Applicability
F02 - Flying equipment/operating information
F03 - Familiarity with operating limitations and emergency equipment
F04 - Equipment - over-the-top/night VFR
F05 - Survival equipment/overwater operations
F06 - Radio equipment/overwater operations
F07 - Emergency equipment
F08 - Flight altitude rules
F09 - Smoking and safety belt signs
F10 - Passenger briefing
F11 - Carry-on baggage
F12 - Carriage of cargo
F13 - VFR fuel requirements
F14 - Operating in icing conditions
F15 - Flight engineer requirements
F16 - Second in command requirements
F17 - Flight attendant requirements
F18 - Inspection program

PART 135: AIR TAXI OPERATORS AND COMMERCIAL OPERATORS OF SMALL AIRCRAFT

G01 - Subpart A - General
G02 - Subpart B - Rules-ATCO certificate holder
G03 - Subpart C - Operating rules
G04 - Subpart D - Crewmember qualifications
G05 - Subpart E - Aircraft and equipment

NATIONAL TRANSPORTATION SAFETY BOARD

PART 830: NOTIFICATION AND REPORTING ACCIDENTS

H01 - Applicability
H02 - Definitions
H03 - Immediate notification and information
H04 - Preserving wreckage/mail/cargo/records
H05 - Reports/statements to be filed

FAA ADVISORY CIRCULARS

I01 - Series 00 General
I02 - Series 20 Aircraft
I03 - Series 60 Airmen
I04 - Series 70 Airspace
I05 - Series 90 Air Traffic Control and General Operations
I06 - Series 120 Air Carrier and Commercial Operators and Helicopters
I07 - Series 150 Airports
I08 - Series 170 Air Navigation Facilities

FLIGHT INFORMATION PUBLICATIONS

J01 - Glossary of aeronautical terms
J02 - Airport lighting/marking/aids
J03 - Air navigation radio aids
J04 - Visual approach slope indicator
J05 - Controlled/uncontrolled airspace
J06 - Operating at non-tower airports
J07 - Special use airspace-prohibited, restricted, ISJTA, alert areas
J08 - Automatic terminal information service
J09 - ATC departure/enroute/arrival procedures
J10 - Radar traffic information service
J11 - Stage I, II, III terminal radar service
J12 - Aeronautical advisory stations (UNICOM)
J13 - Radiotelephone phraseology/technique
J14 - Traffic/wind direction indicators
J15 - Obtaining weather information/briefing
J16 - Flight plans
J17 - VHF/UHF direction finder
J18 - ADIZ and designated mountainous areas
J19 - Medical facts for pilots
J20 - Good operating practices
J21 - Obtaining airport/heliport data
J22 - FSS/Weather Service telephone numbers
J23 - Obtaining radio facility/FSS data
J24 - Special notices/Special Operations
J25 - Notices to airmen (NOTAMS)
J26 - Terminal radar service areas
J27 - Terminal area graphic notices
J28 - Restrictions to enroute navigation aids
J29 - VOR receiver checkpoints
J30 - Parachute jumping areas

AVIATION WEATHER

K01 - Surface weather charts
K02 - Weather depiction charts
K03 - Prognostic charts
K04 - Significant weather charts
K05 - Pressure analyses charts
K06 - Winds aloft charts/forecasts
K07 - Radar summary charts/reports
K08 - Area forecasts
K09 - Terminal forecasts
K10 - Severe weather forecasts
K11 - Elements of forecasting
K12 - Aviation weather (sequence) reports
K13 - Inflight advisories (AIRMET/SIGMET)
K14 - Weather broadcasts-scheduled/advisories
K15 - Transcribed weather broadcasts (TWEB)
K16 - Significance of reported weather
K17 - Significance of cloud types
K18 - Determining cloud-heights
K19 - Recognition of critical weather
K20 - Temperature/dewpoint relationship
K21 - Fog types and their causes
K22 - Air mass characteristics
K23 - Frontal weather
K24 - Thunderstorms/squall lines
K25 - Aircraft icing
K26 - Standard temperatures/pressures
K27 - Standard lapse rates
K28 - Pressure systems/general circulation
K29 - Mountain effects/turbulence/weather
K30 - Information in a weather briefing
K31 - Soaring weather-thermals
K32 - Soaring weather-ridge lift
K33 - Soaring weather-mountain waves

NAVIGATIONAL - GENERAL

L01 - Sectional chart interpretation
L02 - Relating chart symbols to FAR
L03 - Pilotage/recognition of landmarks
L04 - Determining courses/distances on charts
L05 - Planning traffic pattern
L06 - Navigation computer principles
L07 - Computing headings/courses
L08 - Computing time, distance, speed, fuel
L09 - Computing rates of climb/descent
L10 - Computing wind direction/speed in flight
L11 - Computing off-course corrections
L12 - Selecting VFR cruising altitudes

RADIO NAVIGATION

M01 - Characteristics of VOR facilities
M02 - Tuning VOR receivers

Written Test Subject Matter Codes (Continued)

Excerpts

M03 - Identifying VOR stations
M04 - VOR interpretation/orientation
M05 - Intercepting VOR radials
M06 - Tracking VOR radials
M07 - Groundspeed checks using VOR radials
M08 - VOR frequency interference
M09 - VOR test signals/VOR receiver checks
M10 - Characteristics of ADF facilities
M11 - Tuning ADF receivers
M12 - Identifying stations used for ADF
M13 - ADF/RMI interpretation/orientation
M14 - Intercepting ADF/RMI bearings
M15 - Tracking ADF/RMI bearings or "homing"
M16 - Marker beacons/outer compass locators

RADIO COMMUNICATIONS

N01 - VHF radio communications/phraseology
N02 - Position reporting procedures
N03 - Tower/FSS/enroute-advisories/instructions
N04 - FSS communications procedures
N05 - Obtaining emergency assistance
N06 - Lost procedure when radio is inoperative
N07 - Use of proper communications frequencies

AERODYNAMICS AND PRINCIPLES OF FLIGHT

001 - Laws of motion
002 - Functions of the flight controls
003 - Principles of airfoils
004 - Forces acting on the aircraft
005 - Flight controls/axes of the aircraft
006 - Lift/drag during turns
007 - Lift versus angle of attack
008 - Lift/thrust versus air density
009 - Effect of ice/snow/frost on airfoils
010 - Power versus climb/descent/level flight
011 - Gyroscopic precession
012 - Coning (helicopter)
013 - Translating tendency (helicopter)
014 - Ground effect
015 - Translational lift (helicopter)
016 - Transverse flow effect (helicopter)
017 - Loads/load factors
018 - Stability/controllability
019 - Stall/spins
020 - Effects of flaps, spoilers, dive brakes
021 - Relative wind/angle of attack
022 - Effect of wind during turns
023 - Torque effects - P factor
024 - Dissymmetry of lift (helicopter)

AIRCRAFT AND ENGINE OPERATION - GENERAL

P01 - Fuel injection/carburetor principles
P02 - Reciprocating engine principles
P03 - Preflight/postflight safety practices
P04 - Use of mixture/throttle/propeller control
P05 - Use of proper fuel grade/type
P06 - Fuel system operation
P07 - Engine starting/shutdown
P08 - Detonation cause/effect
P09 - Fuel contamination-prevention/elimination
P10 - Emergency-engine/systems/equipment/fire
P11 - Carburetor ice-cause/detection/elimination
P12 - Wake turbulence-causes/precautions
P13 - Crosswind takeoff/landing
P14 - Proper loading of the aircraft
P15 - Interpreting engine instruments
P16 - Ignition or electrical system/units
P17 - Recovery from critical flight situations
P18 - Carburetor heat effect on mixture
P19 - Aircraft operating limitations
P20 - Manifold pressure versus RPM
P21 - High altitude operations/pressurization
P22 - Use of oxygen and oxygen equipment
P23 - Mid-air collision avoidance precautions

AIRCRAFT/ENGINE PERFORMANCE - GENERAL

Q01 - Takeoff charts (airplane/rotorcraft)
Q02 - Rate of climb charts (airplane/rotorcraft)
Q03 - Cruise charts (airplane/rotorcraft)
Q04 - Maximum safe crosswind charts (airplane)
Q05 - Use of Denault computer (airplane)
Q06 - Landing charts (airplane/rotorcraft)
Q07 - Altitude-airspeed charts (rotorcraft)
Q08 - Stall speed charts (airplane)
Q09 - Hovering ceiling charts (rotorcraft)
Q10 - Airspeed correction charts (airplane)
Q11 - Predicting performance (helicopter)
Q12 - Computing density/pressure altitudes
Q13 - Effect of density altitude on performance
Q14 - Effect of weight/balance on performance
Q15 - Critical performance speeds - "V speeds"
Q16 - Effect of wind on aircraft performance
Q17 - Bank/speed versus rate/radius of turn
Q18 - Stall speed versus altitude or attitude
Q19 - Stall speed versus indicated/true airspeed
Q20 - Obstacle clearance takeoff/landing
Q21 - Best angle/best rate of climb (airplane)
Q22 - Computation of gross weight/useful load
Q23 - Computation of center gravity
Q24 - Minimum sink speed (glider)
Q25 - Glide ratio - L/D (glider)
Q26 - Speed-to-fly (glider)
Q27 - Best-glide-speed (glider)
Q28 - Glider performance curves (glider)
Q29 - Airspeed for searching for lift (glider)

FLIGHT INSTRUMENTS AND SYSTEMS

R01 - Attitude indicator operation/errors
R02 - Heading indicator operation/errors
R03 - Turn indicator/coordinator
R04 - Altimeter operation/errors
R05 - Vertical speed indicator operation/errors
R06 - Airspeed indicator operation/errors
R07 - Vacuum systems/instruments
R08 - Pitot-static systems/instruments
R09 - Magnetic compass operation/errors
R10 - Altimeter setting procedure/significance
R11 - Pressure altitude-significance/obtaining
R12 - Gyroscopic principles

INSTRUMENT FLYING PROCEDURES

S01 - Components of attitude instrument flying
S02 - Pitch, bank, power control
S03 - Straight-and-level flight
S04 - Turns/turns to predetermined headings
S05 - Constant rate climbs/descents/level offs
S06 - Constant speed climbs/descents/level offs
S07 - Magnetic compass turns
S08 - Effect of changes in airspeed
S09 - False sensations in flight
S10 - Recoveries from unusual attitudes/stalls
S11 - Visibility minimums
S12 - Interpreting SIDs/STARs
S13 - Interpreting enroute charts
S14 - Interpreting instrument approach charts
S15 - VOR instrument approach procedures
S16 - ADF instrument approach procedures
S17 - ILS/LOC instrument approach procedures
S18 - ASR instrument approach procedures
S19 - Use of VASI during approaches
S20 - Use of Distance Measuring Equipment
S21 - Radar vectoring procedures
S22 - Holding pattern - procedures/entries
S23 - Circling approach procedures

S24 - Missed approach procedures
S25 - DME arc initial approach procedures
S26 - Procedure turns (course reversal)

HELICOPTER AND GYROPLANE OPERATION

T01 - Rotor system - main/antitorque rotors
T02 - Clutch system
T03 - Free-wheeling unit
T04 - Rotor and engine rpm control
T05 - Rotor and engine rpm operating limits
T06 - Retreating blade stall
T07 - Settling with power
T08 - Ground resonance
T09 - Hovering flight (helicopter)
T10 - Antitorque rotor failure (helicopter)
T11 - Emergencies - autorotative landing
T12 - Slope landing/takeoff (helicopter)
T13 - Taxiing - air and surface (helicopter)
T14 - Takeoff/approach/landing
T15 - Rapid deceleration/quick stop (helicopter)
T16 - Confined area/pinnacle operation
T17 - Ground reconnaissance (helicopter)

AIRPLANE OPERATION

U01 - Normal/crosswind takeoff/landing
U02 - Maximum performance takeoff/landing
U03 - Emergency landings
U04 - Maneuvering speed
U05 - Taxiing with strong surface wind
U06 - Flap operation
U07 - Retractable landing gear operation
U08 - Controllable pitch propeller operation
U09 - Supercharged engine operation
U10 - Multiengine critical engine failure

GLIDER OPERATION AND TOWING

V01 - Procedures of assembly and disassembly
V02 - Towrope/cables/hooks/releases
V03 - Standard visual signals
V04 - Aero towing procedures
V05 - Auto towing procedures
V06 - Winch towing procedures
V07 - Traffic pattern/landing
V08 - Use of speed limiting devices
V09 - Strange field (cross-country) landings
V10 - Sharing thermals
V11 - Sharing ridge lift
V12 - Cross-country procedures
V13 - Emergencies-rope break, towplane power failure, etc.

Basic Ground Instructor

QUESTIONS

MAXIMUM TIME ALLOWED FOR TEST: FOUR HOURS

GENERAL INSTRUCTIONS

READ CAREFULLY

1. This book contains 439 questions beginning with number 201. You are required to answer 80 QUESTIONS ONLY.
2. Refer to the QUESTION SELECTION SHEET to determine which 80 questions you are to answer.
3. Make sure you were issued a QUESTION SELECTION SHEET that is marked for use with Question Book "BGI-1".
4. Mark your answers in the appropriate places on the ANSWER SHEET.
5. All Supplementary information required to answer certain questions can be found on the page opposite the question or near the question.
6. 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.
7. Read each question carefully and select the best answer. Always answer questions in terms of current regulations, procedures, or techniques.
8. It will not be necessary to draw course lines on the sectional chart segments, since this has been done for you.
9. The last 9 pages of this book contain legends for the Sectional Chart and the Airport/Facility Directory. A list of Notices to Airmen "Abbreviations" is also included.
10. The MINIMUM passing grade is 70 percent.

SAMPLE INSTRUCTION SHEET FOR QUESTION BOOK

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

(2) GIVE TO ANOTHER OR RECEIVE FROM ANOTHER ANY PART OR COPY OF THAT TEST.

(3) GIVE HELP ON THAT TEST TO OR RECEIVE HELP ON THAT TEST FROM, ANY PERSON DURING THE PERIOD THAT TEST IS BEING GIVEN

(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.

BASIC GROUND INSTRUCTOR
WRITTEN TEST QUESTIONS

001. In regard to the duration of Private Pilot Certificates, which statement is true?

B05
1- They expire after a duration of 12 months.
2- They expire after a duration of 24 months.
3- They are issued without a specific expiration date.
4- When recency of experience requirements are not met the certificates expire.

002. In which of the following flight operations is the pilot in command required to possess an instrument rating while operating in VFR conditions?

B01
1- On a flight to Canada or Mexico.
2- In the Positive Control Area.
3- On a DVFR flight plan.
4- Flight in the Continental Control Area.

003. Which statement is true regarding control zones?

A16
1- They extend upward from 700 feet AGL and terminate at the base of the Continental Control Area.
2- Unless they underlie the Continental Control Area, control zones have no upper limit.
3- Designated control zones are located only at those airports which have a control tower in operation.
4- They are not depicted on sectional aeronautical charts.

004. An airport control zone extends upward from the surface to the base of the

A17
1- Terminal Control Area.
2- Positive Control Area.
3- Continental Control Area.
4- Airport Traffic Area.

005. The Continental Control Area for the 48 contiguous states consists of airspace

A15
1- at and above 14,500 feet MSL.
2- at and below 14,500 feet MSL.
3- within all restricted areas and prohibited areas.
4- below 10,000 feet MSL.

006. "Ceiling" as defined by Federal Aviation Regulations, means the height above the earth's surface of the

A03
1- lowest layer of clouds that is reported as "broken" or "overcast."
2- lowest layer of clouds that is reported as "scattered," "broken," or "thin."
3- lowest reported "obscuration" and the highest layer of clouds that is reported as "overcast."
4- highest layer of clouds that is reported as "broken" or "thin."

007. Where are Airport Traffic Areas in effect?

A02
1- At all airports.
2- Only at airports that have an operating control tower.
3- Only at airports within a control zone.
4- At all airports that have a Flight Service Station on the field.

008. Preflight action as required by regulations for all flights away from the vicinity of an airport shall include a study of the weather, taking into consideration fuel requirements, and

C03
1- an alternate course of action if the flight cannot be completed as planned.
2- the filing of a flight plan.
3- the designation of an alternate airport.
4- an operational check of your navigation radios.

009. In addition to other preflight action for a VFR cross-country flight, regulations specifically require the pilot in command to

C03
1- file a flight plan for the proposed flight.
2- check each fuel tank visually to ensure that it is always filled to capacity.
3- determine runway lengths at the airports of intended use.
4- check the accuracy of the omninavigational equipment if the flight is to be made on airways.

010. If an in-flight emergency requires immediate action, a pilot in command may

C01
1- deviate from Federal Aviation Regulations to the extent required to meet the emergency, but must submit a written report within 24 hours to the Administrator.
2- not deviate from regulations unless permission is obtained from Air Traffic Control.
3- deviate from any rule of Federal Aviation Regulations to the extent required to meet the emergency.
4- not deviate from regulations unless prior to the deviation approval is granted by the Administrator.

011. If you do not meet the recency of experience requirements for a night flight carrying passengers, and official sunset is 1900 EST, you must land at or before what time to comply with regulations?

B11
1- 1830 EST.
2- 1900 EST.
3- 1930 EST.
4- 2000 EST.

012. To act as pilot in command of a single-engine nosewheel-equipped airplane, regulations require recent experience before carrying passengers. To meet this requirement you must, within the preceding

B11
1- 60 days, have made at least three takeoffs and three landings to a full stop in any single-engine airplane.
2- 90 days, have made at least three takeoffs and three landings to a full stop in an aircraft of the same category, class, and type as the one you will be flying.
3- 90 days, have made at least three takeoffs and three landings in an aircraft of the same category and class as the one you will be flying.
4- 60 days, have made at least five takeoffs and five landings to a full stop in an aircraft of the same category as the one you will be flying.

013. To act as pilot in command of an aircraft, one must show by logbook endorsement the satisfactory (1) accomplishment of a flight review, or (2) completion of a pilot proficiency check within the preceding

B11
1- 6 months.
2- 12 months.
3- 24 months.
4- 36 months.

014. When are Emergency Locator Transmitter (ELT) batteries required to be replaced or recharged?

C35
1- After 1 cumulative hour of use.
2- After 30 cumulative minutes of use.
3- After 100 cumulative hours of use.
4- Every 6 months.

015. Which statement is true concerning an Emergency Locator Transmitter (ELT) aboard an airplane?

C35
1- ELT battery replacement is required after each ten hours of cumulative use.
2- When activated, an ELT transmits on the frequencies 118.0 and 122.3 MHz.
3- An operable ELT is required on all training airplanes operated within 50 miles of the point of origin of the flight.
4- Tests of the equipment should be conducted during the first five minutes after every hour.

016. Unless each occupant is provided with supplemental oxygen, no person may operate a civil aircraft of U.S. registry above a cabin pressure altitude of

C22
1- 10,000 feet MSL.
2- 12,500 feet MSL.
3- 14,000 feet MSL.
4- 15,000 feet MSL.

017. Which record or document shall the owner or operator of an airplane keep to show compliance with an applicable Airworthiness Directive?

C20
1- The aircraft owner's handbook.
2- The aircraft maintenance records.
3- The aircraft Airworthiness Certificate.
4- The aircraft Registration Certificate.

018. Who is responsible for determining whether an aircraft is in condition for safe flight?

C20
1- The pilot in command.
2- The owner of the aircraft.
3- The maintenance inspector.
4- The maintenance man who maintains the aircraft.

019. No person may operate a civil aircraft unless the Airworthiness Certificate, or special flight permit or authorization required by regulations, is

C18
1- on file in the owner's operation office where the aircraft is based.
2- filed with the other required certificates or documents within the aircraft to be flown.
3- displayed at the cabin or cockpit entrance so that it is legible to passengers or crewmembers.
4- included in the approved logbooks for the aircraft to be flown.

020. Regulations require that seatbelts be fastened about passengers

C10
1- during all periods of flight.
2- only during flight in turbulent flight conditions.
3- only during takeoffs and landings.
4- only when advised by the pilot in command to do so.

021. Is it permissible for a pilot to allow a person who is obviously under the influence of intoxicating liquors or drugs to be carried aboard an aircraft? This is permitted

C07
1- only if the person does not have access to the cockpit or pilot's compartment.
2- only if the person is a medical patient under proper care.
3- only after a waiver has been obtained from the FAA.
4- under no circumstances.

022. According to Federal Aviation Regulations, which of the following are true statements?

A. Parachutes are required when a private pilot carrying a passenger executes an intentional maneuver that exceeds a 30° noseup attitude relative to the horizon.
B. All acrobatic maneuvers must be completed at least 2,000 feet above the surface.
C. Parachutes are always required for all occupants of an aircraft when spins are practiced.
D. An intentional maneuver, not necessary for normal flight, involving an abrupt change in the aircraft's attitude is considered acrobatic flight.

The true statements are:

D05
1- A, B, C, D.
2- A, D.
3- B, C, D.
4- A, B, C.

023. When acrobatic flight is to be performed, the flight visibility must be at least

D05
1- 3 miles.
2- 5 miles.
3- 7 miles.
4- 9 miles.

024. No person may operate an aircraft in acrobatic flight when

D05
1- below 2,000 feet AGL.
2- the flight visibility is less than 5 miles.
3- the flight visibility is less than 7 miles.
4- over an open air assembly of people.

025. Unless otherwise authorized, no person may operate an aircraft below 10,000 feet MSL at an indicated airspeed of more than

D04
1- 156 knots (180 MPH).
2- 200 knots (230 MPH).
3- 250 knots (288 MPH).
4- 300 knots (345 MPH).

026. When operating an aircraft equipped with a reciprocating engine within an Airport Traffic Area, the maximum indicated airspeed permitted is

D04
1- 109 knots (125 MPH).
2- 156 knots (180 MPH).
3- 200 knots (230 MPH).
4- 250 knots (288 MPH).

027. Approaching a VOR station while flying southwest at 8,500 feet MSL, you see a multiengine airplane at the same altitude converging from your left, headed northwest toward the VOR. According to regulations which pilot should give way and why?

D03
1- You should give way since your airplane is slower and more maneuverable than a multiengine airplane.
2- The pilot of the multiengine airplane should give way since the airplane is not flying at a proper VFR cruising altitude.
3- The multiengine airplane should give way since your airplane is to its right and you have the right-of-way.
4- You should give way since the other airplane is to your left and has the right-of-way.

028. When two aircraft are approaching each other head-on or nearly so, which aircraft should give way?

D03
1- Regardless of the aircraft categories, a glider has the right-of-way over all engine-driven aircraft.
2- If the aircraft are of different categories, an airship would have the right-of-way over a helicopter.
3- Regardless of the aircraft categories, the pilot of each aircraft shall alter course to the right.
4- If the aircraft are of different categories, an airship would have the right-of-way over an airplane.

029. Assume two aircraft of different categories are converging at approximately the same altitude. Which of the following is a true statement?

D03
1- Neither aircraft has the right-of-way and both aircraft should alter course to avert a collision.
2- An aircraft towing or refueling other aircraft has the right-of-way over all other engine-driven aircraft.
3- An airship has the right-of-way over a glider.
4- A jet airliner has the right-of-way over all other aircraft.

030. When flying below 18,000 feet MSL in an aircraft without radio equipment, cruising altitude must be maintained by reference to an altimeter that was

D10
1- periodically reset to the elevations of en route airports.
2- set to zero elevation prior to takeoff.
3- adjusted to 29.92" Hg.
4- set to the elevation of the departure airport.

031. To maintain the proper cruising altitude, if your airplane is not equipped with a radio, the altimeter should be set to

D10
1- the elevation of the airport of departure, or appropriate altimeter settings available prior to departure.
2- the density altitude at the airport of departure.
3- 29.92" Hg at the airport of departure and whenever below 18,000 feet MSL.
4- zero.

032. Over sparsely populated areas an aircraft may not be operated, except when necessary for takeoff or landing, closer than what distance from any person, vehicle, or structure?

D09
1- 100 feet.
2- 500 feet.
3- 1,000 feet.
4- 2,000 feet.

033. The minimum safe altitude required for flights over any congested area of a city, town, or settlement is 1,000 feet above the highest obstacle within a horizontal radius of

D09
1- 1,000 feet from the aircraft.
2- 1,500 feet from the aircraft.
3- 2,000 feet from the aircraft.
4- 3,000 feet from the aircraft.

034. Suppose that you receive a flashing white light from a control tower during the runup prior to takeoff; what action should you take?

D08
1- None, since this light signal is applicable only to aircraft in flight.
2- Return to your starting point on the airport.
3- Taxi clear of the runway in use.
4- Proceed, exercising extreme caution.

035. Suppose that you had an in-flight emergency and found it necessary to deviate from previous ATC instructions, and then you were given landing priority at a controlled airport. If requested by ATC, a report must be submitted within 48 hours to the Chief of the

D07
1- appropriate Search and Rescue Unit.
2- Air Traffic Control facility.
3- nearest National Transportation Safety Board Field Office.
4- nearest General Aviation District Office.

036. Ground Control issues the following taxi instructions:

". . .CLEARED TO RUNWAY TWO ONE, WIND TWO ZERO ZERO AT ONE SIX, ALTIMETER TWO NINER EIGHT SEVEN, TIME ONE ONE FOUR THREE, TAXI NORTH ON THE RAMP. . ."

From these instructions, you are cleared to taxi to

D07
1- and line up on Runway 21 and may take off unless instructed to hold by the tower.
2- the north end of the ramp only.
3- the runup area for Runway 21 only.
4- and line up on Runway 21, but must receive permission for takeoff.

037. Aircraft operating at night, in the air or on the surface, must display lighted position lights during the period from

D06
1- 1 hour before sunset to 1 hour after sunrise.
2- sunset to sunrise.
3- 30 minutes after sunset to 30 minutes after sunrise.
4- 30 minutes before sunset to 30 minutes after sunrise.

038. To operate an airplane within a control zone at night under special VFR, the pilot is required to

D26
1- remain 500 feet below the clouds.
2- have logged more than 500 hours' first pilot time.
3- have an instructor aboard.
4- be instrument rated.

039. No person may operate an airplane within a control zone at night under special VFR unless

D26
1- the flight visibility is at least 3 miles.
2- the airplane is equipped for instrument flight.
3- an instructor is aboard.
4- the flight can be conducted 500 feet below the clouds.

040. A special VFR clearance applies to what kind of controlled airspace?

D26
1- Transition Area.
2- Control Area.
3- Control Zone.
4- Airport Traffic Area.

041. The basic VFR weather minimums for flights within controlled airspace below 10,000 feet MSL require the minimum visibility and distance under the clouds to be

D25
1- 3 miles and 500 feet.
2- 1 mile and 500 feet.
3- 1 mile and clear of clouds.
4- 3 miles and 1,000 feet.

042. During operation outside controlled airspace at altitudes of more than 1,200 feet AGL, but less than 10,000 feet MSL, the minimum "horizontal distance from clouds" requirement for VFR flight is

D25
1- 500 feet.
2- 1,000 feet.
3- 1,500 feet.
4- 2,000 feet.

043. During operations at altitudes of more than 1,200 feet AGL and at or above 10,000 feet MSL, the minimum "distance below clouds" requirement for VFR flight is

D25
1- 500 feet.
2- 1,000 feet.
3- 1,500 feet.
4- 2,000 feet.

044. Which statement is true regarding the requirements for flight within a Group I Terminal Control Area (TCA)?

D15
1- The pilot in command must be instrument rated.
2- The pilot in command must hold at least a Private Pilot Certificate to land or take off in a Group I TCA.
3- An operable ADF receiver is required aboard the aircraft.
4- The aircraft must be equipped with operable Distance Measuring Equipment.

045. In regard to the correct traffic pattern departure procedure to use at a noncontrolled airport, which statement is true?

D14
1- Depart as prearranged with other pilots using the airport.
2- Comply with any FAA traffic pattern established for the airport.
3- Make all turns to the left.
4- Depart in any direction consistent with safety, after crossing the airport boundary.

046. Unless otherwise authorized, two-way radio communications with ATC are required for landings or takeoffs

D13
1- at tower controlled airports within control zones only when weather conditions are less than VFR.
2- at all tower controlled airports only when weather conditions are less than VFR.
3- at all tower controlled airports regardless of the weather conditions.
4- within control zones regardless of the weather conditions.

047. Advisory Circulars are issued by the Federal Aviation Administration to inform the aviation public of

I01
1- nonregulatory material of interest.
2- projects in the planning stage.
3- regulatory material of interest.
4- proposed rulemaking.

048. Suppose an aircraft is involved in an accident that results in substantial damage to the aircraft, but no injuries to the occupants. When must the pilot or operator of the aircraft notify the nearest National Transportation Safety Board Field Office of the occurrence?

H03
1- Immediately.
2- Within 48 hours.
3- Within 10 days.
4- Within 1 week.

049. Of the following incidents, which would require an immediate notification to the nearest Bureau of Aviation Safety Field Office of the National Transportation Safety Board?

H03
1- A near-miss that requires violent evasive action to avoid a collision.
2- Damage to a landing gear as a result of a hard landing.
3- An in-flight generator failure.
4- Flight control system malfunction or failure.

050. How long does the Airworthiness Certificate of your airplane remain valid?

E04
1- Indefinitely, unless the prescribed operating limitations are exceeded.
2- As long as the airplane is maintained and operated as required by Federal Aviation Regulations.
3- Indefinitely, unless the aircraft suffers major damage.
4- As long as the aircraft has a current Registration Certificate.

. To determine the expiration date of the last annual aircraft inspection, you should refer to the

1- Airworthiness Certificate.
2- Registration Certificate.
3- aircraft maintenance records.
4- Owner-Operator Manual.

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

E03
1- for compensation or hire.
2- by any private pilot.
3- with passengers aboard.
4- away from the vicinity of the airport.

053. Who is primarily responsible for ensuring that an aircraft is maintained in an airworthy condition?

E01
1- The mechanic who signs the aircraft maintenance records.
2- The nearest FAA General Aviation District Office.
3- The owner or operator of the aircraft.
4- The pilot in command.

054. Suppose the following factors exist when determining VFR cruising altitudes for a flight where ground elevation is 1,500 feet MSL.

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

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

D27
1- 7,500 feet MSL on Leg I; 8,500 feet MSL on Leg II.
2- 7,500 feet MSL on both legs.
3- 8,500 feet MSL on Leg I; 7,500 feet MSL on Leg II.
4- 8,500 feet MSL on both legs.

055. To comply with regulations, the selection of VFR cruising altitudes should be made on the basis of the magnetic

D27
1- heading when more than 3,000 feet above the surface.
2- heading when more than 3,000 feet above sea level.
3- course when more than 3,000 feet above the surface.
4- course when more than 3,000 feet above sea level.

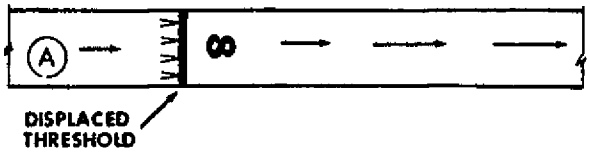
056. The Federal Aviation Administration issues Advisory Circulars that provide a systematic means for the issuance of nonregulatory material of interest to the aviation public. They are issued

I01
1- as amendments to the National Transportation Safety Board regulation, Part 830.
2- by automatic distribution to subscribers of the Airman's Information Manual.
3- on a regularly scheduled basis, but must be purchased by the aviation public.
4- in a numbered system of general subject matter areas to correspond with the subject areas in Federal Aviation Regulations.

057. The FAA established a system for the publication of nonregulatory guidance and informational material to the public. These publications are known as

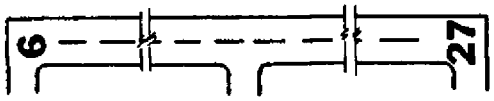
I01
1- Advisory Circulars.
2- Airworthiness Directives (ADs).
3- Technical Standard Orders (TSOs).
4- Airman's Guide.

BASIC RUNWAY



058. Refer to the displaced threshold for Runway 8 above. That portion of the runway identified by the letter "A"

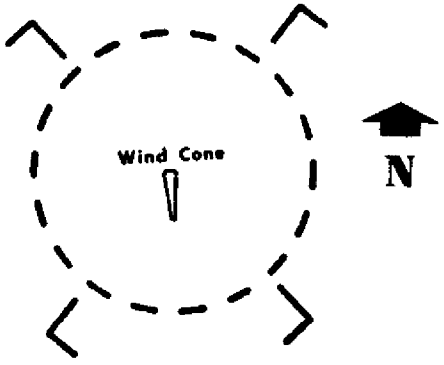
J02
1- is an "overrun area" that is available for landing at the pilot's discretion.
2- may be used only for landings.
3- may be used for taxiing but should not be used for takeoffs or landings.
4- may be used for taxiing or takeoffs but not for landing.



BASIC RUNWAY MARKINGS

059. Refer to the runway direction markings above. The numbers 9 and 27 on the approach ends of the runway indicate that the runway is oriented approximately

J02
1- 090° and 270° magnetic.
2- 009° and 027° true.
3- 090° and 270° true.
4- 009° and 027° magnetic.

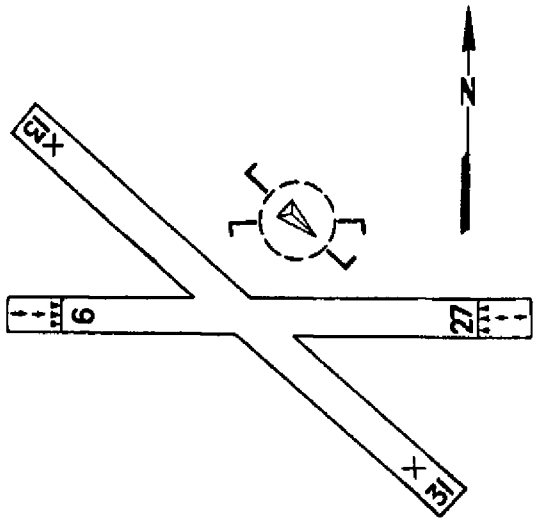


060. The segmented circle shown above indicates that the airport traffic is

J02
1- left-hand for Runway 13 and right-hand for Runway 22.
2- left-hand for Runway 31 and right-hand for Runway 13.
3- right-hand for Runway 31 and left-hand for Runway 4.
4- right-hand for Runway 22 and left-hand for Runway 4.

061. Assume you observe a segmented circle adjacent to an airport runway as shown abo The markings indicate that

J02
1- you should turn left after takeoff on Runway 31.
2- you should circle the airport to left prior to landing on any runw
3- you would have a left-quatering tailwind if you landed on Runway
4- airport traffic is left-hand for R way 13 and Runway 4.



062. Refer to the runway markings and segmented circle above. If the wind is as shown by the landing direction indicator, you should land to the

J02
1- east on Runway 9 and expect a crosswind from the right.
2- west on Runway 27 and expect a crosswind from the right.
3- southeast beyond the "X" marking.
4- northwest beyond the "X" marking.

063. If the runway markings and segmented circle are as shown above, you should

J02
1- land on Runway 27 and anticipate a right crosswind.
2- land on Runway 9 and anticipate a right-quatering headwind.
3- land on Runway 13, as it is aligned with the wind and landing direction indicator.
4- turn left onto final approach and land on Runway 31.

064. Operation of the rotating beacon at an airport in a control zone during the hours of daylight may indicate

J02
1- counterclockwise flow of traffic is required.
2- the ground visibility is less than 3 miles and/or the ceiling is less than 1,000 feet.
3- that right-hand traffic is required.
4- the airport is closed due to hazardous runway conditions.

065. A flashing amber light near the center of an airport's segmented circle (or on top of the control tower or adjoining building) indicates that

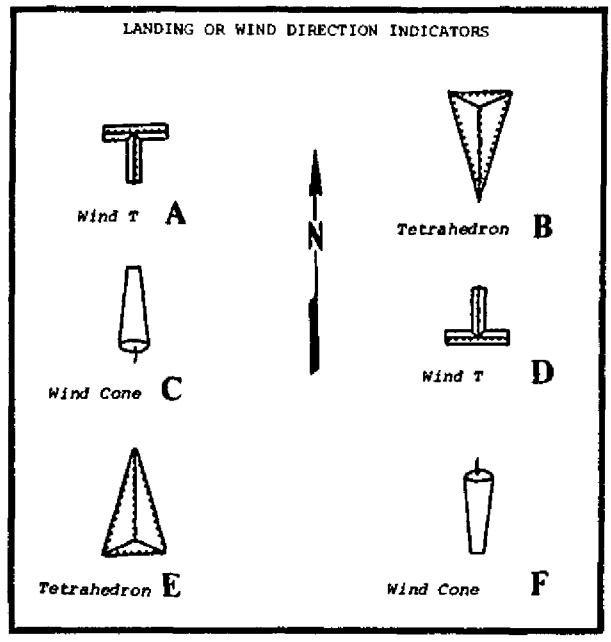
J02
1- the control tower is not in operation.
2- a right-hand traffic pattern is in effect.
3- the airport is temporarily closed to VFR traffic.
4- weather conditions are below basic VFR weather minimums.

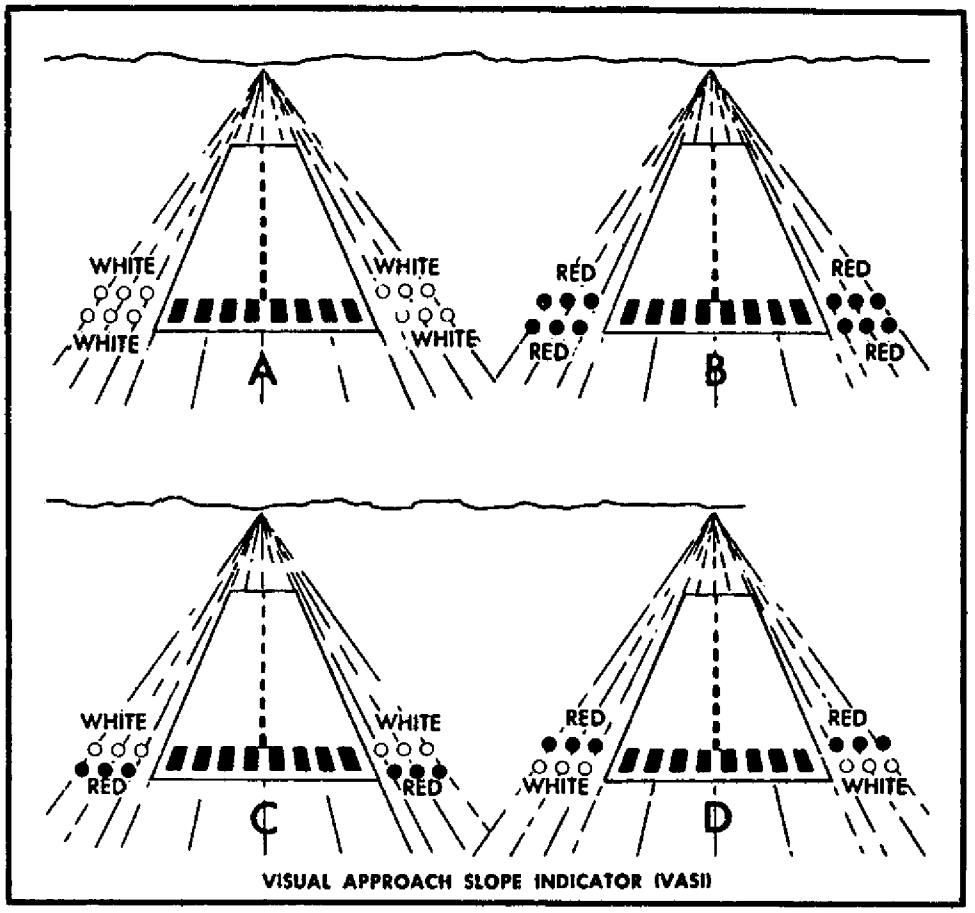
066. Assume that one of the landing or wind direction indicators depicted below is observed adjacent to the landing strip. Which indicators show that the landing should be made to the south?

J02
1- B, D, F.
2- A, B, C.
3- A, E, F.
4- B, C, D.

067. Which indicators depicted below show that landings should be made to the north?

J02
1- B, C, D.
2- A, C, E.
3- A, E, F.
4- D, E, F.





VISUAL APPROACH SLOPE INDICATOR (VASI)

068. A pilot observing VASI lights as in Illustration "D" above would be

J04
1- receiving "VASI inoperative" lights.
2- below the glidepath.
3- on the glidepath.
4- above the glidepath.

069. VASI lights appearing as in Illustration "A" above would indicate that an airplane is

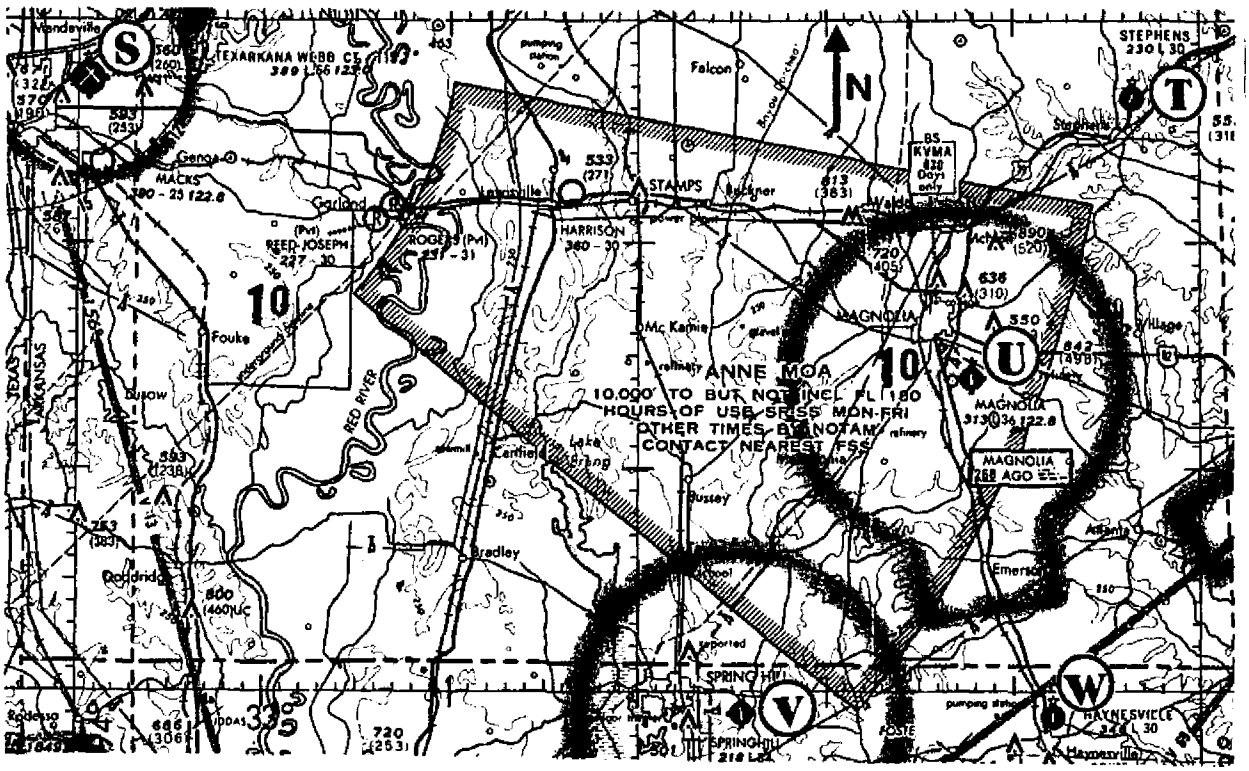
J04
1- off course to the left.
2- on the glidepath.
3- below the glidepath.
4- above the glidepath.

070. Refer to the illustrations above. If you are approaching to land, which group of VASI lights illustrated would indicate that you are on the glidepath?

J04
1- A.
2- B.
3- C.
4- D.

071. Assume that you are approaching an airport that is equipped with a VASI. To comply with regulations, an airplane approaching to land on a runway served by a VASI shall

J04
1- intercept and remain on the glide slope until touchdown only if the aircraft is operating on an instrument flight plan.
2- maintain an altitude that captures the glide slope at least 2 miles downwind from the runway threshold.
3- remain below the glide slope.
4- maintain an altitude at or above the glide slope.



072. *Which statement is true concerning the ANNE MOA in the chart excerpt above?*

J07
1- The military services conduct low altitude navigation flights at or below 1,500 feet AGL at speeds exceeding 250 knots within this area.
2- It is a prohibited area for all VFR flights unless special permission is obtained.
3- Some training activities may necessitate acrobatic maneuvers by military aircraft within this area.
4- VFR flights between 10,000 feet and Flight Level 180 are prohibited within this area.

073. Refer to the chart above. Assume you are planning a VFR flight from airport "S" to airport "U." Which statement is true in regard to flying within the ANNE MOA?

J07
1- You may fly direct to airport "U," even though military training activities exist within the area, and you should exercise caution.
2- The nearest FSS must be contacted to provide you En Route Flight Advisory Service through the area.
3- A VFR flight plan must be filed with a proposed altitude below 10,000 feet MSL.
4- You must plan your proposed flight on a weekend when the area is not in use by the military.

074. *Which statement concerning the ANNE MOA shown in the chart excerpt above is true?*

J07
1- VFR flights below 10,000 feet require rerouting by the nearest FSS.
2- Flights below 10,000 feet must be operating on IFR flight plans.
3- Extreme caution should be exercised while flying within this area.
4- VFR flights are not permitted above 10,000 feet MSL.

075. Refer to the chart excerpt above. Concerning the ANNE MOA and a proposed flight from airport "S" to airport "W," select the true statement.

J07
1- You should circumnavigate the MOA by flying around the southern tip of it.
2- Between Mondays and Fridays a pilot should contact the nearest FSS for rerouting around the area for a flight to airport "W."
3- Nonparticipating IFR traffic may be cleared through the MOA, and VFR pilots should exercise caution while flying within the area.
4- The appropriate military authority having jurisdiction over the area must be contacted to obtain permission to fly within the area.

076. Flight Service Stations having voice facilities on VOR stations or radiobeacons (NDBs), broadcast scheduled weather reports and NOTAM information

J15
1- at 30 minutes past each hour.
2- on the hour each hour.
3- at 15 minutes and 45 minutes past each hour.
4- at 15 minutes past each hour.

077. In regard to UNICOM, select the true statement from the following:

J12
1- UNICOM may not be used for any communication, other than providing known traffic, runway in use, and wind conditions.
2- UNICOM radio frequencies are assigned to Aeronautical Advisory Stations at certain airports not served by a control tower.
3- To obtain the correct UNICOM frequency for a particular airport, a pilot should contact the nearest FSS.
4- UNICOM radio stations are assigned by the FAA to control traffic at nontower airports.

078. To determine if UNICOM is available at an airport without a control tower, you should refer to

J12
1- the Automatic Terminal Information Service (ATIS).
2- the appropriate Airport/Facility Directory.
3- Graphic Notices and Supplemental Data.
4- the Notices to Airmen (NOTAMS).

079. Which one of the following statements is true in regard to UNICOM?

J12
1- UNICOM is a service provided by radar air traffic control facilities.
2- VFR flight plans should be filed through UNICOM at nontower airports.
3- UNICOM use is limited to Air Traffic Control.
4- UNICOM is not intended to be used for Air Traffic Control purposes.

080. Stage III Service within Terminal Radar Service Areas (TRSAs) utilize radar to provide

J11
1- separation between all VFR aircraft operating within TRSAs.
2- radar vectoring if the weather minimums are below VFR conditions.
3- separation between IFR aircraft, because VFR aircraft are not permitted in the area.
4- separation between all participating VFR aircraft and IFR aircraft operating within TRSAs.

081. Assume that you are flying on an east heading in the vicinity of a busy airport and obtain Radar Traffic Information Service. The wind is calm and you receive the following traffic advisory:

"TRAFFIC 3 O'CLOCK, 2 MILES, WESTBOUND. ."

You should look for this traffic in the direction of your airplane's

J10
1- left wingtip, and ahead of you.
2- left wingtip.
3- right wingtip.
4- nose and slightly to the right.

082. Assume that during VFR weather conditions ATC is providing a pilot with Radar Traffic Information Service. If the pilot does not intend to terminate this service, when will the service be terminated?

J10
1- When the controller advises the pilot that radar service is terminated.
2- After departing an Airport Traffic Area.
3- After departing the control zone.
4- When the aircraft reaches a point at least 25 statute miles from the departure airport.

083. Automatic Terminal Information Service (ATIS) is the continuous broadcast of recorded information

J08
1- alerting pilots of radar identified aircraft when their aircraft is in unsafe proximity to terrain or obstruction.
2- concerning nonessential information to relieve frequency congestion.
3- concerning noncontrol information in selected high activity terminal areas.
4- concerning sky conditions limited to ceilings below 1,000 feet and visibilities less than 3 miles.

084. Breathing CARBON MONOXIDE can prove to be very hazardous in flight. Which statement is true regarding this hazard?

J19
1- Carbon monoxide forces oxygen to be attached to the hemoglobin.
2- A small quantity of carbon monoxide is harmless.
3- An increase in altitude decreases the adverse effect/influence of carbon monoxide.
4- Blurred (hazy) thinking, an uneasy feeling, and dizziness are symptoms of carbon monoxide poisoning.

085. Assume that during a night flight you lose all outside visual references and become spatially disoriented. In this situation, you are probably experiencing

J19
1- mild motion sickness.
2- vertigo.
3- carbon monoxide poisoning.
4- the first indication of chronic fatigue.

086. Suppose a pilot experiences vertigo in a restricted visibility condition (dust, smoke, or snow showers). The best way to overcome the effects of vertigo is to

J19
1- depend on sensations received from the fluid in the semicircular canals of the inner ear.
2- concentrate on any "yaw," "pitch," and "roll" sensations.
3- consciously slow your breathing rate until symptoms clear and then resume normal breathing rate.
4- rely upon the aircraft instrument indications.

087. HYPOXIA is considered to be an in-flight hazard. Which statement is true concerning this hazard?

J19
1- Your body has a built-in alarm system to alert you when you are not receiving enough oxygen.
2- Heavy smokers may experience early symptoms of hypoxia at lower altitudes than nonsmokers.
3- Carbon monoxide increases the brain's tolerance of hypoxia.
4- Alcohol increases the brain's tolerance of hypoxia.

088. To use VHF/DF (Direction Finder) facilities, you must have an operable

J17
1- transmitter and receiver.
2- radar beacon transponder.
3- ADF receiver.
4- VOR receiver.

089. Certain ground-based stations have equipment which indicates the magnetic direction of the aircraft from the station each time the aircraft transmits. This equipment is known as

J17
1- Compass Locator (Comlo).
2- Direction Finder (DF).
3- Simplified Directional Facility (SDF).
4- Airport Advisory Service (AAS).

090. A preflight weather briefing would be incomplete if it did not include at least

J15
1- synoptic weather and airspace restrictions.
2- forecast winds and weather and all pertinent radio navigation facilities.
3- winds aloft and current forecasts, weather synopsis (pressure systems and fronts), and possible hazardous weather.
4- the availability of Transcribed Weather Broadcasts (TWEBs) while en route, plus the items in response 2.

091. When you telephone a weather briefing facility for preflight weather information, you should

A. identify yourself as a pilot (student, private, or commercial).
B. state your intended route and destination.
C. identify the radio communications equipment aboard the aircraft.
D. state the number of persons aboard and the color of the aircraft.

Which of the above statements are true?

J15
1- A and B.
2- A, B, C, and D.
3- A and D.
4- A, B, and C.

318-376 O - 80 - 4

092. Refer to the illustration below. Which signalman is giving the all clear signal?

J20
1- I.
2- G.
3- E.
4- A.

093. Refer to the illustration below and select the true statement concerning the hand signals shown.

J20
1- Signal G means cut engine(s).
2- Signal E means all clear.
3- Signal D means stop.
4- Signal C means right turn.

094. Which signalman below is giving the hand signal for an emergency stop?

J20
1- H.
2- G.
3- E.
4- D.

095. Pilots should use the latest issues of aeronautical charts. Sectional Charts for the conterminous United States are updated each

J20
1- 3 months.
2- 6 months.
3- 12 months.
4- 24 months.

096. When nearing a VOR station that you are using for navigation, what vital action should be taken?

J20
1- Exercise vigilance to avoid other aircraft which might be converging on the station from other directions.
2- Pass to the right of the station.
3- Pass to the left of the station.
4- Concentrate on the omni indicator and carefully make corrections so as to pass directly over the VOR station.

097. Refer to the illustration below. Which hand signal means "slow down"?

J20
1- I.
2- H.
3- D.
4- B.

098. Refer to the illustration below. The hand signal "E" means

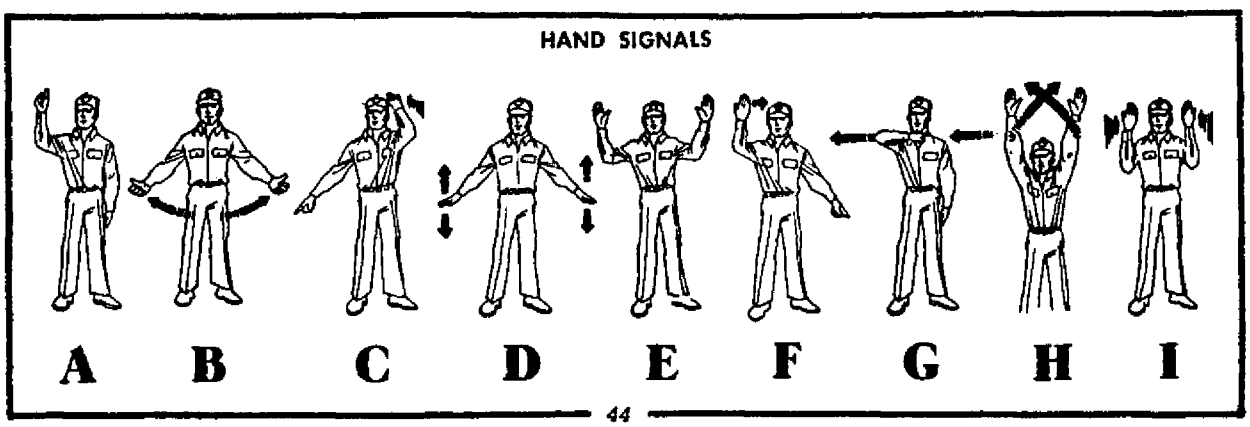
J20
1- stop.
2- start the engine(s).
3- all clear.
4- the chocks have been pulled.

099. Refer to the illustration below. Assume you have taxied into a parking area and the signalman gave hand signals as shown in positions "I", "D", and "F". The meaning of these hand signals in the sequence given are

J20
1- all clear, stop, and right turn.
2- come ahead, emergency stop, and left turn.
3- come ahead, slow down, and right turn.
4- all clear, stop, and cut engine(s).

100. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by

J19
1- closely monitoring the flight instruments to control the airplane.
2- slowing the breathing rate, breathing into a bag, or talking aloud.
3- increasing the breathing rate in order to increase lung ventilation.
4- refraining from the use of over-the-counter remedies and drugs such as antihistamines, cold tablets, tranquilizers, etc.



COLORADO

§ **PUEBLO MEMORIAL** (PUB) 5.2 E GMT-7(-6DT) 38°17'26"N 104°29'41"W DENVER
4726 B S4 FUEL 100 JET A OX 1,2 CFR Index A H-1C, 2H, L-6E, A-26
RWY 07L-25R: H10497X150 (ASPH) S-130, D-150, DT-230 HIRL IAP
RWY 07L: SSALR RWY 25R: VASI
RWY 17-35: H8308X150 (ASPH) S-40, D-55, DT-82 MIRL .98% up N
RWY 17: Thld displaced 1309'. +47' ground. RWY 35: VASI.
RWY 12-30: H8268X150 (ASPH) S-32, D-42, DT-62 LIRL .86% up NW
RWY 07R-25L: H4073X75 (CONC) S-20
RWY 07R: Rgt tfc. RWY 25L: +7' ground.
AIRPORT REMARKS: Attended continuously. South 7000' Rwy 17-35 lighted. Control Zone effective 1230-0600Z‡. Caution—when temperature is over 80° first 2000' Rwy 07L-25R may be soft due to deterioration of seal coat.
COMMUNICATIONS: UNICOM 122.95
DENVER FSS (DEN) LC 948 3368 NOTAM FILE PUB
PUEBLO RCO 122.1R 122.2 116.7T (DENVER FSS)
Ⓡ APP/DEP CON 120.9(E), 120.1(W) opr 1300-0600Z‡
TOWER 119.1 opr 1300-0600Z‡ GND CON 121.9
STAGE II SVC ctc APP CON
RADIO AIDS TO NAVIGATION: VHF/DF ctc DENVER FSS
(H) VORTAC 116.7 PUB Chan 114 38°17'39"N 104°25'44"W 244° 2.1 NM to fld
MERTZ NDB (LOM) 302 PU 38°17'02"N 104°38'47"W 075° 6.5 NM to fld.
ARUBA NDB (LOM) 373 TF 38°17'27"N 104°21'16"W 255° 5.6 NM to fld.
ILS 108.3 I-TFR Rwy 25R LOM ARUBA NDB
ILS 109.5 I PUB Rwy 07L LOM MERTZ NDB
ASR
COMM/NAVAID REMARKS: ILS unmonitored when twr closed.

NOTE: AN AIRPORT/FACILITY DIRECTORY LEGEND IS INCLUDED IN THE BACK PORTION OF THIS BOOKLET.

101. Refer to the Airport/Facility Directory excerpt above concerning Pueblo Memorial Airport. Which statement is true?

J21
1- The surface composition of the longest hard surfaced runway is asphalt.
2- Grade 80 gasoline is available.
3- Runway 12 is equipped with high intensity runway lights.
4- The direction of traffic for Runway 17 is right-hand.

102. Refer to the Airport/Facility Directory excerpt above. Which statement is true concerning Pueblo Memorial Airport?

J21
1- Runway 17 threshold is displaced 130 feet.
2- Crash, fire, and rescue equipment is not available.
3- Caution is advised when using a portion of Runway 25R when high temperatures exist.
4- The Control Zone is in effect continuously, 24 hours per day at this airport.

103. Refer to the Airport/Facility Directory data above concerning Pueblo Memorial Airport. Which statement is true?

J21
1- Airframe and powerplant repairs are not available.
2- Runway 35 is equipped with VASI lights.
3- For direction finding service contact Pueblo FSS.
4- Grade 115 aviation gasoline is available.

104. Refer to the Airport/Facility Directory excerpt above. Which statement is true concerning Pueblo Memorial Airport?

J21
1- Runway 07L is equipped with high intensity runway lights.
2- The longest hard surfaced runway is concrete.
3- Pueblo VORTAC is located on the airport.
4- VASI lights are available for Runway 17.

AIRPORT/FACILITY DIRECTORY

COLORADO

§ **ALAMOSA MUNI** (ALS) 1.7 S GMT-7(-6DT) 37°26'14"N 105°51'56"W — DENVER
7535 B S4 FUEL 100, JET A CFR Index A — H-2H, L-6E
RWY 02-20: H8499X100 (ASPH) S-30, D-55, DT-65 MIRL ① — IAP
RWY 02: REIL RWY 20: VASI, Thld dsplcd 638'. Fence 400' from thld.
RWY 06-24: 4700X100 (DIRT). For light acft only.
AIRPORT REMARKS: Attended daylight hours. ①For rwy lights key 122.8 5 times in 5 seconds, lights remain on for 15 min. Control Zone effective 1200-0330Z‡
COMMUNICATIONS: UNICOM 122.8
TRINIDAD FSS (TAD) Toll free 800 332 3644 NOTAM FILE ALS
ALAMOSA LRCO 122.1R 113.9T (TRINIDAD FSS)
Ⓡ DENVER CENTER APP/DEP CON 126.1
RADIO AIDS TO NAVIGATION:
ALAMOSA (H) VORTAC 113.9 ALS Chan 86 37°20'57"N 105°48'54"W 322° 5.6 NM to fld
VORTAC unusable 025°-045° beyond 25 NM below 15,900'
150°-180° beyond 35 NM below 11,600'

COLORADO SPRINGS

§ **CITY OF COLORADO SPRINGS MUNI** (COS) GMT-7(-6DT) — DENVER
38°48'31.4"N 104°42'34.9"W — L-6E, A-2G
6172 B S4 FUEL 100 JET A, B — IAP
RWY 17-35: H11,013X150 (ASPH-RFSC) S-115, D-175, DT-340
HIRL 1.19% up N, Arrest Dev Avbl
RWY 17: REIL, VASI. RWY 35: VASI, ALSF1
RWY 12-30: H8511X150 (ASPH) S-136, D-175, DT-280 MIRL .46% up NW arrest Device avbl
RWY 30: VASI, TCH 52'
RWY 03-21: H8374X150 (ASPH) S-85, D-110, DT-180 MIRL 1.12% up NE
RWY 03: VASI. RWY 21: VASI Thld dsplcd 520'.
AIRPORT REMARKS: Attended Cont. Rubberized friction Seal Coat. DGFEE Commercial Acft only
COMMUNICATIONS: ATIS 125.0 UNICOM 123.0
DENVER FSS (DEN) LC 634-1561, Toll free (800) 332-1854
COLORADO SPRINGS LRCO 122.1R, 112.5T (DENVER FSS)
Ⓡ APP/DEP CON 118.5 (North), 124.0 (South)
COLORADO SPRINGS TOWER 119.9 GND CON 121.7 CLNC DEL 125.7
STAGE III SVC ctc APP CON 120.6
RADIO AIDS TO NAVIGATION:
(L) VORTAC 112.5 COS Chan 72 38°56'40"N 104°37'59"W 196° 8.2 NM to fld
VORTAC unusable 200°-300° beyond 30 NM below 15,600'
300°-040° beyond 20 NM below 9500'
PETEY NDB (MHW/LOM) 407 CO 38°41'39"N 104°42'56.5"W 347° 6.0 NM to fld
ILS 109.9 I-COS Rwy 35
ASR

NOTE: AN AIRPORT/FACILITY DIRECTORY LEGEND IS INCLUDED IN THE BACK PORTION OF THIS BOOKLET.

105. Refer to the Airport/Facility Directory data above for Alamosa Municipal Airport. Which statement is true?

J21
1- Grade 100 gasoline is available.
2- VASI lights are available for Runway 02.
3- Major powerplant repairs are not available.
4- A control tower is in operation 12 hours of each day.

106. Refer to the Airport/Facility Directory excerpts above. Which statement is true concerning Alamosa Municipal Airport?

J21
1- The weight bearing capacity of Runway 02-20 is unknown.
2- Runway 20 is 8,499 feet in length and the surface composition is asphalt.
3- NOTAM "L" (local dissemination) is the only NOTAM service provided for this airport.
4- The runway lights can be activated by keying the frequency 122.1 MHz.

107. Refer to the Airport/Facility Directory data to the left for Colorado Springs Municipal Airport, and select the true statement.

J21
1- Runway 03 is 8,374 feet in length and the surface composition is asphalt.
2- Grade 115 gasoline is available.
3- Runway 30 is 8,511 feet in length and the surface composition is concrete.
4- Colorado Springs VORTAC is located on the airport.

108. Refer to the Airport/Facility Directory excerpts to the left. Which statement is true concerning Alamosa Municipal Airport?

J22
1- Flight and weather briefing services are available by phoning Trinidad FSS toll free.
2- Alamosa VORTAC is located on the airport.
3- To obtain a weather briefing you could call or visit the Alamosa FSS.
4- NOTAM "L" (local dissemination) is the only NOTAM service available.

109. Refer to the Airport/Facility Directory excerpts to the left. Which statement concerning Colorado Springs Municipal Airport is true?

J22
1- Weather briefing service is provided on the frequency 123.0 MHz.
2- Weather briefing services are available by local telephone call to the Denver FSS.
3- The Colorado Springs FSS and VORTAC are located on the airport.
4- Preflight weather service is available on the ATIS frequency 125.0 MHz.

110. Refer to the Airport/Facility Directory excerpts to the left above. The proper sequence of radio communication frequencies to use when departing Colorado Springs Municipal Airport VFR southbound is

J23
1- 125.0, 121.7, 119.9, 112.5, 124.0 MHz.
2- 121.7, 119.9, 124.0, 122.1R, 120.6 MHz.
3- 125.0, 125.7, 121.7, 119.9, 124.0 MHz.
4- 125.7, 121.7, 119.9, 118.5, 112.5 MHz.

111. Refer to the Airport/Facility Directory excerpts on opposite page. The proper sequence of radio frequencies for contacting clearance delivery, ground control, tower, and departure control when departing Colorado Springs northbound is

J23
1- 121.7, 125.7, 118.5, 120.6 MHz.
2- 125.7, 121.7, 119.9, 124.0 MHz.
3- 125.7, 121.7, 119.9, 118.5 MHz.
4- 119.9, 125.7, 121.7, 124.0 MHz.

112. Refer to the Airport/Facility Directory excerpts on opposite page. Which statement is true?

J28
1- The 170 radial of Alamosa is usable beyond 35 NM below 10,000 feet.
2- Colorado Springs VORTAC is located 6.0 NM from the field.
3- The 020 radial of Colorado Springs VORTAC is unusable beyond 20 NM below 9,500 feet.
4- The 025-045 radials of Alamosa VORTAC are usable at 30 NM below 15,900 feet.

113. Refer to the Airport/Facility Directory excerpts on opposite page. Select the true statement concerning restrictions to en route navigation aids listed for Alamosa or Colorado Springs.

J28
1- The Colorado Springs VORTAC is usable 200° - 300° beyond 30 NM below 15,600 feet.
2- The 020 radial of Alamosa VORTAC is unusable beyond 25 NM below 15,900 feet.
3- The 320 radial of Colorado Springs VORTAC is unusable beyond 20 NM below 9,500 feet.
4- The 150-190 radials of Alamosa VORTAC are unusable beyond 35 NM below 11,600 feet.

114. Information concerning parachute jumping sites may be found in

J30
1- The legend of Sectional Aeronautical Charts only.
2- Notices to Airmen (NOTAMS).
3- Graphic Notices and Supplemental Data.
4- Advisory Circulars.

115. Refer to the NOTAMS to the right for Massachusetts and select the true statement.

J25
1- At Newburyport, Plum Island Airport, the traffic pattern altitude is 1,000 feet.
2- The Plum Island Airport at Newburyport has 1,000-foot overruns on Runway 10-28.
3- At the Laurence G. Hanscom Field in Bedford, Mass., the traffic pattern altitude is 1,000 feet.
4- Within 2 miles of the Fitchburg Airport there is an unlighted tower.

116. Refer to the NOTAMS to the right for Michigan and select the true statement.

J25
1- At Manistee County-Blacker Airport, pilots can control the approach light system.
2- An unlighted tower is located southwest of the Harrisville Airport.
3- Ann Arbor Municipal Airport Runway 12 threshold is displaced 77 feet.
4- The Detroit Willow Run Airport Runway 5R is equipped with an operative approach lighting system.

117. Refer to the NOTAMS to the right and select the true statement.

J25
1- At Detroit Willow Run Airport (Michigan), the approach light system is out of service for one runway.
2- At Baldwin Municipal Airport (Michigan), the runway lights are pilot controlled.
3- At Ann Arbor Municipal Airport (Michigan), there are no restrictions listed.
4- At the Laurence G. Hanscom Field in Bedford, Mass., the traffic pattern altitude is 1,000 feet.

118. To determine the location of reported parachute jumping sites, you should refer to

J30
1- Federal Aviation Regulations, Part 105.
2- The publication entitled Graphic Notices and Supplemental Data.
3- National Transportation Safety Board regulation, Part 830.
4- Federal Aviation Regulations, Part 91.

NOTICES TO AIRMEN

THIS SECTION CONTAINS NOTICES TO AIRMEN THAT ARE EXPECTED TO REMAIN IN EFFECT FOR AT LEAST SEVEN DAYS.
NOTE: NOTICES ARE ARRANGED IN ALPHABETICAL ORDER BY STATE (AND WITHIN STATE BY CITY OR LOCALITY). NEW OR REVISED DATA: NEW OR REVISED DATA ARE INDICATED BY BOLD ITALICIZING THE AIRPORT NAME.
NOTE: ALL TIMES ARE LOCAL UNLESS OTHERWISE INDICATED.

MASSACHUSETTS

SPECIAL NOTICE: Weather warning signs installed arpt ramp areas at number of Cape Cod and bordering Island lctns. Signs function with associated flashing lights during periods where IFR or other hazardous weather is current or forecast. Sign and light system operns at Chatham, Martha's Vineyard, Hyannis, New Bedford, Plymouth, and Nantucket during hours arpt attended or tower open."
BEDFORD, LAURENCE G HANSCOM FLD: Obstruction 215 ft AGL 1000 ft S apch end rwy 11 unlighted. (9/78)
BOSTON, GENERAL EDWARD LAWRENCE LOGAN INTL ARPT: Unlgtd 348 ft AGL stacks 1.5 SE. ILS GS rwy 22L OTS. Unlgtd 97 ft AGL tower 3N. (11/78)
FITCHBURG MUNI ARPT: Tower 1238 ft MSL 2.5 miles NW unlighted. (6/78)
GARDNER MUNI ARPT: Arpt clsd nights. (9/78)
MARSHFIELD ARPT: Tower 213 ft MSL 1 mile SE unlighted. (12/74)
NEWBURYPORT, PLUM ISLAND ARPT: Rwy 10-28 clsd excp W 1000 ft and E 1000 ft. TPA 1000 ft. (12/78-12)
PALMER: NDB "PMX" OTS. (6/78)
PALMER, METROPOLITAN ARPT: Tower 700 ft MSL 5 miles SE unlighted. (3/78-9)
PLYMOUTH MUNI ARPT; UNICOM now freq 123.0. (1/79-2)
PROVINCETOWN MUNI ARPT: ALS rwy 7 OTS. (12/77-9)

MICHIGAN

ANN ARBOR MUNI ARPT: Rwy 12-30 closed tkof. (12/77-9)
BALDWIN MUNI ARPT: Rwy lights OTS. (6/78)
DETROIT, WILLOW RUN ARPT: ALS rwy 5R OTS. (6/78)
ESCANABA, DELTA COUNTY ARPT: Thr rwy 9 dspled 400 ft. Unlgtd 530 ft AGL crane 2 1/2 NM N. (11/78)
GAYLORD, OTSEGO COUNTY ARPT: N 500 ft rwy 18-36 clsd. (11/78)
HARRISVILLE ARPT: Unlgtd 162 ft AGL tower 1 1/2 miles SW. (8/78)
LANSING,CAPITAL CITY ARPT: ILS GS/ALS rwy 27 OTS. Thr rwy 9 dspled 500 ft days. (11/78)
LUDINGTON, MASON COUNTY ARPT: NDB "LDM" unmon. (11/78)
MANISTEE COUNTY-BLACKER ARPT: Pilot Controlled Lighting OTS. (11/78)
MARQUETTE: VORTAC "MQT" OTS. (6/78)
PONTIAC, OAKLAND-PONTIAC ARPT: Unlgtd 115 ft MSL tower 1 1/2 NM ENE. (10/78)
SAULT STE MARIE: LRCO freq 123.65 cmsnd; freq 123.6 dcmsnd. (10/78-11)
SIDNAW, PRICKETT-GROOMS FLD: Arpt closed. (1/76-9)

NOTE: The last page of this test book contains a list of ABBREVIATIONS.

119. Refer to the NOTAMS to the left for Massachusetts and Michigan. Select the true statement concerning a particular airport.

J25
1- At Plymouth, Mass., weather warning signs on the airport ramp function when hazardous weather is forecast.
2- At the Detroit, Willow Run Airport the approach light system is pilot controlled.
3- The Fitchburg, Mass. Municipal Airport tower frequency is 123.8 MHz.
4- The full length of Runway 18-36 is closed at Otsego County Airport, Gaylord, Michigan.

120. Refer to the NOTAMS to the left for Michigan, and select the true statement.

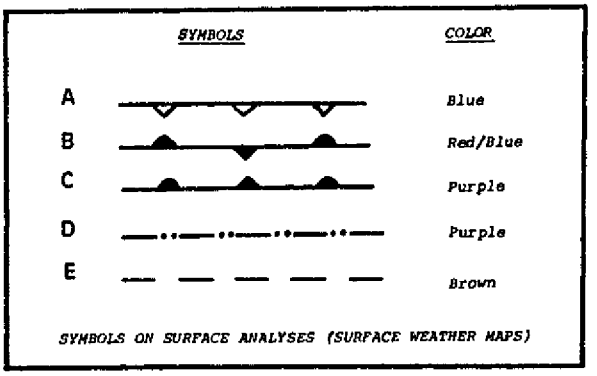
J25
1- At Escanaba, Delta County Airport the threshold of Runway 9 is displaced 400 feet.
2- At Manistee County-Blacker Airport there is a 700-foot unlighted tower located 2 miles southeast.
3- Sault Ste Marie LRCO frequency has been changed to 123.6 MHz.
4- The Oakland-Pontiac Airport is unlighted.

121. Refer to the NOTAMS to the left for Massachusetts and select the true statement.

J25
1- At Fitchburg Municipal Airport there is an unlighted tower northwest of the airport.
2- At Gardner Municipal Airport, the control tower is in operation after dark.
3- At Plum Island Airport, Newburyport, the west 1,000 feet and east 1,000 feet of Runway 10-28 is closed.
4- At Bedford, Laurence G. Hanscom Field, the first 1,000 feet of Runway 11 is unlighted.

122. A list of VOR receiver airborne and ground check points, can be found in which publication?

J29
1- Notices to Airmen.
2- Airport/Facility Directory.
3- Graphic Notices and Supplemental Data.
4- AIM, Basic Flight Information and ATC Procedures.



SYMBOLS ON SURFACE ANALYSES (SURFACE WEATHER MAPS)

123. Refer to the illustration above. Weather conditions associated with symbol "D" are

K01
1- a line of active thunderstorms.
2- stratiform clouds and haze.
3- rain, drizzle, and fog.
4- an area of thundershowers.

124. Refer to the illustration above. Select the symbol which represents an elongated area of relatively low atmospheric pressure called a trough line.

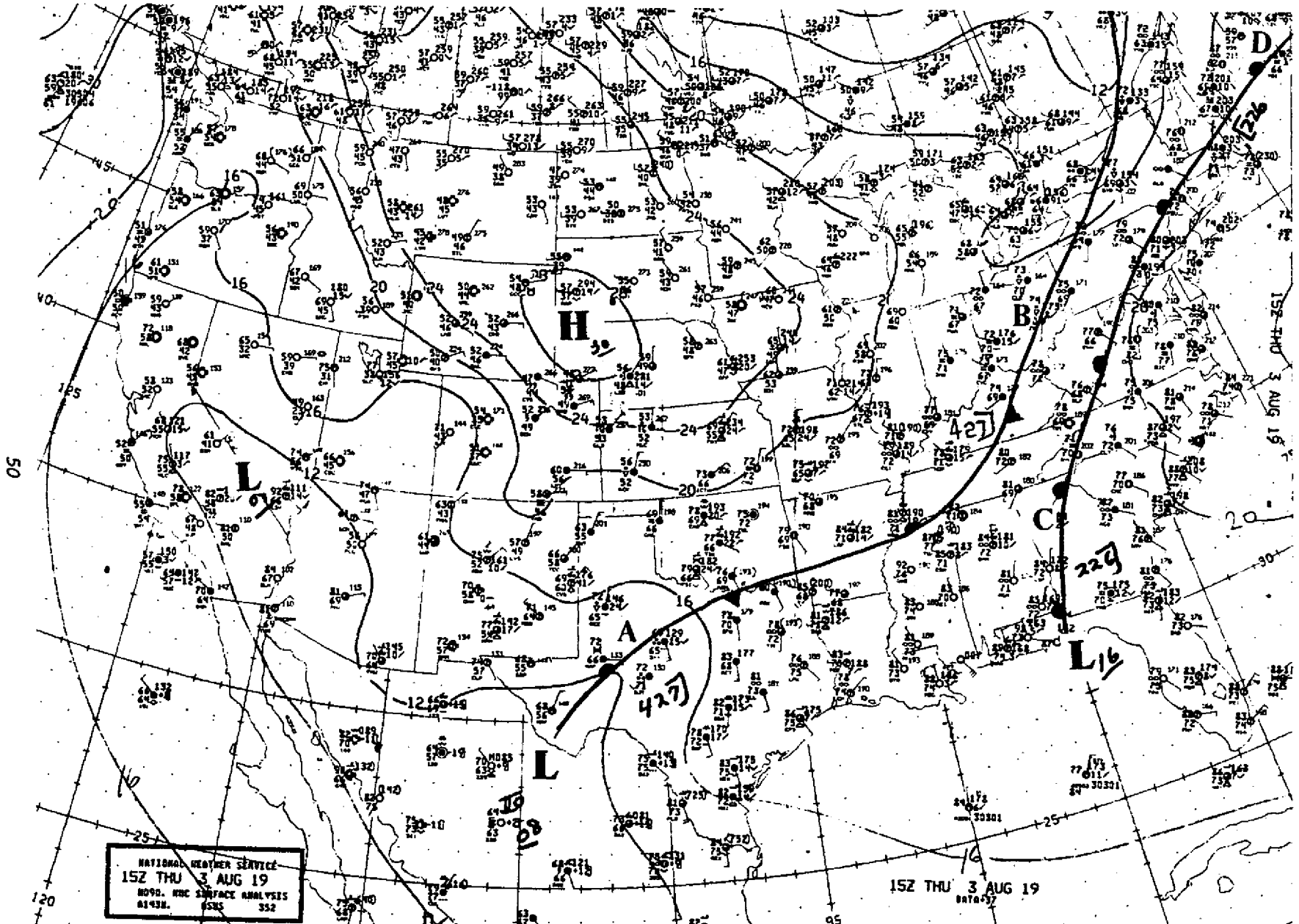
K01
1- B.
2- C.
3- D.
4- E.

125. Select the true statement concerning wind circulation associated with pressure systems in the northern hemisphere, as shown on a Surface Weather Map.

K01
1- Wind circulates counterclockwise around high pressure areas and clockwise around low pressure areas.
2- Wind circulates clockwise around high pressure areas and counterclockwise around low pressure areas.
3- Wind circulates counterclockwise around both high pressure and low pressure areas.
4- Wind circulates clockwise around both low pressure and high pressure areas.

126. Refer to the illustration above. Which symbol represents a stationary front?

K01
1- A.
2- B.
3- C.
4- D.


H
L
L
L
A
B
C
D
L16
427
427
229
NATIONAL WEATHER SERVICE
15Z THU 3 AUG 19
15Z THU 3 AUG 19

127. Refer to the Surface Weather Map to the left, and consider the front that extends from point "A" to point "B".

K01
1- This is an occluded front.
2- This is a slow moving warm front.
3- This front has little or no movement.
4- This is a rapidly moving cold front.

128. Refer to the Surface Analysis to the left. The front that extends from the Florida panhandle to Maine is known as

K01
1- a stationary front.
2- a warm front.
3- an occlusion.
4- a cold front.

129. Refer to the Surface Analysis to the left. Concerning wind circulation associated with high and low pressure areas, select the true statement.

K01
1- Wind flows across both high and low pressure areas paralleling isobars.
2- Wind flows outward from high pressure areas and inward to low pressure areas, crossing isobars at an angle.
3- Wind flows outward in both high and low pressure areas, crossing isobars at an angle.
4- Wind flows inward to high pressure areas and outward from low pressure areas, crossing isobars at an angle.

130. The weather information shown on the Surface Weather Map to the left indicates

K01
1- the front that extends from point "A" to point "B" has little or no movement.
2- the front extending from point "C" to point "D" is moving eastward.
3- the surface winds east of the front at point "B" are from the northwest.
4- air circulation around the high pressure area in the upper midwestern states is counterclockwise.

131. The information shown on Surface Weather Maps (such as shown to the left) that should be of greatest value to you as a pilot, is the

K01
1- speed and direction of surface winds and winds aloft.
2- location of icing, turbulence, and thunderstorms.
3- amount, type, and intensity of cloud formations.
4- pressure patterns and the surface location of fronts.

132. The principal value of the Surface Weather Map is that such a map

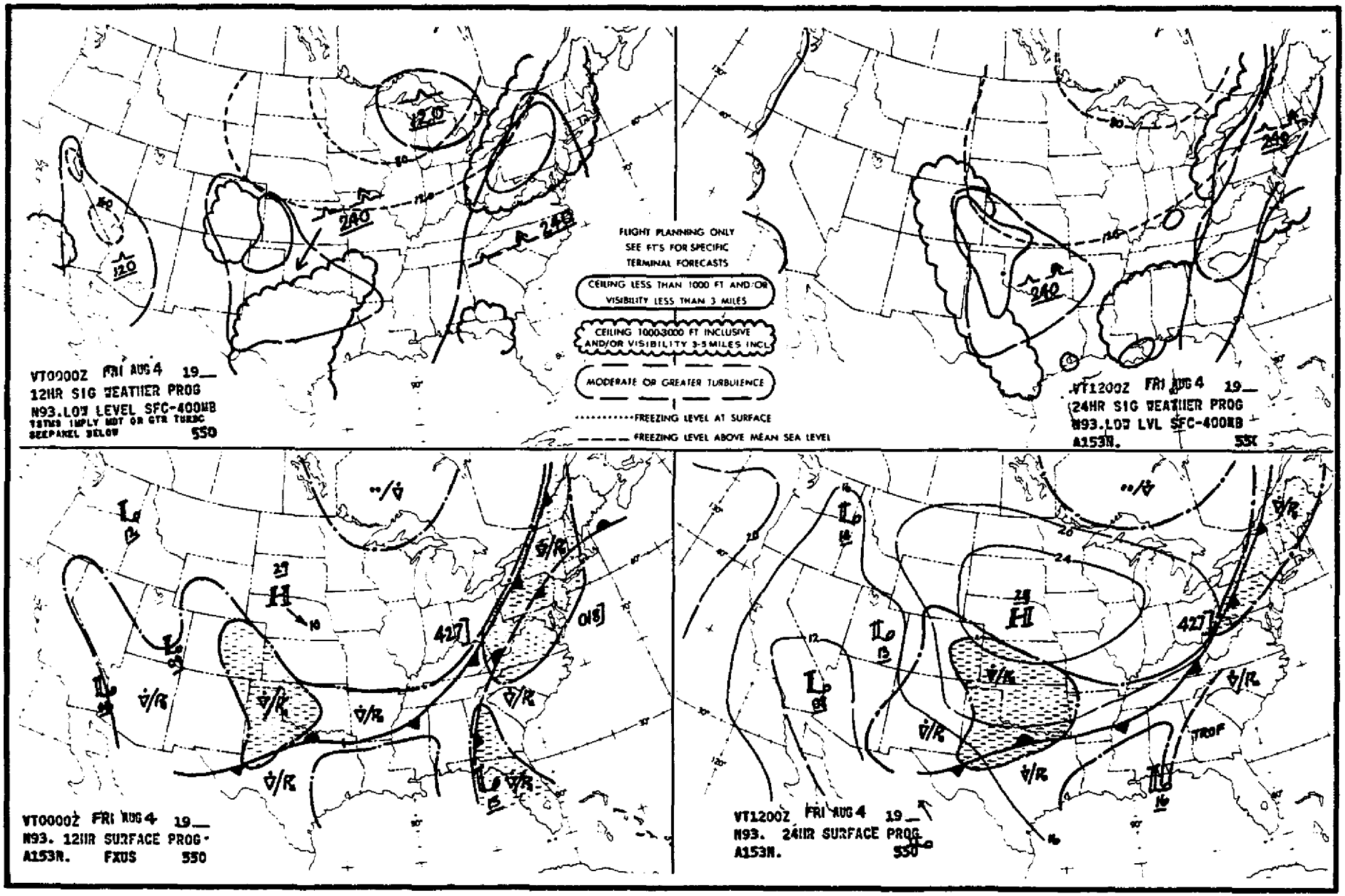
K01
1- provides a means of locating pressure systems and fronts and an overview of winds and temperatures.
2- enables the pilot to accurately forecast weather conditions along the intended route of flight.
3- shows the amount, type, and intensity of cloud formations and the speed and direction of surface winds.
4- enables the pilot to accurately forecast weather conditions at the destination airport.

133. When using a Weather Depiction Chart, you should know that the

K02
1- smooth solid lines enclose areas of constant barometric pressure.
2- smooth solid lines enclose areas containing weather that was below VFR minimums for controlled airspace.
3- scalloped lines enclose areas where the ceiling is below 1,000 feet and the visibility is less than 3 miles.
4- scalloped areas enclose areas which have an overcast below 1,000 feet.

134. A Weather Depiction Chart is useful to a pilot in determining the

K02
1- temperature and dewpoint at selected stations.
2- areas of equal barometric pressure.
3- areas where weather conditions were reported above or below VFR minimums.
4- areas of cloud cover and precipitation that will exist in the next 4 hours.


FLIGHT PLANNING ONLY
SEE FT'S FOR SPECIFIC
TERMINAL FORECASTS
CEILING LESS THAN 1000 FT AND/OR
VISIBILITY LESS THAN 3 MILES
CEILING 1000-3000 FT INCLUSIVE
AND/OR VISIBILITY 3-5 MILES INCL
MODERATE OR GREATER TURBULENCE
FREEZING LEVEL AT SURFACE
FREEZING LEVEL ABOVE MEAN SEA LEVEL
VT0000Z FRI AUG 4 19__
12HR SIG WEATHER PROG
N93.LOW LEVEL SFC-400MB
TSTMS IMPLY MDT OR GTR TURBC
SEEPANEL BELOW
550
VT1200Z FRI AUG 4 19__
(24HR SIG WEATHER PROG
N93.LOW LVL SFC-400MB
A153N.
55X
VT0000Z FRI AUG 4 19__
N93. 12HR SURFACE PROG
A153N. FXUS 550
VT1200Z FRI AUG 4 19__
N93. 24HR SURFACE PROG
A153N.
550
TROF

135. Areas where takeoffs and landings should not be made under VFR (at the time the chart was drawn) can be noted by referring to which type of weather chart?

K02
1- Significant Weather Prognostic Chart.
2- Weather Depiction Chart.
3- Density Altitude Chart.
4- Radar Summary Chart.

136. Areas enclosed by a scalloped line on a Weather Depiction Chart contain weather conditions that are classified as

K02
1- IFR.
2- DVFR.
3- MVFR.
4- VFR.

137. Areas enclosed by a smooth solid line on a Weather Depiction Chart contain weather conditions classified as

K02
1- IFR.
2- DVFR.
3- MVFR.
4- VFR.

138. On the basis of the VT 1200Z 24-hour Surface Prognostic Chart to the left, which of the following conditions are forecast for Oklahoma?

K03
1- Moderate icing.
2- Showers or thunderstorms.
3- Stratus clouds with poor visibilities.
4- Fog and low ceilings.

139. Refer to the 12-hour Significant Weather Prognostic Chart on the adjacent page. The forecast for central portions of Colorado, Oklahoma, and Texas is for

K03
1- the freezing level to be at 24,000 feet MSL.
2- moderate or greater turbulence up to 24,000 feet.
3- continuous rain showers.
4- the freezing level to be at the surface.

140. On the basis of the Significant Weather Prognostic Chart (VT 1200Z) to the left, at what altitude is the freezing level expected to be in the vicinity of the Great Lakes?

K03
1- 2,000 feet MSL.
2- 4,000 feet MSL.
3- 8,000 feet MSL.
4- 18,000 feet MSL.

141. Which weather chart depicts the conditions as they are forecast at the valid time of the chart?

K03
1- Radar Summary Chart.
2- Surface Analysis.
3- Low Level Prognostic Chart.
4- Weather Depiction Chart.

142. Select the true statement concerning U.S. Low Level Significant Weather Prognostic Charts.

K03
1- These are four-panel charts that forecast the weather for a period of 48 hours.
2- The valid times of the charts are the times the plotted observations were made, rather than the times of the forecasts.
3- These charts are designed for use in domestic flight planning to 24,000 feet.
4- These charts do not depict ceiling, visibility, or turbulence.

143. Which source of information best depicts the forecast ceiling, visibility, turbulence, and the freezing level?

K03
1- Weather Depiction Chart.
2- Significant Weather Prognostic Charts.
3- Radar Summary Chart.
4- Surface Analysis.

144. For flight planning purposes, Significant Weather Prognostic Charts are useful in

K03
1- determining wind direction and velocity at various altitudes and flight levels.
2- determining the prevailing ceiling and visibility at the observation sites.
3- plotting the position of weather fronts during the preceding forecast period.
4- determining the expected movement and changes in weather patterns.

WINDS AND TEMPERATURES ALOFT FORECAST

FDUS1 KWBC Ø61740
DATA BASED ON Ø612ØØZ

VALID Ø7ØØØØZ FOR USE 18ØØ-Ø3ØØZ. TEMPS NEG ABV 24ØØØ

FT	3ØØØ	6ØØØ	9ØØØ	12ØØØ	18ØØØ	24ØØØ	3ØØØØ	34ØØØ	39ØØØ
ABI		2318+Ø5	2329+Ø3	2337-Ø3	2359-16	2386-25	731737	742945	743554
ABQ			2323-Ø9	2337-15	2369-26	73Ø5-34	734345	732846	73Ø547
AMA		1815	2129-Ø3	2239-Ø9	2367-21	73Ø3-29	734241	735748	732952
ATL	99ØØ	2317+11	2423+Ø7	2428+Ø1	2540-12	2651-25	266340	266549	256859
BNA	18Ø6	2418+Ø7	2428+Ø3	2438-Ø2	2453-14	256Ø-26	256840	257Ø49	247158
BRO	24Ø8	2614+18	252Ø+11	2425+Ø4	244Ø-11	235Ø-21	236335	236744	247Ø54

145. What information is provided by the Radar Summary Chart?

K07
1- Areas of clear weather.
2- Lines, cells, and areas of hazardous thunderstorms.
3- Ceilings and precipitation between reporting stations.
4- Areas of cloud cover and fog.

146. Which chart would be useful in preflight planning to identify the movement of a thunderstorm cell?

K07
1- Prognostic Chart.
2- Surface Weather Map.
3- Weather Depiction Chart.
4- Radar Summary Chart.

147. In a Winds and Temperatures Aloft Forecast, the wind direction and windspeed are referenced to

K06
1- magnetic north and knots.
2- magnetic north and statute miles per hour.
3- true north and knots
4- true north and statute miles per hour.

148. Refer to the Winds and Temperatures Aloft Forecast above. What is the wind direction, windspeed, and temperature forecast for Abilene (ABI) at 34,000 feet?

K06
1- 240° @ 129 knots; temperature -45° C.
2- 070° @ 142 knots; temperature -74° C.
3- 290° @ 145 knots; temperature -29° C.
4- 045° @ 74 knots; temperature -42° C.

149. Refer to the Winds and Temperatures Aloft Forecast above. What is the wind direction, windspeed, and temperature forecast for Amarillo (AMA) at 30,000 feet?

K06
1- 130° @ 142 knots; temperature -41° C.
2- 240° @ 73 knots; temperature -10° C.
3- 073° @ 41 knots; temperature -73° C.
4- 230° @ 142 knots; temperature -41° C.

150. Refer to the Winds and Temperatures Aloft Forecast above. Which station forecasts the coldest temperature at or below 24,000 feet?

K06
1- ABI.
2- ABQ.
3- BNA.
4- AMA.

151. Refer to the Winds and Temperatures Aloft Forecast above for Atlanta (ATL). The wind and temperature at 6,000 feet is forecast to be from

K06
1- 170° @ 23 knots; temperature 11° C.
2- 230° @ 17 knots; temperature 11° C.
3- 023° @ 11 knots; temperature 17° C.
4- 170° @ 11 knots; temperature 17° C.

152. In decoding a Winds and Temperatures Aloft Forecast, the coded group 9900+00 means

K06
1- winds light and variable, temperature 0° C.
2- wind from 90° at 9 knots, temperature 0° C.
3- there is no forecast of wind and temperature at a prescribed level.
4- wind in excess of 90 knots, temperature 90° F.

153. Based on the amended forecast for Cape Girardeau (CGI) below, you determine

K09
1- at 15Z the ceiling is forecast to be 600 feet, sky obscured.
2- the surface winds are forecast to change from the northwest to a southwesterly direction by the end of the forecast period.
3- the issue time of this forecast was 1325Z.
4- the fog to be dissipating after 17Z with visibilities improving during the remainder of the forecast period.

154. Based on the Terminal Forecast for Joplin (JLN) below, you determine

K09
1- this forecast is valid beginning on the sixth day of the month at 1000Z valid until 1000Z the following day.
2- after 18Z the surface wind is forecast to be from 315° gusting to 22 knots.
3- the visibility at 18Z is forecast to be 3 miles with freezing drizzle and snow showers.
4- this forecast was amended at 1010Z.

155. Based on the corrected forecast below for Cape Girardeau (CGI) you should expect

K09
1- gusty surface winds from 020° after 14Z.
2- after 01Z the visibility to be 4 miles in thunderstorms.
3- southwesterly surface winds at the beginning of the forecast period.
4- higher ceilings after 04Z.

156. Refer to the Terminal Forecast below for Springfield (SGF). What is the lowest ceiling forecast prior to 04Z?

K09
1- 1,000 feet overcast.
2- 1,400 feet overcast.
3- 800 feet overcast.
4- 1,600 feet broken.

157. Select the true statement concerning Radar Summary Charts.

K07
1- The symbol "NA" on the chart means -- no echo (equipment operating but no echoes observed).
2- These charts can be used to identify areas of clear weather because the absence of echoes guarantees clear skies.
3- Boxes enclosed by a dashed line on the chart indicate a severe weather watch in effect.
4- The symbol "NE" on the chart means -- observation not available.

158. The movement of individual thunderstorm cells often differ from the movement of the overall storm pattern. To which chart would you refer to detect the movement of individual echoes or a line of echoes?

K07
1- Stability Chart.
2- Surface Analysis.
3- Weather Depiction Chart.
4- Radar Summary Chart.

SELECTED TERMINAL FORECASTS

CGI FT COR Ø61ØlØ 1Ø28Z 8Ø SCT Ø21Ø. 14Z 4Ø SCT C8Ø BKN Ø213G21
SCT OCNL BKN. ØlZ C4Ø OVC Ø214 CHC 4R-. Ø4Z MVFR CIG..

JLN FT COR Ø61ØlØ 1Ø3ØZ C16 BKN 8Ø OVC Ø315G22 BKN OCNL SCT.
18Z C14 OVC Ø315G22 CHC 5R-. ØlZ C1Ø OVC Ø414 CHC 3ZR-S-.
Ø4Z IFR CIG ZR-S-..

SGF FT COR Ø61ØlØ 1Ø3ØZ C16 BKN 8Ø OVC Ø315G22 BKN OCNL SCT.
18Z C14 OVC Ø315G22 CHC 5R-. ØlZ C1Ø OVC Ø414 CHC 3ZR-S-.
Ø4Z IFR CIG ZR-S-..

CGI FT AMD1 Ø613lØ 1325Z C6X3F 331Ø. 15Z C1Ø BKN 5F Ø112.
17Z C2Ø BKN 8Ø OVC Ø112G2Ø. ØlZ C14 OVC Ø214 CHC 4R-.
Ø4Z MVFR CIG R BCMG IFR CIG R..

AREA FORECAST

DFW FA 131240
131300Z-140700Z
OTLK 140700Z-141900Z

NM OK TX AND CSTL WTRS...

HGTS ASL UNLESS NOTE...

FLT PRCTN..,E OF PNC-SPS-LRD LN FOR TSTMS AND ICG. ERN HLF TX FOR CIGS BLO 10 VSBY BLO 3 TIL ARND 18Z. PTNS WRN TX SERN NM FOR BD AND TURBC 17Z-02Z.

SYNS... AT 13Z CDFNT NR A GCK-SPS-DLF LN MOVG EWD ABT 20 KTS TO NR A SHV-BRO LN BY 07Z.

CLDS AND WX...
OK AND TX ALG AND AHD CDFNT...
WDSPRD CIGS BLO 10 OVC VSBYS LCLY BLO 3L-F OVR TX PTN AND CIGS 15-25 OVC OK PTN. TOPS LYRD TO 150. SCT RW OVR AREA WITH ISOLD TRW OK PTN. CB TOPS 280. 16Z-18Z OVR TX CIGS IPVG TO 15-25 BKN-OVC VSBYS 7 MI OR BTR WITH RW/TRW INCRG OVR ENTR AREA. AFT 19Z OVR ERN THIRD TX PSBL SVR TSTMS TOPS ABV 350. OTLK...MVFR CIG.

SERN QTR NM RMNDR TX AND OK BHND CDFNT...
MSTLY CLR BCMG AFT 17Z PTCHY CIGS 80-100 BKN 120-150. ALSO AFT 17Z VSBYS LCLY 2-4BD IN CDS-ABI-INK-CVS AREA. D TOPS 100-120 WITH VSBYS IPVG ARND 02Z. SFC WIND 3020G35 17Z-02Z. OTLK...VFR CLR.

WRN AND NRM NM...
PTCHY 80-100 BKN-SCT 120 WRN HLF OTRW MSTLY CLR. AFT 17Z MSTLY CLR WRN HLF AND PTCHY 80-100 BKN 150 NERN QTR WITH HIR RDGS OCNLY OBSCD. OVR NCNTRL MTNS CHC 2SW- 17Z-01Z. OTLK...VFR.

CSTL WTRS...
10-20 SCT CIG 80-100 BKN TOPS 150 WITH WDLY SCT RW-. AFT 22Z RW INCRG WITH SCT TRW. RW TOPS 180. CB TOPS 300. OTLK...MVFR CIG TRW BCMG VFR 12Z.

ICG AND FRZLVL...MDT MXD ICGICIP ABV FRZLVL AHD CDFNT. LGT RIME ICGIC BHND CDFNT. FRZLVL 70 NRN NM SLPG TO 100 SWRN TX AND 90 NERN OK SLPG TO 120 SRN TX.

TURBC...OCNL MDT TURBC SERN NM AND OVR WRN TX MAINLY 17Z-02Z. ELSW GENLY LGT TURBC.

THIS FA ISSUANCE CANCELS THE FOLLOWING AIRMETS...QUEBEC 1 ROMEO 1.

STATION IDENTIFIERS

ABI	ABILENE, TX	INK	WINK, TX
BRO	BROWNSVILLE, TX	LRD	LAREDO, TX
CDS	CHILDRESS, TX	PNC	PONCA CITY, OK
CVS	CLOVIS, NM	SHV	SHREVEPORT, LA
DLF	DEL RIO, TX	SPS	WICHITA FALLS, TX
GCK	GARDEN CITY, KS		

159. In Area Forecasts, cloud heights are given in reference to

K08
1- ground level only.
2- density altitude.
3- pressure altitude.
4- sea level or ground level.

160. Based on the Area Forecast to the left for the coastal waters of Texas, you determine that

K08
1- widely scattered severe thunderstorms with hail at the surface are forecast prior to 22Z.
2- the cumulonimbus cloud tops are forecast to reach 30,000 feet after 22Z.
3- rain showers are forecast to decrease in intensity after 22Z.
4- ceilings are forecast to be 800 to 1,000 feet broken at the beginning of the forecast period.

161. Refer to the Area Forecast to the left. Which statement is true?

K08
1- Over Oklahoma along and ahead of the cold front, the ceilings are forecast to be below 1,000 feet overcast.
2- The outlook is for weather conditions over the coastal waters to deteriorate after 12Z.
3- The weather in the western half of New Mexico after 17Z is forecast to be mostly clear.
4- Flight precautions are in effect for the western half of Texas for ceilings below 1,000 feet and visibilities less than 3 miles.

162. It is a true statement to say that Area Forecasts are issued every

K08
1- 12 hours and cover a 12-hour period with an additional 6-hour outlook.
2- 6 hours and the distances are in nautical miles, while visibilities are in statute miles.
3- 12 hours and cover an 18-hour period with an additional 12-hour outlook.
4- 18 hours and windspeed is in knots, with wind direction in degrees magnetic.

163. What is the meaning of "MVFR" as used in the categorical outlook portion of Area Forecasts?

K08
1- Ceiling 800 to 1,000 feet; visibility less than 3 miles.
2- Ceiling 1,500 feet; visibility 1 mile to less than 3 miles.
3- Ceiling greater than 3,000 feet; visibility 3 to 5 miles.
4- Ceiling 1,000 to 3,000 feet; and/or visibility 3 to 5 miles.

164. Refer to the Area Forecast on the adjacent page. Which statement is true?

K08
1- The outlook for Oklahoma and Texas along and ahead of the cold front is for ceilings of 1,000 to 3,000 feet; and/or visibility 3 to 5 miles.
2- The weather in the western half of New Mexico after 17Z is forecast to be MVFR.
3- The outlook is for weather conditions over the coastal waters to deteriorate after 12Z.
4- This type forecast is issued every 18 hours and windspeed is in knots with wind direction in degrees magnetic.

165. Which statement is true concerning In-Flight Weather Advisories?

K13
1- AIRMETS will be issued concerning weather phenomena of such severity as tornadoes, embedded thunderstorms, squall lines, severe and extreme turbulence, 3/4" hail, and severe icing.
2- SIGMETS include weather phenomena less severe than those covered by AIRMETS.
3- In-Flight Weather Advisories are also called PIREPS (Pilot Weather Reports).
4- In-flight advisories are unscheduled forecasts to advise en route aircraft of the development of potentially hazardous weather.

IN-FLIGHT ADVISORIES

DFW WA Ø61Ø5Ø
Ø61Ø5Ø-Ø616Ø5Ø

CNL AIRMET CHARLIE 1. CONDS INCLD IN AIRMET ALFA 3.

AIRMET ALFA 3. FLT PRCTN. NM OK PNHDL NWRN TX DUE LOW CIGS LOW VSBYS OBSCMT AND ICG. OVR NM OK PNHDL NWRN TX GENLY N OF 6Ø W DMN-INK-CDS LN CIGS OCNLY BLO 1 THSD VSBYS BLO 3 MIS SNW FRZG DRZL AND FOG MORE FQT OVR NM. MDT MXD ICGICIP BLO 1ØØ OVR OK AND TX AND BLO 14Ø OVR NM. TRRN 7Ø AND ABV FQTLY OBSCD. CONDS CONTG PAST 165ØZ.

DFW WA Ø611Ø5
Ø611Ø5-Ø617Ø5

AIRMET BRAVO 2. FLT PRCTN. NM OK TX CSTL WTRS DUE STG LOW LVL WNDS TURBC AND OVR NM UDDF. OVR NM OK TX AND CSTL WTRS WNDS 3Ø KTS OR MORE WITHIN 2 THSD FT SFC. MDT TURBC BLO 1ØØ OK TX AND CSTL WTRS AND 15Ø AND BLO OVR NM. OCNL STG UDDF ALG ERN SL.

DFW WA Ø6163Ø
Ø6163Ø-Ø618ØØ

AIRMET DELTA 2. FLT PRCTN. PTNS S CNTRL AND SWRN TX DUE LOW CIGS AND LOW VSBYS. OVR S CNTRL AND SWRN TX GENLY W OF AUS-MFE LN AND E OF SJT-DRT LN CIGS BLO 1 THSD VSBYS OCNLY BLO 3 MIS DRZL AND FOG. CONDS IPVG AND ENDG ARND 18Z. CNL AIRMET 18Z.

DFW WA Ø61545 COR
Ø61545-Ø62145

AIRMET ALFA 4. FLT PRCTN. NM OK PNHDL NWRN TX DUE LOW CIGS LOW VSBYS AND OBSCMT. OVR NM OK PNHDL NWRN TX GENLY N OF 6Ø W DMN-INK-MAF-CDS LN CIGS OCNLY BLO 1 THSD VSBYS BLO 3 MIS SNW FRZG DRZL AND FOG. TRRN 7Ø AND ABV GENLY OBSCD. CONDS CONTG PAST 2145Z.

STATION IDENTIFIERS

AUS	Austin, TX	INK	Wink, TX
CDS	Childress, TX	MAF	Midland, TX
DMN	Deming, NM	MFE	McAllen, TX
DRT	Dalhart, TX	SJT	San Angelo, TX

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166. Refer to the In-Flight Advisory above. Which statement is true concerning "AIRMET ALFA 4"?

K13
1- Northwestern Texas has moderate turbulence below 6,000 feet MSL.
2- "AIRMET ALFA 4" was issued at 0615 Greenwich time.
3- The terrain 7,000 feet and above is generally obscured in the areas mentioned in the AIRMET.
4- Flight precautions are advised for southern and central Texas, due to blowing snow and strong winds.

167. Which statement is true in regard to In-Flight Weather Advisories?

K13
1- SIGMET advisories include weather phenomena potentially hazardous to all aircraft.
2- AIRMET advisories concern such severe weather phenomena as tornadoes, thunderstorms, and severe turbulence.
3- Both SIGMETS and AIRMETS are broadcast on receipt and at quarter-hour intervals thereafter.
4- SIGMETS include weather phenomena less severe than those covered by AIRMETS.

168. Which statement is true concerning In-Flight Weather Advisories?

K13
1- SIGMETS include weather phenomena less severe than those covered by AIRMETS.
2- Both SIGMETS and AIRMETS are broadcast on receipt and at quarter-hour intervals thereafter.
3- AIRMET advisories concern such severe weather phenomena as tornadoes, thunderstorms, and severe turbulence.
4- The purpose of this service is to notify en route pilots of the possibility of encountering hazardous flying conditions.

169. Refer to the In-Flight advisory to the left. Which statement is true concerning "AIRMET DELTA 2"?

K13
1- The stated conditions are forecast to be improving and to end around 1800Z.
2- "AIRMET DELTA 2" was issued at 0616 Greenwich time.
3- In Texas, west of line between Austin and McAllen, a line of thunderstorms with moderate turbulence is developing.
4- Flight precautions are advised due to freezing rain and drizzle over portions of central and southern Texas.

170. Refer to the In-Flight Advisory to the left above. Which statement is true concerning "AIRMET ALFA 3"?

K13
1- In Oklahoma and Texas, moderate mixed icing in clouds and precipitation is not expected above 1,000 feet.
2- Over portions of New Mexico, Oklahoma, and northwestern Texas, the ceilings will occasionally be below 1,000 feet.
3- Heavy rain, hail, and thunderstorms are occurring in New Mexico and portions of central Texas.
4- Visibilities are expected to be below 1 mile due to blowing dust in the Oklahoma panhandle and surrounding areas.

SELECTED SURFACE AVIATION WEATHER REPORTS

MLC SA 1252 E23 OVC 7 126/34/3Ø/361Ø/991
ADM SA 1252 E2Ø BKN 2Ø 37/26/3612G22/989

171. Which statement regarding the aviation weather reports above for McAlester (MLC) or Ardmore (ADM) is true?

K12
1- At ADM the temperature/dewpoint spread is greater than at MLC.
2- At MLC the altimeter setting is 31.26 inches.
3- At ADM the 20,000-foot broken layer of clouds is more than 0.9 sky cover.
4- At ADM the temperature/dewpoint spread is such that the formation of fog is likely.

172. Suppose a PIREP indicates "moderate clear air turbulence above 5,000 feet." Which statement correctly describes the intensity of this turbulence and aircraft reaction to the turbulence?

K13
1- Rapid jolts or bumps with appreciable change in aircraft altitude or attitude. The aircraft may be momentarily out of control.
2- Large variations in indicated airspeed; large and abrupt changes in altitude and attitude. The aircraft may be momentarily out of control.
3- Variations in indicated airspeed, changes in altitude and/or attitude, but the aircraft is controllable at all times.
4- Rapid and rhythmic bumpiness without appreciable changes in attitude or altitude.

UA /OV MRB-PIT 16ØØ FLØ8Ø /TP BE55 /SK ØØ4 BKN Ø12/Ø22 BKN-OVC /TA Ø1 /IC LGT-MDT RIME Ø35-Ø6Ø /RM WIND COMP HEAD Ø2Ø MH31Ø TAS 18Ø

173. The Pilot Report above for a flight between Martinsburg (MRB) and Pittsburgh (PIT), indicates that a pilot

K13
1- reported three layers of broken/overcast clouds.
2- was flying a compass heading of 020° at the time of the report.
3- did not report the outside air temperature.
4- reported the base of the broken clouds is 1,200 feet with tops at 2,200 feet.

318-376 O - 80 - 5

SELECTED SURFACE AVIATION WEATHER REPORTS

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     SA21 Ø613ØØ
MLC SA 1252 E23 OVC 7 126/34/3Ø/361Ø/991
ADM SA 1252 E2Ø BKN 2Ø 37/26/3612G22/989
DAL SA 1250 M35 OVC 15 4Ø/32/3313/988/BINOVC
TYR SA 1250 M1Ø OVC 7 56/54/34Ø5/982
FTW SA 1255 M3Ø OVC 7 37/32/3213/988
DFW SA 1253 M38 OVC 15 117/39/31/34Ø9/988
CLL RS 1255 E25 OVC 7 Ø93/59/58/36Ø6/982/ OVC75
LFK SA 1250 E35 BKN 7 1Ø5/59/57/11Ø6/985
OKC SA 1254 M23 OVC 15 156/3Ø/22/Ø119G27/997/PK WND Ø127/48
WDG SA 1245 5Ø -BKN 1Ø 28/M/Ø318/ØØØ
TUL SA 1253 M2Ø OVC 15 159/34/25/Ø318G24/999


→ NO SUMØ613Ø2
→ DAL 11/ØØ1 SLR THR 17 DSPLCD 215Ø/ARPT CLSD NIGHT
→ FTW 11/ØØ2 F16 ALS OTS
→ DFW 11/ØØ1 DFW CRANE 3ØAGL 7ØØNW AER 13L DAY
→ DFW 11/ØØ2 DFW NORTH 75Ø 13L-31R CLSD THRU 5/31
→ CLL 11/ØØ1 CFD RWY LGTS OTS
→ OKC 12/ØØ6 OKC EFAS FORT SMITH OUTLET OTS
→ TUL 11/ØØ5 MEE VOR OTS
→ TUL 11/Ø1Ø TUL ILS GS 17L OTS
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174. Refer to the Aviation Weather Reports and NOTAM Summary above for Dallas (DAL) and for Enid (WDG). Which statement is true?

K12
1- At DAL the surface windspeed is greater than at WDG.
2- Dallas reports a NOTAM for Sulphur Springs (SLR) concerning the displacement of Runway 17 threshold.
3- The altimeter setting for WDG is missing.
4- The WDG dewpoint is below 0° F.

175. Refer to the Aviation Weather Reports above for MLC and for CLL. Which statement is true?

K12
1- The sea level pressure is greater at CLL than at MLC.
2- The temperature/dewpoint spread is greater at CLL than at MLC.
3- There is no reason to believe that fog will develop at CLL.
4- The wind at MLC is from the south at 10 knots.

176. Refer to the Aviation Weather Reports and NOTAM Summary above for Dallas-Fort Worth (DFW) and for Tyler (TYR). Which statement is correct?

K12
1- At DFW the altimeter setting is 31.17 inches.
2- There are two NOTAMS concerning operations from Runway 13L at DFW.
3- The visibility at TYR is greater than at DFW.
4- The temperature/dewpoint spread is greater at TYR than at DFW.

177. Select the true statement pertaining to the Aviation Weather Reports and NOTAM Summary above for Oklahoma City (OKC) or for Tulsa (TUL).

K12
1- Both TUL and OKC have measured overcast ceilings and NOTAMS are listed for both stations.
2- The visibility is greater at OKC than at TUL.
3- The altimeter setting at TUL is 31.59 inches.
4- The temperature at OKC is higher than the temperature at TUL.

178. Cumulonimbus clouds can best be described as

K17
1- thin, white, feather like clouds in patches or narrow bands formed on the crests of waves created by barriers in the windflow.
2- white or gray layers or patches of solid clouds, usually appearing in waves.
3- dense clouds, dark at lower levels extending many thousands of feet upward.
4- fluffy, white clouds appearing in layers and sometimes producing steady precipitation.

179. Consider the following statements about mountain waves.

A. Mountain waves always develop on the upwind (windward) side of mountain ridges.
B. In a mountain wave the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downstream.
C. If the air is humid and the wave is of large amplitude, lenticular (lens-shaped) clouds may mark the wave's crest.
D. In a typical wave, the greatest amplitude is seldom more than 1,000 feet above the ridge crest elevation.

Select from the statements above those which are true.

K17
1- B, C.
2- A, B, C.
3- A, C, D.
4- A, B, C, D.

180. Almond or lens-shaped clouds formed on the leeward side of a mountain range, are known as

K17
1- cirrocumulus clouds.
2- roll clouds.
3- cirrus clouds.
4- lenticular clouds.

181. Hail is most likely to be associated with which type of cloud formation?

K17
1- Cumulonimbus.
2- Cumulus.
3- Stratocumulus.
4- Cirrocumulus.

182. Listed below are factors which change density altitude.

A. Decreasing barometric pressure.
B. Increasing barometric pressure.
C. Decreasing temperature.
D. Increasing temperature.
E. Decreasing relative humidity.
F. Increasing relative humidity.

Select the factors which <u>increase</u> the <u>density altitude</u> at a given airport.

K16
1- B, C, F.
2- A, D, F.
3- B, C, E.
4- A, D, E.

183. Meteorological and Notices to Airmen data are recorded on tapes and broadcast continuously over selected radio facilities, including

K15
1- En Route Flight Advisory Service (EFAS).
2- Automatic Terminal Information Service (ATIS).
3- low-frequency navigational aids and VORs.
4- all Flight Service Stations.

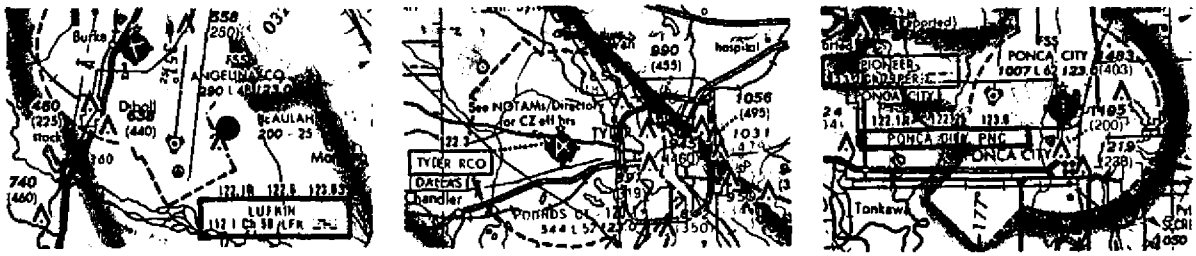
184. Transcribed Weather Broadcasts (TWEB) containing recorded meteorological and Notices to Airmen data are transmitted continuously over which of the following?

K15
1- Automatic Terminal Information Service (ATIS).
2- Selected low-frequency navigational aids and VORs.
3- Stage III, Radar Sequencing and Separation Service for VFR aircraft.
4- Flight Service Stations at 15 and 45 minutes after the hour on 123.5 MHz.

185. Recorded meteorological information and Notices to Airmen data are broadcast continuously over navigational aids by selected Flight Service Stations. These broadcasts are known as

K15
1- Automatic Terminal Information Service (ATIS).
2- En Route Flight Advisories Service (EFAS).
3- Scheduled Weather Broadcasts (SWB).
4- Transcribed Weather Broadcasts (TWEB).

SECTIONAL CHART SEGMENTS



SELECTED SURFACE AVIATION WEATHER REPORTS

SA21 Ø614ØØ
LFK SA 1353 35 SCT 25Ø SCT 7 11Ø/6Ø/57/1109/986
TYR SA 135Ø 28 SCT M35 OVC 15 4Ø/32/3513/991/BINOVC
PNC SA 135Ø 2Ø SCT E5Ø BKN 12Ø BKN 15 171/28/14/Ø416G23/ØØ1

STATION IDENTIFIERS

LFK	Lufkin, Texas
TYR	Tyler, Texas
PNC	Ponca City, Oklahoma

186. According to the Aviation Weather Report and the chart segment above for Ponca City (PNC), you would expect to find the base of the highest layer of clouds above Ponca City Airport at what indicated altitude?

K18
1- 5,000 feet MSL.
2- 6,007 feet MSL.
3- 12,000 feet MSL.
4- 13,007 feet MSL.

187. Based on the Aviation Weather Report and the chart segment above for Tyler, Texas, the ceiling above Pounds Field is at what indicated altitude?

K18
1- 4,044 feet MSL.
2- 3,500 feet MSL.
3- 3,344 feet MSL.
4- 2,800 feet MSL.

188. Based on the Aviation Weather Report and the chart segment above for Tyler, Texas, the base of the lowest clouds above Pounds Field is at what indicated altitude?

K18
1- 2,800 feet MSL.
2- 3,344 feet MSL.
3- 3,500 feet MSL.
4- 4,044 feet MSL.

189. According to the Aviation Weather Report and the chart segment above for Ponca City (PNC), the lowest ceiling above Ponca City Airport is at what indicated altitude?

K18
1- 12,007 feet MSL.
2- 6,007 feet MSL.
3- 5,000 feet MSL.
4- 3,007 feet MSL.

190. Based on the Aviation Weather Report and the chart segment above for Lufkin, Texas, the base of the lowest layer of clouds above Angelina County Airport would be at what indicated altitude?

K18
1- 2,790 feet MSL.
2- 2,500 feet MSL.
3- 3,790 feet MSL.
4- 3,500 feet MSL.

191. Refer to the Aviation Weather Report and the chart segment above for Lufkin, Texas. At what indicated altitude would you expect to find the base of the highest layer of clouds above Angelina County Airport?

K18
1- 25,290 feet MSL.
2- 25,000 feet MSL.
3- 3,790 feet MSL.
4- 2,790 feet MSL.

192. Refer to the Aviation Weather Report and the chart segment above for Ponca City (PNC). The base of the lowest clouds above the Ponca City Airport would be at what indicated altitude?

K18
1- 2,000 feet MSL.
2- 3,007 feet MSL.
3- 5,000 feet MSL.
4- 6,007 feet MSL.

193. Which type of cloud formation is most likely to produce hail?

K17
1- Cirrocumulus.
2- Cumulonimbus.
3- Stratocumulus.
4- Altocumulus castellanus.

194. If the temperature/dewpoint spread is 4° and decreasing, and the temperature is 62° F., what type weather is most likely to develop?

K20
1- Rain showers.
2- Fog or low clouds.
3- Thunderstorms.
4- Freezing precipitation.

195. The temperature to which moist air must be cooled to become saturated is defined as

K20
1- sublimation.
2- condensation nuclei.
3- relative humidity.
4- the dewpoint.

196. If your destination airport reports a temperature of 45° F. and a dewpoint of 41° F. with spread between the two decreasing, which type weather would you most likely encounter upon arrival?

K20
1- Fog or low clouds.
2- Thunderstorms and cold frontal-type weather.
3- An increase in pressure altitude.
4- Freezing precipitation or icing conditions.

197. Low-level wind shear is best described as

K19
1- deflection of wind currents as the result of Coriolis force.
2- a downward motion of the air associated with continuous winds blowing with an easterly component due to the rotation of the earth.
3- a change in wind direction and/or speed in a very short distance in the atmosphere.
4- a violently rotating column of air extending from a cumulonimbus cloud.

198. Which statement is true regarding the in-flight hazard called HAIL?

K19
1- Hail is usually produced by cirrocumulus clouds.
2- Large hailstones usually do not have alternating layers of clear and cloudy ice.
3- Subtropical and tropical thunderstorms contain more hail than thunderstorms in northern latitudes.
4- Large hail is most commonly found in thunderstorms which have strong updrafts and large liquid water content.

199. Which statement is true regarding HAIL?

K19
1- Subtropical and tropical thunderstorms contain more hail than thunderstorms in northern latitudes.
2- Large hailstones are entirely composed of clear ice.
3- Hail is usually produced by cirrocumulus clouds.
4- Hail is usually produced during the mature stage of a thunderstorm's life span.

200. Low-level wind shear occurs

K19
1- when surface winds are 15 knots and there is no change in wind direction and windspeed with height.
2- when there is a low-level temperature inversion with strong winds above the inversion.
3- after a warm front has passed.
4- when surface winds are light and variable.

201. Suppose hazardous low-level wind shear is encountered during the initial climb after takeoff. Select the true statement.

K19
1- The wind direction will always change from a headwind to a tailwind when flying through wind shear.
2- When passing through wind shear the groundspeed will usually remain constant.
3- Low-level wind shear may be associated with a thunderstorm's gust front that precedes the actual storm by 15 nautical miles.
4- The pilot should decrease power to compensate for the increase in lift.

202. Cloud heights as reported in the Surface Aviation Weather Reports are reported in hundreds of feet above

K21
1- mean sea level (MSL).
2- ground level at the station of observation.
3- the highest terrain within the Airport Traffic Area of the station of observation.
4- the highest terrain within 5 statute miles from the station of observation.

203. Supercooled rain falling through colder air may freeze during its descent, falling as

K22
1- ice pellets.
2- rime ice.
3- snow.
4- hail.

204. Which of the following would decrease the stability of an air mass?

K22
1- Warming from below.
2- Cooling from below.
3- Decrease in water vapor.
4- Sinking of the air mass.

205. A moist, cold air mass that is being warmed from below is characterized, in part, by

K22
1- smooth air.
2- fog and drizzle.
3- continuous heavy precipitation.
4- showers and thunderstorms.

206. Select the true statement concerning a temperature inversion.

K22
1- A temperature inversion normally develops with a decrease in the temperature as height is increased.
2- A temperature inversion occurs when unstable air rapidly transfers heat from the surface upward.
3- A temperature inversion often develops near the ground on clear, cool nights when the wind is light.
4- A temperature inversion is usually indicated by the base of a line of cumulus clouds.

207. Suppose conditionally unstable air with high moisture content and very warm surface temperatures are forecast. From these conditions you should expect

K22
1- continuous heavy precipitation.
2- fog and drizzle.
3- strong updrafts and cumuliform clouds.
4- smooth air and excellent weather for flying.

208. A temperature inversion would most likely result in which of the following weather conditions?

K22
1- Clouds with extensive vertical development above an inversion aloft.
2- Good visibility in the lower levels of the atmosphere and poor visibility above an inversion aloft.
3- An increase in temperature as altitude is increased.
4- A decrease in temperature as altitude is increased.

209. The weather condition normally associated with unstable air is

K22
1- good visibility, except in blowing sand or snow.
2- stratiform clouds.
3- fair to poor visibility.
4- continuous precipitation.

210. Advection fog is formed as a result of

K21
1- moist air condensing as it moves over a cooler surface.
2- the ground cooling adjacent air to the dewpoint temperature on clear, calm nights.
3- the addition of moisture to a mass of cold air as it moves over a body of water.
4- moist, unstable air being cooled as it is forced up a sloping land surface.

211. Radiation fog is most likely to occur under which of the following conditions?

K21
1- Low temperature/dewpoint spread, calm wind conditions, the presence of hydroscopic nuclei, low overcast, and favorable topography.
2- Warm, moist air being forced upslope by light winds resulting in the air being cooled and condensed.
3- Warm, moist air flowing from a body of water over a cold surface with an 8 to 10 knot wind causing mixing and condensation.
4- A clear sky, little or no wind, and small temperature/dewpoint spread.

212. An advancing warm front containing moist and stable air is characterized, in part, by

K23
1- a wall of turbulent clouds known as a "squall line."
2- stratiform clouds and smooth air.
3- thunderstorms embedded in the cloud masses.
4- tornadic activity and extensive electrical discharges.

213. Regarding the characteristics and weather associated with a warm front, which of the following is a true statement?

K23
1- The presence of thunderstorms in a warm front is usually easy to detect, since they are not embedded in cloud masses.
2- The frontal zone may have low ceilings and zero visibilities over a wide area.
3- Colder air is overtaking and replacing warmer air and this usually produces wide bands of precipitation ahead of the warm front surface position.
4- Squall lines sometimes develop 300 miles ahead of warm fronts.

214. Sometimes the opposing forces exerted by adjacent air masses of different densities are such that the frontal surfaces between them show little or no movement. This is known as

K23
1- an occluded front.
2- a stationary front.
3- a frontogenesis.
4- a frontolysis.

215. The leading edge of an advancing cold air mass overtaking and replacing warmer air at the surface, is

K23
1- a cold front.
2- an occluded front.
3- a warm front.
4- a frontogenesis.

216. When a cold front overtakes a warm front, the two of them join together to form

K23
1- an occluded front.
2- a dewpoint front.
3- a stationary front.
4- a squall line.

217. The temperature at which moisture in the air begins to condense is called

K22
1- dewpoint.
2- lapse rate.
3- relative humidity.
4- divergence.

218. Which statement is true concerning the use of a Pseudo-Adiabatic Chart? The adiabatic chart

K22
1- provides assistance to pilots facing hazardous or unknown weather and winds aloft and is adapted from in-flight advisories.
2- is a forecast of the vertical temperature profile and moist adiabatic changes.
3- is used to graphically compute adiabatic changes in vertically moving air and to determine stability.
4- cannot be relied upon to determine the existence of an inversion aloft.

219. The ratio of the existing water vapor in the air, as compared to the maximum amount that could exist at a given temperature, is called

K22
1- convergence.
2- saturation point.
3- relative humidity.
4- the dewpoint.

220. Which statement is true concerning the use of a Pseudo-Adiabatic Chart or the information it provides?

K22
1- The adiabatic chart provides assistance to pilots facing hazardous or unknown weather and contains data compiled from in-flight advisories.
2- The strength of thermals is in proportion to the magnitude of the positive value of the thermal index (TI).
3- The strength of thermals is in proportion to the magnitude of the negative value of the thermal index (TI).
4- The adiabatic chart is a forecast of the vertical temperature profile and moist adiabatic changes.

221. A nonfrontal, narrow band of active thunderstorms, that often develop ahead of a cold front, is known as

K24
1- an occlusion.
2- a prefrontal system.
3- a squall line.
4- a shear line.

222. Select the statement which is correct in regard to the life cycle of a thunderstorm.

K24
1- Throughout the dissipating stage of a thunderstorm the updrafts continue to develop.
2- The beginning of rain at the earth's surface indicates the dissipating stage of the thunderstorm.
3- The beginning of rain at the earth's surface indicates the mature stage of the thunderstorm.
4- The initial stage of a thunderstorm is always a nimbus cloud which means "rain cloud."

223. If there is thunderstorm activity in the vicinity of an airport at which you plan to land, which hazardous and invisible atmospheric phenomenon might you expect to encounter on the landing approach?

K24
1- St. Elmo's Fire.
2- Wind shear turbulence.
3- Tornadoes.
4- Virga.

224. Tornadoes are most likely to occur with which type of thunderstorms?

K24
1- Squall line thunderstorms that form ahead of warm fronts.
2- Tropical thunderstorms during the mature stage.
3- Steady-state thunderstorms associated with cold fronts or squall lines.
4- Air mass thunderstorms.

225. A squall line preceding a cold front may often be characterized by

K24
1- widespread fog and extremely cold surface temperature.
2- thunderstorms and turbulence.
3- milder weather conditions than the cold front itself.
4- fog, low stratus clouds, and steady drizzle.

226. A squall line is usually associated with which type of frontal weather?

1- A fast-moving cold front.
2- A fast-moving warm front.
3- A stationary front.
4- An occluded front.

227. The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with

K24
1- slow-moving warm fronts.
2- slow-moving cold fronts.
3- squall line thunderstorms.
4- fast-moving fronts.

228. Thunderstorms are produced by which type of clouds?

K24
1- Nimbostratus.
2- Altostratus.
3- Cumulonimbus.
4- Stratocumulus.

229. Which hazardous clouds (among others) are specifically mentioned in Surface Aviation Weather reports?

K24
1- Nimbostratus clouds.
2- Noctilucent clouds.
3- Cirrus clouds.
4- Cumulonimbus mamma clouds.

230. The boundary between two different air masses is referred to as a

K23
1- foehn gap.
2- frontolysis.
3- frontogenesis.
4- front.

231. Which statement is true concerning an approaching warm front that had been forecast for the area?

K23
1- The first clouds that would appear are called cirrus clouds.
2- Squall lines often develop 100 miles ahead of the surface position of a warm front.
3- Warm front weather normally extends only a short distance ahead of and a greater distance behind the surface position of the front.
4- The weather associated with warm fronts normally extends 200-300 miles behind the surface position of the front.

232. Frost which has not been removed from the lifting surfaces of an airplane before flight

K25
1- may prevent the airplane from becoming airborne.
2- may cause the airplane to become airborne with a lower angle of attack and at a lower indicated airspeed.
3- will change the camber (curvature of the wing) thereby increasing lift during the takeoff.
4- would present no problems since frost will blow off when the airplane starts moving during takeoff.

233. Which statement is true regarding frost which has not been removed from the lifting surfaces of an airplane before flight?

K25
1- It may prevent the airplane from becoming airborne at normal takeoff speed.
2- It will change the curvature of the wing (camber) thereby increasing lift during the takeoff.
3- It may cause the airplane to become airborne with a lower angle of attack and at a lower indicated airspeed.
4- It would present no problems since frost will blow off when the airplane starts moving during takeoff.

234. Which statement is true regarding aircraft structural icing?

K25
1- It is impossible for weather forecasters to identify regions where icing will form.
2- Rime ice is the most common type of ice encountered in cumuliform clouds.
3- The most rapid accumulations of clear ice are usually at temperatures from 0° C. to -15° C.
4- The most common type of icing encountered in lower level stratus clouds is clear ice.

235. In flight, clear ice may accumulate on an aircraft structure most rapidly with the outside air temperature between 0° C. to -15° C., in

K25
1- ice fog.
2- any clouds or dry snow.
3- cumuliform clouds.
4- stratiform clouds.

236. The type of ice which forms on an aircraft structure in flight, depends on

K25
1- the increase in flight altitude.
2- the temperature/dewpoint spread.
3- the size of the water droplets that strike the aircraft surface.
4- an inversion aloft.

237. Tornadoes frequently form with which type thunderstorms?

K24
1- Squall line thunderstorms that form ahead of warm fronts.
2- Tropical thunderstorms during the mature stage.
3- Steady-state thunderstorms associated with cold fronts or squall lines.
4- Air mass thunderstorms.

238. When flying in the vicinity of thunderstorms, you should be aware that

K24
1- the most severe conditions, such as heavy hail, destructive winds, and tornadoes are generally associated with squall line thunderstorms.
2- avoidance of severe turbulence is assured by circumnavigating thunderstorms and clearing edges of the storms by 5 miles.
3- the overhanging anvil of a thunderstorm points in the direction from which the storm has moved.
4- avoidance of lightning and hail is assured by flying in the clear air outside the confines of a thunderstorm cell.

239. Consider the following statements in regard to standing mountain waves.

A. Mountain waves always develop in a series on the upwind (windward) side of mountain ridges.
B. In a mountain wave the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downwind.
C. If the air is humid and the wave is of large amplitude, lenticular clouds mark the wave's crest.
D. Clouds are always present to mark the mountain wave.

Select from the statements above those which are ture.

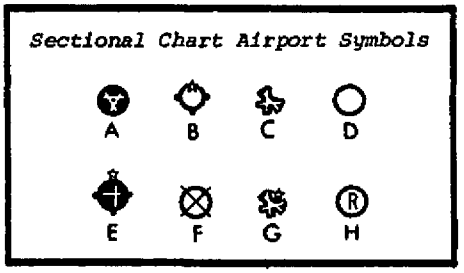
K29
1- A, B, C, D.
2- A, C, D.
3- A, B, C.
4- B, C.

240. Crests of standing mountain waves may be marked by stationary, lens-shaped clouds known as

K29
1- cumulonimbus mamma clouds.
2- standing lenticular clouds.
3- roll clouds.
4- rotor clouds.

241. Refer to the airport symbols below. Select the true statement concerning these symbols.

L01
1- Symbol "H" depicts a Rotorcraft-Helicopter facility.
2- Symbol "A" depicts an airport with emergency service or no service.
3- Symbols "A", "C", "E", and "G" depict airports with services and fuel available.
4- The stars on symbols "B", "E", and "G" indicate that these are military airports.



242. When flying at a low altitude across a mountain range the greatest potential danger, caused by descending air currents, will usually be encountered on the

K29
1- leeward side when flying into the wind.
2- windward side when flying into the wind.
3- leeward side when flying with the wind.
4- windward side when flying with the wind.

243. Select the true statement concerning isobars and windflow patterns around high and low pressure systems that are shown on a Surface Analysis (Surface Weather Map).

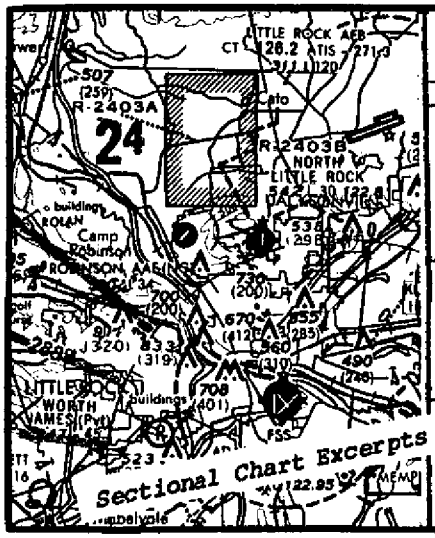
K28
1- When the isobars are far apart, crests of standing waves may be marked by stationary lenticular clouds.
2- Isobars connect contour lines of equal temperature.
3- When the isobars are close together, the pressure gradient force is greater and wind velocities are stronger.
4- Surface winds flow perpendicular to the isobars.

244. A pilot planning a long distance flight from west to east in the conterminous United States would most likely find favorable winds associated with high and low pressure systems by planning to fly a course which is

K28
1- south of both highs and lows.
2- north of a high.
3- north of a low.
4- south of a high.

245. Regarding aircraft structural icing, which statement is true?

K25
1- It is unnecessary for an aircraft to fly through rain or cloud droplets for structural ice to form.
2- Clear ice is most likely to form on an airplane when flying through stratified clouds or light drizzle.
3- In order for structural ice to form, the temperature at the point where moisture strikes the aircraft must be 0° C. (32° F.) or colder.
4- Rime ice gradually freezes on an airplane's surface becoming a smooth sheet of solid ice.



PROHIBITED, RESTRICTED, WARNING, AND ALERT AREAS ON MEMPHIS SECTIONAL CHART

NO.	NAME	ALTITUDE	TIME	APPROPRIATE AUTHORITY
R-2403A	Little Rock, Arkansas	To 16,000	0700 to 2100 May 1 thru Aug. 31 by NOTAM 48 hr in advance. OT 0700 Sat. to 1700 Sun. Sept. 1 thru Apr. 30 by NOTAM 24 hr in advance.	† FAA,Memphis ARTC Center * Area FSS Arkansas Army National Guard.
R-2403B	Little Rock, Arkansas	To 16,000	Daily 0700 to 2100 May 1 thru Aug. 31 by NOTAM 48 hr in advance. OT 0700 Sat. to 1700 Sun. Sep. 1 thru Apr. 30 by NOTAM 24 hr in advance.	† FAA, Memphis ARTC Center * Area FSS Arkansas Army National Guard.

P - Prohibited R - Restricted W - Warning A - Alert † - Controlling Agency * - For Information Only

Unless otherwise noted: Altitudes are MSL and in feet; time is local.

No person shall operate an aircraft within a Prohibited Area, or within a Restricted Area between the designated altitudes during the time of designation unless prior permission has been issued by the appropriate authority as listed above. The appropriate authority is defined as either the controlling agency (†) or the using agency.

Flight within Alert Areas is not restricted, but pilots are advised to exercise extreme caution.

246. Flight through Restricted Areas R-2403A and R-2403B (above) should not be accomplished unless the pilot

LOI
1- has received prior permission from the Commanding Officer of Little Rock, AFB.
2- is aware that the time of designation is continuous for both of these restricted areas.
3- has received prior permission from the appropriate authority.
4- has filed a VFR flight plan with the area FSS.

247. Refer to the chart segment to the right. Select the true statement concerning the areas marked "A" and "B".

LOI
1- Pilots are requested to maintain at least 2,000 feet above the terrain while flying over these areas.
2- A minimum altitude of 1,000 feet above the terrain is required while flying over these areas.
3- These are designated "Alert Areas" and extreme caution is advised when flying over these areas, due to low flying military aircraft.
4- Approval from the appropriate authority is required prior to flying over these areas.

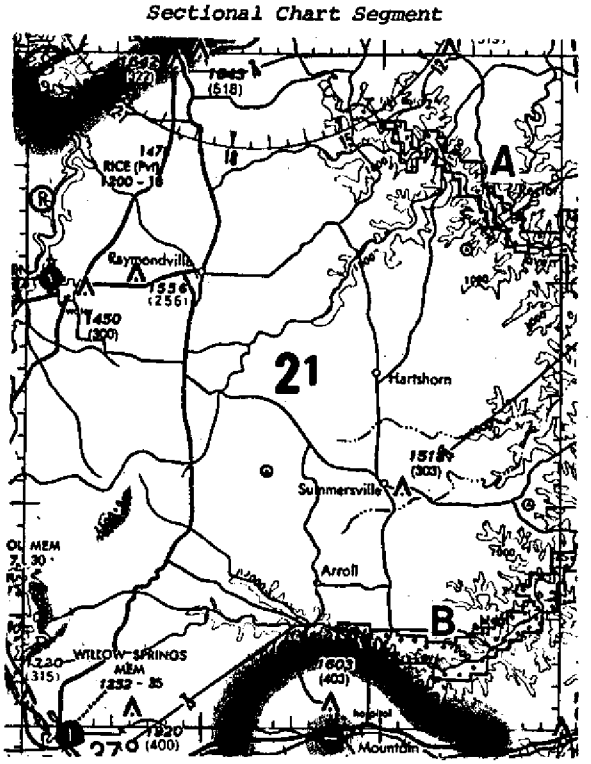
248. Refer to the chart to the right. What is the maximum elevation of the terrain and obstructions (antennas, towers, etc.) within the quadrangle bounded by ticked lines of latitude and longitude?

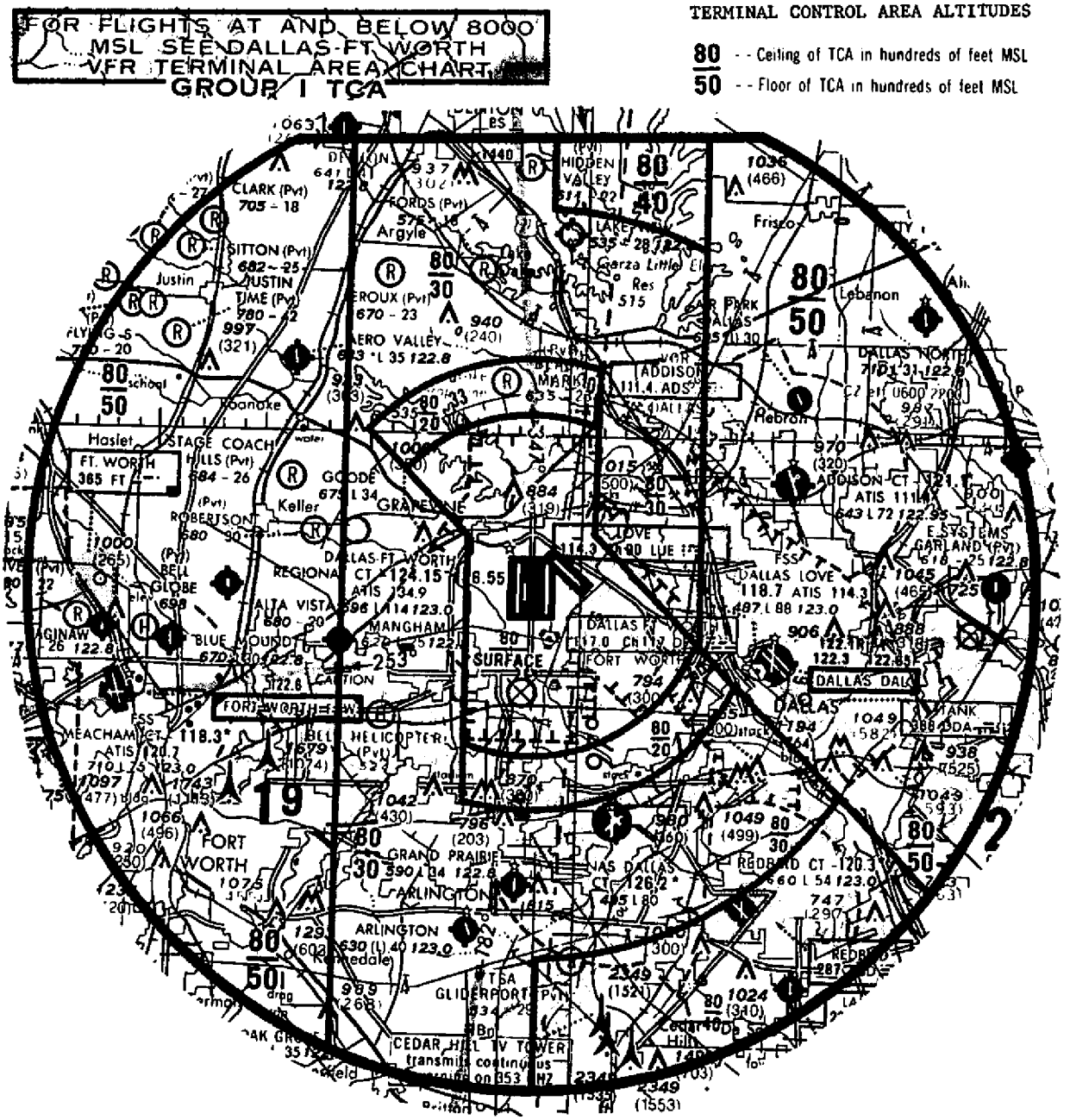
LOI
1- 2,320 feet MSL.
2- 2,100 feet MSL.
3- 1,920 feet MSL.
4- 1,642 feet MSL.

249. Refer to the sectional chart excerpts above. Which statement is true regarding Restricted Area R-2403B?

LOI
1- For information concerning the Restricted Area, contact the area FSS.
2- Permission from the Arkansas Army National Guard is required prior to flight within this area.
3- This is a Military Operation Area of Little Rock AFB, that extends from the surface to 2,200 feet.
4- This is a Military Climb Corridor that is used by aircraft operating from Little Rock AFB.

Sectional Chart Segment




FOR FLIGHTS AT AND BELOW 8000 MSL SEE DALLAS-FT WORTH VFR TERMINAL AREA CHART
GROUP I TCA
TERMINAL CONTROL AREA ALTITUDES
80 -- Ceiling of TCA in hundreds of feet MSL
50 -- Floor of TCA in hundreds of feet MSL
DALLAS-FT WORTH REGIONAL
DALLAS LOVE
DALLAS
FORT WORTH
ADDISON
ARLINGTON
GRAPEVINE
GRAND PRAIRIE
CEDAR HILL TV TOWER

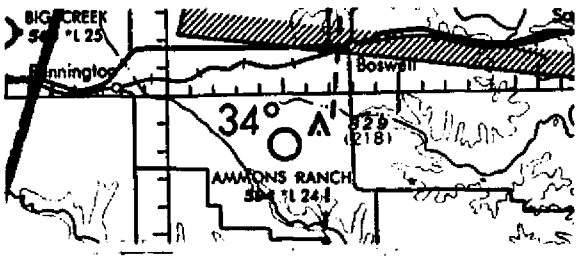
250. Contour lines placed on a Sectional Aeronautical Chart connect points of the same

LO1
1- longitude.
2- variation.
3- latitude.
4- elevation above sea level.

33 37

251. Large numbers on Sectional Aeronautical Charts, such as shown above, indicate

LO1
1- height of vertical obstructions within the areas, but do not include maximum terrain elevations.
2- the base of the controlled airspace over the areas.
3- maximum elevation figures (including terrain and obstructions) shown in quadrangles bounded by ticked lines of latitude and longitude.
4- latitude and longitude coordinates of the areas bounded by ticked lines.



252. The top of the obstruction shown in the sectional chart excerpt above is

LO1
1- 829 feet AGL.
2- 218 feet MSL.
3- 3,400 feet MSL.
4- less than 1,000 feet AGL.

253. Refer to the Terminal Control Area (TCA) to the left. To remain below the TCA when departing Arlington Airport (located south of Dallas-Ft. Worth Airport) VFR on a magnetic course of 182°, a pilot must fly below which altitude?

LO1
1- 4,000 feet AGL.
2- 3,000 feet MSL.
3- 3,000 feet AGL.
4- 2,000 feet MSL.

254. Refer to the Terminal Control Area (TCA) on the adjacent page. To remain below the TCA when departing Addison Airport (located northeast of Dallas-Ft. Worth Airport) VFR eastbound, a pilot must fly below which altitude and not exceed what maximum indicated airspeed?

LO2
1- 8,000 feet MSL; 250 knots.
2- 5,000 feet AGL; 230 knots.
3- 5,000 feet MSL; 200 knots.
4- 3,000 feet AGL; 156 knots.

255. Refer to the chart on the opposite page. What is the lowest appropriate VFR cruising altitude to fly over the Dallas-Ft. Worth TCA from the southwest to the northeast and remain above the TCA?

LO2
1- 9,500 feet MSL.
2- 9,000 feet MSL.
3- 8,500 feet MSL.
4- 8,000 feet MSL.

256. True course measurements on a sectional aeronautical chart should be made using a meridian near the midpoint of the course because the

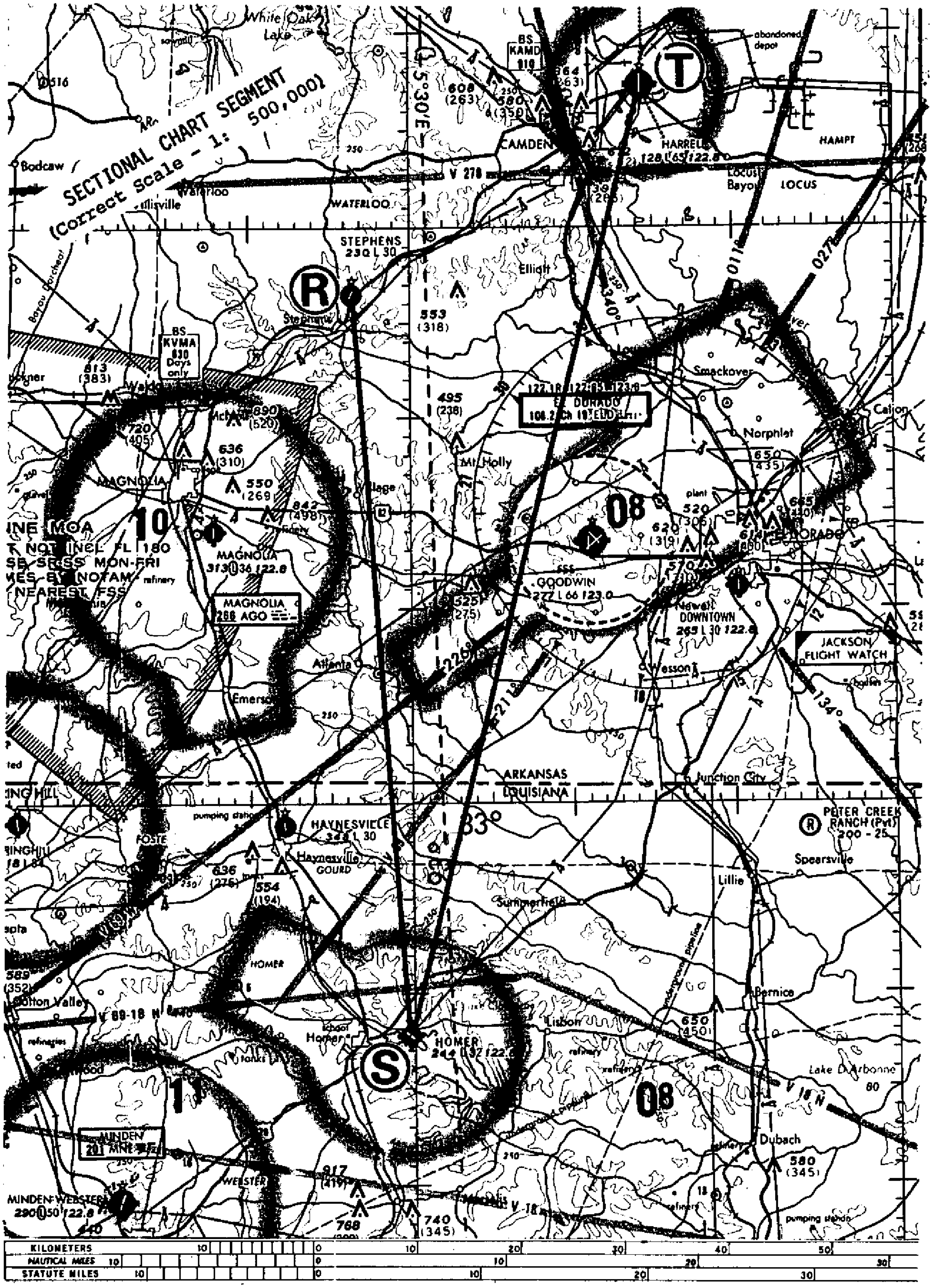
LO4
1- isogonic lines are not parallel.
2- meridians converge toward the poles and the angles formed by lines of longitude and latitude vary from point to point.
3- geographic North Pole from which direction is measured is not located at the magnetic North Pole.
4- lines of latitude vary from point to point.

257. Refer to the chart on the adjacent page. Assume the traffic pattern altitude at Addison Airport (located northeast of Dallas-Ft. Worth Airport) is 900 feet AGL. What would be the approximate altitude indicated by a properly adjusted altimeter on the downwind leg at this airport?

LO5
1- 2,550 feet MSL.
2- 600 feet MSL.
3- 900 feet MSL.
4- 1,550 feet MSL.

258. Refer to the chart on the adjacent page. Suppose the tower advises you that left traffic is in use for landing on Runway 13L at Dallas-Love Field. In calm wind conditions, the magnetic heading on base leg would be approximately

LO5
1- 235°.
2- 220°.
3- 130°.
4- 040°.


SECTIONAL CHART SEGMENT
(Correct Scale - 1: 500,000)
KILOMETERS
NAUTICAL MILES
STATUTE MILES
CAMDEN
STEPHENS
MAGNOLIA
EL DORADO
GOODWIN
HAYNESVILLE
HOMER
ARKANSAS
LOUISIANA
JACKSON FLIGHT WATCH
Smackover
Norphlet
Junction City
MINDEN
Dubach
Bernice
Lisbon
Summerfield
Spearsville
Lillie
Atlanta
Emerson
Lake D'Arbonne

259. Refer to the adjacent chart. What is the MAGNETIC COURSE from Airport "T" direct to Airport "S"?

L07
1- 194°.
2- 188°.
3- 014°.
4- 008°.

260. Refer to the adjacent chart. The MAGNETIC COURSE from Airport "S' direct to Airport "R" is

L07
1- 350°.
2- 356°.
3- 176°.
4- 001°.

261. Refer to the chart to the left and consider the following:

GIVEN: True airspeed . . . 150 MPH
Wind from 150° @ . 26 knots

Under these conditions, the magnetic heading and groundspeed from Airport "R" to Airport "S" is

L07
1- 163° and 123 MPH.
2- 170° and 123 knots.
3- 176° and 150 MPH.
4- 151° and 134 knots.

262. Refer to the chart to the left and consider the following conditions:

GIVEN: True airspeed . . . 160 MPH
Wind from 150° @ . 45 knots

Under the conditions given, the magnetic heading and groundspeed from Airport "T" to Airport "S" is

L07
1- 169° and 103 knots.
2- 187° and 123 MPH.
3- 181° and 119 knots.
4- 175° and 119 MPH.

263. Refer to the chart to the left and consider the following conditions:

True airspeed . . . 140 MPH
Wind from 240° @ . 13 knots

The magnetic heading and groundspeed from Airport "T" to Airport "S" is

L07
1- 012° and 134 knots.
2- 191° and 153 MPH.
3- 203° and 155 MPH.
4- 182° and 133 knots.

264. Refer to the chart on the adjacent page and consider the following conditions:

GIVEN: True airspeed . . . 130 MPH
Wind from 120° @ . 13 knots

Under these conditions, the magnetic heading and groundspeed from Airport "S" to Airport "T" is

L07
1- 195° and 120 knots.
2- 017° and 112 knots.
3- 014° and 116 knots.
4- 011° and 116 knots.

265. Refer to the chart on adjacent page and the compass correction card below.

GIVEN: True airspeed . . . 150 MPH
Wind from 160° @ . 30 knots

Under these conditions, what is the COMPASS HEADING and groundspeed from Airport "R" to Airport "S"?

L07
1- 164° and 101 knots.
2- 172° and 121 MPH.
3- 176° and 116 knots.
4- 168° and 116 MPH.

266. Refer to the chart on adjacent page, the compass correction card below, and consider the following conditions:

GIVEN: True airspeed . . . 120 MPH
Wind from 160° @ . 30 knots

The COMPASS HEADING from Airport "T" to Airport "S" is

L07
1- 196°.
2- 186°.
3- 179°.
4- 169°.

267. Refer to the chart on adjacent page, and compass correction card below, and consider the following conditions:

GIVEN: True airspeed . . . 138 MPH
Wind from 210° @ . 35 knots

The compass heading from Airport "R" to Airport "S" is

L07
1- 187°.
2- 181°.
3- 177°.
4- 171°.

COMPASS CORRECTION CARD

FOR (MH)	N	030	060	E	120	150	S	210	240	W	300	330
STEER (CH)	0	031	062	094	125	154	181	208	237	266	297	328

268. GIVEN:

Flight duration . . . . . 50 minutes
Rate of fuel consumption . 10.7 GPH

How much fuel would be used?

L08
1- 8.8 gallons.
2- 8.5 gallons.
3- 8.3 gallons.
4- 9.2 gallons.

269. Consider the following data:

Distance . . . . . 258 Statute miles
True course . . . 086°
Wind . . . . . 145° @ 45 knots
True airspeed . . 153 MPH
Rate of fuel consumption . . 11.7 gals./hour

What would be the approximate amount of fuel consumed on this flight?

L08
1- 29.5 gallons.
2- 25.2 gallons.
3- 21.7 gallons.
4- 19.3 gallons.

270 GIVEN:

Outside air temperature . . -15° C.
Pressure altitude . . . . . 4,500 feet
Indicated airspeed . . . . 180 knots

Based on the above data, what is the true airspeed?

L08
1- 188 knots.
2- 185 knots.
3- 175 knots.
4- 171 knots.

271. GIVEN:

Outside air temperature . . +15° C.
Pressure altitude . . . . . 3,500 feet
Indicated airspeed . . . . 140 knots

Determine the true airspeed.

L08
1- 149 knots.
2- 145 knots.
3- 142 knots.
4- 131 knots.

272. You have your student plan a flight of 105 statute miles at a groundspeed of 137 MPH. The airplane has 47 gallons of usable fuel aboard, and the rate of fuel consumption is 11.5 gallons per hour. What would be the maximum flying time available with the remaining fuel upon arrival at the destination?

L08
1- 3 hours 59 minutes.
2- 3 hours 19 minutes.
3- 3 hours 37 minutes.
4- 3 hours 29 minutes.

273. You plan a flight of 95 statute miles and anticipate a groundspeed of 120 MPH. The airplane has 30 gallons usable fuel aboard, and the rate of fuel consumption is 8 gallons per hour. What would be the maximum flying time available with the remaining fuel when you arrive at your destination?

L08
1- 2 hours 57 minutes.
2- 2 hours 40 minutes.
3- 1 hour 38 minutes.
4- 1 hour 15 minutes.

274. GIVEN:

Flight duration . . 3 hours 50 minutes
Rate of fuel consumption . . . 8.5 GPH

How much fuel would be used?

L08
1- 36.5 gallons.
2- 34.5 gallons.
3- 32.6 gallons.
4- 29.5 gallons.

275. Consider the following data:

Distance . . . . . 340 Statute miles
True course . . . 260°
Wind . . . . . 245° @ 45 knots
True airspeed . . 135 MPH
Rate of fuel consumption . . 12.7 gals./hour

What would be the approximate groundspeed and amount of fuel consumed?

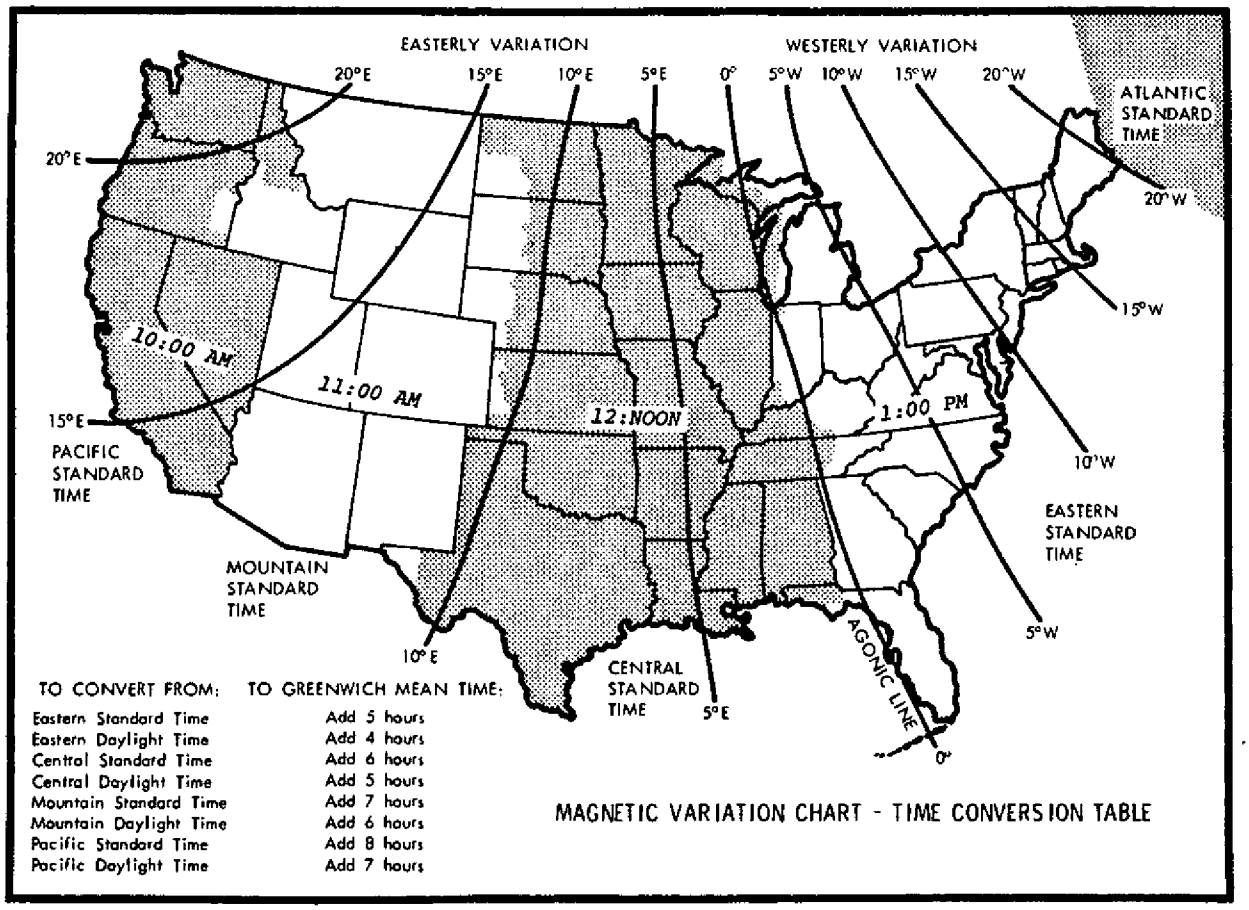
L08
1- 90 MPH; 47.3 gallons.
2- 74 knots; 50.1 gallons.
3- 84 MPH; 51.2 gallons.
4- 80 knots; 55.3 gallons.

276. GIVEN:

Distance . . . . . 200 Statute miles
True course . . . 320°
Wind . . . . . 215° @ 25 knots
True airspeed . . 128 MPH
Rate of fuel consumption . . 19 gals./hour

What would be the approximate groundspeed and amount of fuel consumed?

L08
1- 117 knots; 27.3 gallons.
2- 132 MPH; 28.9 gallons.
3- 127 MPH; 33.3 gallons.
4- 115 knots; 31.5 gallons.



MAGNETIC VARIATION CHART - TIME CONVERSION TABLE

277. Assume that you depart an airport in the Pacific Standard Time Zone at 0730 PST, for a 4 hour flight to an airport located in the Central Standard Time Zone. At what Central Standard Time would you expect to land?

LO8
1- 1230 CST.
2- 1330 CST.
3- 1430 CST.
4- 1530 CST.

NOTE: See Time Conversion data above.

278. Refer to the illustration above. Assume that you depart an airport in the Central Daylight Time Zone at 1315 CDT, for a 2 hour flight to an airport located in the Mountain Daylight Time Zone. At what Greenwich Mean Time would you expect to land?

LO8
1- 1415Z.
2- 1615Z.
3- 1815Z.
4- 2015Z.

279. Refer to the illustration above. Assume you depart an airport in the Eastern Daylight Time Zone at 0815 EDT, for a 2 hour flight to an airport located in the Central Daylight Time Zone. At what Greenwich Mean Time would you expect to land?

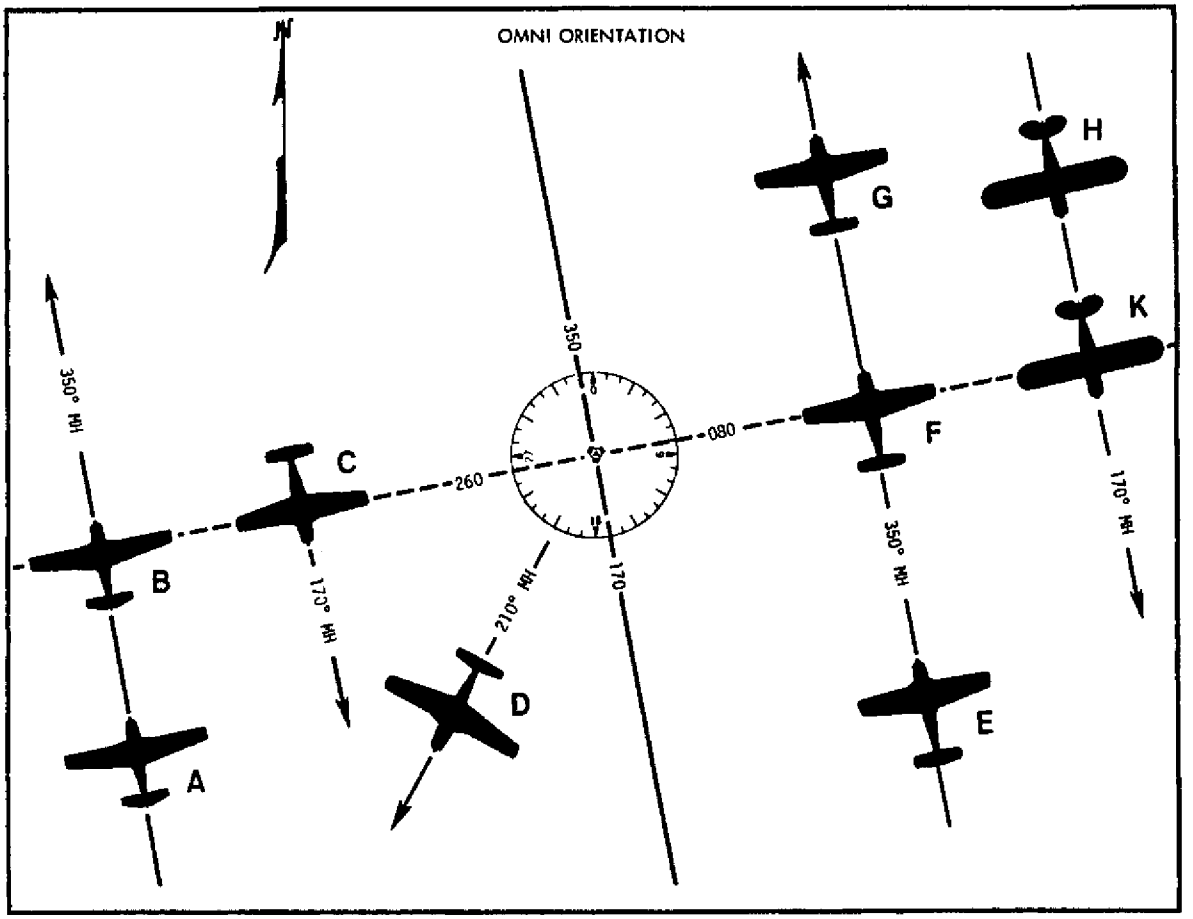
LO8
1- 1115Z.
2- 1315Z.
3- 1415Z.
4- 1515Z.

280. Assume that you depart an airport in the Central Standard Time Zone at 1630 CST, for a 2 hour flight to an airport located in the Mountain Standard Time Zone. What would the landing time be?

LO8
1- 1230 MST.
2- 1430 MST.
3- 1730 MST.
4- 1830 MST.

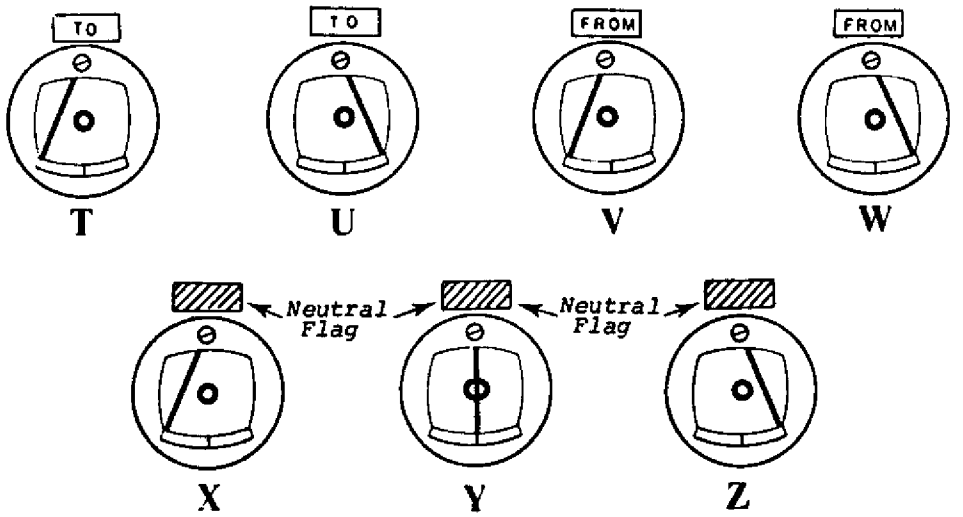
NOTE: See Time Conversion data above.

318-376 0 - 80 - 6



OMNI INDICATIONS

NOTE: ASSUME ALL OMNI BEARING SELECTORS ARE SET TO 350°.



281. Refer to the adjacent illustrations. The omnireceiver indication for airplane position "D" would be

M04
1- W.
2- V.
3- T.
4- U.

282. Refer to the illustrations to the left. The omnireceiver indications for airplane positions "A" and "B" would be, respectively,

M04
1- U and Z.
2- T and X.
3- T and W.
4- U and Y.

283. Refer to the illustrations to the left. Which of the airplanes shown would have omni indication "Z"?

M04
1- B and F.
2- B and C.
3- F and C.
4- F and K.

284. Refer to the illustrations to the left. At which airplane position(s) would you receive omni indication "U"?

M04
1- A and B.
2- A only.
3- E and D.
4- A and D.

285. Select the true statement concerning characteristics of VHF radio reception.

M01
1- VHF reception distance varies in proportion to the altitude of the receiving equipment.
2- Unlike reception with low or medium frequency (L/MF) equipment, VHF reception is not subject to line-of-sight restrictions.
3- VHF reception distance remains constant regardless of altitude.
4- Reception of VHF signals is more subject to signal fades and interference from distant stations than reception of low or medium frequency (L/MF) signals.

286. Refer to the illustrations on the opposite page. The omnireceiver indications for airplane positions "E," "F," and "G" would be, respectively,

M04
1- U, Z, W.
2- T, Y, V.
3- T, X, V.
4- W, Y, T.

287. Refer to the illustrations on the opposite page. At which airplane position(s) would you receive omni indication "U"?

M04
1- A and B.
2- A only.
3- E and F.
4- A and D.

288. Refer to the illustrations on the opposite page. At which airplane positions would you receive omni indication "V"?

M04
1- H and K.
2- F and G.
3- G and H.
4- A and D.

289. Refer to the illustrations on the opposite page. At which airplane position(s) would you receive omni indication "X" or "Z"?

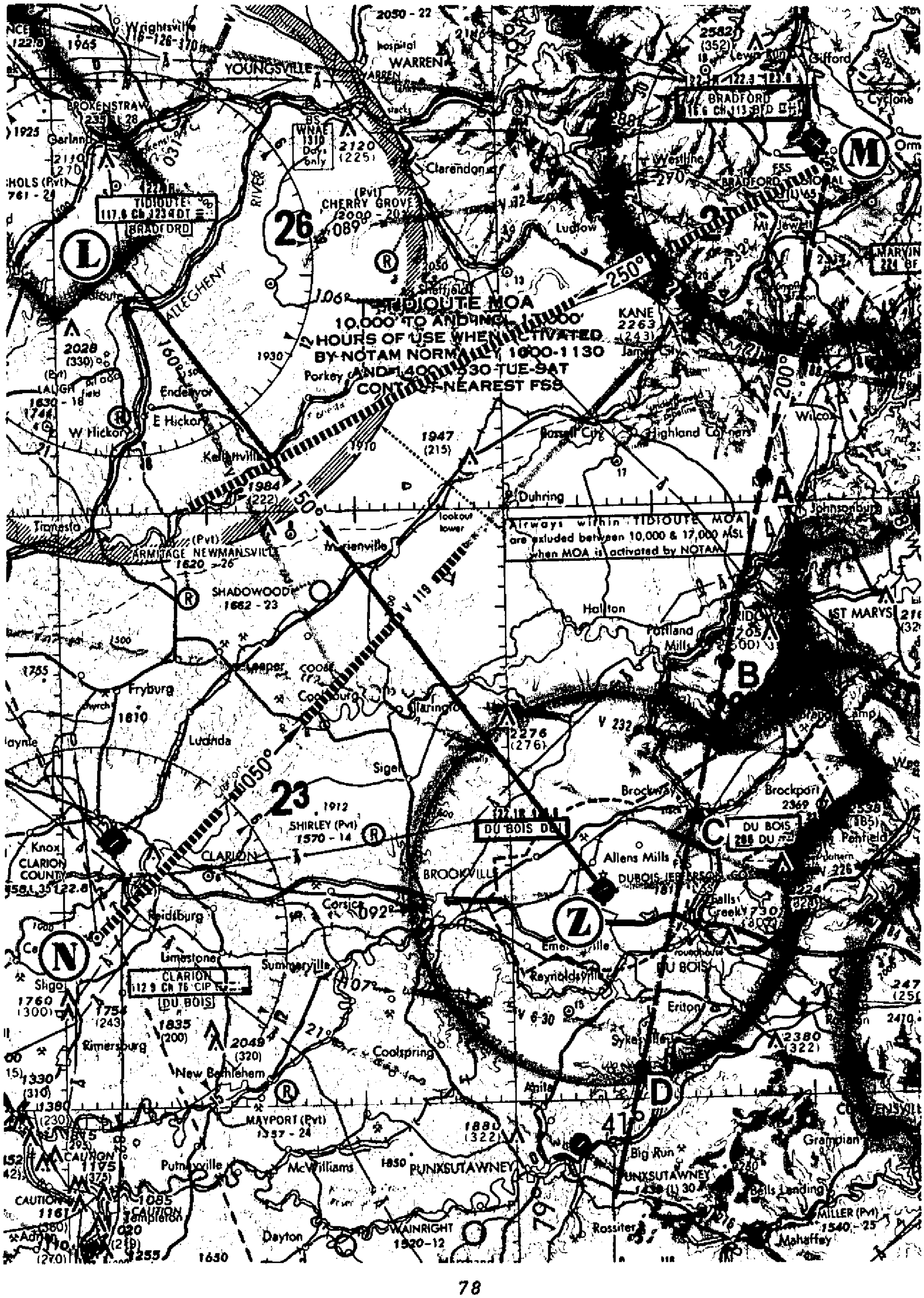
M04
1- C and K.
2- B, C, F, and K.
3- B and F.
4- D only.

290. Refer to the illustrations on the opposite page. If you were receiving indication "Y," what would be your position in relation to the station?

M04
1- Directly over the station.
2- At position K.
3- At position C.
4- At position B or F.

291. Refer to the illustrations on the opposite page. Which of the airplanes shown would have omni indication "X"?

M04
1- F only.
2- B and K.
3- F and K.
4- B and C.



TIDIOUTE MOA
10,000' TO AND INCL 17,000'
HOURS OF USE WHEN ACTIVATED
BY NOTAM NORMALLY 1600-1130
AND 1400-530 TUE-SAT
CONTACT NEAREST FSS
Airways within TIDIOUTE MOA are exluded between 10,000 & 17,000 MSL when MOA is activated by NOTAM
L
M
A
B
C
D
N
Z
26
23
41
250°
200°
150°
050°
YOUNGSVILLE
WARREN
BROKENSTRAW
TIDIOUTE 117.6 Ch 123 DT
BRADFORD
CHERRY GROVE
Clarendon
Sheffield
Ludlow
KANE
Russell City
Highland Corners
Duhring
Tionesta
NEWMANSVILLE
Marienville
SHADOWOOD
Cooksburg
Clarington
Fryburg
Lucinda
Sigel
SHIRLEY (Pvt)
CLARION
Knox
CLARION COUNTY
Reidsburg
Limestone
Summerville
Corsica
BROOKVILLE
DU BOIS
DUBOIS-JEFFERSON CO
Allens Mills
Brockway
Brockport
Reynoldsville
Sykesville
Emerickville
Falls Creek
Coolspring
New Bethlehem
Rimersburg
MAYPORT (Pvt)
Putneyville
McWilliams
PUNXSUTAWNEY
Big Run
Rossiter
Dayton
WAINRIGHT
Grampian
Bells Landing
MILLER (Pvt)
Mahaffey
Penfield
ST MARYS
Johnsonburg
Halton
Portland Mills
Wilcox
Westline
Lewis Run
Gifford
Cyclone
Endeavor
E Hickory
W Hickory
Kellettville
Porkey
Leeper
Erie
Sligo
V 232
V 118

292. Refer to the chart to the left. Assume that you are flying outbound from Bradford VORTAC (M) on the 200 radial. Which radial of Tidioute VORTAC (L) intersects your course at point B?

MOS
1- 130.
2- 125.
3- 120.
4- 115.

293. Refer to the adjacent chart. Assume you are outbound on the 200 radial of Bradford VORTAC (M). If you have one omnireceiver tuned to Tidioute VORTAC (L), to what radial of this VORTAC should the omnibearing selector be set for determining when you reach point "A"?

MOS
1- 135 radial.
2- 125 radial.
3- 115 radial.
4- 105 radial.

294. Refer to the opposite page. Assume you are flying outbound on the 200 radial of Bradford VORTAC (M), and one omnireceiver is tuned to Tidioute VORTAC (L). With the omnibearing selector set to 125°, the CDI needle is centered and the TO-FROM indicator reads "FROM". What is your position?

MOS
1- Between points C and D.
2- Between points B and C.
3- Between points A and B.
4- Between point A and VORTAC "M".

295. Refer to the chart to the left. Assume you are outbound on the 200 radial of Bradford VORTAC (M), and one omnireceiver is tuned to Clarion VORTAC (N). To what radial of this VORTAC should the omnibearing selector be set for determining when you reach point "C"?

MOS
1- 100 radial.
2- 095 radial.
3- 090 radial.
4- 085 radial.

296. Refer to the adjacent chart. While flying eastbound, one omnireceiver indicates you are crossing the 200 radial of Bradford VORTAC (M). Another receiver tuned to Clarion VORTAC (N), indicates you are on the 085 radial of this VORTAC. Your position is at

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

297. Refer to the opposite page. While on course from Tidioute VORTAC "L" to airport "Z", you tune the omnireceiver to Clarion VORTAC "N" to check your progress along the route. With the omnibearing selector set to 050° (V-119) and the TO-FROM indicator reading FROM, the Course Deviation Indicator shows a full-scale deflection to the left. This means that you

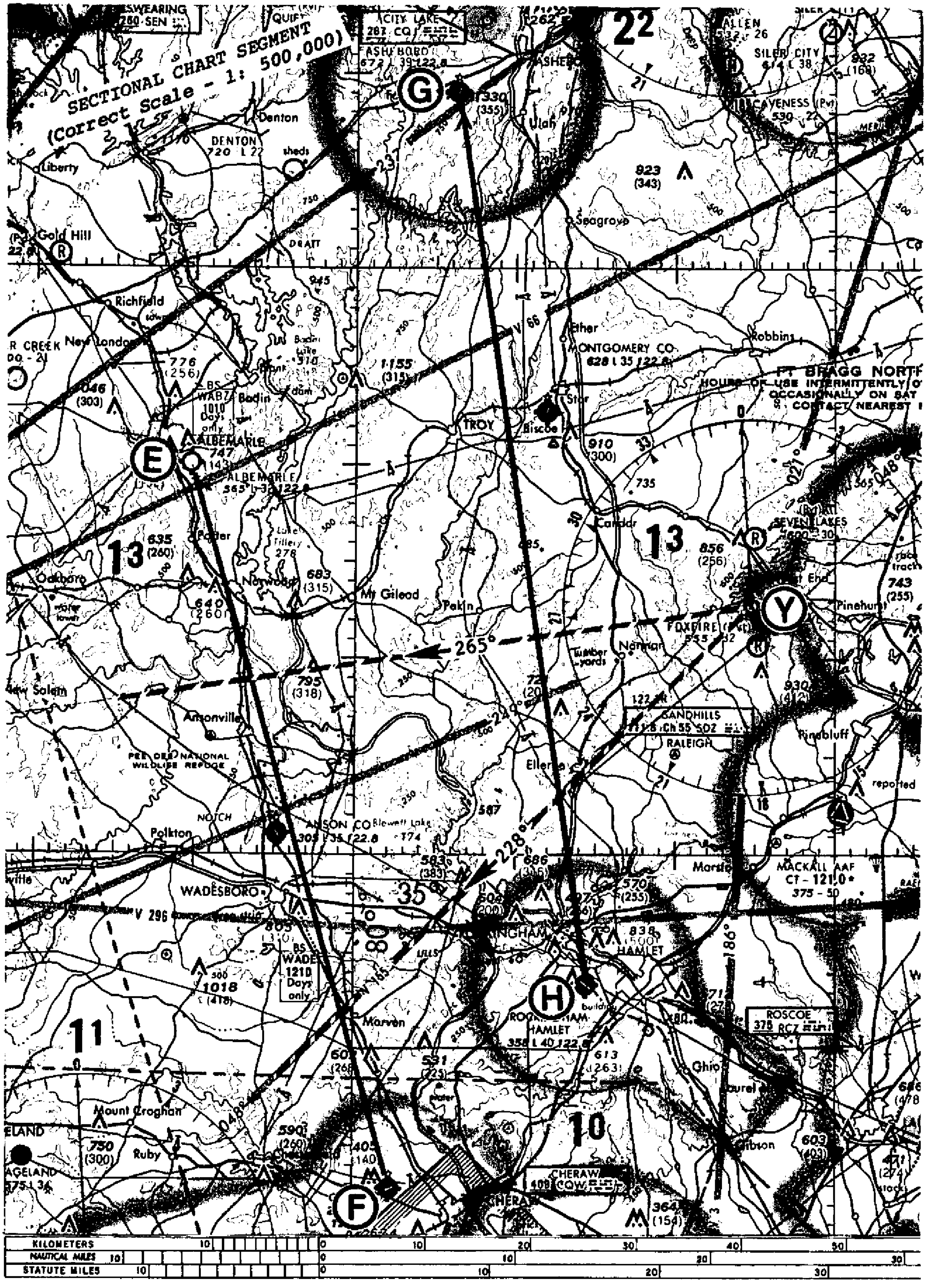
MOS
1- have already crossed the 050 radial (V-119).
2- have a malfunction in your omni-equipment since Clarion VORTAC is to the right of course.
3- have not crossed the 050 radial (V-119).
4- are not using a proper method of determining your position.

298. To check your progress on course from airport "Z" to Tidioute VORTAC "L" (see opposite page), you tune to Clarion VORTAC "N". With the omnibearing selector set to 050° (V-119) and the TO-FROM indicator reading FROM, the Course Deviation Indicator shows a full-scale deflection to the right. This means that you

MOS
1- are not using a proper method of determining your position.
2- have not crossed the 050 radial (V-119).
3- have a malfunction in your omni-equipment since Clarion VORTAC is to the left of course.
4- have already crossed the 050 radial (V-119).

299. To check your progress on course from VORTAC "L" to airport "Z" (see opposite page), you tune to the Bradford VORTAC. With the omnibearing selector set to 250° and the TO-FROM indicator reading "FROM", the Course Deviation Indicator shows a full-scale deflection to the left. This means that you

MOS
1- are presently on the 250 radial.
2- are not using a proper method of determining your position.
3- have not crossed the 250 radial.
4- have already crossed the 250 radial.


SECTIONAL CHART SEGMENT
(Correct Scale - 1: 500,000)
Denton
DENTON
Liberty
Gold Hill
Richfield
New London
ALBEMARLE
Badin
TROY
Biscoe
Star
Ether
MONTGOMERY CO.
Ulah
Seagrove
SILER CITY
FT BRAGG NORTH
SEVEN LAKES
Pinehurst
FOXFIRE
Candor
Norman
Mt Gilead
Norwood
Oakboro
Ansonville
PEE DEE NATIONAL WILDLIFE REFUGE
ANSON CO
Polkton
WADESBORO
V 296
SANDHILLS
RALEIGH
Pinebluff
MACKALL AAF
HAMLET
ROCKINGHAM HAMLET
ROSCOE
Marston
Marven
Mount Croghan
Ruby
CHERAW
Gibson
Ghio
Laurel
265°
228°
186°
048°
021°
KILOMETERS
NAUTICAL MILES
STATUTE MILES

341. Select the true statement concerning the use of flaps during the landing approach.

020
1- The use of flaps increases the airplane's controllability.
2- The use of flaps permits a decreased approach angle.
3- By using flaps, a steeper than normal angle of descent is possible without increasing the airspeed.
4- The use of flaps requires a higher indicated airspeed on the final approach.

342. In all cases for an airplane to spin, it must first be

019
1- partially stalled with one wing low and the throttle closed.
2- placed in a steep diving spiral.
3- stalled.
4- placed in a steep nose-high pitch attitude.

343. Regarding stalls, which statement is true?

019
1- An airplane can be stalled only when the nose is high and the airspeed is low.
2- An airplane can be stalled only when the airspeed decreases to the published stalling speed.
3- An airplane can be stalled only when the nose is too high in relation to the horizon.
4- An airplane can be stalled at any airspeed and in any flight attitude.

344. If an airplane is loaded 102 lbs. over maximum certificated gross weight, and gasoline is drained to bring the aircraft weight within limits, how much fuel should be drained?

017
1- 23 gallons.
2- 21 gallons.
3- 17 gallons.
4- 11 gallons.

345. Which statement is true relative to trimming to compensate for the effects of torque in a single-engine propeller-driven airplane?

023
1- If power is reduced (airspeed constand), right rudder trim must be added.
2- If power is increased (airspeed constant), left rudder trim must be added.
3- If airspeed is decreased (power constant), right rudder trim must be added.
4- If airspeed is increased (power constant), right rudder trim must be added.

346. The effect of torque is most noticeable during

023
1- maximum speed in level flight with maximum continuous power.
2- flight at a critically slow airspeed with full throttle.
3- maximum structural cruising speed.
4- gliding flight with a reduced throttle setting.

347. The term "angle-of-attack" is best defined as the

021
1- angle between the wing chord line and the direction of the relative wind.
2- angle between the airplane's climb angle and the horizon.
3- angle formed by the longitudinal axis of the airplane and the chord line of the wing.
4- specific angle at which the ratio between lift and drag is the highest.

348. Excessively high cylinder head and oil temperatures, either in the air or on the ground, will

P02
1- cause damage to heat-conducting hoses and warping of the cylinder cooling fins.
2- cause loss of power, excessive oil consumption, and possible permanent internal engine damage.
3- not appreciably affect an aircraft engine.
4- increase fuel consumption and may increase power due to the increased heat.

349. What change occurs in the fuel/air mixture when carburetor heat is applied?

P01
1- The mixture becomes leaner and causes a decrease in RPM.
2- No change occurs in the fuel/air mixture.
3- The fuel/air mixture becomes leaner.
4- The fuel/air mixture becomes richer.

350. Float-type carburetor systems, compared to fuel injection systems, are generally considered to be

P01
1- equally susceptible to icing as a fuel injection unit.
2- susceptible to icing only when visible moisture is present.
3- more susceptible to icing than a fuel injection unit.
4- less susceptible to icing than a fuel injection unit.

351. To counteract the effect of torque in a conventional single-engine propeller-driven airplane, a pilot should normally apply

023
1- left rudder pressure during the takeoff roll and while climbing with full power.
2- right rudder pressure when entering a glide from level cruising flight.
3- right rudder pressure during the takeoff roll and while climbing with full power.
4- left rudder pressure when entering a climb from level cruising flight.

352. Detonation occurs in a reciprocating aircraft engine when

P08
1- the spark plugs are "fouled" or "shorted out" or the wiring is defective.
2- hot spots in the combustion chamber ignite the fuel/air mixture in advance of normal ignition.
3- the fuel/air mixture is too rich.
4- the unburned charge in the cylinders explodes instead of burning normally.

353. Running a fuel tank dry before switching tanks is considered unwise because

P06
1- the engine-driven fuel pump or electric fuel boost pump may draw air into the fuel system causing vapor lock.
2- the engine-driven fuel pump is lubricated by fuel and operating on a dry tank may cause pump failure.
3- any foreigh matter in the tank will be pumped into the fuel system.
4- the fuel pump is located above the bottom portion of the fuel tank.

354. If the grade of fuel used in an aircraft engine is lower than specified for the engine, it will most likely cause

P05
1- a fuel/air mixture that is not uniform in all cylinders.
2- lower cylinder head temperatures.
3- an increase in power which could overstress internal engine components.
4- detonation.

355. Which of these may result in overstressing and damaging aircraft engine crankshafts?

P04
1- carburetor ice forming on the throttle valve.
2- rapid opening and closing of the throttle.
3- operating with an excessively rich fuel/air mixture.
4- extended glides with reduced power.

356. Wingtip vortices are created only when the generating airplane is

P12
1- developing lift.
2- heavily loaded.
3- operating at high airspeeds.
4- using high power settings.

357. Concerning carburetor icing, which statement is true?

P11
1- Carburetor icing would most likely form when the air temperature is between 20° F. and 70° F. with visible moisture or high humidity.
2- The carburetor heater is a deicing device that heats the air after it enters the carburetor.
3- The first indication of carburetor icing in an airplane equipped with a fixed-pitch propeller is an increase in RPM, followed by a decrease in RPM.
4- Carburetor icing will form in a carburetor whenever the temperature is below freezing 32° F. (0° C.).

358. Suppose that battery and alternator failure occurred during flight. In this situation, you would experience

P10
1- avionics equipment failure.
2- engine failure due to the loss of the engine-driven fuel pump and also experience failure of the radio equipment, lights, and all instruments that require AC current.
3- failure of the ignition system, fuel gauges, lighting system, and avionics equipment.
4- high cylinder head temperature and low oil pressure indications.

359. Filling the fuel tanks after the last flight of the day is a good operating procedure because this will

P09
1- force any existing water to the top of the tank away from the fuel lines to the engine.
2- prevent expansion of the fuel by eliminating airspace in the tanks.
3- prevent moisture condensation by eliminating airspace in the tanks.
4- eliminate vaporization of the fuel.

360. Concerning the advantages of an aircraft generator or alternator, select the true statement.

P16
1- An alternator provides more electrical power at lower engine RPM than a generator.
2- A generator charges the battery during low engine RPM; therefore, the battery has less chance to become fully discharged, as often occurs with an alternator.
3- An alternator provides electrical current and eliminates the need for an aircraft to be equipped with a battery.
4- A generator always provides more electrical current than an alternator.

361. What is one result of permitting an airplane engine to idle for a long period of time while on the ground?

P16
1- A hydraulic lock may develop in one or more cylinders.
2- It may cause excessively high oil pressure.
3- The lean mixture may cause the engine to misfire or to quit.
4- The spark plugs may become fouled.

362. Which operating procedure would most likely cause the cylinder head and oil temperature gauges to exceed the normal operating ranges?

P15
1- Using fuel that has a fuel rating lower-than-specified for the engine.
2- Using fuel that has a fuel rating higher-than-specified for the engine.
3- Operating with higher-than-normal oil pressure.
4- Operating with the mixture control set too rich.

TAKE-OFF DATA

TAKE-OFF DISTANCE FROM HARD SURFACE RUNWAY WITH FLAPS UP

GROSS WEIGHT POUNDS	IAS AT 50' MPH	HEAD WIND KNOTS	AT SEA LEVEL & 59°		AT 2500 FT. & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32°F	
			GROUND RUN	TOTAL TO CLEAR 50 FT OBS	GROUND RUN	TOTAL TO CLEAR 50 FT OBS	GROUND RUN	TOTAL TO CLEAR 50 FT OBS	GROUND RUN	TOTAL TO CLEAR 50 FT OBS
2300	68	0	865	1525	1040	1910	1255	2480	1565	3055
		10	615	1170	750	1485	920	1955	1160	3110
		20	405	850	505	1100	630	1480	810	2425
2000	63	0	630	1095	755	1325	905	1625	1120	2155
		10	435	820	530	1005	645	1250	810	1685
		20	275	580	340	720	425	910	595	1255
1700	58	0	435	780	520	920	625	1095	765	1370
		10	290	570	355	680	430	820	535	1040
		20	175	385	215	470	270	575	345	745

NOTES: 1. Increase distance 10% for each 25°F above standard temperature for particular altitude.
2. For operation on a dry, grass runway, increase distances (both "ground run" and "total to clear 50 ft. obstacle") by 7% of the "total to clear 50 ft. obstacle" figure.

363. Assume these conditions exist:

Gross weight . . . . . 2000 lbs.
Outside temperature . . . 100° F.
Pressure altitude . . . . 2,500 feet
Wind (Headwind) . . . . . 20 knots

According to the chart above, the TOTAL TAKEOFF DISTANCE required to clear a 50-foot obstacle is

Q01
1- 995 feet.
2- 910 feet.
3- 864 feet.
4- 720 feet.

364. Given data:

Gross weight . . . . . 1700 lbs.
Pressure altitude . . . . Sea level
Outside temperature . . . 84° F.
Wind (Headwind) . . . . . 10 knots

Applying the given data to the chart above, the total takeoff distance required to clear a 50-foot obstacle is

Q01
1- 990 feet.
2- 920 feet.
3- 780 feet.
4- 627 feet.

365. Refer to the chart below and apply the following data:

Pressure altitude . . . . Sea level
Temperature . . . . . 89° F.
Gross weight . . . . . 1,700 lbs.
Indicated airspeed . . . 77 MPH

If after takeoff a climb was made for a period of 4 minutes 30 seconds, what would be the approximate indicated altitude?

Q02
1- 5,212 feet.
2- 4,998 feet.
3- 4,882 feet.
5- 4,612 feet.

366. Use the following data and the chart below to obtain the approximate gain in altitude after a 6-minute climb:

Pressure altitude . . . . . Sea level
Temperature . . . . . 79° F.
Gross weight . . . . . 2,300 lbs.
Indicated airspeed . . . . 82 MPH

The gain in altitude would be

Q02
1- 3,630 feet.
2- 3,440 feet.
3- 3,210 feet.
4- 3,000 feet.

MAXIMUM RATE-OF-CLIMB DATA

GROSS WEIGHT POUNDS	AT SEA LEVEL & 59°F			AT 5000 FT. & 41°F			AT 10,000 FT. & 23°F			AT 15,000 FT. & 5°F		
	IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	IAS MPH	RATE OF CLIMB FT MIN	FROM S.L. FUEL USED	IAS MPH	RATE OF CLIMB FT MIN	FROM S.L. FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED
2300	82	845	1.0	81	435	2.6	79	230	4.8	78	22	11.5
2000	79	840	1.0	79	610	2.2	76	380	3.6	75	155	6.3
1700	77	1085	1.0	76	825	1.9	73	570	2.9	72	315	4.4

NOTES: 1. Flaps up, full throttle, mixture leaned for smooth operation above 3000 ft.
2. Fuel used includes warm up and take-off allowance.
3. For hot weather, decrease rate of climb 20 ft./min. for each 10°F above standard day temperature for particular altitude.

CRUISE & RANGE PERFORMANCE

Gross Weight- 2300 Lbs.
Standard Conditions
Zero Wind Lean Mixture

NOTE: Maximum cruise is normally limited to 75% power.

ALT.	RPM	% BHP	TAS MPH	GAL / HOUR	38 GAL (NO RESERVE) ENDR. HOURS	38 GAL (NO RESERVE) RANGE MILES	48 GAL (NO RESERVE) ENDR. HOURS	48 GAL (NO RESERVE) RANGE MILES
2500	2700	86	134	9.7	3.9	525	4.9	660
	2600	79	129	8.6	4.4	570	5.6	720
	2500	72	123	7.8	4.9	600	6.2	760
	2400	65	117	7.2	5.3	620	6.7	780
	2300	58	111	6.7	5.7	630	7.2	795
	2200	52	103	6.3	6.1	625	7.7	790
5000	2700	82	134	9.0	4.2	565	5.3	710
	2600	75	128	8.1	4.7	600	5.9	760
	2500	68	122	7.4	5.1	625	6.4	790
	2400	61	116	6.9	5.5	635	6.9	805
	2300	55	108	6.5	5.9	635	7.4	805
	2200	49	100	6.0	6.3	630	7.9	795
7500	2700	78	133	8.4	4.5	600	5.7	755
	2600	71	127	7.7	4.9	625	6.2	790
	2500	64	121	7.1	5.3	645	6.7	810
	2400	58	113	6.7	5.7	645	7.2	820
	2300	52	105	6.2	6.1	640	7.7	810
10,000	2650	70	129	7.6	5.0	640	6.3	810
	2600	67	125	7.3	5.2	650	6.5	820
	2500	61	118	6.9	5.5	655	7.0	830
	2400	55	110	6.4	5.9	650	7.5	825
	2300	49	100	6.0	6.3	635	8.0	800

367. Refer to the above chart. If the cruise altitude is 7,500 feet, using 64% power at 2500 RPM, what would be the range with 48 gallons of usable fuel?

Q03
1- 685 miles.
2- 635 miles.
3- 810 miles.
4- 645 miles.

368. Refer to the above chart. You plan to cruise at 2,500 feet, using 58% BHP and 2300 RPM. How long could the airplane be flown with 48 gallons of usable fuel aboard?

Q03
1- 7.7 hours.
2- 7.2 hours.
3- 6.1 hours.
4- 5.7 hours.

369. With the conditions shown on the above chart, what would be the flight hours' endurance at an altitude of 7,500 feet, using 52% power?

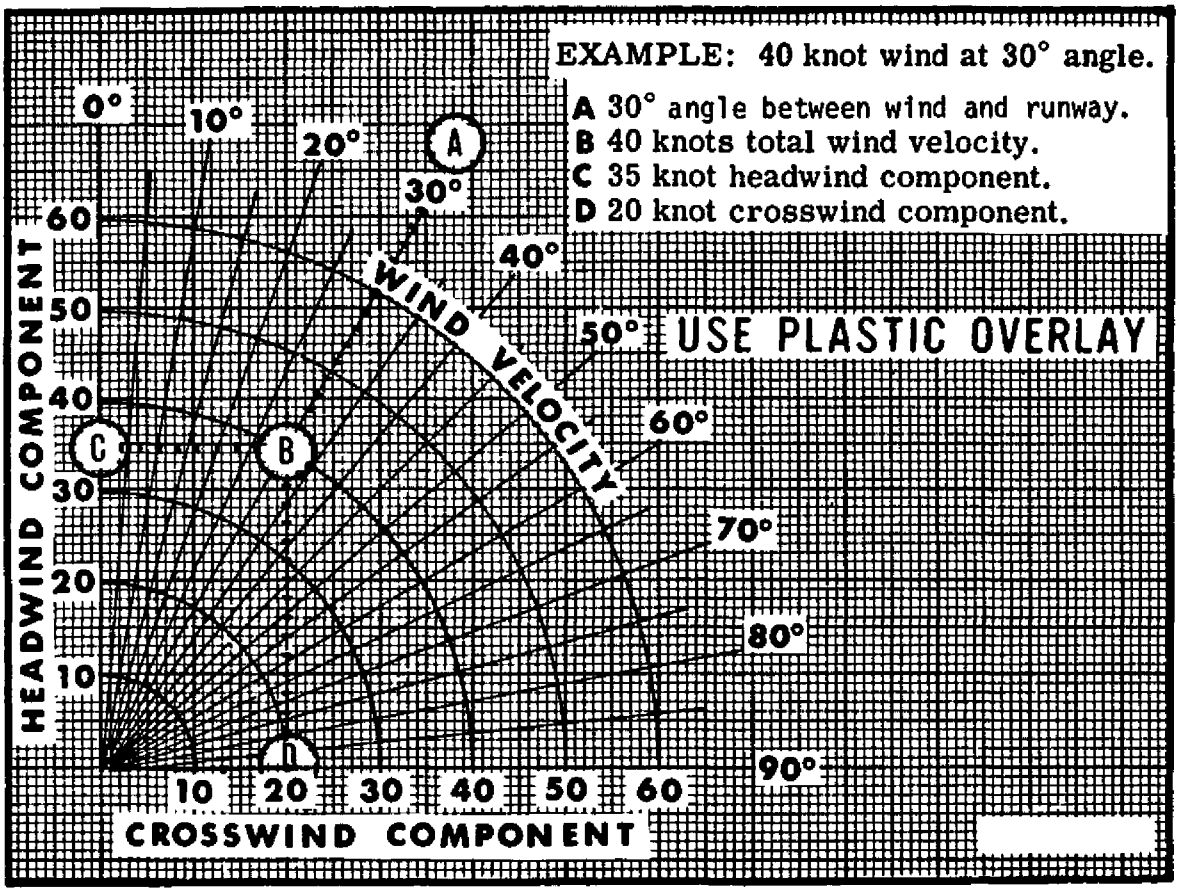
Q03
1- 8.4 hours.
2- 8.0 hours.
3- 7.7 hours.
4- 6.1 hours.

NOTE: With 48 gals. fuel - no reserve.

370. With the conditions shown on the chart above, what would be the approximate true airspeed and fuel consumption per hour at an altitude of 5,000 feet, using 55% power?

Q03
1- 100 MPH TAS, 6.0 GPH.
2- 108 MPH TAS, 6.5 GPH.
3- 116 MPH TAS, 6.9 GPH.
4- 111 MPH TAS, 7.4 GPH.

318-376 O - 80 - 7



371. GIVEN:

Landing runway 27
Wind . . . . . 290° @ 25 knots

The headwind component is

Q04
1- 31 knots.
2- 26 knots.
3- 23 knots.
4- 9 knots.

NOTE: Use chart above.

372. GIVEN:

Max. crosswind component for your airplane . . . . 15 knots
Landing runway 18
Wind from 225° at . . . . . 20 knots

Which of the following statements is true? (Use chart above.)

Q04
1- The maximum crosswind component is not exceeded.
2- A left quartering headwind exists.
3- The maximum crosswind component is exceeded.
4- The crosswind component exceeds the headwind component.

373. The wind is reported to be from 070° at 15 knots and you plan to land on Runway 14. What will be the crosswind component? (Use chart above.)

Q04
1- 30 knots.
2- 20 knots.
3- 14 knots.
4- 12 knots.

374. The wind is reported to be from 010° at 30 knots and you plan to land on Runway 5. What will be the crosswind component? (Use chart above.)

Q04
1- 25 knots.
2- 19 knots.
3- 15 knots.
4- 10 knots.

NORMAL LANDING DISTANCES

ASSOCIATED CONDITIONS

POWER	OFF
FLAPS	35°
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
WEIGHT	2750 POUNDS
APPROACH SPEED	85 MPH/74 KTS IAS

NOTES:

1. GROUND ROLL IS APPROXIMATELY 45% OF TOTAL DISTANCE OVER 50 FT. OBSTACLE
2. FOR EACH 100 LBS. BELOW 2750 LBS. REDUCE TABULATED DISTANCE BY 3% AND APPROACH SPEED BY 1 MPH.

WIND COMPONENT DOWN RUNWAY KNOTS	SEA LEVEL OAT °F	SEA LEVEL TOTAL OVER 50 FT OBSTACLE FEET	2000 FT OAT °F	2000 FT TOTAL OVER 50 FT OBSTACLE FEET	4000 FT OAT °F	4000 FT TOTAL OVER 50 FT OBSTACLE FEET	6000 FT OAT °F	6000 FT TOTAL OVER 50 FT OBSTACLE FEET	8000 FT OAT °F	8000 FT TOTAL OVER 50 FT OBSTACLE FEET
0	23	1578	16	1651	9	1732	2	1820	-8	1916
	41	1624	34	1701	27	1787	20	1880	13	1983
	59	1670	52	1752	45	1842	38	1942	31	2050
	77	1717	70	1804	63	1899	56	2004	49	2118
	95	1764	88	1856	81	1956	74	2068	66	2187
15	23	1329	16	1397	9	1472	2	1555	-6	1644
	41	1372	34	1444	27	1524	20	1611	13	1707
	59	1414	52	1491	45	1575	38	1668	31	1770
	77	1458	70	1540	63	1626	56	1727	49	1833
	95	1502	88	1588	81	1682	74	1784	66	1898
30	23	1079	16	1142	9	1212	2	1289	-6	1372
	41	1119	34	1186	27	1260	20	1341	13	1430
	59	1158	52	1230	45	1308	38	1395	31	1489
	77	1199	70	1275	63	1357	56	1449	49	1548
	95	1240	88	1320	81	1407	74	1502	66	1608

375. Apply the following conditions to the chart above:

Gross weight . . . . . 2,750 lbs.
Outside air temperature . . 78° F.
Pressure altitude . . . . . 5,000 ft.
Wind (down runway) . . . . . 15 knots

The total landing distance over a 50-foot obstacle would be

Q06
1- 2,011 feet.
2- 1,933 feet.
3- 1,733 feet.
4- 1,454 feet.

376. Assume the following conditions exist and apply them to the chart below:

Gross weight . . . . . 1,600 lbs.
Pressure altitude . . Sea level
Headwind . . . . . 20 knots
Temperature . . . . . 59° F.

What would be the landing ground roll distance?

Q06
1- 222 feet.
2- 267 feet.
3- 445 feet.
4- 623 feet.

377. Given data:

Gross weight . . . . . 2,750 lbs.
Outside air temperature . . 20° F.
Pressure altitude . . . . . 6,000 ft.
Wind (down runway) . . . . . 30 knots

Using the given data and the chart above, the approximate ground roll would be

Q06
1- 903 feet.
2- 846 feet.
3- 724 feet.
4- 603 feet.

378. Consider the following conditions and use the chart below:

Gross weight . . . . . 1,600 lbs.
Pressure altitude . . . 7,500 feet
Headwind . . . . . 16 knots
Temperature . . . . . 32° F.

The approximate total distance required to land over a 50-foot obstacle is

Q06
1- 1,255 feet.
2- 502 feet.
3- 753 feet.
4- 2,259 feet.

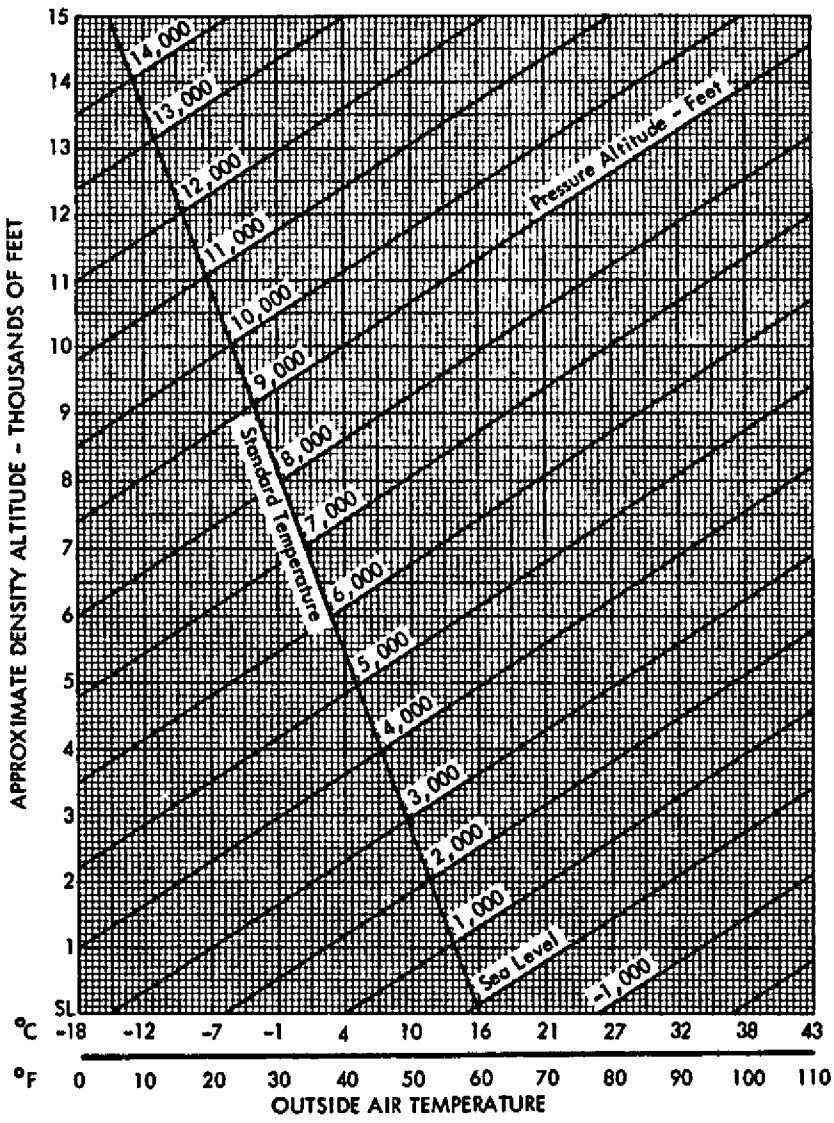
—LANDING DISTANCE—

FLAPS LOWERED TO 40° - POWER OFF
HARD SURFACE RUNWAY - ZERO WIND

GROSS WEIGHT LBS.	APPROACH SPEED, IAS, MPH	AT SEA LEVEL & 59° F. GROUND ROLL	AT SEA LEVEL & 59° F. TOTAL TO CLEAR 50 FT. OBS	AT 2500 FT. & 50° F. GROUND ROLL	AT 2500 FT. & 50° F. TOTAL TO CLEAR 50 FT. OBS	AT 5000 FT. & 41° F. GROUND ROLL	AT 5000 FT. & 41° F. TOTAL TO CLEAR 50 FT. OBS	AT 7500 FT. & 32° F. GROUND ROLL	AT 7500 FT. & 32° F. TOTAL TO CLEAR 50 FT. OBS
1600	60	445	1075	470	1135	495	1195	520	1255

NOTES: 1. Decrease the distances shown by 10% for each 4 knots of headwind.
2. Increase the distance by 10% for each 60°F. temperature increase above standard.
3. For operation on a dry, grass runway, increase distances (both "ground roll" and "total to clear 50 ft. obstacle") by 20% of the "total to clear 50 ft. obstacle" figure.

DENSITY ALTITUDE CHART



Altimeter Setting (In. Hg.)	*Altitude Correction For Obtaining Pressure Alt.*
28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983

DO NOT MARK ON CHART

USE PLASTIC OVERLAY

379. Assume these conditions exist:

Outside air temperature . . 95° F.
Altimeter setting . . . . . 30.40" Hg.
Airport elevation . . . . . 3,450 feet.

You determine the density altitude to be approximately

Q12
1- 7,200 feet.
2- 7,650 feet.
3- 6,650 feet.
4- 5,950 feet.

NOTE: Use chart on opposite page.

380. GIVEN:

Airport elevation . . . . . 5,515 feet.
Outside air temperature . . 85° F.
Altimeter setting . . . . . 29.40" Hg.

Determine the density altitude.

Q12
1- 9,250 feet.
2- 9,050 feet.
3- 8,400 feet.
4- 6,000 feet.

NOTE: Use chart on opposite page.

381. GIVEN:

Airport elevation . . . . . 608 feet.
Outside air temperature . . 70° F.
Altimeter setting . . . . . 29.40" Hg.

Determine the density altitude.

Q12
1- 4,000 feet.
2- 3,000 feet.
3- 2,100 feet.
4- 1,100 feet.

NOTE: Use chart on opposite page.

382. GIVEN:

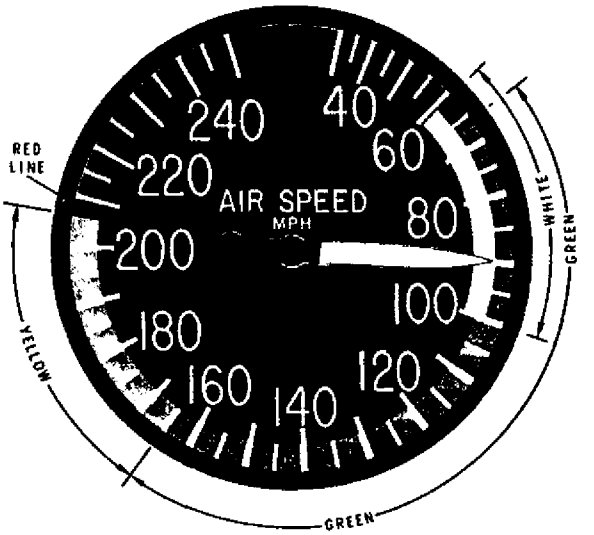
Altimeter setting . . . . . 29.70" Hg.
Airport elevation . . . . . 3,795 feet
Outside air temperature . . 75° F.

Using the chart on the opposite page, determine the DENSITY ALTITUDE.

Q12
1- 6,200 feet.
2- 5,900 feet.
3- 3,900 feet.
4- 3,000 feet.

383. While on the ground at an airport, you can determine the pressure altitude by

Q12
1- setting the altimeter to the field elevation and reading the value in the altimeter setting window.
2- setting the altimeter to zero and reading the value in the altimeter setting window.
3- setting 29.92 in the airplane's altimeter setting window and reading the indicated altitude.
4- setting the field elevation in the altimeter setting window and reading the indicated altitude.



384. Refer to the airspeed indicator above. Which color-coded marking identifies the power-off stalling speed with flaps and landing gear in the retracted position?

Q15
1- Upper A/S limit of the green arc.
2- Upper A/S limit of the white arc.
3- Lower A/S limit of the green arc.
4- Lower A/S limit of the white arc.

385. Refer to the color-coded markings on the airspeed indicator above. What is the "caution range" of the airplane?

Q15
1- 208 to 210 MPH.
2- 165 to 208 MPH.
3- 60 to 100 MPH.
4- 0 to 60 MPH.

386. Refer to the airspeed indicator above. What is the "maximum structural cruising speed?"

Q15
1- 240 MPH.
2- 208 MPH.
3- 165 MPH.
4- 100 MPH.

387. Refer to the airspeed indicator above. The maximum speed at which the airplane can be operated in smooth air is

Q15
1- 208 MPH.
2- 165 MPH.
3- 100 MPH.
4- 65 MPH.

388. Suppose that an airplane has been loaded in such a manner that the center of gravity is located aft of the CG limit. One characteristic that a pilot might experience with this airplane would be

Q14
1- a longer takeoff run.
2- the inability to recover from a stalled condition.
3- stalling at higher than normal airspeed.
4- the inability to flare during landings.

389. What is an important airspeed limitation that is not color-coded on airspeed indicators?

Q15
1- Never-exceed speed.
2- Maximum structural cruising speed.
3- Maneuvering speed.
4- Maximum flaps-extended speed.

390. Which important airspeed limitation is not color-coded on the airspeed indicator?

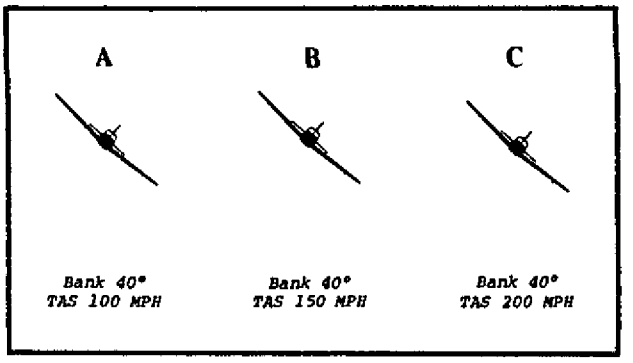
Q15
1- The maneuvering speed.
2- The maximum power-off stalling speed with the landing gear and wing flaps retracted.
3- The never-exceed speed.
4- The maximum structural cruising speed.

391. The upper airspeed limit of the green arc on an airspeed indicator represents the maximum

Q15
1- landing gear lowering speed.
2- structural cruising speed.
3- design maneuvering speed.
4- allowable speed for smooth-air operations.

392. Concerning airplane structural limitations, if moderate to severe turbulence is encountered, the indicated airspeed should not exceed the

Q15
1- minimum design cruise speed.
2- maximum structural cruising speed.
3- maximum flaps-extended speed.
4- maneuvering speed.



393. Assume that the airplanes in the above illustration are making coordinated turns. Which statement is true?

Q17
1- Airplane "A" has the greatest rate of turn and the smallest radius of turn.
2. Airplanes "A," "B," and "C" have equal rates of turn, but airplane "C" has the largest radius of turn.
3- Airplane "C" has the greatest rate of turn and the largest radius of turn.
4- Airplane "A" has the smallest rate of turn and the greatest radius of turn.

394. As you maneuver an airplane you should realize that it can be stalled

Q18
1- only when the nose is too high in relation to the horizon.
2- at any airspeed and in any flight attitude.
3- only when the airspeed decreases to the published stalling speed.
4- only when the nose is high and the airspeed is low.

395. Assume that the normal landing approach speed of your airplane is 75 MPH indicated airspeed at sea level. If you plan to land at an airport where the elevation is 7,500 ft. MSL, the indicated approach speed should be

Q18
1- higher than at sea level and the true airspeed will be higher.
2- the same as at sea level and the true airspeed will be the same.
3- higher than at sea level, but the true airspeed will be the same.
4- the same as at sea level, but the true airspeed will be higher.

STALL SPEEDS

GROSS WEIGHT 2750 LBS		ANGLE OF BANK			
		LEVEL	30°	45°	60°
POWER		GEAR AND FLAPS UP			
ON	MPH	62	67	74	88
	KTS	54	58	64	76
OFF	MPH	75	81	89	106
	KTS	65	70	77	92
		GEAR AND FLAPS DOWN			
ON	MPH	54	58	64	76
	KTS	47	50	56	66
OFF	MPH	66	71	78	93
	KTS	57	62	68	81

396. Refer to the chart above. Select the true statement concerning the effect on stall speeds when operating with the gear and flaps up and with the gear and flaps down.

Q18
1- In a 45° bank with power on, the stall occurs at a higher airspeed with gear and flaps down than when they are up.
2- In power-off turns, regardless of the gear and flaps position, the stall will occur at an airspeed 7-8 MPH higher with 45° of bank than with 30° of bank.
3- In level flight with power off, a stall would occur at a higher airspeed with gear and flaps down than with gear and flaps up.
4- In a 60° bank with power on or power off, the airplane will stall at a lower airspeed with gear and flaps up than with the gear and flaps down.

397. Refer to the Stall Speeds Chart above and select the true statement.

Q18
1- The airplane with gear and flaps down and power on, would stall at a 30 MPH higher airspeed in a 45° bank than in level flight.
2- The stalling speed in a 30° bank with power on or power off, would be the same regardless of whether the gear and flaps are up or down.
3- The power-on stalling speed in a 30° bank is 4-5 MPH higher than level flight stalling speed with gear and flaps either up or down.
4- The stall speed in level flight, with power on and gear and flaps up, is the same as the stall speed in a 45° bank, with power off and gear and flaps down.

398. When computing weight and balance, the "empty weight" includes the weight of the airframe, engine(s), and all items of operating equipment permanently installed. Empty weight also includes

Q22
1- all usable fuel and oil, but does not include any radio equipment or instruments that were installed by someone other than the manufacturer.
2- all usable fuel, maximum oil, hydraulic fluid, but does not include the weight of pilot, passengers, or baggage.
3- the unusable fuel, hydraulic fluid, and undrainable oil (or, in some aircraft all of the oil).
4- all usable fuel and oil.

399. Which items are included in the certificated empty weight of an airplane?

Q22
1- Only the airframe, powerplant, and equipment installed by the manufacturer.
2- Hydraulic fluid and usable fuel.
3- Full fuel tanks and engine oil to capacity, but excluding crew and baggage.
4- Unusable fuel and optional equipment.

400. Which of the following would provide the greatest gain in altitude in the shortest distance during climb after takeoff?

Q21
1- Steepest pitch attitude.
2- Cruising climb speed.
3- Best rate-of-climb speed.
4- Best angle-of-climb speed.

401. After takeoff, which airspeed would permit the pilot to gain the most altitude in a given period of time?

Q21
1- Cruising climb speed.
2- Best rate-of-climb speed.
3- Best angle-of-climb speed.
4- Minimum control speed.

PILOT'S OPERATING HANDBOOK
(Excerpt)

AIRCRAFT DESIGNATION:- *Mark A5*
Single-Engine, Four-place Land Monoplane
Seating Arrangement
--Pilot and passenger - front seat
Two passengers -- rear seat

ENGINE OPERATING LIMITS:- 150 HP @ 2700 RPM

FUEL SYSTEM:- Float Type Carburetor
Fuel Capacity 19 gallons in each wing tank (2 tanks)
37 gallons usable

OIL CAPACITY:- 8 quarts (not included in empty weight)

PROPELLER:- Fixed Pitch
LANDING GEAR:- Fixed Tricycle Gear
WING FLAPS:- Electrically operated 0° to 40°

EMPTY WEIGHT:- 1271 lbs.
(moment/1000 pound inches 102.04)

MAXIMUM GROSS WEIGHT:- 2200 lbs.

MAXIMUM WEIGHT IN BAGGAGE COMPARTMENT - 120 lbs.

402. Refer to the excerpt above and assume the airplane is loaded as follows:

Pilot	185 lbs.
Front seat passenger	140 lbs.
Rear seat passenger	150 lbs.
Rear seat passenger	167 lbs.
Baggage	40 lbs.
Oil	Full
Fuel	Full

This airplane is loaded

Q22
1- 5 lbs. more than the maximum allowable gross weight.
2- 11 lbs. more than the maximum allowable gross weight.
3- 10 lbs. less than the maximum allowable gross weight.
4- 14 lbs. less than the maximum allowable gross weight.

403. Refer to the excerpt above. What is the combined maximum weight of four persons and baggage that can be loaded, without exceeding the maximum certificated gross weight, if the airplane is serviced to capacity with oil and fuel?

Q22
1- 707 lbs.
2- 698 lbs.
3- 692 lbs.
4- 697 lbs.

404. Refer to the excerpt to the left and assume the airplane is loaded as follows:

Pilot	165 lbs.
Passengers	450 lbs.
Fuel	Full
Oil	Full

Determine the amount of baggage that can be loaded aboard without exceeding the maximum certificated gross weight of the airplane.

Q22
1- 97 lbs.
2- 89 lbs.
3- 87 lbs.
4- 77 lbs.

405. Refer to the excerpt to the left. Assume you plan to load the airplane with 105 lbs. of baggage, 8 qts. of oil, and four persons whose total weight is 625 lbs. What is the maximum amount of usable fuel that can be aboard without exceeding the maximum certificated gross weight?

Q22
1- 36.5 gallons.
2- 30.6 gallons.
3- 33.1 gallons.
4- 11.0 gallons.

406. Refer to the excerpt to the left above and assume the airplane is loaded as follows:

Pilot and front seat passenger	295 lbs.
Rear seat passengers	325 lbs.
Fuel	Full
Oil	Full

What is the total weight of baggage that can be loaded aboard without exceeding the maximum certificated gross weight of the airplane?

Q22
1- 93 lbs.
2- 87 lbs.
3- 72 lbs.
4- No baggage, as the airplane is already overloaded.

407. Refer to the excerpt to the left above. Assume that you plan to load the airplane with three persons whose total weight is 580 lbs., and baggage that weighs 120 lbs. There are 8 qts. of oil in the engine. Under these conditions, the maximum usable fuel that can be carried without exceeding the maximum certificated gross weight is

Q22
1- 41.6 gallons.
2- 38.1 gallons.
3- 35.6 gallons.
4- 32.0 gallons.

PILOT'S OPERATING HANDBOOK
(Excerpt)

AIRCRAFT DESIGNATION:- Jancraft 15
Single-Engine, Land Monoplane
(Seating Arrangement--Pilot and passenger side-by-side plus a child's seat in the baggage area)

ENGINE OPERATING LIMITS:- 100 HP

FUEL SYSTEM:- Float-Type Carburetor
- Fuel Capacity Standard Tanks - two 13 gal. tanks (capacity 26 gals.) - maximum usable 22.5 gals.
- *Optional long range tanks* - total capacity 38 gals. - maximum usable 35 gals.

OIL CAPACITY:- 6 quarts - included in empty weight

PROPELLER:- Fixed Pitch
LANDING GEAR:- Fixed Tricycle Gear
WING FLAPS:- Electrically operated 0° to 40°

EMPTY WEIGHT:- 1,104 lbs.
MAX. GROSS WEIGHT:- 1,600 lbs.

MAX. WEIGHT IN BAGGAGE COMPARTMENT - 120 lbs.

408. Refer to the excerpt above and assume the airplane is loaded as follows:

Pilot	160 lbs.
Passenger	145 lbs.
Baggage	55 lbs.
Oil	Full
Fuel (standard tanks)	Full

This airplane is loaded

Q22
1- 74 pounds more than the maximum allowable gross weight.
2- 10 pounds more than the maximum allowable gross weight.
3- 10 pounds less than the maximum allowable gross weight.
4- 1 pound less than the maximum allowable gross weight.

409. Refer to the excerpt above and assume the airplane is loaded as follows:

Pilot	190 lbs.
Passenger	175 lbs.
Oil	Full
Fuel (standard tanks)	Full

With reference to maximum certificated gross weight, the airplane is loaded

Q22
1- 19 pounds under maximum allowable.
2- 15 pounds over maximum allowable.
3- 7 pounds under maximum allowable.
4- 4 pounds over maximum allowable.

410. Refer to the excerpt to the left. Assume that the total weight of the pilot and passenger is 305 pounds, and the airplane's standard fuel tanks are full. Under these conditions, how much baggage could be loaded without exceeding the maximum certificated gross weight?

Q22
1- 78 pounds.
2- 72 pounds.
3- 66 pounds.
4- 56 pounds.

411. Refer to the excerpt to the left. What is the combined maximum weight of two persons (with no baggage) that can be loaded, without exceeding the maximum certificated gross weight, if the airplane is serviced to oil capacity and the long range fuel tanks are full?

Q22
1- 361 pounds.
2- 330 pounds.
3- 306 pounds.
4- 286 pounds.

412. GIVEN:

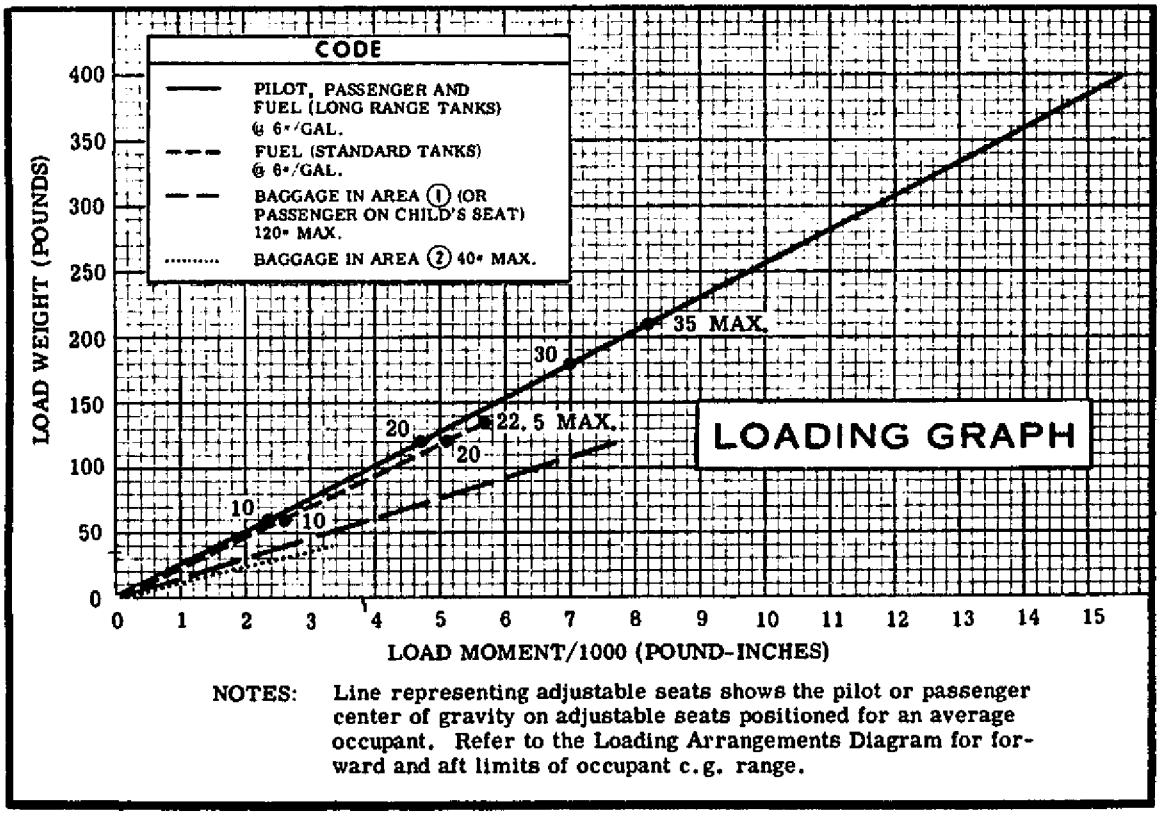
Pilot	150 lbs.
Passenger	129 lbs.
Baggage	18 lbs.
Oil	Full
Fuel (long range tanks)	Full

Using the given data and the excerpt above left, you determine the airplane, in respect to maximum certificated gross weight limit, is loaded

Q22
1- 56 pounds over maximum allowable.
2- 64 pounds under maximum allowable.
3- 11 pounds over maximum allowable.
4- 11 pounds under maximum allowable.

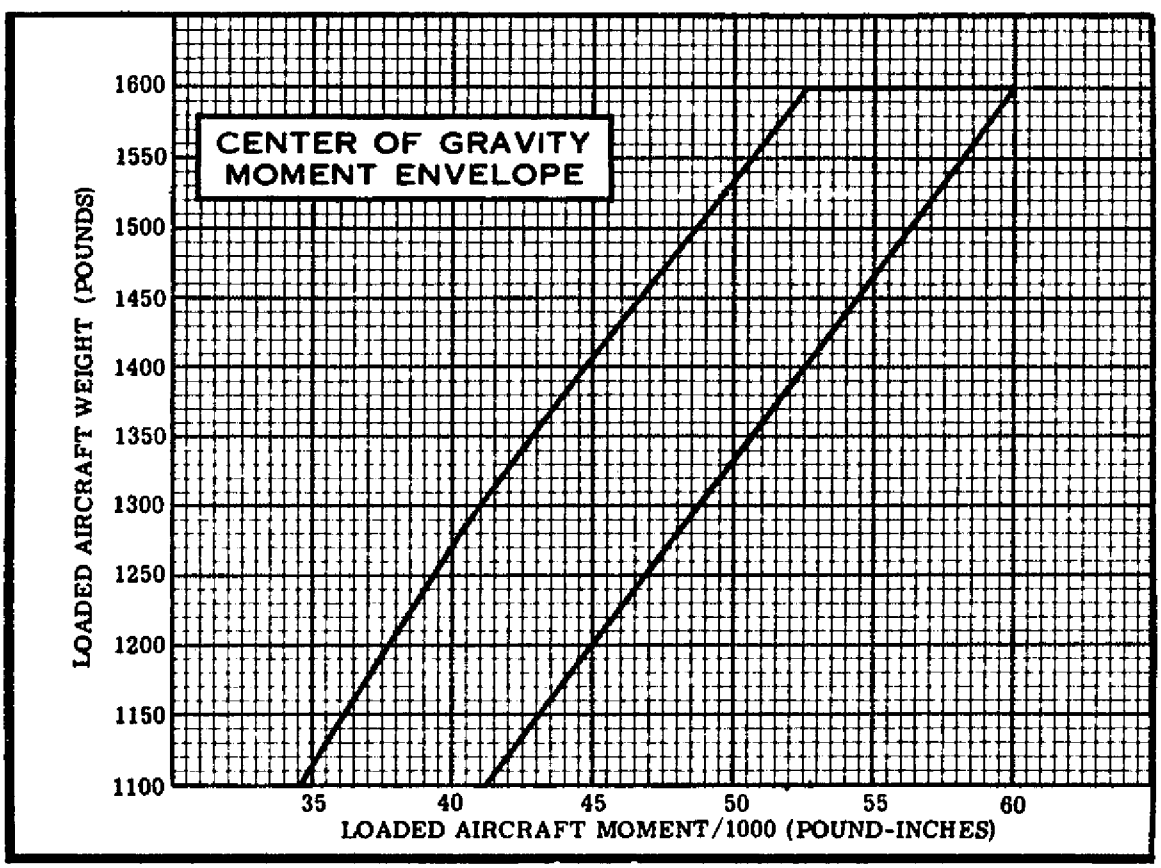
413. Refer to the excerpt to the left above. Assume you plan to load your airplane with 30 pounds of baggage, 6 quarts of oil, and three persons whose total weight is 360 pounds. What is the total amount of usable fuel that can be in the standard tanks without exceeding the maximum certificated gross weight?

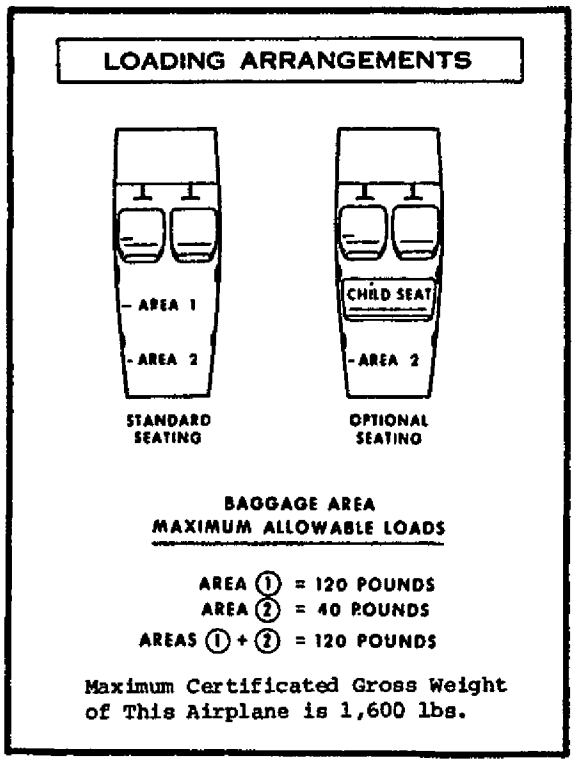
Q22
1- 23.9 gallons.
2- 21.7 gallons.
3- 19.3 gallons.
4- 17.6 gallons.



NOTES: Line representing adjustable seats shows the pilot or passenger center of gravity on adjustable seats positioned for an average occupant. Refer to the Loading Arrangements Diagram for forward and aft limits of occupant c.g. range.

NOTE: Empty weight of this airplane includes unusable fuel, full oil, and hydraulic fluid.





414. Refer to the appropriate chart to the left and the illustration above. Assume an airplane is loaded as follows:

	WEIGHT (LBS.)
Empty weight	1,100
Pilot & front passenger	305
Baggage (area 1)	70

What is the maximum amount of usable fuel that may be put into the standard tanks without exceeding the maximum gross weight limit?

Q22
1- 20.8 gallons.
2- 18.2 gallons.
3- 17.0 gallons.
4- 15.8 gallons.

415. GIVEN:

	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight (oil included)	1,100	35.9
Pilot & passenger (front seat)	290	?
Fuel (standard tanks)	125	?
Baggage (area 1)	65	?

Based on this information and using the appropriate chart to the left and illustration above, what would be the center of gravity moment/1000?

Q22
1- 56.8 pound-inches.
2- 54.1 pound-inches.
3- 51.8 pound-inches.
4- 48.5 pound-inches.

416. Refer to the illustration to the left and charts on the opposite page.

GIVEN:

	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight	1,100	35.9
Pilot & full fuel (long range tanks)	360	?
Baggage (area 1)	85	?
Baggage (area 2)	40	?

You determine that the airplane is

Q22
1- over gross weight limit, but within CG limits.
2- within gross weight limit, but exceeds aft CG limit.
3- over gross weight limit and exceeds the aft CG limit.
4- within gross weight limit and within CG limits.

417. Refer to the appropriate chart on opposite page and the illustration to the left. Assume an airplane is loaded as follows:

	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight	1,100	35.9
Pilot & passenger (front seat)	328	?
Fuel, 12 gals. usable (standard tanks)	72	?
Baggage (area 2)	25	?

What would be the gross weight and center of gravity moment/1000?

Q22
1- 1,525 lbs.; 56.3 pound-inches.
2- 1,525 lbs.; 53.9 pound-inches.
3- 1,500 lbs.; 50.9 pound-inches.
4- 1,490 lbs.; 49.7 pound-inches.

418. GIVEN:

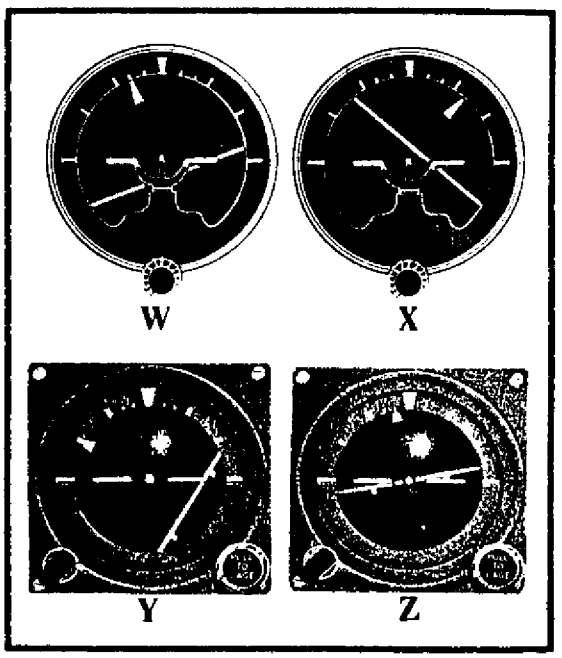
	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight	1,100	35.9
Pilot & passenger	300	?
Fuel, 22.5 gals. usable (standard tanks)	?	?
Passenger on child seat (area 1)	65	?

Based on this information and the charts on opposite page and to the left above, what would be the maximum allowable load that can be placed in baggage area 2, without exceeding the gross weight and center of gravity aft limits?

Q22
1- 40 pounds.
2- 10 pounds.
3- 5 pounds.
4- No additional baggage in area 2.

419. Assume that baggage in the baggage compartment (located aft of the cabin) was moved into the cabin area, how would this affect the airplane's center of gravity?

Q23
1- The CG would be unpredictable with flight altitude changes.
2- The CG would move forward.
3- The CG would remain the same.
4- The CG would move aft.



420. Refer to the attitude indicators illustrated above and select the true statement concerning the attitude of the airplane.

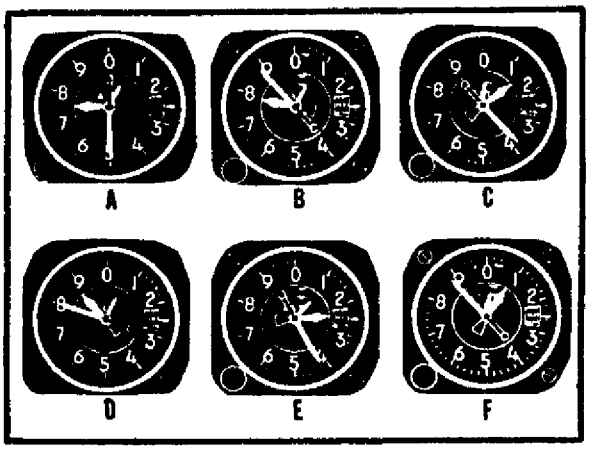
R01
1- Instrument "Z" depicts a 10° banked level turn to the left.
2- Instrument "Y" depicts a 60° banked turn to the right.
3- Instrument "X" depicts a 40° banked turn to the right.
4- Instrument "W" depicts a 20° banked turn to the left.

421. GIVEN:

Indicated altitude . . . . . 7,000 feet
Outside air temperature . . +20° C.
Pressure altitude . . . . . 7,000 feet

Based on these conditions what is the true altitude?

R04
1- 7,475 feet.
2- 7,275 feet.
3- 6,775 feet.
4- 6,550 feet.



422. Which of the altimeters above display an indicated altitude of more than 8,000 feet?

R04
1- A, B, C, D.
2- B, E, F.
3- D, E.
4- A, B, F.

423. Refer to altimeter "B" above. Which one of the following indications is correct?

R04
1- 7,880 feet.
2- 1,880 feet.
3- 8,880 feet.
4- 880 feet.

424. Which of the altimeters above display an indicated altitude of less than 2,000 feet?

R04
1- D, E.
2- C, F.
3- B, E, F.
4- A, C, E.

425. Which statement is true in regard to the effects of atmospheric conditions on the indication of a pressure altimeter? When flying in air that is

R04
1- COLDER than standard temperature the aircraft will be higher than the altimeter indicates.
2- WARMER than standard temperature the aircraft will be at the altitude indicated on the altimeter.
3- COLDER than standard temperature the aircraft will be lower than the altimeter indicates.
4- WARMER than standard temperature the aircraft will be lower than the altimeter indicates.

426. Assume a constant indicated altitude were flown from an area of high pressure into an area of lower pressure without adjusting the altimeter. Under these conditions the altimeter would indicate

R04
1- the actual altitude above sea level.
2- the actual altitude above ground level.
3- higher than the actual altitude above sea level.
4- lower than the actual altitude above sea level.

427. The pitot system provides impact pressure for which instrument(s)?

R08
1- Airspeed indicator, vertical-speed indicator, and altimeter.
2- Altimeter and vertical-speed indicator.
3- Vertical-speed indicator.
4- Airspeed indicator.

428. What causes deviation errors in a magnetic compass?

R08
1- magnetic dip.
2- acceleration and deceleration.
3- the difference in location of true north and magnetic north.
4- certain metals and electrical systems within the airplane.

429. In the Northern Hemisphere, if an airplane is accelerated or decelerated, the magnetic compass will normally indicate

R09
1- a turn momentarily, with changes in airspeed on any heading.
2- a turn toward south while accelerating on a west heading.
3- correctly only when on a north or south heading.
4- a turn toward north while decelerating on an east heading.

430. Which statement is true about magnetic deviation of a compass?

R09
1- Deviation is different in a given airplane in different localities.
2- Deviation is the same for all airplanes on different headings.
3- Deviation varies for different headings of the same airplane.
4- Deviation is the same for all airplanes in the same locality.

431. In the Northern Hemisphere, a magnetic compass will normally indicate initially a turn toward the WEST if

R09
1- an aircraft is decelerated while on a south heading.
2- an aircraft is accelerated while on a north heading.
3- a left turn is entered from a north heading.
4- a right turn is entered from a north heading.

432. The pressure altitude at a given location is indicated by the altimeter after it is set to

R11
1- the current altimeter setting.
2- 29.92
3- the density altitude.
4- the field elevation.

433. Pressure altitude can be determined by which one of the following methods?

R11
1- Adjust the altimeter setting window to 29.92 and read pressure altitude directly from the altimeter.
2- Adjust the altimeter to the airport elevation and read pressure altitude.
3- Pressure altitude can be determined only by the use of a computer.
4- Set the altimeter to the current altimeter setting and read pressure altitude directly from the altimeter.

434. The most important rule to remember in the event of engine failure after becoming airborne, is to

U03
1- quickly check the fuel supply for possible fuel exhaustion.
2- determine the wind direction to plan for your forced landing.
3- turn back immediately to the takeoff runway.
4- maintain a safe airspeed.

435. If severe turbulence is encountered during flight, the pilot should reduce the airspeed to

U04
1- maximum structural cruising speed.
2- never exceed speed.
3- minimum control speed.
4- design maneuvering speed or less.

436. The maneuvering speed (V_a) of an airplane should be explained as that speed at which

U04
1- abrupt attitude changes can be made without exceeding the load limits; or the maximum speed in rough air.
2- an airplane should be maneuvered in the traffic pattern.
3- unanticipated stalls, resulting from gusts, will be averted.
4- turbulence will cause structural damage to the airplane.

437. When taxiing with strong quartering tailwinds, which of the following aileron positions should be generally used?

U05
1- Aileron PARALLEL to the ground on the side from which the wind is blowing.
2- Neutral (streamlined position).
3- Aileron UP on the side from which the wind is blowing.
4- Aileron DOWN on the side from which the wind is blowing.

438. Which of the following aileron positions should you generally use when taxiing in strong quartering headwinds?

U05
1- Aileron up on the side from which the wind is blowing.
2- Aileron down on the side from which the wind is blowing.
3- Neutral.
4- Aileron as stated in response 1 for high-wing airplanes, but as stated in response 3 for low-wing airplanes.

439. One of the main purposes of using flaps during the approach and landing is to

U06
1- decrease lift, thus enabling a steeper-than-normal approach to be made.
2- increase the angle of descent without increasing airspeed.
3- permit a touchdown at a higher indicated airspeed.
4- decrease the angle of descent without increasing the airspeed.

BEFORE TURNING IN YOUR TEST AND ANSWER SHEET, EXAMINE YOUR ANSWER SHEET TO BE SURE THAT

1- the answers are marked on page 4 and are also legible on page 2.
2- only one answer is marked for each test item.
3- each mark on page 4 is black and heavy.
4- all erasures on page 4 are complete and clean.
5- selections changed on page 2 are marked with a slash (/).

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INCORRECT SCORING WHICH WILL LOWER YOUR GRADE.

SECTIONAL CHART LEGEND EXCERPTS

LEGEND

Airports having Control Towers (Airport Traffic Areas) are shown in blue, all others in magenta.
(To the maximum extent possible these charts reflect the most current information available at time of printing.)

AIRPORTS

Civil - Public use, processed through FAA

Military - Without charting restrictions (identified by abbreviations AFB, NAS, AAF, etc.) (For complete airport information consult DOD—FLIP)

Private "(Pvt)" - Non-public use, having emergency use or landmark value

Heliport - Selected

Unverified - Emergency use only

Abandoned - Paved, having landmark value

Seaplane Base (SPB)

Airports with paved runways at least 1500 feet long are shown by pattern. All recognizable runways, including those closed are shown for visual identification.

AIRPORTS WITH SERVICES

Fuel available and field tended normal working hours

Non-hard-surfaced runways - turf, gravel, asphalt-treated, etc.

Hard-surfaced runways - concrete/asphalt

Rotating light in operation Sunset to Sunrise

AIRPORTS WITH EMERGENCY OR NO SERVICES

AIRPORT DATA

FSS ——— Indicates FSS on field

NAME CT - 118.3*
ATIS 124.8
093 L 92 123.0 ——— UNICOM
VFR Advry 126.3
Airport of entry

FSS - Flight Service Station
CT - 118.3 - Control Tower (CT) - primary frequency
* - Star indicates operation part time. See Tower Frequencies tabulation for hours of operation.
ATIS 124.8 - Automatic Terminal Information Service
UNICOM - Unmanned communication advisory station
VFR Advry - VFR Advisory Service shown where ATIS not available and frequency is other than primary CT frequency.
093 - Elevation in feet
L - Lighting in operation Sunset to Sunrise
*L - Lighting available Sunset to Sunrise only on request (by radio call, letter, phone, telegram)
(L) - Lighting in operation part of the night and on request, or not operating thereafter.
92 - Pilot-controlled lighting (PCL)
9 - Length of longest runway in hundreds of feet
S - Normally shuttered take-off area (SPB)
When facility or information is lacking, the respective character is replaced by a dash.
All times are local.
NPCT - Non-Federal Control Tower

RADIO AIDS TO NAVIGATION AND COMMUNICATION BOXES

VHF OMNI RANGE (VOR)

VORTAC

VOR-DME

Non-Directional Radiobeacon (RBn)

RBn
POINT LOMA
Marine Radiobeacon

Other facilities, i.e., Commercial Broadcast Stations, FSS Outlets-RCO, LRCO, SFO, SSFO, etc.

Triangles in corners of box indicate Enroute Flight Advisory Service "(EFAS)" Frequency 122.0, Voice Call, e.g. "Oakland Flight Watch"
122.1R 122.6 123.6
OAKLAND
382 118.0 OAK CT

Underline indicates no voice on this freq

122.1R
CHICAGO CHI

Heavy line box indicates Flight Service Station (FSS). Freqs 121.5, 122.2, 243.0 and 255.4 are normally available at all FSS's and are not shown above boxes. All other freqs are shown.

122.1R
MIAMI
Controlling FSS

LOS ANGELES FLIGHT WATCH
Remoted EFAS

Square indicates Transcribed Weather Broadcast (TWEB) available at this NAVAID

Frequencies above this line box are remoted to NAVAID site. Other freqs at controlling FSS may be available determined by altitude and terrain.

In Canada a heavy line box indicates Aeradio. All available frequencies are shown.

R - receive only T - transmit only

AIRPORT TRAFFIC SERVICE AND AIRSPACE INFORMATION

AIRSPACE INFORMATION

Only the controlled and reserved airspace effective below 18,000 ft MSL are shown on this chart. All times are local.

092 V 3

Low Altitude Federal Airways are indicated by center line.

The limits of controlled airspace are shown by the bands (Vignette) and are color-coded in blue and magenta:

Floor 700 feet above surface

Floor 1200 feet above surface

2000 / 2000 MSL — Floors other than 700 feet or 1200 feet above surface

TA - Transition Area CZ - Control Zone

Prohibited, Restricted, Warning and Alert Area

MOA - Military Operations Area

CZ - extends upwards from surface

CZ within which Read-wing special VFR Flight is prohibited

Positive CZ (Canada)

Parachute Jumping Area (See part 4 of AIM for details)

Intersection
Arrows are directed toward facilities which establish intersection

NAME (Red, Blue, or Black)
Visual Check Point

ADIZ - Air Defense Identification Zone

FIR - Flight Information Region

Special Conservation Areas

AIRPORT TRAFFIC AREA

Tower Controlled Airport

DAYTON CT - 118.8
1008 L 70

ADVISORY SERVICE AIRPORT

Non-Tower Airport

FSS
MARTIN
858 L 70 123.0

SOMERSET
1540 L 37 122.8

OBSTRUCTIONS

1000 ft and higher AGL

below 1000 ft AGL

Group Obstruction

Obstruction with hi-intensity lights

1520 (1210) UC — Elevation of the top above mean sea level; Height above ground; Under Construction or reported - position and elevation unverified

CAUTION: Guy wires may extend outward from structures.

MISCELLANEOUS

Mountain Pass Routes

2°W — Isogonic Line (1975 VALUE)

FI☆ Flashing Light Marine Light

Light Ship Glider Operating Area

TOPOGRAPHICAL INFORMATION

Roads

Road Markers

Bridges And Viaducts

Power Transmission Lines

Mines And Quarries

Lookout Tower
A-17 (Site Number)
618 (Elevation Base Of Tower)

CG Coast Guard Station

Race Track

Tank - water, oil or gas

Oil Well Water Well

Aerial Cableway

Outdoor Theater

Docks

Shipwreck Pier

Perennial Lake

Non-Perennial Lake

Dams

ATTENTION

THIS CHART CONTAINS MAXIMUM ELEVATION FIGURES (MEF). The Maximum Elevation Figures shown in quadrangles bounded by ticked lines of latitude and longitude are represented in THOUSANDS and HUNDREDS of feet above mean sea level. The MEF is based on information available concerning the highest known feature in each quadrangle, including terrain and obstructions (trees, towers, antennas, etc.).

Example: 12,500 feet 125

SECTIONAL AERONAUTICAL CHART
SCALE 1:500,000

CONTOUR INTERVAL

500 feet

Intermediate contours shown at 250 feet

500 Basic — 250 Intermediate

HIGHEST TERRAIN elevation is 1719 feet located at 43°02'N - 89°51'W

1719
1500
Sea level

REGULATIONS REGARDING FLIGHTS OVER CHARTED NATIONAL PARK SERVICE AREAS, U.S. FISH AND WILDLIFE SERVICE AREAS, AND U.S. FOREST SERVICE AREAS

The landing of aircraft is prohibited on lands or waters administered by the National Park Service, U.S. Fish and Wildlife Service or U.S. Forest Service without authorization from the respective agency. Exceptions include: 1) when forced to land due to an emergency beyond the control of the operator, 2) at officially designated landing sites, or 3) on approved official business of the Federal Government.

All aircraft are requested to maintain a minimum altitude of 2,000 feet above the terrain of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas and Scenic Riverways administered by the National Park Service; National Wildlife Refuges, Big Game Ranges, Game Ranges and Wildlife Ranges administered by the U.S. Fish and Wildlife Service; and Wilderness and Primitive areas administered by the U.S. Forest Service.

Federal regulations also prohibit airdrops by parachute or other means of persons, cargo or objects from aircraft on lands administered by the three agencies without authorization from the respective agency. Exceptions include: 1) emergencies involving the safety of human life or 2) threat of serious property loss.

---- Boundary of National Park Service areas, U.S. Fish and Wildlife Service areas and U.S. Forest Service Wilderness and Primitive areas.

PROHIBITED, RESTRICTED, WARNING, AND ALERT AREAS ON CHICAGO SECTIONAL CHART

NO.	NAME	ALTITUDE	TIME	APPROPRIATE AUTHORITY
R-3502	Savanna, Ill.	To 2500	0800 to 2200	C.O., Ordnance Depot, Savanna, Ill.
R-6901	Camp McCoy, Wis.	To 20,000	Continuous	† FAA, Chicago ARTC Center or area FSS C.O., Camp McCoy, Wis.
R-6903	Sheboygan, Wis.	To Ft. 450	Continuous sunrise to sunset.	† FAA, Chicago ARTC Center or area FSS Comdr., Volk Field, Wis.
R-6904	Volk Field, Wis.	To 15,000	Continuous sunrise to sunset.	† FAA, Chicago ARTC Center or area FSS Comdr., Volk Field, Wis.

P - Prohibited R - Restricted W - Warning A - Alert † - Controlling Agency

Unless otherwise noted: Altitudes are MSL and in feet, time is local.

No person shall operate an aircraft within a Prohibited Area, or within a Restricted Area between the designated altitudes during the time of designation unless prior permission has been issued by the appropriate authority as listed above. The appropriate authority is defined as either the controlling agency (†) or the using agency. Flight within Alert Areas is not restricted, but pilots are advised to exercise extreme caution.

SE

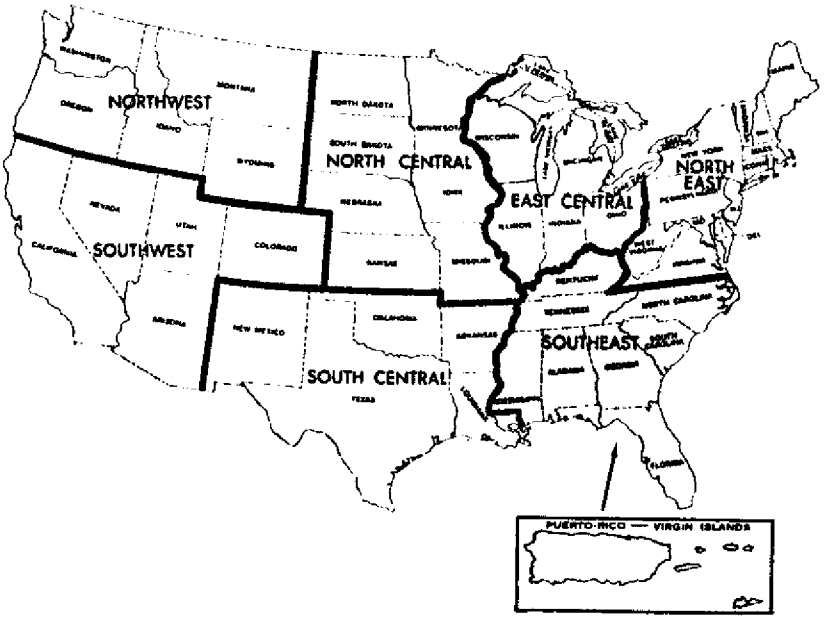
UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION

AIRPORT/FACILITY DIRECTORY

SOUTHEAST U.S.

EFFECTIVE 0901Z 18 MAY
TO 0901Z 13 JUL

Consult NOTAMS for latest information



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National Ocean Survey
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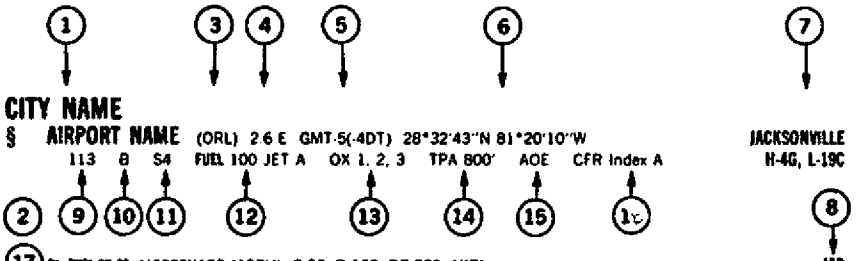
DIRECTORY LEGEND
SAMPLE



CITY NAME

§ **AIRPORT NAME** (ORL) 2 6 E GMT-5(-4DT) 28°32'43"N 81°20'10"W — **JACKSONVILLE**
113 B S4 FUEL 100 JET A OX 1, 2, 3 TPA 800' AOE CFR Index A — **H-4G, L-19C**

IAP

17 **RWY 07-25:** H6000X150 (ASPH) S-90, D-160, DT-300 HIRL
RWY 07: ALSF1 Trees 1700' from thld **RWY 25:** REIL Rgt tfc
RWY 13-31: H4620X100 (ASPH) HIRL
RWY 13: VASI Pole 600' from thld 385' ovrn **RWY 31:** VASI Rgt tfc 569' ovrn. Brush 200' from thld

18 **AIRPORT REMARKS:** Acft 100,000 lbs or over ctc Director of Aviation for approval (305) 894-9831. Fee for all airline charters, travel clubs and certain revenue producing acft

19 **COMMUNICATIONS: ATIS** 127.25 **UNICOM** 123.0
NAME FSS (ORL) on fld 123.65 122.65 122.2 122.1R 112.2T (305) 894-0861
Ⓡ **NAME APP CON** 124.8 (337°-179°) 120.15 (180°-336°)
TOWER 118.7 **GND CON** 121.7 **CLNC DEL** 125.55
STAGE I SVC ctc **ORLANDO APP CON**

20 **RADIO AIDS TO NAVIGATION:** VHF/DF ctc — — FSS
NAME (H) VORTAC 112.2 ORL Chan 59 28°32'33"N 81°20'07"W at fld.
VOR unusable 050-060° beyond 5000'
ILS 109.9 I-ORL Rwy 07. LOM Henry 221 OR
ASR

21 **COMM/NAVAID REMARKS:** Tower operates 1200-0400Z‡

AIRPORT NAME (X30) 7 W GMT-5(-4DT) 28°31'50"N 81°32'26"W — **JACKSONVILLE**
130 S4 FUEL 100 OX 2
RWY 18-36: 2430X150 (TURF) LIRL
RWY 18: Thld dsplcd 215' **RWY 36:** Thld dsplcd 270'
AIRPORT REMARKS: Attended dawn-0300Z‡
COMMUNICATIONS: UNICOM 122.8
NAME FSS (ORL)

---

§ **AIRPORT NAME** (MCO) 6.1 SE GMT-5(-4DT) 28°25'53"N 81°19'29"W — **JACKSONVILLE**
96 B FUEL 100, JET A CFR Index D — **H-4G, L-19C**
RWY 18R-36L: H12004X300 (CONC) S-100, D-200, DT-400 HIRL — **IAP**
RWY 18R: ALSF1, REIL Rgt tfc **RWY 36L:** ALSF1
RWY 18L-36R: H12004X200 (ASPH) S-165, D-200, DT-400 HIRL
RWY 18L: ALSF1 Thld dsplcd 990' **RWY 36R:** ALSF1 Rgt tfc
AIRPORT REMARKS: Attended 1200-0300Z‡. 1000' ovrns all rwys
COMMUNICATIONS: UNICOM 123.0
NAME FSS (ORL) on Herndon
Ⓡ **APP CON** 124.8 (337°-179°) 120.1 (180°-336°)
TOWER 124.3 **GND CON** 121.85 **CLNC DEL** 134.7
DEP CON 124.8 (337°-179°) 120.1 (180°-336°)
STAGE III SVC ctc **APP CON**
RADIO AIDS TO NAVIGATION:
(H) VORTAC 112.2 ORL Chan 59 28°32'33"N 81°20'07"W 173° 5.7 NM to fld
VOR unusable 050°-060° beyond 15 NM below 5000'
ILS 109.3 I-MCO Rwy 36 BC unusable
ASR

AIRPORT NAME (See PLYMOUTH)

DIRECTORY LEGEND

LEGEND

This Directory is an alphabetical listing of data on record with the FAA on all airports that are open to the public, associated terminal control facilities, air route traffic control centers and radio aids to navigation within the conterminous United States, Puerto Rico and the Virgin Islands. Airports are listed alphabetically by associated city name and cross referenced by airport name. Facilities associated with an airport, but with a different name, are listed individually under their own name, as well as under the airport with which they are associated.

The listing of an airport in this directory merely indicates the airport operator's willingness to accommodate transient aircraft, and does not represent that the facility conforms with any Federal or local standards, or that it has been approved for use on the part of the general public.

The information on obstructions is taken from reports submitted to the FAA. It has not been verified in all cases. Pilots are cautioned that objects not indicated in this tabulation (or on charts) may exist which can create a hazard to flight operation.

Detailed specifics concerning services and facilities tabulated within this directory are contained in Airman's Information Manual, Basic Flight Information and ATC Procedures.

The legend items that follow explain in detail the contents of this Directory and are keyed to the circled numbers on the sample on the preceding page.

(1) CITY/AIRPORT NAME

Airports and facilities in this directory are listed alphabetically by associated city and state. Where the city name is different than the airport name the city name will appear on the line above the airport name. Airports with the same associated city name will be listed alphabetically by airport name and will be separated by a dashed rule line. All others will be separated by a solid rule line.

(2) NOTAM SERVICE

The symbol § preceding the airport name indicates NOTAM Service is provided. Notam service is available only at airports with established instrument approach procedures, or high volume VFR activity.

(3) LOCATION IDENTIFIER

A three or four character code assigned to airports. These identifiers are used by ATC in lieu of the airport name in flight plans, flight strips and other written records and computer operations.

(4) AIRPORT LOCATION

Airport location is expressed as distance and direction from the center of the associated city in nautical miles and cardinal points, i.e., 3.5 NE.

(5) TIME CONVERSION

Hours of operation of all facilities are expressed in Greenwich Mean Time (GMT) and shown as "Z" time. The directory indicates the number of hours to be subtracted from GMT to obtain local standard time and local daylight saving time GMT-5(-4DT). The symbol ‡ indicates that during periods of Daylight Saving Time effective hours will be one hour earlier than shown. In those areas where daylight saving time is not observed that (-4DT) and ‡ will not be shown.

(6) GEOGRAPHIC POSITION OF AIRPORT

(7) CHARTS

The Sectional Chart and Low and High Altitude Enroute Chart and panel on which the airport or facility is located.

(8) INSTRUMENT APPROACH PROCEDURES

IAP indicates an airport for which a prescribed (Public Use) FAA Instrument Approach Procedure has been published.

(9) ELEVATION

Elevation is given in feet above mean sea level and is the highest point on the landing surface. When elevation is sea level it will be indicated as (00). When elevation is below sea level a minus (-) sign will precede the figure.

(10) ROTATING LIGHT BEACON

B indicates rotating beacon is available. Rotating beacons operate dusk to dawn unless otherwise indicated in AIRPORT REMARKS.

(11) SERVICING

S1: Minor airframe repairs.
S2: Minor airframe and minor powerplant repairs.
S3: Major airframe and minor powerplant repairs.
S4: Major airframe and major powerplant repairs.

DIRECTORY LEGEND

(12) FUEL

FUEL CODE	PRODUCT
80	Grade 80 gasoline (Red)
100	Grade 100 gasoline (Green)
100LL	Grade 100LL gasoline (low lead) (Blue)
115	Grade 115 gasoline
A	Jet A—Kerosene freeze point—40° C.
A1	Jet A-1—Kerosene, freeze point—50° C.
A1+	Jet A-1—Kerosene with icing inhibitor, freeze point—50° C.
B	Jet B—Wide-cut turbine fuel, freeze point—50° C.
B+	Jet B—Wide-cut turbine fuel with icing inhibitor, freeze point—50° C.

(13) OXYGEN

OX 1 High Pressure
OX 2 Low Pressure
OX 3 High Pressure—Replacement Bottles
OX 4 Low Pressure—Replacement Bottles

(14) TRAFFIC PATTERN ALTITUDE

TPA—Traffic Pattern Altitude is provided only for those airports without a 24 hour operating control tower. "Altitudes shown are Above Ground Level (AGL)"

(15) AIRPORT OF ENTRY AND LANDING RIGHTS AIRPORTS

AOE—Airport of Entry-A customs Airport of Entry where permission from U.S. Customs is not required, however, at least one hour advance notice of arrival must be furnished.
LRA—Landing Rights Airport-Application for permission to land must be submitted in advance to U.S. Customs. At least one hour advance notice of arrival must be furnished.
NOTE: Advance notice of arrival at both an AOE and LRA airport may be included in the flight plan when filed in Canada or Mexico, if destination is an airport where flight notification service is available. This notice will also be treated as an application for permission to land in the case of an LRA. (See Customs, Immigration and Naturalization, Public Health and Agriculture Department requirements in the International Flight Information Manual for further details.)

(16) CERTIFICATED AIRPORT (FAR 139) and FAA INSPECTION

Airport serving Civil Aeronautics Board certified carriers and certified under FAR Part 139 are indicated by the CFR Index i.e., CFR Index A, which relates to the availability of Crash, Fire, Rescue equipment.

All airports not inspected by FAA will be identified by the note: Not insp. This indicates that the airport information has been provided by the owner or operator of the field.

Airports serving Civil Aeronautics Board certified carriers and certified under FAR, Part 139, are indicated by the CFR index; i.e., CFR Index A, which relates to the availability of crash, fire, rescue equipment.

FAR—PART 139 CERTIFICATED AIRPORTS

INDICES AND FIRE FIGHTING AND RESCUE EQUIPMENT REQUIREMENTS

Airport Index	*Required No. Vehicles*	*Aircraft Length*	*Scheduled Departures*	*Agent + Water for Protein Foam*
A	1	≥90'	≤1	500#DC or 450#DC + 50 gal H²O
		>90', ≤125'	<5	300#DC + 500 gal H²O
B	2	>90', ≤125'	≤5	Index A + 1500 gal H²O
		>125', ≤160'	<5	
C	3	>125', ≤160'	≤5	Index A + 3000 gal H²O
		>160', ≤200'	<5	
D	3	>160', ≤200'	≤5	Index A + 4800 gal H²O
		>200'	<5	
E	3	>200'	≤5	Index A + 6000 gal H²O
Ltd.	Vehicle and capacity requirements for airports limited operating certificates are determined on a case by case basis.			

> Greater Than: < Less Than ≤Equal or Greater Than: ≥ Equal or Less Than; H²O—Water; DC—Dry Chemical.

NOTE: If AFFF (Aqueous Film Forming Foam) is used in lieu of Protein Foam, the water quantities listed for Indices A thru E can be reduced 33-1/3%.

(17) RUNWAY DATA

Runway information is shown on two lines. That information common to the entire runway is shown on the first line while information concerning the runway ends are shown on the second or following line. Lengthy information will be footnoted and placed in the Airport Remarks.
Runway direction, surface, length, width, weight bearing capacity, lighting, gradient (when gradient exceeds 0.3 percent) and appropriate remarks are shown for each runway. Direction, length, width, lighting and remarks are shown for sealanes.

DIRECTORY LEGEND

RUNWAY SURFACE AND LENGTH

Runway lengths prefixed by the letter "H" indicate that the runways are hard surfaced (concrete, asphalt). If the runway length is not prefixed, the surface is sold, clay, etc. The runway surface composition is indicated in parentheses after runway length as follows:

(ASPH)–Asphalt
(CONC)–Concrete
(DIRT)–Dirt
(GRVL)–Gravel, or cinders
(TURF)–Sod

The full dimensions of helipads are shown, i.e., 50X50.

RUNWAY WEIGHT BEARING CAPACITY

Runway strength data shown in this publication is derived from available information and is a realistic estimate of capability at an average level of activity. It is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights of 25-50% in excess of the published figures. Permissible operating weights, insofar as runway strengths are concerned, are a matter of agreement between the owner and user. When desiring to operate into any airport at weights in excess of those published in the publication, users should contact the airport management for permission. Add 000 to figure following S, D, DT, DDT and MAX for gross weight capacity:

S—Runway weight bearing capacity for aircraft with single-wheel type landing gear, (DC-3), etc.
D—Runway weight bearing capacity for aircraft with dual-wheel type landing gear, (DC-6),etc.
DT—Runway weight bearing capacity for aircraft with dual-tandem type landing gear, (707), etc.
DDT—Runway weight bearing capacity for aircraft with double dual-tandem type landing gear, (747), etc.

Quadricycle and dual-tandem are considered virtually equal for runway weight bearing consideration, as are single-tandem and dual-wheel.
Omission of weight bearing capacity indicates information unknown.

RUNWAY LIGHTING

Lights are in operation sunset to sunrise. Lighting available by prior arrangement only or operating part of the night only and/or pilot controlled and with specific operating hours are indicated under airport remarks as footnotes. Since obstructions are usually lighted, obstruction lighting is not included in this code. Unlighted obstructions on or surrounding an airport will be noted in airport remarks.
Temporary, emergency or limited runway edge lighting such as flares, smudge pots, lanterns or portable runway lights will also be shown in airport remarks, instead of being designated by code numbers.
Types of lighting are shown with the runway or runway end they serve.

LIRL—Low intensity Runway Lights
MIRL—Medium Intensity Runway Lights
HIRL—High Intensity Runway Lights
REIL—Runway End Identifier Lights
C/L—Centerline Lights
TDZ—Touchdown Zone Lights
ODALS—Omni Directional Approach Lighting System.
USAF OVRN—Air Force Overrun 1000' Standard Approach Lighting System.
LDIN—Lead-In Lighting System.
MALS—Medium Intensity Approach Lighting System.
MALSF—Medium Intensity Approach Lighting System with Sequenced Flasher Lights.
MALSR—Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights.
SALS—Short Approach Lighting System.
SALSF—Short Approach Lighting System with Sequenced Flashing Lights.
SSALS—Simplified Short Approach Lighting System.
SSALF—Simplified Short Approach Lighting System with Sequenced Flashing Lights.
SSALR—Simplified Short Approach Lighting System with Runway Alignment Indicator Lights.
ALSF1—High Intensity Approach Lighting System with Sequenced Flashing Lights, Category I, Configuration
ALSF2—High Intensity Approach Lighting System with Sequenced Flashing Lights, Category II, Configuration.
VASI—Visual Approach Slope Indicator Systems

VASI approach slope angle and TCH will be shown only when slope angle exceeds 3°

RUNWAY GRADIENT

Runway gradient will be shown only when it is 0.3 percent or more. When available the direction of slope upward will be indicated, i.e., 0.5% up NW.

RUNWAY END DATA

Lighting systems such as VASI, MALSR, REIL; obstructions; displaced thresholds will be shown on the specific runway end. "Rgt tfc"–Right traffic indicates right turns should be made on landing and takeoff for specified runway end.

(18) AIRPORT REMARKS

"Landing Fee" indicates landing charges for private or non-revenue producing aircraft, in addition, fees may be charged for planes that remain over a couple of hours and buy no services, or at major airline terminals for all aircraft.
Obstructions—Because of space limitations only the more prominent obstacles are indicated. Natural obstruction, such as trees, clearly discernible for contact operations are not included. On the other hand, all obstructions within at least a 20:1 approach ratio are indicated.
Remarks—Data is confined to operational items affecting the status and usability of the airport.

(19) COMMUNICATIONS

Communications will be listed in sequence in the order shown below:
Automatic Terminal Information Service (ATIS) and Private Aeronautical Stations (UNICOM) along with their frequency is shown, where available, on the line following the heading "COMMUNICATIONS".
Flight Service Station (FSS) information. The associated FSS will be shown followed by the identifier and information concerning availability of telephone service, e.g. Direct Line (DL). Local Call (LC), etc. Where the airport NOTAM File identifier is different then the associated FSS it will be shown as "NOTAM File DCA". Where the FSS is located

on the field it will be indicated as "on arpt" following the identifier. Frequencies available will follow. The FSS telephone number will follow along with any significant operational information. FSS's whose name is not the same as the airport on which located will also be listed in the normal alphabetical name listing for the state in which located. Limited Remote Communication Outlet (LRCO) or Remote Communications Outlet (RCO) providing service to the airport followed by the frequency and name of the Controlling FSS.

FSS's and CS/Ts provide information on airport conditions, radio aids and other facilities, and process flight plans. Airport Advisory Service is provided at the pilot's request on 123.6 or 123.65 by FSS's located at non-tower airports or when the tower is not in operation. (See AIM Part 1, ADVISORIES AT NON TOWER AIRPORTS.)

Aviation weather briefing service is provided by FSS's and CS/T's; however, CS/T personnel are not certified weather briefers and therefore provide only factual data from weather reports and forecasts. Flight and weather briefing services are also available by calling the telephone numbers listed.

Limited Remote Communications Outlet (LRCO)—Unmanned satellite air/ground communications facility, which may be associated with a VOR. These outlets effectively extend service range of the FSS and provide greater communications reliability.

Remote Communications Outlet (RCO)—An unmanned satellite air to ground communication stations remotely controlled and providing UHF and VHF communications capability to extend the service range of an FSS.

Civil communications frequencies used in the FSS air/ground system are now operated simplex on 122.0, 122.2, 122.3, 122.4, 122.6, 123.6; emergency 121.5; plus receive-only on 122.05, 122.1, 122.15 and 123.6.

a. 122.0 is assigned as the Enroute Flight Advisory Service channel at selected FSS's.

b. 122.2 is assigned to all FSS's as a common enroute simplex service.

c. 123.6 is assigned as the airport advisory channel at non-tower FSS locations, however, it is still in commission at some FSS's collocated with towers to provide part-time Airport Advisory Service.

d. 122.1 is the primary receive-only frequency at VORs. 122.05, 122.15 and 123.6 are assigned at selected VORs meeting certain criteria.

e. Some FSS's are assigned 50kHz channels for simplex operation in the 122-123 MHz band (e.g. 122.35). Pilots using the FSS A/G system should refer to this directory or appropriate charts to determine frequencies available at the FSS or remoted facility through which they wish to communicate.

Part time FSS hours of operation are shown in remarks under facility name.

Emergency frequency 121.5 is available at all Flight Service Stations, Towers, Approach Control and RADAR facilities, unless indicated as not available.

TERMINAL SERVICES

ATIS—A continuous broadcast of recorded non-control information in selected areas of high activity.

UNICOM—A non-government air/ground radio communications facility utilized to provide general airport advisory service.

APP CON—Approach Control. The symbol Ⓡ indicates radar approach control.

TOWER—Control tower

GND CON—Ground Control

DEP CON—Departure Control. The symbol Ⓡ indicates radar departure control.

CLNC DEL—Clearance Delivery.

VFR ADVSY SVC—VFR Advisory Service. Service provided by Non-Radar Approach Control.

STAGE I SVC—Radar Advisory Service for VFR aircraft

STAGE II SVC—Radar Advisory and Sequencing Service for VFR aircraft

STAGE III SVC—Radar Sequencing and Separation Service for participating VFR Aircraft within a Terminal Radar Service Area (TRSA)

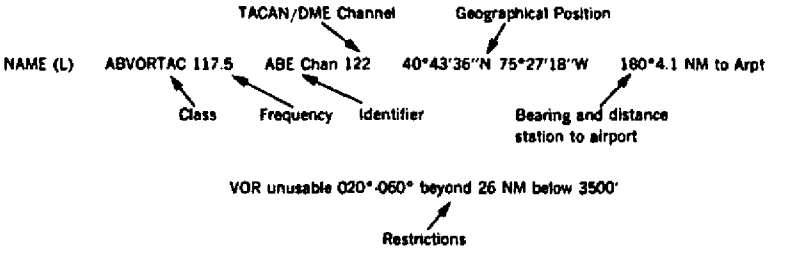
TCA—Radar Sequencing and Separation Service for all aircraft in a Terminal Control Area (TCA)

(20) RADIO AIDS TO NAVIGATION

The Airport/Facility Directory lists by facility name all Radio Aids to Navigation in the National Airspace System and those upon which the FAA has approved an instrument approach. Private or military Radio Aids to Navigation not in the National Airspace System are not tabulated.

All VOR, VORTAC and ILS equipment in the National Airspace System has an automatic monitoring and shutdown feature in the event of malfunction. Unmonitored as used in the publication means that FSS or tower personnel cannot observe the malfunction or shutdown signal.

NAVAID information is tabulated as indicated in the following sample:



ASR—indicates that civil radar instrument approach minimums are published.

DIRECTORY LEGEND

RADIO CLASS DESIGNATIONS

Identification of VOR/VORTAC/TACAN Stations by Class (Operational Limitations):

Normal Usable Altitudes and Radius Distances

Class	Altitudes	Distance (miles)
(T)	12,000' and below	25
(L)	Below 18,000'	40
(H)	Below 18,000'	40
(H)	Within the Conterminous 48 States only, between 14,500' and 17,999'	100
(H)	18,000'-FL 450	130
(H)	Above FL 450	100

(H) = High (L) = Low (T) = Terminal

NOTE: An (H) facility is capable of providing (L) and (T) service volume and an (L) facility additionally provides (T) service volume.

The term VOR is, operationally, a general term covering the VHF omnidirectional bearing type of facility without regard to the fact that the power, the frequency-protected service volume, the equipment configuration, and operational requirements may vary between facilities at different locations.

AB — Automatic Weather Broadcast (also shown with a following frequency.)
B — Scheduled Broadcast Station (broadcasts weather at 15 minutes after the hour.)
DF — Direction Finding Service.
DME — UHF standard (TACAN compatible) distance measuring equipment.
H — Non-directional radio beacon (homing), power 50 watts to less than 2,000 watts.
HH — Non-directional radio beacon (homing), power 2,000 watts or more.
H-SAB — Non-directional radio beacons providing automatic transcribed weather service.
ILS — Instrument Landing System (voice, where available, on localizer channel).
LDA — Localizer Directional Aid.
LMM — Compass locator station when installed at middle marker site.
LOM — Compass locator station when installed at outer marker site.
MH — Non-directional radio beacon (homing) power less than 50 watts.
S — Simultaneous range homing signal and/or voice.
SABH — Non-directional radio beacon not authorized for IFR or ATC. Provides automatic weather broadcasts.
SDF — Simplified Direction Facility.
TACAN — UHF navigational facility-omnidirectional course and distance information.
VOR — VHF navigational facility-omnidirectional course only.
VOR/DME — Collocated VOR navigational facility and UHF standard distance measuring equipment.
VORTAC — Collocated VOR and TACAN navigational facilities.
W — Without voice on radio facility frequency.
Z — VHF station on location marker at a LF radio facility.

(21) COMM/NAVAID REMARKS:

Pertinent remarks concerning communications and NAVAIDS.

DIRECTORY LEGEND

ABBREVIATIONS

The following abbreviations are those commonly used within this Directory. Other abbreviations may be found in the Legend and are not duplicated below.

acft	aircraft	ldg	landing
apch	approach	med	medium
arpt	airport	ngt	night
avbl	available	ntc	notice
bcn	beacon	opr	operate
blo	below	ops	operates operation
byd	beyond	ovrn	overrun
ctc	contact	p-line	power line
dalgt	daylight	req	request
dspic	displace	rqr	requires
dspicd	displaced	rgt tfc	right traffic
emerg	emergency	rwy	runway
fld	field	svc	service
ints	intensity	tkf	take off
lgtd	lighted	tfc	traffic
lgts	lights	thld	threshold

BASIC GROUND INSTRUCTOR

Written Test Guide

1980

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AC 143-3 BASIC GROUND INSTRUCTOR WRITTEN TEST GUIDE 1980

BASIC
GROUND INSTRUCTOR

WRITTEN TEST GUIDE

1980

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
OFFICE OF FLIGHT OPERATIONS

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

PREFACE

The Federal Aviation Administration has developed this guide to help applicants prepare for the Basic Ground Instructor Written Test. It cancels AC 143-1E, Ground Instructor Written Test Guide, Basic-Advanced, dated 1976.

This guide outlines the aeronautical knowledge requirements for a Basic Ground Instructor, informs the applicant of source material that can be used to acquire this knowledge, and includes test items and illustrations representative of those used in the FAA Basic Ground Instructor Written Test.

The test items in this guide are based on regulations, principles, and practices that were current at the time this publication was printed. Test items in the FAA written tests are updated as the need arises, consequently, FAA written test items may vary from those contained in this guide.

The FAA does not supply the correct answers to questions included in this guide. Students should determine the answers by research and study, by working with instructors, or by attending ground schools. The FAA is not responsible for the contents of commercial reprints of this publication nor the accuracy of answers they may list.

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

BASIC GROUND INSTRUCTOR WRITTEN TEST GUIDE

INTRODUCTION

THE ROLE OF THE GROUND 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.

How does one become a skilled and effective ground 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 ground instructors become so through study, training, experience, and conscientious effort. Probably more than any other single factor, the ground instructor's own attitude toward ground instruction determines how well the job of teaching is done.

The ground instructor must, of course, be fully qualified. Qualifications go far beyond those required for certification, however, if success as a professional ground instructor is to be achieved.

The instructor must have 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 ground 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 to retain that knowledge.

The ground 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. Obviously, to responsibly answer such questions, or resolve related problems, the ground instructor should have sound knowledge of the various aviation subjects.

Even after the new ground instructor has gained the basic knowledge 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 ground 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 ground instructor will be starting a personal aeronautical library that will be useful throughout a teaching career in aviation.

GROUND INSTRUCTOR CERTIFICATION

Required Tests

To be certificated as a Basic Ground Instructor, the applicant must pass the FAA's Fundamentals of Instructing (FOI) and the Basic Ground Instructor Written Test. However, if an applicant already holds a valid FAA Ground or Flight 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.

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

The Basic Ground Instructor written 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.

TYPE OF TEST QUESTIONS

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 judgement 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.

The Basic Ground Instructor Written Test contains 80 test items and 4 hours are allowed for completing this test.

Taking The Test

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.

The applicant taking the Basic Ground Instructor Written Test will be supplied a question book containing several hundred questions, a question selection sheet which indicates the specific questions to be answered, and an Airman Written Test Application (AC Form 8080-3) which contains the answer sheet.

To familiarize you with the procedures for taking the official FAA written test, samples of the General Instructions, Written Test Application, Question Selection Sheet, and answer sheet are provided in this guide.

Also included in this guide are questions which are representative of those in the official BGI question book.

Applicants are encouraged to adhere to the following guidelines when taking the test:

1. Answer only the 80 questions whose numbers appear on your question selection sheet.

2. 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.

3. Carefully read the entire test item, statement, or question before selecting an answer. Skimming and hasty assumptions can lead to a completely erroneous interpretation of 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.

4. Only one of the listed answers given is completely correct. The others may be the result of 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.

5. 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.

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.

The written tests are administered by FAA-General Aviation District Offices (GADO), Flight Standards District Offices (FSDO), and some Air Carrier District Offices (ACDO). In addition, certain designated individuals, some associated with privately owned organizations, have been given the authority to administer the FAA written tests.

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. 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, audiovisual 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. The FAA issues Advisory Circulars to inform the aviation public in a systematic way of nonregulatory material of interest. Many of the study materials in this guide are issued as Advisory Circulars. Before ordering any FAA publication, it is advisable to obtain a copy of:

AC 00-2 (latest revision) -- Advisory Circular Checklist.

AC 00-2 includes the most current prices on the FAA publications which are cost items, information regarding their availability, and instructions for ordering them from the Superintendent of Documents. All free advisory circulars are also listed in the Advisory Circular Checklist. To obtain a free copy of AC 00-2, send the request to:

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

AVIATION INSTRUCTOR'S HANDBOOK, AC 60-14. SN 050-011-00072-1. The objective of this handbook is to provide aviation instructors with comprehensive, accurate, and easily understood information about learning and teaching, and to relate this information to their task of conveying aeronautical knowledge and skill to students.

PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE. AC 61-23A. SN 050-011-00051-8. Contains authoritative information used in training pilots, and most subject areas in which an applicant may be tested. This publication is in the process of being revised.

FLIGHT TRAINING HANDBOOK, AC 61-21A. SN 050-007-00504-1. 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.

PRIVATE PILOT-AIRPLANE WRITTEN TEST GUIDE, AC 61-32C. SN 050-011-00075-5. Provides information, guidelines, and includes representative test items used in FAA written tests to assist applicants for the Private Pilot Certificate in attaining necessary aeronautical knowledge.

COMMERCIAL PILOT-AIRPLANE WRITTEN TEST GUIDE, AC 61-71B. SN 050-007-00482-6. Reflects current operating procedures and techniques for use of applicants in preparing for the Commercial Pilot-Airplane Written Test.

FLIGHT INSTRUCTOR-AIRPLANE WRITTEN TEST GUIDE, AC 61-72B. SN 050-007-00501-6. Outlines the aeronautical knowledge requirements for certification as an airplane flight instructor, outlines source material for study, and includes representative test items used in FAA written tests.

AVIATION WEATHER, AC 00-6A. 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 00-45A. SN 050-007-00392-7. 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.

MEDICAL HANDBOOK FOR PILOTS, AC 67-2. 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.

PILOT'S WEIGHT AND BALANCE HANDBOOK, AC 91-23A. SN 050-007-00405-2. 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 from FAA upon request.

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

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 Federal Aviation Regulations, AC 00-44 (latest revision)." The status list is free upon request.

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.

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

Part 61, Certification: Pilots and Flight Instructors.

Part 71, Designation of Federal Airways, Area Low Routes, Controlled Airspace and Reporting Points.

Part 91, General Operating and Flight Rules.

Part 141, Pilot Schools.

Part 143, Ground Instructors.

FLIGHT INFORMATION/OPERATIONAL PUBLICATIONS

AIRMAN'S INFORMATION MANUAL (AIM): BASIC FLIGHT INFORMATION AND ATC PROCEDURES. This manual is designed to provide airmen with basic flight information and ATC procedures for use in the National Airspace System (NAS) of the U.S. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the Air Traffic Control System, and information on safety, accident and hazard reporting. (Subscription, Supt. Docs.) TD 4.12: Pt. 1/.

This manual is complemented by other operational publications which are available upon separate subscription. These publications are:

GRAPHIC NOTICES AND SUPPLEMENTAL DATA -- A publication containing a tabulation of Parachute Jump Areas; Special Notice Area Graphics; Terminal Area Graphics; Terminal Radar Service Area (TRSA) Graphics; and other data, as required, not subject to frequent change. This publication is issued quarterly. (Subscription, Supt. Docs.) TD 4.12: Pt. 4/.

NOTICES TO AIRMEN (Class II) -- A publication containing current Notices to Airmen (NOTAMs) which are considered essential to the safety of flight as well as supplemental data affecting the other operational publications listed here. This publication is issued every 14 days. (Subscription, Supt. Docs.) TD 4.12/2:

AIRPORT/FACILITY DIRECTORY, ALASKA SUPPLEMENT, PACIFIC SUPPLEMENT -- These publications contain information on airports, communications, navigational aids, instrument landing systems, VOR receiver checkpoints, FSS/Weather Service telephone numbers, and various other pertinent special notices. These publications are available upon subscription from the National Ocean Survey (NOS), Distribution Division (C-44), Riverdale, Maryland 20840.

NATIONAL TRANSPORTATION SAFETY BOARD, PART 830--RULES PERTAINING TO THE NOTIFICATION AND REPORTING OF AIRCRAFT ACCIDENTS OR INCIDENTS AND OVERDUE AIRCRAFT, AND PRESERVATION OF AIRCRAFT WRECKAGE, MAIL, CARGO, AND RECORDS. This publication is free upon request from the National Transportation Safety Board, Publications Branch, Washington, D.C. 20594.

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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.

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EXCERPTS OF FEDERAL AVIATION REGULATIONS

Part 61—Certification: Pilots and Flight Instructors

Subpart A—General

§ 61.1 Applicability.

(a) This Part prescribes the requirements for issuing pilot and flight instructor certificates and ratings, the conditions under which those certificates and ratings are necessary, and the privileges and limitations of those certificates and ratings.

* * * * * *

§ 61.3 Requirements for certificates, rating, and authorizations.

* * * * * *

(d) *Flight instructor certificate.* Except for lighter-than-air flight instruction in lighter-than-air aircraft, and for instruction in air transportation service given by the holder of an Airline Transport Pilot Certificate under § 61.169, no person other than the holder of a flight instructor certificate issued by the Administrator with an appropriate rating on that certificate may—

(1) Give any of the flight instruction required to qualify for a solo flight, solo cross-country flight, or for the issue of a pilot or flight instructor certificate or rating;

(2) Endorse a pilot logbook to show that he has given any flight instruction; or

(3) Endorse a student pilot certificate or logbook for solo operating privileges.

* * * * * *

§ 61.5 Certificates and ratings issued under this Part.

(a) The following certificates are issued under this Part:

(1) Pilots certificates:
- (i) Student pilot.
- (ii) Private pilot.
- (iii) Commercial pilot.
- (iv) Airline transport pilot.

(2) Flight instructor certificates.

* * * * * *

(c) The following ratings are placed on flight instructor certificates where applicable:

(1) Aircraft category ratings:
- (i) Airplane.
- (ii) Rotorcraft.
- (iii) Glider.

(2) Airplane class ratings:
- [(i) Single-engine.
- [(ii) Multiengine.]

(3) Rotorcraft class ratings:
- (i) Helicopter.
- (ii) Gyroplane.

(4) Instrument ratings:
- (i) Instrument—airplane.
- (ii) Instrument—helicopter.

* * * * * *

§ 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.

* * * * * *

§ 61.37 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;

(2) Give to another, or receive from another, any part of copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(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 whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefor, under this chapter for a period of one year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

§ 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;

(4) Except for a flight test for an airline transport pilot certificate, meet the age requirement for the issuance of the certificate or rating he seeks; and

(5) Have a written statement from an appropriately certificated flight instructor certifying that he has given the applicant flight instruction in preparation for the flight test within 60 days preceding the date of application, and finds him competent to pass the test and to have satisfactory knowledge of the subject areas in which he is shown to be deficient by his FAA airman written test report. However, an applicant need not have this written statement if he—

(i) Holds a foreign pilot license issued by a contracting State to the Convention on International Civil Aviation that authorizes at least the pilot privileges of the airman certificate sought by him;

(ii) Is applying for a type rating only, or a class rating with an associated type rating; or

§ 61.49 Retesting after failure.

An applicant for a written or flight test who fails that test may not apply for retesting until after 30 days after the date he failed the test. However, in the case of his first failure he may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that he has given flight or ground instruction as appropriate to the applicant and finds him competent to pass the test.

Excerpts

Subpart D—Private Pilots

Excerpts

§ 61.101 Applicability.

This subpart prescribes the requirements for the issuance of private pilot certificates and ratings, the conditions under which those certificates and ratings are necessary, and the general operating rules for the holders of those certificates and ratings.

§ 61.103 Eligibility requirements: general.

To be eligible for a private pilot certificate, a person must—

(a) Be at least 17 years of age, except that a private pilot certificate with a free balloon or a glider rating only may be issued to a qualified applicant who is at least 16 years of age;

(b) Be able to read, speak, and understand the English language, or have such operating limitations placed on his pilot certificate as are necessary for the safe operation of aircraft, to be removed when he shows that he can read, speak, and understand the English language;

(c) Hold at least a current third-class medical certificate issued under Part 67 of this chapter, or, in the case of a glider or free balloon rating, certify that he has no known medical defect that makes him unable to pilot a glider or free balloon, as appropriate;

(d) Pass a written test on the subject areas on which instruction or home study is required by § 61.105;

(e) Pass an oral and flight test on procedures and maneuvers selected by an FAA inspector or examiner to determine the applicant's competency in the flight operations on which instruction is required by the flight proficiency provisions of § 61.107; and

(f) Comply with the sections of this Part that apply to the rating he seeks.

§ 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.

(b) *Rotorcraft.*

(1) The accident reporting requirements of the National Transportation Safety Board and the Federal Aviation Regulations applicable to private pilot privileges, limitations, and helicopter or gyroplane operations, as appropriate;

(2) The use of aeronautical charts and the magnetic compass for pilotage, and elementary dead reckoning, and the use of radio aids;

(3) 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 helicopters or gyroplanes, as appropriate, including high density airport operations.

(c) *Gliders.*

(1) The accident reporting requirements of the National Transportation Safety Board and the Federal Aviation Regulations applicable to glider pilot privileges, limitations, and flight operations;

(2) Glider navigation, including the use of aeronautical charts and the magnetic compass;

(3) Recognition of weather situations of concern to the glider pilot, and the procurement and use of aeronautical weather reports

and forecasts; and

Excerpts

(4) The safe and efficient operation of gliders, including ground and aero tow procedures, signals, and safety precautions.

* * * * * *

Subpart E—Commercial Pilots

§ 61.121 Applicability.

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

§ 61.123 Eligibility requirements: general

To be eligible for a commercial pilot certificate, a person must—

(a) Be at least 18 years of age;

[(b) Be able to read, speak, and understand the English language, or have such operating limitations placed on his pilot certificate as are necessary for safety, to be removed when he shows that he can read, speak, and understand the English language;]

(c) Hold at least a valid second-class medical certificate issued under Part 67 of this chapter, or, in the case of a glider or free balloon rating, certify that he has no known medical deficiency that makes him unable to pilot a glider or a free balloon, as appropriate;

(d) Pass a written examination appropriate to the aircraft rating sought on the subjects in which ground instruction is required by § 61.125;

(e) Pass an oral and flight test appropriate to the rating he seeks, covering items selected by the inspector or examiner from those on which training is required by § 61.127; and

(f) Comply with the provisions of this subpart which apply to the rating he seeks.

§ 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.

(b) *Rotorcraft.*

(1) The regulations of this chapter which apply to the operations, privileges, and limitations of a commercial rotorcraft pilot, and the accident reporting requirements of the National Transportation Safety Board;

(2) Meteorology, including the characteristics of air masses and fronts, elements of weather forecasting, and the procurement and use of aeronautical weather reports and forecasts;

(3) The use of aeronautical charts and the magnetic compass for pilotage and dead reckoning, and the use of radio aids for VFR navigation; and

(4) The safe and efficient operation of helicopters or gyroplanes, as appropriate to the rating sought.

(c) *Gliders.*

(1) The regulations of this chapter pertinent to commercial glider pilot operations, privilege, and limitations, and the accident reporting requirements of the National Transportation Safety Board;

(2) Glider navigation, including the use of aeronautical charts and the magnetic compass, and radio orientation;

(3) The recognition of weather situations of concern to the glider pilot 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 gliders, including ground and aero tow pro-

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cedures, signals, critical sailplane performance speeds, and safety precautions.

* * * * * *

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.

●●●●●

Excerpts

Part 143—Ground Instructors

Excerpts

§ 143.1 Applicability.

This Part prescribes the requirements for issuing ground instructor certificates and associated ratings and the general operating rules for the holders of those certificates and ratings.

§ 143.3 Application and issue.

(a) An application for a certificate and rating, or for an additional rating, under this Part, is made on a form and in a manner prescribed by the Administrator. However, a person whose ground instructor certificate has been revoked may not apply for a new certificate for a period of one year after the effective date of the revocation unless the order of revocation provides otherwise.

(b) An applicant who meets the requirements of this Part is entitled to an appropriate certificate with ratings naming the ground school subjects that he is authorized to teach.

(c) Unless authorized by the Administrator, a person whose ground instructor certificate is suspended may not apply for any rating to be added to that certificate during the period of suspension.

(d) Unless the order of revocation provides otherwise, a person whose ground instructor certificate is revoked may not apply for any ground instructor certificate for one year after the date of revocation.

* * * * * *

§ 143.9 Eligibility requirements: general.

To be eligible for a certificate under this Part, a person must be at least 18 years of age, be of good moral character, and comply with § 143.11.

§ 143.11 Knowledge requirements.

Each applicant for a ground instructor certificate must show his practical and theoretical knowledge of the subject for which he seeks a rating by passing a written test on that subject.

* * * * * *

§ 143.15 Tests: general procedures.

(a) Tests prescribed by or under this Part are given at times and places, and by persons, designated by the Administrator.

(b) The minimum passing grade for each test is 70 percent.

§ 143.17 Retesting after failure.

An applicant for a ground instructor rating who fails a test under this Part may apply for retesting—

(a) After 30 days after the date he failed that test; or

(b) Upon presenting a statement from a certificated ground instructor, rated for the subject of the test failed, certifying that he has given the applicant at least five hours additional instruction in that subject and now considers that he can pass the test.

* * * * * *

STUDY OUTLINE

BASIC GROUND INSTRUCTOR 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, Title 14, Code of Federal Regulations (CFR).

I. FEDERAL AVIATION REGULATIONS

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

1. Airport traffic area
2. Ceiling
3. Flight time
4. Flight visibility
5. Pilot in command
6. Federal airway
7. Controlled area
8. Continental control area
9. Control zone
10. Terminal control area
11. 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. Preflight action
3. Careless or reckless operation
4. Liquor and drugs
5. Dropping objects
6. Fastening of safety belts
7. Parachutes and parachuting

8. Portable electronic devices
9. ATC transponder equipment requirements
10. Civil aircraft: certificates required
11. Aircraft airworthiness
12. Towing gliders and other objects
13. Pilot in command/more than one pilot
14. Flight instruction: simulated instruments
15. Flight crewmembers at stations
16. Carriage of narcotic drugs
17. Altitude alerting system or device
18. Aircraft operating limitations/markings
19. Supplemental oxygen
20. Instrument and equipment requirements
21. Limited/restricted aircraft limitations
22. Emergency locator transmitters (ELT)

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

1. Waivers
2. Operating near other aircraft
3. Right-of-way rules
4. Aircraft speed restrictions
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. Operating--in vicinity of airport
13. Operation--airport with control tower
14. Operation--airport without control tower
15. Flight in terminal control areas (TCA)
16. Temporary flight restrictions
17. Flight test areas
18. Restricted and prohibited areas
19. Positive control areas; route segments
20. Operations to/over Cuba
21. Basic VFR weather minimums
22. Special VFR weather minimums
23. VFR cruising altitude or flight level

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

II. TITLE 49--TRANSPORTATION, 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 and General Operating Rules.
F. Series 140--Schools and Other Certificated Agencies.
G. Series 170--Navigational Facilities.

IV. FLIGHT INFORMATION/OPERATIONAL PUBLICATIONS

A. AIM--Basic Flight Information and ATC Procedures.

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

B. Graphic Notices and Supplemental Data

1. Parachute jumping areas
2. Military training routes
3. Special operations-military refueling, tracks and areas
4. Terminal area graphic notices
5. Terminal radar service areas (TRSAs)

C. Notices to Airmen (NOTAMS)

1. Specials

D. Airport/Facility Directory

1. Airport/heliport data/seaplane bases
2. VOR receiver checkpoints
3. FSS-CS/T and national weather service telephone numbers
4. Aeronautical chart bulletin
5. Special notices

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.

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2. Aerotitis
3. Aerosinusitis

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

1. Hypoxia
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D. Self Imposed Stress.

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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.

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   a. Flight factors contributing to sensory illusions
   b. Flight factors contributing to visual illusions
   c. Combating sensory illusions

F. Principles and Problems of Vision.

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3. Night vision

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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.

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2. Vertical structure
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B. Temperature

1. Temperature measurement
2. Heat and temperature
3. Temperature aloft
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
4. 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. Air Masses.

1. Source regions
2. Classification of air masses
3. Air mass modification
4. Summer and winter air mass 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. Obstructions to Vision.

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 office
3. Service outlets
4. Users

O. Weather Observations.

1. Surface weather observations
2. Pilot weather 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 charts

Q. Aviation Weather Forecasts.

1. Terminal forecasts (FT)
2. Area forecasts (FA)
3. Winds & temperatures aloft forecasts (FD)
4. TWEB route forecasts and synopses
5. In-flight weather advisories (WA, WS, WST)
6. Severe weather outlooks
7. Severe weather forecasts
8. Surface analyses and prognoses

R. Services to Pilots.

1. FSS briefing
2. Automatic terminal information service (ATIS)
3. Pilot's automatic telephone weather answering service (PATWAS)
4. Transcribed weather broadcasts (TWEB)
5. En route flight advisory service
6. Scheduled weather broadcasts

S. Determining Cloud-Height From Reports.

T. Information in a Weather Briefing.

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. Landing charts
6. Stall speed charts
7. Airspeed correction charts
8. Computing density/pressure altitudes
9. Effect of density altitude on performance
10. Critical performance speeds -- "V" speeds
11. Effect of wind and shear on aircraft performance
12. Bank/speed versus rate/radius of turns
13. Stall speed versus altitude or attitude
14. Stall speed versus indicated/true airspeed
15. Obstacle clearance takeoff/landing
16. Best angle-/rate-of-climb
17. Computations of gross weight/ useful load
18. Computation of center of gravity

VIII. ENGINE OPERATION

A. General.

1. Reciprocating engine principles
2. Carburetion principles
3. Carburetor/fuel injection principles
4. Carburetor heat effect on mixture
5. Lubrication systems
6. Electrical systems/units
7. Ignition systems/units

8. Fuel 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/preignition 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

IX. NAVIGATION

A. General.

1. Sectional chart interpretation
   a. Topographic information
   b. Symbols/obstruction heights/ elevations
   c. Relief
   d. Aeronautical data
   e. Navigation aids
   f. Controlled airspace and special use airspace markings
2. Time zones and 24-hour system

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/Navigation Computer Principles.

1. True course and groundspeed
2. True heading and groundspeed
3. Magnetic heading and groundspeed
4. True course and true airspeed
5. Time, speed, distance, fuel consumed
6. Density altitude
7. Conversions-temperatures, speeds, distances, altitudes

E. 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 interpretation/orientation
14. Intercepting ADF bearings
15. Tracking ADF bearings or "homing"
16. Nondirectional radiobeacons
17. Distance measuring equipment
18. Transponder use
19. Emergency locator beacons (ELT)
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. Pressures 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/centripetal

F. Flight Controls/Axes of an Airplane.

G. Lift/Drag During Turns.

1. Angle of attack
2. Adverse yaw/aileron drag

H. Lift Versus Angle of Attack.

I. Lift/Thrust Versus Air Density.

J. Types/Effect of Flaps, Spoilers.

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/Torque Effect.

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

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. Pitot/Static Systems/Instruments.

H. Magnetic Compass Operation/Errors.

I. Altimeter Setting Procedure/Significance.

J. Pressure Altitude Significance/Obtaining.

K. 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. Use of Proper Communications Frequencies.

XIII. MANEUVERING BY INSTRUMENTS

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. Magnetic Compass Turns.

G. Effect of Changes in Airspeed.

H. False Sensations in Flight.

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: Sample

- ★ **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.
11/29/79	Basic Ground Instructor	757805

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

NAME (LAST, FIRST, MIDDLE): Doe, John R.

DATE OF BIRTH (MONTH / DAY / YEAR): 03 / 16 / 53

MAILING ADDRESS NO. AND STREET, APT. #, P.O. BOX, OR RURAL ROUTE: 1575 South 18th Street

DESCRIPTION

HEIGHT	WEIGHT	HAIR	EYES
70"	160	Br	Br

CITY, TOWN OR POST OFFICE, AND STATE: Pine Bluff, Arkansas

ZIP CODE: 71601

BIRTHPLACE (City and State, or foreign country): Louisville, Ky

CITIZENSHIP: U.S.A.

SOCIAL SECURITY NO.: 411 23 2677

IF A SOCIAL SECURITY NUMBER HAS NEVER BEEN ISSUED CHECK THIS BLOCK →

Is this a retest? [X] No [ ] Yes, date of last test

Have you taken or are you taking an FAA approved course for this test? [ ] No [X] Yes (If "yes" give details below)

Graduation date: NAME OF SCHOOL: Seneca Flying Service CITY AND STATE: Little Rock, Ark.

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: John R. Doe

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

Applicant's identity established by: Driver's License

FIELD OFFICE DESIGNATION: 2-06

SIGNATURE of FAA Representative: James R. Jones

CARD A											CARD B				
CATEGORY	TEST NUMBER	TAKE NO.	SECTIONS 1	2	3	4	5	6	7	EXPIRATION MONTH	DAY	YEAR	CERTIFICATED SCHOOL NUMBER	MECH. EXP. DATE BY SECTION 1	2	3	ID

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, open 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 response with a slash (/). Questions are arranged in VERTICAL sequence as indicated by the arrows.

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

Sample

DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

BGI-1A

USE WITH QUESTION BOOK BGI-1.

TITLE

Basic Ground Instructor

TEST NO. 757805

NAME John R. Doe

NOTE: IT IS PERMISSIBLE TO MARK ON THIS SHEET

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	21	312	41	458	61	556
2	207	22	316	42	460	62	560
3	209	23	323	43	469	63	562
4	213	24	334	44	479	64	564
5	218	25	345	45	483	65	572
6	223	26	347	46	493	66	581
7	226	27	360	47	501	67	585
8	237	28	366		504	68	593
9	242	29	Sample		508	69	595
10	249	30	3	50	509	70	606
11	254	31	388	51	518	71	611
12	256	32	400	52	525	72	618
13	258	33	417	53	530	73	620
14	268	34	424	54	534	74	621
15	275	35	435	55	536	75	622
16	277	36	441	56	538	76	625
17	285	37	443	57	541	77	630
18	292	38	446	58	545	78	633
19	294	39	452	59	553	79	636
20	304	40	455	60	555	80	638

FOR OFFICIAL USE ONLY

WRITTEN TEST SUBJECT MATTER CODES

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
FLIGHT AND GROUND INSTRUCTOR KNOWLEDGE
Written Test Subject Matter Codes

Excerpts

42 A

USE ONLY TO IDENTIFY CODES, not as study outline, since all certificate and rating areas are combined. To determine the subject areas you missed, compare subject matter codes on your Airman Written Test Report, with coded items on this list. The total number of questions you missed is NOT reflected by the number of subject matter codes shown on the test report, since ONE OR MORE questions may have been asked in each item.

FEDERAL AVIATION REGULATIONS

PARTS 1; 71: DEFINITIONS/CONTROLLED AIRSPACE

A01 - Air commerce
A02 - Airport traffic area
A03 - Ceiling
A04 - Commercial operator
A05 - Flight level
A06 - Flight visibility
A07 - Interstate air commerce
A08 - Large aircraft
A09 - DH, MCA, MDA, MEA, MOCA, MRA, RVR
A10 - Major alteration
A11 - Major repair
A12 - Pilot in command
A13 - Second in command
A14 - Federal airway
A15 - Control area
A16 - Continental control area
A17 - Control zone
A18 - Route segment
A19 - Terminal control area
A20 - Positive control area

PART 61: CERTIFICATION: PILOTS/FLIGHT INSTRUCTORS

B01 - Required certificates/ratings
B02 - Certificates and ratings issued
B03 - Expired pilot certificates/reissuance
B04 - Carriage of narcotic drugs/marihuana
B05 - Duration of pilot certificates
B06 - Duration of medical certificates
B07 - General limitations
B08 - Pilot logbooks
B09 - Operations during medical deficiency
B10 - Second in command qualifications
B11 - Recent experience: Pilot in command
B12 - Pilot in command proficiency check
B13 - Falsification, reproduction, alteration
B14 - Change of address
B15 - Glider towing: experience/instruction
B16 - Private pilot privileges/limitations
B17 - Commercial pilot privileges/limitations
B18 - Instrument rating requirements

PART 91: GENERAL OPERATING RULES-SUBPART A

C01 - Responsibility of pilot in command
C02 - Pilot in command - more than one pilot
C03 - Preflight action
C04 - Flight crewmembers at stations
C05 - Interference with crewmembers
C06 - Careless or reckless operation
C07 - Liquor and drugs
C08 - Flights between Mexico/United States
C09 - Dropping objects
C10 - Fastening of safety belts
C11 - Parachutes and parachuting
C12 - Towing: gliders or other than gliders
C13 - Portable electronic devices
C14 - Simulated instrument and flight tests
C15 - ATC transponder equipment requirements
C16 - VOR equipment check for IFR operations
C17 - Fuel requirements - IFR conditions
C18 - Civil aircraft: certificates required
C19 - Special authorizations - foreign aircraft
C20 - Aircraft airworthiness
C21 - Aircraft operating limitations/markings
C22 - Supplemental oxygen
C23 - Instrument and equipment requirements
C24 - Flight recorders; cockpit voice recorders
C25 - Automatically reported altitude/pilot's reference
C26 - Transport airplane weight limitation
C27 - Maximum weights for airplanes in Alaska
C28 - Limited/restricted aircraft limitations
C29 - Experimental aircraft limitations
C30 - Special rules for foreign civil aircraft
C31 - Ferry flight with one engine inoperative
C32 - Emergency exits for airplanes
C33 - Aural speed warning device
C34 - Altitude alerting system or device
C35 - Emergency locator transmitters
C36 - Report: aircraft identification/activity

PART 91: GENERAL FLIGHT RULES-SUBPART B

D01 - Waivers
D02 - Operating near other aircraft
D03 - Right-of-way rules
D04 - Aircraft speed
D05 - Acrobatic flight
D06 - Aircraft lights
D07 - Complying - ATC clearances/instructions
D08 - ATC light signals
D09 - Minimum safe altitudes; general
D10 - Altimeter settings
D11 - Flight plan; information required
D12 - Operation - in vicinity of airport
D13 - Operation - airport with control tower
D14 - Operation - airport without tower
D15 - Flight in terminal control areas
D16 - Temporary flight restrictions
D17 - Flight test areas
D18 - Restricted and prohibited areas
D19 - Positive control areas; route segments
D20 - Jet advisory areas
D21 - Operations to, or over, Cuba
D22 - Flight limitation - space flight recovery
D23 - Operation: aircraft of Cuban registry
D24 - Flight restriction - Presidential/parties
D25 - Basic VFR weather minimums
D26 - Special VFR weather minimums
D27 - VFR cruising altitude or flight level
D28 - ATC clearance/flight plan required (IFR)
D29 - Takeoff/landing under IFR
D30 - Limitations-instrument approach procedure
D31 - Minimum altitudes for IFR operations
D32 - IFR cruising altitude/flight level
D33 - Course to be flown (IFR)
D34 - IFR radio communications
D35 - IFR two-way communications failure
D36 - Malfunction reports (IFR)
D37 - ATC transponder test/inspection

Written Test Subject Matter Codes (Continued) Excerpts

PART 91: MAINTENANCE, PREVENTATIVE MAINTENANCE, AND ALTERATIONS-SUBPART C
E01 - General maintenance and alterations
E02 - Maintenance required
E03 - Carrying persons after repair/alteration
E04 - Inspections/progressive inspection
E05 - Altimeter system tests/inspections
E06 - Maintenance records/transfer of records
E07 - Rebuilt engine maintenance records
E08 - ATC transponder test/inspection

PART 91: LARGE AND TURBINE-POWERED MULTIENGINE AIRPLANES-SUBPART D
F01 - Applicability
F02 - Flying equipment/operating information
F03 - Familiarity with operating limitations and emergency equipment
F04 - Equipment - over-the-top/night VFR
F05 - Survival equipment/overwater operations
F06 - Radio equipment/overwater operations
F07 - Emergency equipment
F08 - Flight altitude rules
F09 - Smoking and safety belt signs
F10 - Passenger briefing
F11 - Carry-on baggage
F12 - Carriage of cargo
F13 - VFR fuel requirements
F14 - Operating in icing conditions
F15 - Flight engineer requirements
F16 - Second in command requirements
F17 - Flight attendant requirements
F18 - Inspection program

PART 135: AIR TAXI OPERATORS AND COMMERCIAL OPERATORS OF SMALL AIRCRAFT
G01 - Subpart A - General
G02 - Subpart B - Rules-ATCO certificate holder
G03 - Subpart C - Operating rules
G04 - Subpart D - Crewmember qualifications
G05 - Subpart E - Aircraft and equipment

NATIONAL TRANSPORTATION SAFETY BOARD
PART 830: NOTIFICATION AND REPORTING ACCIDENTS
H01 - Applicability
H02 - Definitions
H03 - Immediate notification and information
H04 - Preserving wreckage/mail/cargo/records
H05 - Reports/statements to be filed

FAA ADVISORY CIRCULARS
I01 - Series 00 General
I02 - Series 20 Aircraft
I03 - Series 60 Airmen
I04 - Series 70 Airspace
I05 - Series 90 Air Traffic Control and General Operations
I06 - Series 120 Air Carrier and Commercial Operators and Helicopters
I07 - Series 150 Airports
I08 - Series 170 Air Navigation Facilities

FLIGHT INFORMATION PUBLICATIONS
J01 - Glossary of aeronautical terms
J02 - Airport lighting/marking/aids
J03 - Air navigation radio aids
J04 - Visual approach slope indicator
J05 - Controlled/uncontrolled airspace
J06 - Operating at non-tower airports
J07 - Special use airspace-prohibited, restricted, ISJTA, alert areas
J08 - Automatic terminal information service
J09 - ATC departure/enroute/arrival procedures
J10 - Radar traffic information service
J11 - Stage I, II, III terminal radar service
J12 - Aeronautical advisory stations (UNICOM)
J13 - Radiotelephone phraseology/technique
J14 - Traffic/wind direction indicators
J15 - Obtaining weather information/briefing
J16 - Flight plans
J17 - VHF/UHF direction finder
J18 - ADIZ and designated mountainous areas
J19 - Medical facts for pilots
J20 - Good operating practices
J21 - Obtaining airport/heliport data
J22 - FSS/Weather Service telephone numbers
J23 - Obtaining radio facility/FSS data
J24 - Special notices/Special Operations
J25 - Notices to airmen (NOTAMS)
J26 - Terminal radar service areas
J27 - Terminal area graphic notices
J28 - Restrictions to enroute navigation aids
J29 - VOR receiver checkpoints
J30 - Parachute jumping areas

AVIATION WEATHER
K01 - Surface weather charts
K02 - Weather depiction charts
K03 - Prognostic charts
K04 - Significant weather charts
K05 - Pressure analyses charts
K06 - Winds aloft charts/forecasts
K07 - Radar summary charts/reports
K08 - Area forecasts
K09 - Terminal forecasts
K10 - Severe weather forecasts
K11 - Elements of forecasting
K12 - Aviation weather (sequence) reports
K13 - Inflight advisories (AIRMET/SIGMET)
K14 - Weather broadcasts-scheduled/advisories
K15 - Transcribed weather broadcasts (TWEB)
K16 - Significance of reported weather
K17 - Significance of cloud types
K18 - Determining cloud-heights
K19 - Recognition of critical weather
K20 - Temperature/dewpoint relationship
K21 - Fog types and their causes
K22 - Air mass characteristics
K23 - Frontal weather
K24 - Thunderstorms/squall lines
K25 - Aircraft icing
K26 - Standard temperatures/pressures
K27 - Standard lapse rates
K28 - Pressure systems/general circulation
K29 - Mountain effects/turbulence/weather
K30 - Information in a weather briefing
K31 - Soaring weather-thermals
K32 - Soaring weather-ridge lift
K33 - Soaring weather-mountain waves

NAVIGATIONAL - GENERAL
L01 - Sectional chart interpretation
L02 - Relating chart symbols to FAR
L03 - Pilotage/recognition of landmarks
L04 - Determining courses/distances on charts
L05 - Planning traffic pattern
L06 - Navigation computer principles
L07 - Computing headings/courses
L08 - Computing time, distance, speed, fuel
L09 - Computing rates of climb/descent
L10 - Computing wind direction/speed in flight
L11 - Computing off-course corrections
L12 - Selecting VFR cruising altitudes

RADIO NAVIGATION
M01 - Characteristics of VOR facilities
M02 - Tuning VOR receivers

Written Test Subject Matter Codes (Continued)

Excerpts

M03 - Identifying VOR stations
M04 - VOR interpretation/orientation
M05 - Intercepting VOR radials
M06 - Tracking VOR radials
M07 - Groundspeed checks using VOR radials
M08 - VOR frequency interference
M09 - VOR test signals/VOR receiver checks
M10 - Characteristics of ADF facilities
M11 - Tuning ADF receivers
M12 - Identifying stations used for ADF
M13 - ADF/RMI interpretation/orientation
M14 - Intercepting ADF/RMI bearings
M15 - Tracking ADF/RMI bearings or "homing"
M16 - Marker beacons/outer compass locators

RADIO COMMUNICATIONS

R01 - VHF radio communications/phraseology
R02 - Position reporting procedures
R03 - Tower/FSS/enroute-advisories/instructions
R04 - FSS communications procedures
R05 - Obtaining emergency assistance
R06 - Lost procedure when radio is inoperative
R07 - Use of proper communications frequencies

AERODYNAMICS AND PRINCIPLES OF FLIGHT

A01 - Laws of motion
A02 - Functions of the flight controls
A03 - Principles of airfoils
A04 - Forces acting on the aircraft
A05 - Flight controls/axes of the aircraft
A06 - Lift/drag during turns
A07 - Lift versus angle of attack
A08 - Lift/thrust versus air density
A09 - Effect of ice/snow/frost on airfoils
A10 - Power versus climb/descent/level flight
A11 - Gyroscopic precession
A12 - Coning (helicopter)
A13 - Translating tendency (helicopter)
A14 - Ground effect
A15 - Translational lift (helicopter)
A16 - Transverse flow effect (helicopter)
A17 - Loads/load factors
A18 - Stability/controllability
A19 - Stall/spins
A20 - Effects of flaps, spoilers, dive brakes
A21 - Relative wind/angle of attack
A22 - Effect of wind during turns
A23 - Torque effects - P factor
A24 - Dissymmetry of lift (helicopter)

AIRCRAFT AND ENGINE OPERATION - GENERAL

P01 - Fuel injection/carburetor principles
P02 - Reciprocating engine principles
P03 - Preflight/postflight safety practices
P04 - Use of mixture/throttle/propeller control
P05 - Use of proper fuel grade/type
P06 - Fuel system operation
P07 - Engine starting/shutdown
P08 - Detonation cause/effect
P09 - Fuel contamination-prevention/elimination
P10 - Emergency-engine/systems/equipment/fire
P11 - Carburetor ice-cause/detection/elimination
P12 - Wake turbulence-causes/precautions
P13 - Crosswind takeoff/landing
P14 - Proper loading of the aircraft
P15 - Interpreting engine instruments
P16 - Ignition or electrical system/units
P17 - Recovery from critical flight situations
P18 - Carburetor heat effect on mixture
P19 - Aircraft operating limitations
P20 - Manifold pressure versus RPM
P21 - High altitude operations/pressurization
P22 - Use of oxygen and oxygen equipment
P23 - Mid-air collision avoidance precautions

AIRCRAFT/ENGINE PERFORMANCE - GENERAL

Q01 - Takeoff charts (airplane/rotorcraft)
Q02 - Rate of climb charts (airplane/rotorcraft)
Q03 - Cruise charts (airplane/rotorcraft)
Q04 - Maximum safe crosswind charts (airplane)
Q05 - Use of Denault computer (airplane)
Q06 - Landing charts (airplane/rotorcraft)
Q07 - Altitude-airspeed charts (rotorcraft)
Q08 - Stall speed charts (airplane)
Q09 - Hovering ceiling charts (rotorcraft)
Q10 - Airspeed correction charts (airplane)
Q11 - Predicting performance (helicopter)
Q12 - Computing density/pressure altitudes
Q13 - Effect of density altitude on performance
Q14 - Effect of weight/balance on performance
Q15 - Critical performance speeds - "V speeds"
Q16 - Effect of wind on aircraft performance
Q17 - Bank/speed versus rate/radius of turn
Q18 - Stall speed versus altitude or attitude
Q19 - Stall speed versus indicated/true airspeed
Q20 - Obstacle clearance takeoff/landing
Q21 - Best angle/best rate of climb (airplane)
Q22 - Computation of gross weight/useful load
Q23 - Computation of center gravity
Q24 - Minimum sink speed (glider)
Q25 - Glide ratio - L/D (glider)
Q26 - Speed-to-fly (glider)
Q27 - Best-glide-speed (glider)
Q28 - Glider performance curves (glider)
Q29 - Airspeed for searching for lift (glider)

FLIGHT INSTRUMENTS AND SYSTEMS

R01 - Attitude indicator operation/errors
R02 - Heading indicator operation/errors
R03 - Turn indicator/coordinator
R04 - Altimeter operation/errors
R05 - Vertical speed indicator operation/errors
R06 - Airspeed indicator operation/errors
R07 - Vacuum systems/instruments
R08 - Pitot-static systems/instruments
R09 - Magnetic compass operation/errors
R10 - Altimeter setting procedure/significance
R11 - Pressure altitude-significance/obtaining
R12 - Gyroscopic principles

INSTRUMENT FLYING PROCEDURES

S01 - Components of attitude instrument flying
S02 - Pitch, bank, power control
S03 - Straight-and-level flight
S04 - Turns/turns to predetermined headings
S05 - Constant rate climbs/descents/level offs
S06 - Constant speed climbs/descents/level offs
S07 - Magnetic compass turns
S08 - Effect of changes in airspeed
S09 - False sensations in flight
S10 - Recoveries from unusual attitudes/stalls
S11 - Visibility minimums
S12 - Interpreting SIDs/STARs
S13 - Interpreting enroute charts
S14 - Interpreting instrument approach charts
S15 - VOR instrument approach procedures
S16 - ADF instrument approach procedures
S17 - ILS/LOC instrument approach procedures
S18 - ASR instrument approach procedures
S19 - Use of VASI during approaches
S20 - Use of Distance Measuring Equipment
S21 - Radar vectoring procedures
S22 - Holding pattern - procedures/entries
S23 - Circling approach procedures

S24 - Missed approach procedures
S25 - DME arc initial approach procedures
S26 - Procedure turns (course reversal)

HELICOPTER AND GYROPLANE OPERATION

T01 - Rotor system - main/antitorque rotors
T02 - Clutch system
T03 - Free-wheeling unit
T04 - Rotor and engine rpm control
T05 - Rotor and engine rpm operating limits
T06 - Retreating blade stall
T07 - Settling with power
T08 - Ground resonance
T09 - Hovering flight (helicopter)
T10 - Antitorque rotor failure (helicopter)
T11 - Emergencies - autorotative landing
T12 - Slope landing/takeoff (helicopter)
T13 - Taxiing - air and surface (helicopter)
T14 - Takeoff/approach/landing
T15 - Rapid deceleration/quick stop (helicopter)
T16 - Confined area/pinnacle operation
T17 - Ground reconnaissance (helicopter)

AIRPLANE OPERATION

U01 - Normal/crosswind takeoff/landing
U02 - Maximum performance takeoff/landing
U03 - Emergency landings
U04 - Maneuvering speed
U05 - Taxiing with strong surface wind
U06 - Flap operation
U07 - Retractable landing gear operation
U08 - Controllable pitch propeller operation
U09 - Supercharged engine operation
U10 - Multiengine critical engine failure

GLIDER OPERATION AND TOWING

V01 - Procedures of assembly and disassembly
V02 - Towrope/cables/hooks/releases
V03 - Standard visual signals
V04 - Aero towing procedures
V05 - Auto towing procedures
V06 - Winch towing procedures
V07 - Traffic pattern/landing
V08 - Use of speed limiting devices
V09 - Strange field (cross-country) landings
V10 - Sharing thermals
V11 - Sharing ridge lift
V12 - Cross-country procedures
V13 - Emergencies-rope break, towplane power failure, etc.

Basic Ground Instructor

QUESTIONS

MAXIMUM TIME ALLOWED FOR TEST: FOUR HOURS

GENERAL INSTRUCTIONS

READ CAREFULLY

1. This book contains 439 questions beginning with number 201. You are required to answer 80 QUESTIONS ONLY.
2. Refer to the QUESTION SELECTION SHEET to determine which 80 questions you are to answer.
3. Make sure you were issued a QUESTION SELECTION SHEET that is marked for use with Question Book "BGI-1".
4. Mark your answers in the appropriate places on the ANSWER SHEET.
5. All Supplementary information required to answer certain questions can be found on the page opposite the question or near the question.
6. 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.
7. Read each question carefully and select the best answer. Always answer questions in terms of current regulations, procedures, or techniques.
8. It will not be necessary to draw course lines on the sectional chart segments, since this has been done for you.
9. The last 9 pages of this book contain legends for the Sectional Chart and the Airport/Facility Directory. A list of Notices to Airmen "Abbreviations" is also included.
10. The MINIMUM passing grade is 70 percent.

SAMPLE INSTRUCTION SHEET FOR QUESTION BOOK

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

(2) GIVE TO ANOTHER OR RECEIVE FROM ANOTHER ANY PART OR COPY OF THAT TEST,

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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.

BASIC GROUND INSTRUCTOR
WRITTEN TEST QUESTIONS

001. In regard to the duration of Private Pilot Certificates, which statement is true?

B05
1- They expire after a duration of 12 months.
2- They expire after a duration of 24 months.
3- They are issued without a specific expiration date.
4- When recency of experience requirements are not met the certificates expire.

002. In which of the following flight operations is the pilot in command required to possess an instrument rating while operating in VFR conditions?

B01
1- On a flight to Canada or Mexico.
2- In the Positive Control Area.
3- On a DVFR flight plan.
4- Flight in the Continental Control Area.

003. Which statement is true regarding control zones?

A16
1- They extend upward from 700 feet AGL and terminate at the base of the Continental Control Area.
2- Unless they underlie the Continental Control Area, control zones have no upper limit.
3- Designated control zones are located only at those airports which have a control tower in operation.
4- They are not depicted on sectional aeronautical charts.

004. An airport control zone extends upward from the surface to the base of the

A17
1- Terminal Control Area.
2- Positive Control Area.
3- Continental Control Area.
4- Airport Traffic Area.

005. The Continental Control Area for the 48 contiguous states consists of airspace

A15
1- at and above 14,500 feet MSL.
2- at and below 14,500 feet MSL.
3- within all restricted areas and prohibited areas.
4- below 10,000 feet MSL.

006. "Ceiling" as defined by Federal Aviation Regulations, means the height above the earth's surface of the

A03
1- lowest layer of clouds that is reported as "broken" or "overcast."
2- lowest layer of clouds that is reported as "scattered," "broken," or "thin."
3- lowest reported "obscuration" and the highest layer of clouds that is reported as "overcast."
4- highest layer of clouds that is reported as "broken" or "thin."

007. Where are Airport Traffic Areas in effect?

A02
1- At all airports.
2- Only at airports that have an operating control tower.
3- Only at airports within a control zone.
4- At all airports that have a Flight Service Station on the field.

008. Preflight action as required by regulations for all flights away from the vicinity of an airport shall include a study of the weather, taking into consideration fuel requirements, and

C03
1- an alternate course of action if the flight cannot be completed as planned.
2- the filing of a flight plan.
3- the designation of an alternate airport.
4- an operational check of your navigation radios.

009. In addition to other preflight action for a VFR cross-country flight, regulations specifically require the pilot in command to

C03
1- file a flight plan for the proposed flight.
2- check each fuel tank visually to ensure that it is always filled to capacity.
3- determine runway lengths at the airports of intended use.
4- check the accuracy of the omninavigational equipment if the flight is to be made on airways.

010. If an in-flight emergency requires immediate action, a pilot in command may

C01
1- deviate from Federal Aviation Regulations to the extent required to meet the emergency, but must submit a written report within 24 hours to the Administrator.
2- not deviate from regulations unless permission is obtained from Air Traffic Control.
3- deviate from any rule of Federal Aviation Regulations to the extent required to meet the emergency.
4- not deviate from regulations unless prior to the deviation approval is granted by the Administrator.

011. If you do not meet the recency of experience requirements for a night flight carrying passengers, and official sunset is 1900 EST, you must land at or before what time to comply with regulations?

B11
1- 1830 EST.
2- 1900 EST.
3- 1930 EST.
4- 2000 EST.

012. To act as pilot in command of a single-engine nosewheel-equipped airplane, regulations require recent experience before carrying passengers. To meet this requirement you must, within the preceding

B11
1- 60 days, have made at least three takeoffs and three landings to a full stop in any single-engine airplane.
2- 90 days, have made at least three takeoffs and three landings to a full stop in an aircraft of the same category, class, and type as the one you will be flying.
3- 90 days, have made at least three takeoffs and three landings in an aircraft of the same category and class as the one you will be flying.
4- 60 days, have made at least five takeoffs and five landings to a full stop in an aircraft of the same category as the one you will be flying.

013. To act as pilot in command of an aircraft, one must show by logbook endorsement the satisfactory (1) accomplishment of a flight review, or (2) completion of a pilot proficiency check within the preceding

B11
1- 6 months.
2- 12 months.
3- 24 months.
4- 36 months.

014. When are Emergency Locator Transmitter (ELT) batteries required to be replaced or recharged?

C35
1- After 1 cumulative hour of use.
2- After 30 cumulative minutes of use.
3- After 100 cumulative hours of use.
4- Every 6 months.

015. Which statement is true concerning an Emergency Locator Transmitter (ELT) aboard an airplane?

C35
1- ELT battery replacement is required after each ten hours of cumulative use.
2- When activated, an ELT transmits on the frequencies 118.0 and 122.3 MHz.
3- An operable ELT is required on all training airplanes operated within 50 miles of the point of origin of the flight.
4- Tests of the equipment should be conducted during the first five minutes after every hour.

016. Unless each occupant is provided with supplemental oxygen, no person may operate a civil aircraft of U.S. registry above a cabin pressure altitude of

C22
1- 10,000 feet MSL.
2- 12,500 feet MSL.
3- 14,000 feet MSL.
4- 15,000 feet MSL.

017. Which record or document shall the owner or operator of an airplane keep to show compliance with an applicable Airworthiness Directive?

C20
1- The aircraft owner's handbook.
2- The aircraft maintenance records.
3- The aircraft Airworthiness Certificate.
4- The aircraft Registration Certificate.

018. Who is responsible for determining whether an aircraft is in condition for safe flight?

C20
1- The pilot in command.
2- The owner of the aircraft.
3- The maintenance inspector.
4- The maintenance man who maintains the aircraft.

019. No person may operate a civil aircraft unless the Airworthiness Certificate, or special flight permit or authorization required by regulations, is

C18
1- on file in the owner's operation office where the aircraft is based.
2- filed with the other required certificates or documents within the aircraft to be flown.
3- displayed at the cabin or cockpit entrance so that it is legible to passengers or crewmembers.
4- included in the approved logbooks for the aircraft to be flown.

020. Regulations require that seatbelts be fastened about passengers

C10
1- during all periods of flight.
2- only during flight in turbulent flight conditions.
3- only during takeoffs and landings.
4- only when advised by the pilot in command to do so.

021. Is it permissible for a pilot to allow a person who is obviously under the influence of intoxicating liquors or drugs to be carried aboard an aircraft? This is permitted

C07
1- only if the person does not have access to the cockpit or pilot's compartment.
2- only if the person is a medical patient under proper care.
3- only after a waiver has been obtained from the FAA.
4- under no circumstances.

022. According to Federal Aviation Regulations, which of the following are true statements?

A. Parachutes are required when a private pilot carrying a passenger executes an intentional maneuver that exceeds a 30° noseup attitude relative to the horizon.
B. All acrobatic maneuvers must be completed at least 2,000 feet above the surface.
C. Parachutes are always required for all occupants of an aircraft when spins are practiced.
D. An intentional maneuver, not necessary for normal flight, involving an abrupt change in the aircraft's attitude is considered acrobatic flight.

The true statements are:

D05
1- A, B, C, D.
2- A, D.
3- B, C, D.
4- A, B, C.

023. When acrobatic flight is to be performed, the flight visibility must be at least

D05
1- 3 miles.
2- 5 miles.
3- 7 miles.
4- 9 miles.

024. No person may operate an aircraft in acrobatic flight when

D05
1- below 2,000 feet AGL.
2- the flight visibility is less than 5 miles.
3- the flight visibility is less than 7 miles.
4- over an open air assembly of people.

025. Unless otherwise authorized, no person may operate an aircraft below 10,000 feet MSL at an indicated airspeed of more than

D04
1- 156 knots (180 MPH).
2- 200 knots (230 MPH).
3- 250 knots (288 MPH).
4- 300 knots (345 MPH).

026. When operating an aircraft equipped with a reciprocating engine within an Airport Traffic Area, the maximum indicated airspeed permitted is

D04
1- 109 knots (125 MPH).
2- 156 knots (180 MPH).
3- 200 knots (230 MPH).
4- 250 knots (288 MPH).

027. Approaching a VOR station while flying southwest at 8,500 feet MSL, you see a multiengine airplane at the same altitude converging from your left, headed northwest toward the VOR. According to regulations which pilot should give way and why?

D03
1- You should give way since your airplane is slower and more maneuverable than a multiengine airplane.
2- The pilot of the multiengine airplane should give way since the airplane is not flying at a proper VFR cruising altitude.
3- The multiengine airplane should give way since your airplane is to its right and you have the right-of-way.
4- You should give way since the other airplane is to your left and has the right-of-way.

028. When two aircraft are approaching each other head-on or nearly so, which aircraft should give way?

D03
1- Regardless of the aircraft categories, a glider has the right-of-way over all engine-driven aircraft.
2- If the aircraft are of different categories, an airship would have the right-of-way over a helicopter.
3- Regardless of the aircraft categories, the pilot of each aircraft shall alter course to the right.
4- If the aircraft are of different categories, an airship would have the right-of-way over an airplane.

029. Assume two aircraft of different categories are converging at approximately the same altitude. Which of the following is a true statement?

D03
1- Neither aircraft has the right-of-way and both aircraft should alter course to avert a collision.
2- An aircraft towing or refueling other aircraft has the right-of-way over all other engine-driven aircraft.
3- An airship has the right-of-way over a glider.
4- A jet airliner has the right-of-way over all other aircraft.

030. When flying below 18,000 feet MSL in an aircraft without radio equipment, cruising altitude must be maintained by reference to an altimeter that was

D10
1- periodically reset to the elevations of en route airports.
2- set to zero elevation prior to takeoff.
3- adjusted to 29.92" Hg.
4- set to the elevation of the departure airport.

031. To maintain the proper cruising altitude, if your airplane is not equipped with a radio, the altimeter should be set to

D10
1- the elevation of the airport of departure, or appropriate altimeter settings available prior to departure.
2- the density altitude at the airport of departure.
3- 29.92" Hg at the airport of departure and whenever below 18,000 feet MSL.
4- zero.

032. Over sparsely populated areas an aircraft may not be operated, except when necessary for takeoff or landing, closer than what distance from any person, vehicle, or structure?

D09
1- 100 feet.
2- 500 feet.
3- 1,000 feet.
4- 2,000 feet.

033. The minimum safe altitude required for flights over any congested area of a city, town, or settlement is 1,000 feet above the highest obstacle within a horizontal radius of

D09
1- 1,000 feet from the aircraft.
2- 1,500 feet from the aircraft.
3- 2,000 feet from the aircraft.
4- 3,000 feet from the aircraft.

034. Suppose that you receive a flashing white light from a control tower during the runup prior to takeoff; what action should you take?

D08
1- None, since this light signal is applicable only to aircraft in flight.
2- Return to your starting point on the airport.
3- Taxi clear of the runway in use.
4- Proceed, exercising extreme caution.

035. Suppose that you had an in-flight emergency and found it necessary to deviate from previous ATC instructions, and then you were given landing priority at a controlled airport. If requested by ATC, a report must be submitted within 48 hours to the Chief of the

D07
1- appropriate Search and Rescue Unit.
2- Air Traffic Control facility.
3- nearest National Transportation Safety Board Field Office.
4- nearest General Aviation District Office.

036. Ground Control issues the following taxi instructions:

". . .CLEARED TO RUNWAY TWO ONE, WIND TWO ZERO ZERO AT ONE SIX, ALTIMETER TWO NINER EIGHT SEVEN, TIME ONE ONE FOUR THREE, TAXI NORTH ON THE RAMP. . ."

From these instructions, you are cleared to taxi to

D07
1- and line up on Runway 21 and may take off unless instructed to hold by the tower.
2- the north end of the ramp only.
3- the runup area for Runway 21 only.
4- and line up on Runway 21, but must receive permission for takeoff.

037. Aircraft operating at night, in the air or on the surface, must display lighted position lights during the period from

D06
1- 1 hour before sunset to 1 hour after sunrise.
2- sunset to sunrise.
3- 30 minutes after sunset to 30 minutes after sunrise.
4- 30 minutes before sunset to 30 minutes after sunrise.

038. To operate an airplane within a control zone at night under special VFR, the pilot is required to

D26
1- remain 500 feet below the clouds.
2- have logged more than 500 hours' first pilot time.
3- have an instructor aboard.
4- be instrument rated.

039. No person may operate an airplane within a control zone at night under special VFR unless

D26
1- the flight visibility is at least 3 miles.
2- the airplane is equipped for instrument flight.
3- an instructor is aboard.
4- the flight can be conducted 500 feet below the clouds.

040. A special VFR clearance applies to what kind of controlled airspace?

D26
1- Transition Area.
2- Control Area.
3- Control Zone.
4- Airport Traffic Area.

041. The basic VFR weather minimums for flights within controlled airspace below 10,000 feet MSL require the minimum visibility and distance under the clouds to be

D25
1- 3 miles and 500 feet.
2- 1 mile and 500 feet.
3- 1 mile and clear of clouds.
4- 3 miles and 1,000 feet.

042. During operation outside controlled airspace at altitudes of more than 1,200 feet AGL, but less than 10,000 feet MSL, the minimum "horizontal distance from clouds" requirement for VFR flight is

D25
1- 500 feet.
2- 1,000 feet.
3- 1,500 feet.
4- 2,000 feet.

043. During operations at altitudes of more than 1,200 feet AGL and at or above 10,000 feet MSL, the minimum "distance below clouds" requirement for VFR flight is

D25
1- 500 feet.
2- 1,000 feet.
3- 1,500 feet.
4- 2,000 feet.

044. Which statement is true regarding the requirements for flight within a Group I Terminal Control Area (TCA)?

D15
1- The pilot in command must be instrument rated.
2- The pilot in command must hold at least a Private Pilot Certificate to land or take off in a Group I TCA.
3- An operable ADF receiver is required aboard the aircraft.
4- The aircraft must be equipped with operable Distance Measuring Equipment.

045. In regard to the correct traffic pattern departure procedure to use at a noncontrolled airport, which statement is true?

D14
1- Depart as prearranged with other pilots using the airport.
2- Comply with any FAA traffic pattern established for the airport.
3- Make all turns to the left.
4- Depart in any direction consistent with safety, after crossing the airport boundary.

046. Unless otherwise authorized, two-way radio communications with ATC are required for landings or takeoffs

D13
1- at tower controlled airports within control zones only when weather conditions are less than VFR.
2- at all tower controlled airports only when weather conditions are less than VFR.
3- at all tower controlled airports regardless of the weather conditions.
4- within control zones regardless of the weather conditions.

047. Advisory Circulars are issued by the Federal Aviation Administration to inform the aviation public of

I01
1- nonregulatory material of interest.
2- projects in the planning stage.
3- regulatory material of interest.
4- proposed rulemaking.

048. Suppose an aircraft is involved in an accident that results in substantial damage to the aircraft, but no injuries to the occupants. When must the pilot or operator of the aircraft notify the nearest National Transportation Safety Board Field Office of the occurrence?

H03
1- Immediately.
2- Within 48 hours.
3- Within 10 days.
4- Within 1 week.

049. Of the following incidents, which would require an immediate notification to the nearest Bureau of Aviation Safety Field Office of the National Transportation Safety Board?

H03
1- A near-miss that requires violent evasive action to avoid a collision.
2- Damage to a landing gear as a result of a hard landing.
3- An in-flight generator failure.
4- Flight control system malfunction or failure.

050. How long does the Airworthiness Certificate of your airplane remain valid?

E04
1- Indefinitely, unless the prescribed operating limitations are exceeded.
2- As long as the airplane is maintained and operated as required by Federal Aviation Regulations.
3- Indefinitely, unless the aircraft suffers major damage.
4- As long as the aircraft has a current Registration Certificate.

051. To determine the expiration date of the last annual aircraft inspection, you should refer to the

E04
1- Airworthiness Certificate.
2- Registration Certificate.
3- aircraft maintenance records.
4- Owner-Operator Manual.

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

E03
1- for compensation or hire.
2- by any private pilot.
3- with passengers aboard.
4- away from the vicinity of the airport.

053. Who is primarily responsible for ensuring that an aircraft is maintained in an airworthy condition?

E01
1- The mechanic who signs the aircraft maintenance records.
2- The nearest FAA General Aviation District Office.
3- The owner or operator of the aircraft.
4- The pilot in command.

054. Suppose the following factors exist when determining VFR cruising altitudes for a flight where ground elevation is 1,500 feet MSL.

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

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

D27
1- 7,500 feet MSL on Leg I; 8,500 feet MSL on Leg II.
2- 7,500 feet MSL on both legs.
3- 8,500 feet MSL on Leg I; 7,500 feet MSL on Leg II.
4- 8,500 feet MSL on both legs.

055. To comply with regulations, the selection of VFR cruising altitudes should be made on the basis of the magnetic

D27
1- heading when more than 3,000 feet above the surface.
2- heading when more than 3,000 feet above sea level.
3- course when more than 3,000 feet above the surface.
4- course when more than 3,000 feet above sea level.

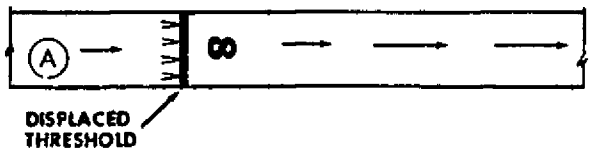
056. The Federal Aviation Administration issues Advisory Circulars that provide a systematic means for the issuance of nonregulatory material of interest to the aviation public. They are issued

I01
1- as amendments to the National Transportation Safety Board regulation, Part 830.
2- by automatic distribution to subscribers of the Airman's Information Manual.
3- on a regularly scheduled basis, but must be purchased by the aviation public.
4- in a numbered system of general subject matter areas to correspond with the subject areas in Federal Aviation Regulations.

057. The FAA established a system for the publication of nonregulatory guidance and informational material to the public. These publications are known as

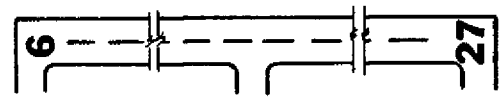
I01
1- Advisory Circulars.
2- Airworthiness Directives (ADs).
3- Technical Standard Orders (TSOs).
4- Airman's Guide.

BASIC RUNWAY



058. Refer to the displaced threshold for Runway 8 above. That portion of the runway identified by the letter "A"

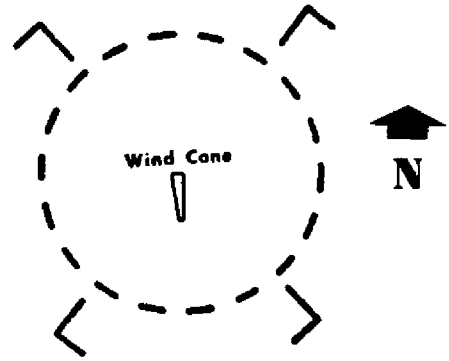
J02
1- is an "overrun area" that is available for landing at the pilot's discretion.
2- may be used only for landings.
3- may be used for taxiing but should not be used for takeoffs or landings.
4- may be used for taxiing or takeoffs but not for landing.



BASIC RUNWAY MARKINGS

059. Refer to the runway direction markings above. The numbers 9 and 27 on the approach ends of the runway indicate that the runway is oriented approximately

J02
1- 090° and 270° magnetic.
2- 009° and 027° true.
3- 090° and 270° true.
4- 009° and 027° magnetic.

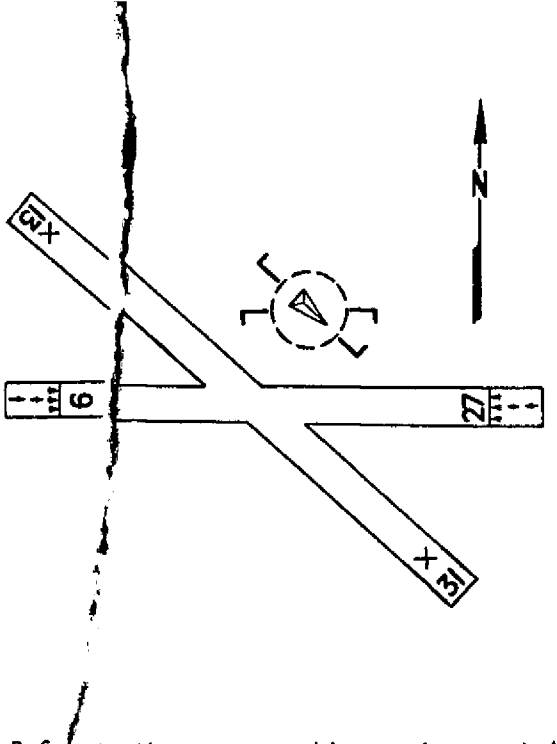


060. The segmented circle shown above indicates that the airport traffic is

J02
1- left-hand for Runway 13 and right-hand for Runway 22.
2- left-hand for Runway 31 and right-hand for Runway 13.
3- right-hand for Runway 31 and left-hand for Runway 4.
4- right-hand for Runway 22 and left-hand for Runway 4.

061. Assume you observe a segmented circle adjacent to an airport runway as shown above. The markings indicate that

J02
1- you should turn left after takeoff on Runway 31.
2- you should circle the airport to the left prior to landing on any runway.
3- you would have a left-quatering tailwind if you landed on Runway 31.
4- airport traffic is left-hand for Runway 13 and Runway 4.



062. Refer to the runway markings and segmented circle above. If the wind is as shown by the landing direction indicator, you should land to the

J02
1- east on Runway 9 and expect a crosswind from the right.
2- west on Runway 27 and expect a crosswind from the right.
3- southeast beyond the "X" marking.
4- northwest beyond the "X" marking.

063. If the runway markings and segmented circle are as shown above, you should

J02
1- land on Runway 27 and anticipate a right crosswind.
2- land on Runway 9 and anticipate a right-quatering headwind.
3- land on Runway 13, as it is aligned with the wind and landing direction indicator.
4- turn left onto final approach and land on Runway 31.

064. Operation of the rotating beacon at an airport in a control zone during the hours of daylight may indicate

J02
1- counterclockwise flow of traffic is required.
2- the ground visibility is less than 3 miles and/or the ceiling is less than 1,000 feet.
3- that right-hand traffic is required.
4- the airport is closed due to hazardous runway conditions.

065. A flashing amber light near the center of an airport's segmented circle (or on top of the control tower or adjoining building) indicates that

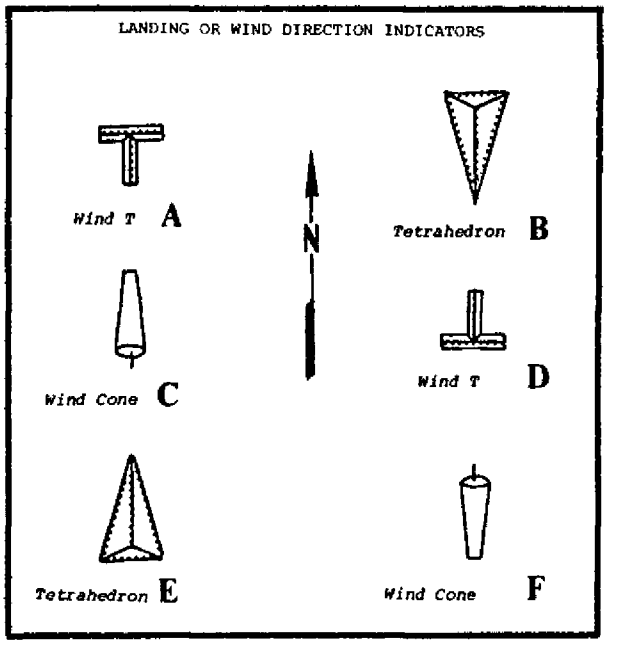
J02
1- the control tower is not in operation.
2- a right-hand traffic pattern is in effect.
3- the airport is temporarily closed to VFR traffic.
4- weather conditions are below basic VFR weather minimums.

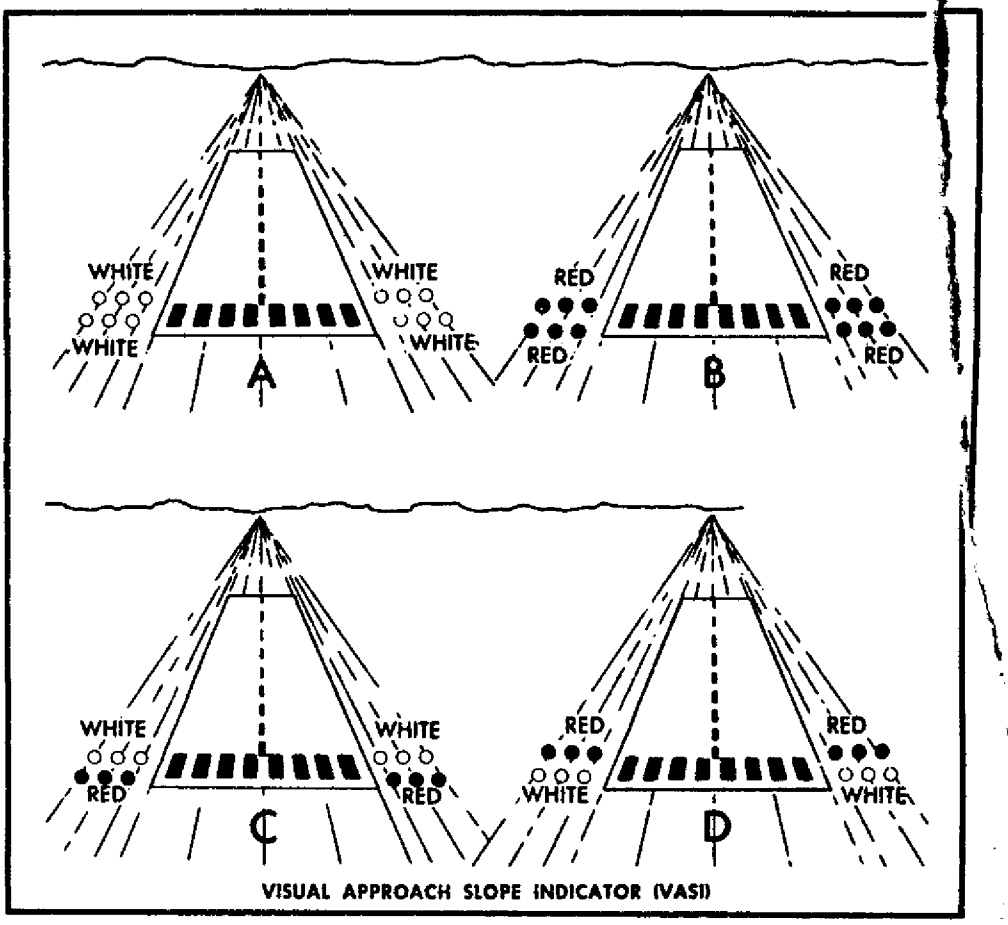
066. Assume that one of the landing or wind direction indicators depicted below is observed adjacent to the landing strip. Which indicators show that the landing should be made to the south?

J02
1- B, D, F.
2- A, B, C.
3- A, E, F.
4- B, C, D.

067. Which indicators depicted below show that landings should be made to the north?

J02
1- B, C, D.
2- A, C, E.
3- A, E, F.
4- D, E, F.





VISUAL APPROACH SLOPE INDICATOR (VASI)

068. A pilot observing VASI lights as in Illustration "D" above would be

J04
1- receiving "VASI inoperative" lights.
2- below the glidepath.
3- on the glidepath.
4- above the glidepath.

069. VASI lights appearing as in Illustration "A" above would indicate that an airplane is

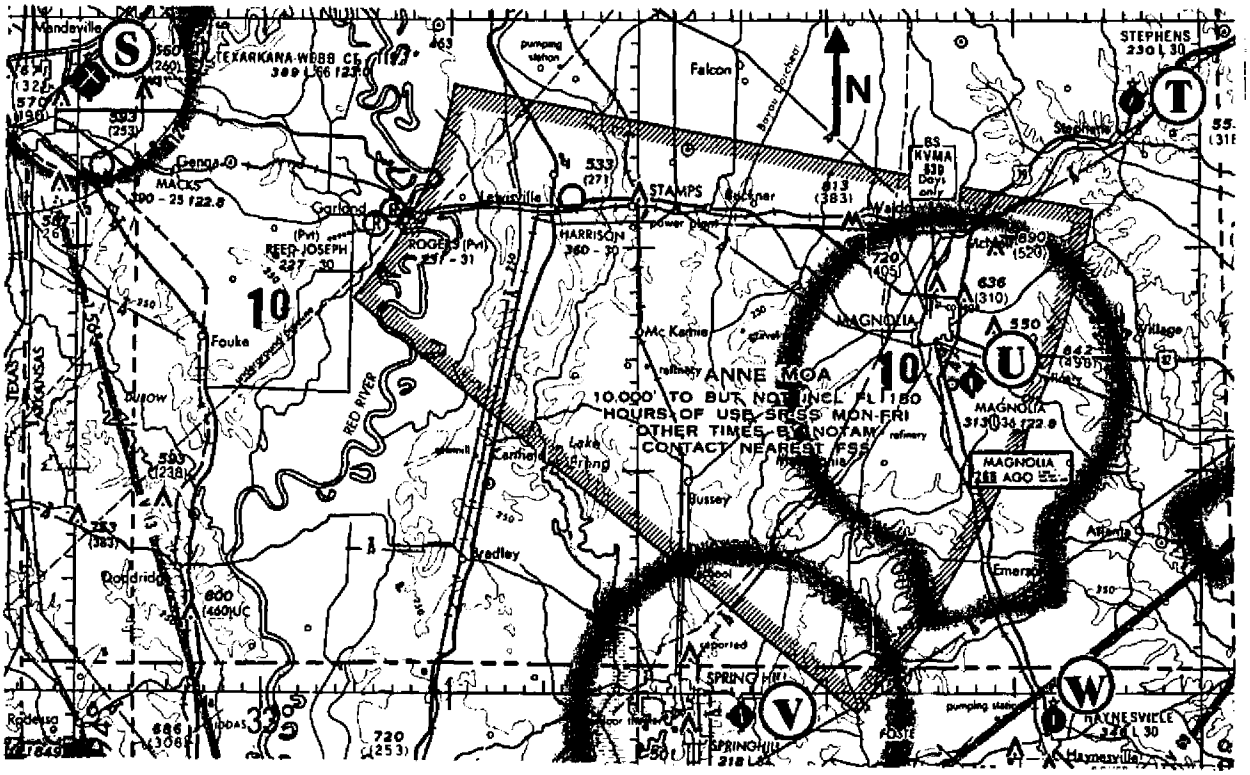
J04
1- off course to the left.
2- on the glidepath.
3- below the glidepath.
4- above the glidepath.

070. Refer to the illustrations above. If you are approaching to land, which group of VASI lights illustrated would indicate that you are on the glidepath?

J04
1- A.
2- B.
3- C.
4- D.

071. Assume that you are approaching an airport that is equipped with a VASI. To comply with regulations, an airplane approaching to land on a runway served by a VASI shall

J04
1- intercept and remain on the glide slope until touchdown only if the aircraft is operating on an instrument flight plan.
2- maintain an altitude that captures the glide slope at least 2 miles downwind from the runway threshold.
3- remain below the glide slope.
4- maintain an altitude at or above the glide slope.



072. Which statement is true concerning the ANNE MOA in the chart excerpt above?

J07
1- The military services conduct low altitude navigation flights at or below 1,500 feet AGL at speeds exceeding 250 knots within this area.
2- It is a prohibited area for all VFR flights unless special permission is obtained.
3- Some training activities may necessitate acrobatic maneuvers by military aircraft within this area.
4- VFR flights between 10,000 feet and Flight Level 180 are prohibited within this area.

073. Refer to the chart above. Assume you are planning a VFR flight from airport "S" to airport "U." Which statement is true in regard to flying within the ANNE MOA?

J07
1- You may fly direct to airport "U," even though military training activities exist within the area, and you should exercise caution.
2- The nearest FSS must be contacted to provide you En Route Flight Advisory Service through the area.
3- A VFR flight plan must be filed with a proposed altitude below 10,000 feet MSL.
4- You must plan your proposed flight on a weekend when the area is not in use by the military.

074. Which statement concerning the ANNE MOA shown in the chart excerpt above is true?

J07
1- VFR flights below 10,000 feet require rerouting by the nearest FSS.
2- Flights below 10,000 feet must be operating on IFR flight plans.
3- Extreme caution should be exercised while flying within this area.
4- VFR flights are not permitted above 10,000 feet MSL.

075. Refer to the chart excerpt above. Concerning the ANNE MOA and a proposed flight from airport "S" to airport "W," select the true statement.

J07
1- You should circumnavigate the MOA by flying around the southern tip of it.
2- Between Mondays and Fridays a pilot should contact the nearest FSS for rerouting around the area for a flight to airport "W."
3- Nonparticipating IFR traffic may be cleared through the MOA, and VFR pilots should exercise caution while flying within the area.
4- The appropriate military authority having jurisdiction over the area must be contacted to obtain permission to fly within the area.

076. Flight Service Stations having voice facilities on VOR stations or radiobeacons (NDBs), broadcast scheduled weather reports and NOTAM information

J15
1- at 30 minutes past each hour.
2- on the hour each hour.
3- at 15 minutes and 45 minutes past each hour.
4- at 15 minutes past each hour.

077. In regard to UNICOM, select the true statement from the following:

J12
1- UNICOM may not be used for any communication, other than providing known traffic, runway in use, and wind conditions.
2- UNICOM radio frequencies are assigned to Aeronautical Advisory Stations at certain airports not served by a control tower.
3- To obtain the correct UNICOM frequency for a particular airport, a pilot should contact the nearest FSS.
4- UNICOM radio stations are assigned by the FAA to control traffic at nontower airports.

078. To determine if UNICOM is available at an airport without a control tower, you should refer to

J12
1- the Automatic Terminal Information Service (ATIS).
2- the appropriate Airport/Facility Directory.
3- Graphic Notices and Supplemental Data.
4- the Notices to Airmen (NOTAMS).

079. Which one of the following statements is true in regard to UNICOM?

J12
1- UNICOM is a service provided by radar air traffic control facilities.
2- VFR flight plans should be filed through UNICOM at nontower airports.
3- UNICOM use is limited to Air Traffic Control.
4- UNICOM is not intended to be used for Air Traffic Control purposes.

080. Stage III Service within Terminal Radar Service Areas (TRSAs) utilize radar to provide

J11
1- separation between all VFR aircraft operating within TRSAs.
2- radar vectoring if the weather minimums are below VFR conditions.
3- separation between IFR aircraft, because VFR aircraft are not permitted in the area.
4- separation between all participating VFR aircraft and IFR aircraft operating within TRSAs.

081. Assume that you are flying on an east heading in the vicinity of a busy airport and obtain Radar Traffic Information Service. The wind is calm and you receive the following traffic advisory:

"TRAFFIC 3 O'CLOCK, 2 MILES, WESTBOUND. ."

You should look for this traffic in the direction of your airplane's

J10
1- left wingtip, and ahead of you.
2- left wingtip.
3- right wingtip.
4- nose and slightly to the right.

082. Assume that during VFR weather conditions ATC is providing a pilot with Radar Traffic Information Service. If the pilot does not intend to terminate this service, when will the service be terminated?

J10
1- When the controller advises the pilot that radar service is terminated.
2- After departing an Airport Traffic Area.
3- After departing the control zone.
4- When the aircraft reaches a point at least 25 statute miles from the departure airport.

083. Automatic Terminal Information Service (ATIS) is the continuous broadcast of recorded information

J08
1- alerting pilots of radar identified aircraft when their aircraft is in unsafe proximity to terrain or obstruction.
2- concerning nonessential information to relieve frequency congestion.
3- concerning noncontrol information in selected high activity terminal areas.
4- concerning sky conditions limited to ceilings below 1,000 feet and visibilities less than 3 miles.

084. Breathing CARBON MONOXIDE can prove to be very hazardous in flight. Which statement is true regarding this hazard?

J19
1- Carbon monoxide forces oxygen to be attached to the hemoglobin.
2- A small quantity of carbon monoxide is harmless.
3- An increase in altitude decreases the adverse effect/influence of carbon monoxide.
4- Blurred (hazy) thinking, an uneasy feeling, and dizziness are symptoms of carbon monoxide poisoning.

085. Assume that during a night flight you lose all outside visual references and become spatially disoriented. In this situation, you are probably experiencing

J19
1- mild motion sickness.
2- vertigo.
3- carbon monoxide poisoning.
4- the first indication of chronic fatigue.

086. Suppose a pilot experiences vertigo in a restricted visibility condition (dust, smoke, or snow showers). The best way to overcome the effects of vertigo is to

J19
1- depend on sensations received from the fluid in the semicircular canals of the inner ear.
2- concentrate on any "yaw," "pitch," and "roll" sensations.
3- consciously slow your breathing rate until symptoms clear and then resume normal breathing rate.
4- rely upon the aircraft instrument indications.

087. HYPOXIA is considered to be an in-flight hazard. Which statement is true concerning this hazard?

J19
1- Your body has a built-in alarm system to alert you when you are not receiving enough oxygen.
2- Heavy smokers may experience early symptoms of hypoxia at lower altitudes than nonsmokers.
3- Carbon monoxide increases the brain's tolerance of hypoxia.
4- Alcohol increases the brain's tolerance of hypoxia.

088. To use VHF/DF (Direction Finder) facilities, you must have an operable

J17
1- transmitter and receiver.
2- radar beacon transponder.
3- ADF receiver.
4- VOR receiver.

089. Certain ground-based stations have equipment which indicates the magnetic direction of the aircraft from the station each time the aircraft transmits. This equipment is known as

J17
1- Compass Locator (Comlo).
2- Direction Finder (DF).
3- Simplified Directional Facility (SDF).
4- Airport Advisory Service (AAS).

090. A preflight weather briefing would be incomplete if it did not include at least

J15
1- synoptic weather and airspace restrictions.
2- forecast winds and weather and all pertinent radio navigation facilities.
3- winds aloft and current forecasts, weather synopsis (pressure systems and fronts), and possible hazardous weather.
4- the availability of Transcribed Weather Broadcasts (TWEBs) while en route, plus the items in response 2.

091. When you telephone a weather briefing facility for preflight weather information, you should

A. identify yourself as a pilot (student, private, or commercial).
B. state your intended route and destination.
C. identify the radio communications equipment aboard the aircraft.
D. state the number of persons aboard and the color of the aircraft.

Which of the above statements are true?

J15
1- A and B.
2- A, B, C, and D.
3- A and D.
4- A, B, and C.

318-376 O - 80 - 4

092. Refer to the illustration below. Which signalman is giving the all clear signal?

J20
1- I.
2- G.
3- E.
4- A.

093. Refer to the illustration below and select the true statement concerning the hand signals shown.

J20
1- Signal G means cut engine(s).
2- Signal E means all clear.
3- Signal D means stop.
4- Signal C means right turn.

094. Which signalman below is giving the hand signal for an emergency stop?

J20
1- H.
2- G.
3- E.
4- D.

095. Pilots should use the latest issues of aeronautical charts. Sectional Charts for the conterminous United States are updated each

J20
1- 3 months.
2- 6 months.
3- 12 months.
4- 24 months.

096. When nearing a VOR station that you are using for navigation, what vital action should be taken?

J20
1- Exercise vigilance to avoid other aircraft which might be converging on the station from other directions.
2- Pass to the right of the station.
3- Pass to the left of the station.
4- Concentrate on the omni indicator and carefully make corrections so as to pass directly over the VOR station.

097. Refer to the illustration below. Which hand signal means "slow down"?

J20
1- I.
2- H.
3- D.
4- B.

098. Refer to the illustration below. The hand signal "E" means

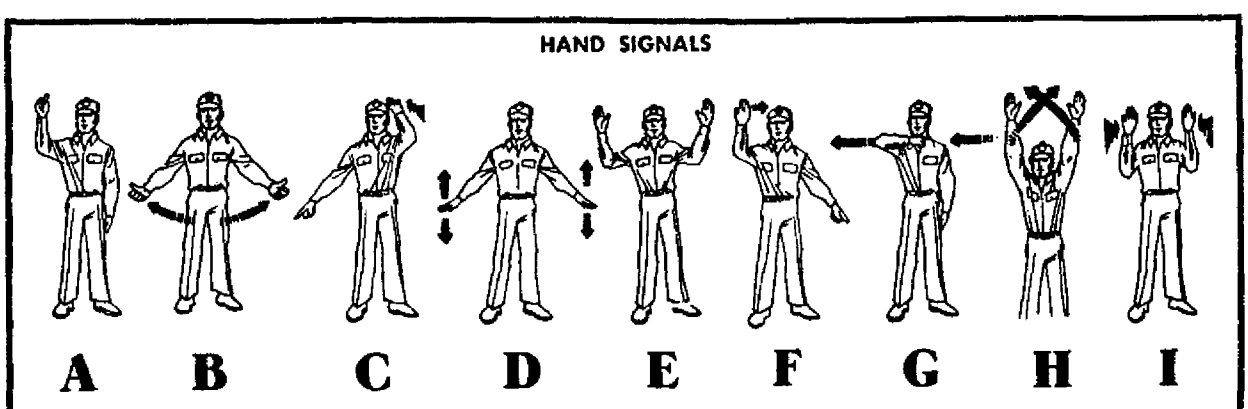
J20
1- stop.
2- start the engine(s).
3- all clear.
4- the chocks have been pulled.

099. Refer to the illustration below. Assume you have taxied into a parking area and the signalman gave hand signals as shown in positions "I", "D", and "F". The meaning of these hand signals in the sequence given are

J20
1- all clear, stop, and right turn.
2- come ahead, emergency stop, and left turn.
3- come ahead, slow down, and right turn.
4- all clear, stop, and cut engine(s).

100. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by

J19
1- closely monitoring the flight instruments to control the airplane.
2- slowing the breathing rate, breathing into a bag, or talking aloud.
3- increasing the breathing rate in order to increase lung ventilation.
4- refraining from the use of over-the-counter remedies and drugs such as antihistamines, cold tablets, tranquilizers, etc.



AIRPORT/FACILITY DIRECTORY

COLORADO

§ **PUEBLO MEMORIAL** (PUB) 5.2 E GMT-7(-6DT) 38°17'26"N 104°29'41"W DENVER
4726 B S4 FUEL 100 JET A OX 1,2 CFR Index A H-1C, 2H, L-6E, A-2G
RWY 07L-25R: H10497X150 (ASPH) S-130, D-150, DT-230 HIRL IAP
RWY 07L: SSALR RWY 25R: VASI
RWY 17-35: H8308X150 (ASPH) S-40, D-55, DT-82 MIRL .98% up N
RWY 17: Thld displaced 1309'. +47' ground. RWY 35: VASI.
RWY 12-30: H8268X150 (ASPH) S-32, D-42, DT-62 LIRL .86% up NW
RWY 07R-25L: H4073X75 (CONC) S-20
RWY 07R: Rgt tfc. RWY 25L: +7' ground.
AIRPORT REMARKS: Attended continuously. South 7000' Rwy 17-35 lighted. Control Zone effective 1230-0600Z‡. Caution—when temperature is over 80° first 2000' Rwy 07L-25R may be soft due to deterioration of seal coat.
COMMUNICATIONS: UNICOM 122.95
DENVER FSS (DEN) LC 948-3368 NOTAM FILE PUB
PUEBLO RCO 122.1R 122.2 116.7T (DENVER FSS)
Ⓡ APP/DEP CON 120.9(E), 120.1(W) opr 1300-0600Z‡
TOWER 119.1 opr 1300-0600Z‡ GRD CON 121.9
STAGE II SVC ctc APP CON
RADIO AIDS TO NAVIGATION: VHF/DF ctc DENVER FSS
(H) VORTAC 116.7 PUB Chan 114 38°17'39"N 104°25'44"W 244° 2.1 NM to fld.
MERTZ NDB (LOM) 302 PU 38°17'02"N 104°38'47"W 075° 6.5 NM to fld.
ARUBA NDB (LOM) 373 TF 38°17'27"N 104°21'16"W 255° 5.6 NM to fld.
ILS 108.3 I-TFR Rwy 25R LOM ARUBA NDB
ILS 109.5 I PUB Rwy 07L LOM MERTZ NDB
ASR
COMM/NAVAID REMARKS: ILS unmonitored when twr closed.

NOTE: AN AIRPORT/FACILITY DIRECTORY LEGEND IS INCLUDED IN THE BACK PORTION OF THIS BOOKLET.

101. Refer to the Airport/Facility Directory excerpt above concerning Pueblo Memorial Airport. Which statement is true?

J21
1- The surface composition of the longest hard surfaced runway is asphalt.
2- Grade 80 gasoline is available.
3- Runway 12 is equipped with high intensity runway lights.
4- The direction of traffic for Runway 17 is right-hand.

102. Refer to the Airport/Facility Directory excerpt above. Which statement is true concerning Pueblo Memorial Airport?

J21
1- Runway 17 threshold is displaced 130 feet.
2- Crash, fire, and rescue equipment is not available.
3- Caution is advised when using a portion of Runway 25R when high temperatures exist.
4- The Control Zone is in effect continuously, 24 hours per day at this airport.

103. Refer to the Airport/Facility Directory data above concerning Pueblo Memorial Airport. Which statement is true?

J21
1- Airframe and powerplant repairs are not available.
2- Runway 35 is equipped with VASI lights.
3- For direction finding service contact Pueblo FSS.
4- Grade 115 aviation gasoline is available.

104. Refer to the Airport/Facility Directory excerpt above. Which statement is true concerning Pueblo Memorial Airport?

J21
1- Runway 07L is equipped with high intensity runway lights.
2- The longest hard surfaced runway is concrete.
3- Pueblo VORTAC is located on the airport.
4- VASI lights are available for Runway 17.

AIRPORT/FACILITY DIRECTORY

COLORADO

§ **ALAMOSA MUNI** (ALS) 1.7 S GMT-7(-6DT) 37°26'14"N 105°51'56"W — DENVER
7535 B S4 FUEL 100, JET A CFR Index A — H-2H, L-6E
RWY 02-20: H8499X100 (ASPH) S-30, D-55, DT-65 MIRL ① — IAP
RWY 02: REIL. RWY 20: VASI Thld dsplcd 638'. Fence 400' from thld.
RWY 06-24: 4700X100 (DIRT). For light acft only.
AIRPORT REMARKS: Attended daylight hours. ①For rwy lights key 122.8 5 times in 5 seconds, lights remain on for 15 min. Control Zone effective 1200-0330Z‡.
COMMUNICATIONS: UNICOM 122.8
TRINIDAD FSS (TAD) Toll free 800 332-3644 NOTAM FILE ALS
ALAMOSA LRCO 122.1R 113.9T (TRINIDAD FSS)
Ⓡ DENVER CENTER APP/DEP CON 126.1
RADIO AIDS TO NAVIGATION:
ALAMOSA (H) VORTAC 113.9 ALS Chan 86 37°20'57"N 105°48'54"W 322° 5.6 NM to fld
VORTAC unusable 025°-045° beyond 25 NM below 15,900'
150°-180° beyond 35 NM below 11,600'

COLORADO SPRINGS

§ **CITY OF COLORADO SPRINGS MUNI** (COS) GMT-7(-6DT) — DENVER
38°48'31.4"N 104°42'34.9"W — L-6E, A-2G
6172 B S4 FUEL 100 JET A, B — IAP
RWY 17-35: H11,013X150 (ASPH-RFSC) S-115, D-175, DT-340
HIRL 1.19% up N, Arrest Dev Avbl
RWY 17: REIL, VASI. RWY 35: VASI, ALSF1
RWY 12-30: H8511X150 (ASPH) S-136, D-175, DT-280 MIRL .46% up NW arrest Device avbl.
RWY 30: VASI, TCH 52'
RWY 03-21: H8374X150 (ASPH) S-85, D-110, DT-180 MIRL 1.12% up NE
RWY 03: VASI. RWY 21: VASI. Thld dsplcd 520'.
AIRPORT REMARKS: Attended Cont. Rubberized friction Seal Coat. DGFEE Commercial Acft only
COMMUNICATIONS: ATIS 125.0 UNICOM 123.0
DENVER FSS (DEN) LC 634-1561. Toll free (800) 332-1854
COLORADO SPRINGS LRCO 122.1R, 112.5T (DENVER FSS)
Ⓡ APP/DEP CON 118.5 (North), 124.0 (South)
COLORADO SPRINGS TOWER 119.9 GND CON 121.7 CLNC DEL 125.7
STAGE III SVC ctc APP CON 120.6
RADIO AIDS TO NAVIGATION:
(L) VORTAC 112.5 COS Chan 72 38°56'40"N 104°37'59"W 196° 8.2 NM to fld
VORTAC unusable 200°-300° beyond 30 NM below 15,600'
300°-040° beyond 20 NM below 9500'
PETEY NDB (MHW/LOM) 407 CO 38°41'39"N 104°42'56.5"W 347° 6.0 NM to fld
ILS 109.9 I-COS Rwy 35
ASR

NOTE: AN AIRPORT/FACILITY DIRECTORY LEGEND IS INCLUDED IN THE BACK PORTION OF THIS BOOKLET.

105. Refer to the Airport/Facility Directory data above for Alamosa Municipal Airport. Which statement is true?

J21
1- Grade 100 gasoline is available.
2- VASI lights are available for Runway 02.
3- Major powerplant repairs are not available.
4- A control tower is in operation 12 hours of each day.

106. Refer to the Airport/Facility Directory excerpts above. Which statement is true concerning Alamosa Municipal Airport?

J21
1- The weight bearing capacity of Runway 02-20 is unknown.
2- Runway 20 is 8,499 feet in length and the surface composition is asphalt.
3- NOTAM "L" (local dissemination) is the only NOTAM service provided for this airport.
4- The runway lights can be activated by keying the frequency 122.1 MHz.

107. Refer to the Airport/Facility Directory data to the left for Colorado Springs Municipal Airport, and select the true statement.

J21
1- Runway 03 is 8,374 feet in length and the surface composition is asphalt.
2- Grade 115 gasoline is available.
3- Runway 30 is 8,511 feet in length and the surface composition is concrete.
4- Colorado Springs VORTAC is located on the airport.

108. Refer to the Airport/Facility Directory excerpts to the left. Which statement is true concerning Alamosa Municipal Airport?

J22
1- Flight and weather briefing services are available by phoning Trinidad FSS toll free.
2- Alamosa VORTAC is located on the airport.
3- To obtain a weather briefing you could call or visit the Alamosa FSS.
4- NOTAM "L" (local dissemination) is the only NOTAM service available.

109. Refer to the Airport/Facility Directory excerpts to the left. Which statement concerning Colorado Springs Municipal Airport is true?

J22
1- Weather briefing service is provided on the frequency 123.0 MHz.
2- Weather briefing services are available by local telephone call to the Denver FSS.
3- The Colorado Springs FSS and VORTAC are located on the airport.
4- Preflight weather service is available on the ATIS frequency 125.0 MHz.

110. Refer to the Airport/Facility Directory excerpts to the left above. The proper sequence of radio communication frequencies to use when departing Colorado Springs Municipal Airport VFR southbound is

J23
1- 125.0, 121.7, 119.9, 112.5, 124.0 MHz.
2- 121.7, 119.9, 124.0, 122.1R, 120.6 MHz.
3- 125.0, 125.7, 121.7, 119.9, 124.0 MHz.
4- 125.7, 121.7, 119.9, 118.5, 112.5 MHz.

111. Refer to the Airport/Facility Directory excerpts on opposite page. The proper sequence of radio frequencies for contacting clearance delivery, ground control, tower, and departure control when departing Colorado Springs northbound is

J23
1- 121.7, 125.7, 118.5, 120.6 MHz.
2- 125.7, 121.7, 119.9, 124.0 MHz.
3- 125.7, 121.7, 119.9, 118.5 MHz.
4- 119.9, 125.7, 121.7, 124.0 MHz.

112. Refer to the Airport/Facility Directory excerpts on opposite page. Which statement is true?

J28
1- The 170 radial of Alamosa is usable beyond 35 NM below 10,000 feet.
2- Colorado Springs VORTAC is located 6.0 NM from the field.
3- The 020 radial of Colorado Springs VORTAC is unusable beyond 20 NM below 9,500 feet.
4- The 025-045 radials of Alamosa VORTAC are usable at 30 NM below 15,900 feet.

113. Refer to the Airport/Facility Directory excerpts on opposite page. Select the true statement concerning restrictions to en route navigation aids listed for Alamosa or Colorado Springs.

J28
1- The Colorado Springs VORTAC is usable 200° - 300° beyond 30 NM below 15,600 feet.
2- The 020 radial of Alamosa VORTAC is unusable beyond 25 NM below 15,900 feet.
3- The 320 radial of Colorado Springs VORTAC is unusable beyond 20 NM below 9,500 feet.
4- The 150-190 radials of Alamosa VORTAC are unusable beyond 35 NM below 11,600 feet.

114. Information concerning parachute jumping sites may be found in

J30
1- The legend of Sectional Aeronautical Charts only.
2- Notices to Airmen (NOTAMS).
3- Graphic Notices and Supplemental Data.
4- Advisory Circulars.

115. Refer to the NOTAMS to the right for Massachusetts and select the true statement.

J25
1- At Newburyport, Plum Island Airport, the traffic pattern altitude is 1,000 feet.
2- The Plum Island Airport at Newburyport has 1,000-foot overruns on Runway 10-28.
3- At the Laurence G. Hanscom Field in Bedford, Mass., the traffic pattern altitude is 1,000 feet.
4- Within 2 miles of the Fitchburg Airport there is an unlighted tower.

116. Refer to the NOTAMS to the right for Michigan and select the true statement.

J25
1- At Manistee County-Blacker Airport, pilots can control the approach light system.
2- An unlighted tower is located southwest of the Harrisville Airport.
3- Ann Arbor Municipal Airport Runway 12 threshold is displaced 77 feet.
4- The Detroit Willow Run Airport Runway 5R is equipped with an operative approach lighting system.

117. Refer to the NOTAMS to the right and select the true statement.

J25
1- At Detroit Willow Run Airport (Michigan), the approach light system is out of service for one runway.
2- At Baldwin Municipal Airport (Michigan), the runway lights are pilot controlled.
3- At Ann Arbor Municipal Airport (Michigan), there are no restrictions listed.
4- At the Laurence G. Hanscom Field in Bedford, Mass., the traffic pattern altitude is 1,000 feet.

118. To determine the location of reported parachute jumping sites, you should refer to

J30
1- Federal Aviation Regulations, Part 105.
2- The publication entitled Graphic Notices and Supplemental Data.
3- National Transportation Safety Board regulation, Part 830.
4- Federal Aviation Regulations, Part 91.

NOTICES TO AIRMEN

THIS SECTION CONTAINS NOTICES TO AIRMEN THAT ARE EXPECTED TO REMAIN IN EFFECT FOR AT LEAST SEVEN DAYS.
NOTE: NOTICES ARE ARRANGED IN ALPHABETICAL ORDER BY STATE (AND WITHIN STATE BY CITY OR LOCALITY). NEW OR REVISED DATA: NEW OR REVISED DATA ARE INDICATED BY BOLD ITALICIZING THE AIRPORT NAME.
NOTE: ALL TIMES ARE LOCAL UNLESS OTHERWISE INDICATED.

MASSACHUSETTS

SPECIAL NOTICE: Weather warning signs installed arpt ramp areas at number of Cape Cod and bordering Island lctns. Signs function with associated flashing lights during periods where IFR or other hazardous weather is current or forecast. Sign and light system operns at Chatham, Martha's Vineyard, Hyannis, New Bedford, Plymouth, and Nantucket during hours arpt attended or tower open."
BEDFORD, LAURENCE G HANSCOM FLD: Obstruction 215 ft AGL 1000 ft S apch end rwy 11 unlighted. (9/78)
BOSTON, GENERAL EDWARD LAWRENCE LOGAN INTL ARPT: Unlgtd 348 ft AGL stacks 1.5 SE. ILS GS rwy 22L OTS. Unlgtd 97 ft AGL tower 3N. (11/78)
FITCHBURG MUNI ARPT: Tower 1238 ft MSL 2.5 miles NW unlighted. (6/78)
GARDNER MUNI ARPT: Arpt clsd nights. (9/78)
MARSHFIELD ARPT: Tower 213 ft MSL 1 mile SE unlighted. (12/74)
NEWBURYPORT, PLUM ISLAND ARPT: Rwy 10-28 clsd excp W 1000 ft and E 1000 ft. TPA 1000 ft. (12/78-12)
PALMER: NDB "PMX" OTS. (6/78)
PALMER, METROPOLITAN ARPT: Tower 700 ft MSL 5 miles SE unlighted. (3/78-9)
PLYMOUTH MUNI ARPT; UNICOM now freq 123.0. (1/79-2)
PROVINCETOWN MUNI ARPT: ALS rwy 7 OTS. (12/77-9)

MICHIGAN

ANN ARBOR MUNI ARPT: Rwy 12-30 closed tkof. (12/77-9)
BALDWIN MUNI ARPT: Rwy lights OTS. (6/78)
DETROIT, WILLOW RUN ARPT: ALS rwy 5R OTS. (6/78)
ESCANABA, DELTA COUNTY ARPT: Thr rwy 9 dspled 400 ft. Unlgtd 530 ft AGL crane 2 1/2 NM N. (11/78)
GAYLORD, OTSEGO COUNTY ARPT: N 500 ft rwy 18-36 clsd. (11/78)
HARRISVILLE ARPT: Unlgtd 162 ft AGL tower 1 1/2 miles SW. (8/78)
LANSING,CAPITAL CITY ARPT: ILS GS/ALS rwy 27 OTS. Thr rwy 9 dspled 500 ft days. (11/78)
LUDINGTON, MASON COUNTY ARPT: NDB "LDM" unmon. (11/78)
MANISTEE COUNTY-BLACKER ARPT: Pilot Controlled Lighting OTS. (11/78)
MARQUETTE: VORTAC "MQT" OTS. (6/78)
PONTIAC, OAKLAND-PONTIAC ARPT: Unlgtd 115 ft MSL tower 1 1/2 NM ENE. (10/78)
SAULT STE MARIE: LRCO freq 123.65 cmsnd; freq 123.6 dcmsnd. (10/78-11)
SIDNAW, PRICKETT-GROOMS FLD: Arpt closed. (1/76-9)

NOTE: The last page of this test book contains a list of ABBREVIATIONS.

119. Refer to the NOTAMS to the left for Massachusetts and Michigan. Select the true statement concerning a particular airport.

J25
1- At Plymouth, Mass., weather warning signs on the airport ramp function when hazardous weather is forecast.
2- At the Detroit, Willow Run Airport the approach light system is pilot controlled.
3- The Fitchburg, Mass. Municipal Airport tower frequency is 123.8 MHz.
4- The full length of Runway 18-36 is closed at Otsego County Airport, Gaylord, Michigan.

120. Refer to the NOTAMS to the left for Michigan, and select the true statement.

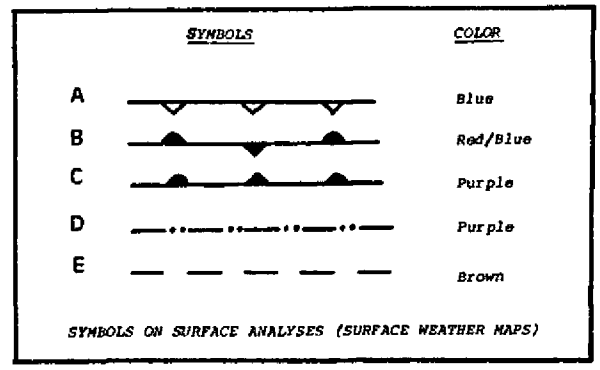
J25
1- At Escanaba, Delta County Airport the threshold of Runway 9 is displaced 400 feet.
2- At Manistee County-Blacker Airport there is a 700-foot unlighted tower located 2 miles southeast.
3- Sault Ste Marie LRCO frequency has been changed to 123.6 MHz.
4- The Oakland-Pontiac Airport is unlighted.

121. Refer to the NOTAMS to the left for Massachusetts and select the true statement.

J25
1- At Fitchburg Municipal Airport there is an unlighted tower northwest of the airport.
2- At Gardner Municipal Airport, the control tower is in operation after dark.
3- At Plum Island Airport, Newburyport, the west 1,000 feet and east 1,000 feet of Runway 10-28 is closed.
4- At Bedford, Laurence G. Hanscom Field, the first 1,000 feet of Runway 11 is unlighted.

122. A list of VOR receiver airborne and ground check points, can be found in which publication?

J29
1- Notices to Airmen.
2- Airport/Facility Directory.
3- Graphic Notices and Supplemental Data.
4- AIM, Basic Flight Information and ATC Procedures.



SYMBOLS ON SURFACE ANALYSES (SURFACE WEATHER MAPS)

123. Refer to the illustration above. Weather conditions associated with symbol "D" are

K01
1- a line of active thunderstorms.
2- stratiform clouds and haze.
3- rain, drizzle, and fog.
4- an area of thundershowers.

124. Refer to the illustration above. Select the symbol which represents an elongated area of relatively low atmospheric pressure called a trough line.

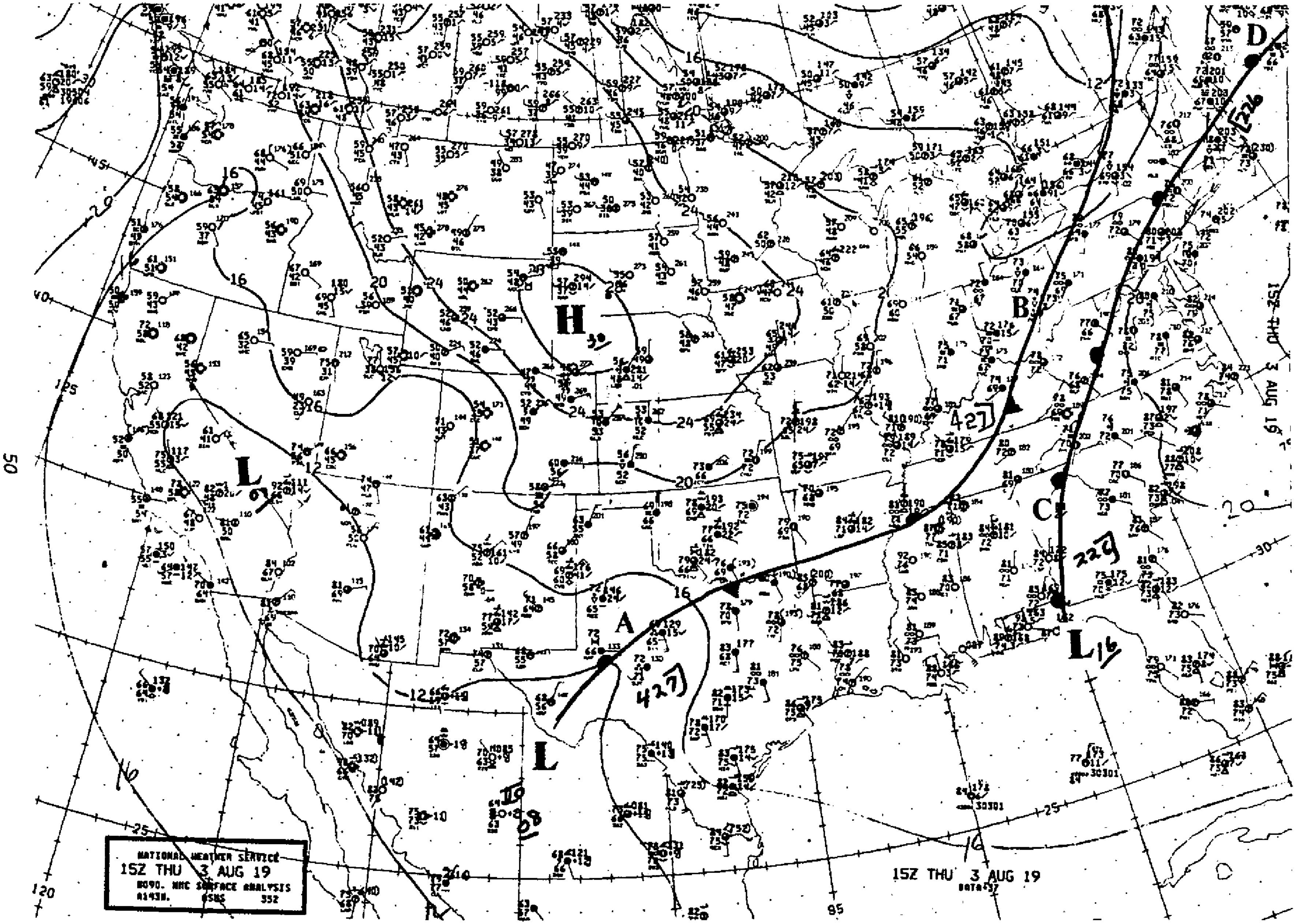
K01
1- B.
2- C.
3- D.
4- E.

125. Select the true statement concerning wind circulation associated with pressure systems in the northern hemisphere, as shown on a Surface Weather Map.

K01
1- Wind circulates counterclockwise around high pressure areas and clockwise around low pressure areas.
2- Wind circulates clockwise around high pressure areas and counterclockwise around low pressure areas.
3- Wind circulates counterclockwise around both high pressure and low pressure areas.
4- Wind circulates clockwise around both low pressure and high pressure areas.

126. Refer to the illustration above. Which symbol represents a stationary front?

K01
1- A.
2- B.
3- C.
4- D.


NATIONAL WEATHER SERVICE
15Z THU 3 AUG 19
SURFACE ANALYSIS
352
15Z THU 3 AUG 19
H
L
L
L
A
B
C
D
427
427
226
229

127. Refer to the Surface Weather Map to the left, and consider the front that extends from point "A" to point "B".

K01
1- This is an occluded front.
2- This is a slow moving warm front.
3- This front has little or no movement.
4- This is a rapidly moving cold front.

128. Refer to the Surface Analysis to the left. The front that extends from the Florida panhandle to Maine is known as

K01
1- a stationary front.
2- a warm front.
3- an occlusion.
4- a cold front.

129. Refer to the Surface Analysis to the left. Concerning wind circulation associated with high and low pressure areas, select the true statement.

K01
1- Wind flows across both high and low pressure areas paralleling isobars.
2- Wind flows outward from high pressure areas and inward to low pressure areas, crossing isobars at an angle.
3- Wind flows outward in both high and low pressure areas, crossing isobars at an angle.
4- Wind flows inward to high pressure areas and outward from low pressure areas, crossing isobars at an angle.

130. The weather information shown on the Surface Weather Map to the left indicates

K01
1- the front that extends from point "A" to point "B" has little or no movement.
2- the front extending from point "C" to point "D" is moving eastward.
3- the surface winds east of the front at point "B" are from the northwest.
4- air circulation around the high pressure area in the upper midwestern states is counterclockwise.

131. The information shown on Surface Weather Maps (such as shown to the left) that should be of greatest value to you as a pilot, is the

K01
1- speed and direction of surface winds and winds aloft.
2- location of icing, turbulence, and thunderstorms.
3- amount, type, and intensity of cloud formations.
4- pressure patterns and the surface location of fronts.

132. The principal value of the Surface Weather Map is that such a map

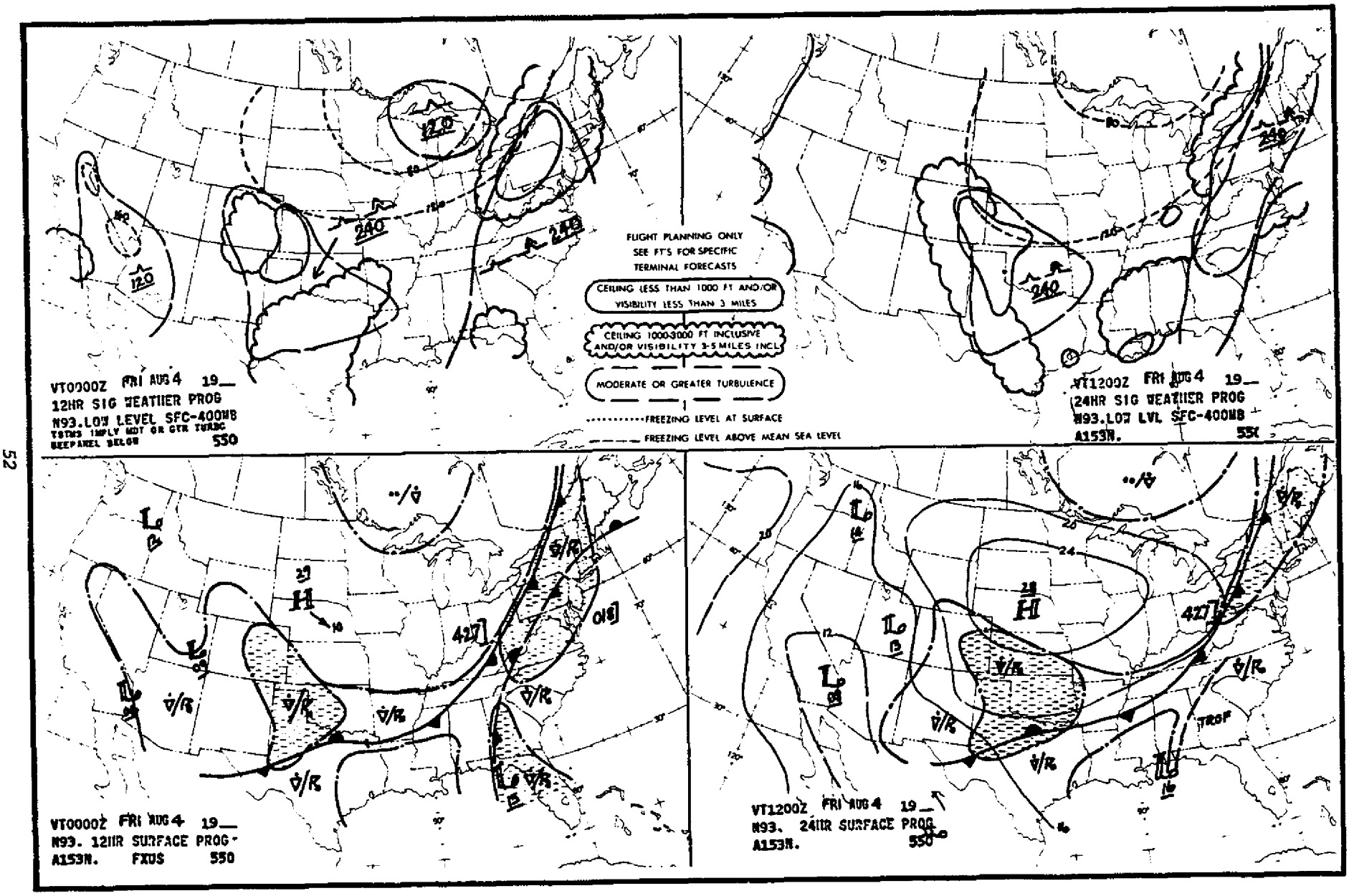
K01
1- provides a means of locating pressure systems and fronts and an overview of winds and temperatures.
2- enables the pilot to accurately forecast weather conditions along the intended route of flight.
3- shows the amount, type, and intensity of cloud formations and the speed and direction of surface winds.
4- enables the pilot to accurately forecast weather conditions at the destination airport.

133. When using a Weather Depiction Chart, you should know that the

K02
1- smooth solid lines enclose areas of constant barometric pressure.
2- smooth solid lines enclose areas containing weather that was below VFR minimums for controlled airspace.
3- scalloped lines enclose areas where the ceiling is below 1,000 feet and the visibility is less than 3 miles.
4- scalloped areas enclose areas which have an overcast below 1,000 feet.

134. A Weather Depiction Chart is useful to a pilot in determining the

K02
1- temperature and dewpoint at selected stations.
2- areas of equal barometric pressure.
3- areas where weather conditions were reported above or below VFR minimums.
4- areas of cloud cover and precipitation that will exist in the next 4 hours.


FLIGHT PLANNING ONLY
SEE FT'S FOR SPECIFIC
TERMINAL FORECASTS
CEILING LESS THAN 1000 FT AND/OR
VISIBILITY LESS THAN 3 MILES
CEILING 1000-3000 FT INCLUSIVE
AND/OR VISIBILITY 3-5 MILES INCL
MODERATE OR GREATER TURBULENCE
FREEZING LEVEL AT SURFACE
FREEZING LEVEL ABOVE MEAN SEA LEVEL
VT0000Z FRI AUG 4 19__
12HR SIG WEATHER PROG
N93. LOW LEVEL SFC-400MB
TSTMS IMPLY MDT OR GTR TURBC
BELOW FL250
550
VT1200Z FRI AUG 4 19__
24HR SIG WEATHER PROG
N93. LOW LVL SFC-400MB
A153N.
VT0000Z FRI AUG 4 19__
N93. 12HR SURFACE PROG
A153N. FXUS 550
VT1200Z FRI AUG 4 19__
N93. 24HR SURFACE PROG
A153N. 550
TROF

135. Areas where takeoffs and landings should not be made under VFR (at the time the chart was drawn) can be noted by referring to which type of weather chart?

K02
1- Significant Weather Prognostic Chart.
2- Weather Depiction Chart.
3- Density Altitude Chart.
4- Radar Summary Chart.

136. Areas enclosed by a scalloped line on a Weather Depiction Chart contain weather conditions that are classified as

K02
1- IFR.
2- DVFR.
3- MVFR.
4- VFR.

137. Areas enclosed by a smooth solid line on a Weather Depiction Chart contain weather conditions classified as

K02
1- IFR.
2- DVFR.
3- MVFR.
4- VFR.

138. On the basis of the VT 1200Z 24-hour Surface Prognostic Chart to the left, which of the following conditions are forecast for Oklahoma?

K03
1- Moderate icing.
2- Showers or thunderstorms.
3- Stratus clouds with poor visibilities.
4- Fog and low ceilings.

139. Refer to the 12-hour Significant Weather Prognostic Chart on the adjacent page. The forecast for central portions of Colorado, Oklahoma, and Texas is for

K03
1- the freezing level to be at 24,000 feet MSL.
2- moderate or greater turbulence up to 24,000 feet.
3- continuous rain showers.
4- the freezing level to be at the surface.

140. On the basis of the Significant Weather Prognostic Chart (VT 1200Z) to the left, at what altitude is the freezing level expected to be in the vicinity of the Great Lakes?

K03
1- 2,000 feet MSL.
2- 4,000 feet MSL.
3- 8,000 feet MSL.
4- 18,000 feet MSL.

141. Which weather chart depicts the conditions as they are forecast at the valid time of the chart?

K03
1- Radar Summary Chart.
2- Surface Analysis.
3- Low Level Prognostic Chart.
4- Weather Depiction Chart.

142. Select the true statement concerning U.S. Low Level Significant Weather Prognostic Charts.

K03
1- These are four-panel charts that forecast the weather for a period of 48 hours.
2- The valid times of the charts are the times the plotted observations were made, rather than the times of the forecasts.
3- These charts are designed for use in domestic flight planning to 24,000 feet.
4- These charts do not depict ceiling, visibility, or turbulence.

143. Which source of information best depicts the forecast ceiling, visibility, turbulence, and the freezing level?

K03
1- Weather Depiction Chart.
2- Significant Weather Prognostic Charts.
3- Radar Summary Chart.
4- Surface Analysis.

144. For flight planning purposes, Significant Weather Prognostic Charts are useful in

K03
1- determining wind direction and velocity at various altitudes and flight levels.
2- determining the prevailing ceiling and visibility at the observation sites.
3- plotting the position of weather fronts during the preceding forecast period.
4- determining the expected movement and changes in weather patterns.

WINDS AND TEMPERATURES ALOFT FORECAST

FDUS1 KWBC Ø6174Ø
DATA BASED ON Ø612ØØZ

VALID Ø7ØØØØZ FOR USE 18ØØ-Ø3ØØZ. TEMPS NEG ABV 24ØØØ

FT	3ØØØ	6ØØØ	9ØØØ	12ØØØ	18ØØØ	24ØØØ	3ØØØØ	34ØØØ	39ØØØ
ABI		2318+Ø5	2329+Ø3	2337-Ø3	2359-16	2386-25	731737	742945	743554
ABQ			2323-Ø9	2337-15	2369-26	73Ø5-34	734345	732846	73Ø547
AMA		1815	2129-Ø3	2239-Ø9	2367-21	73Ø3-29	734241	735748	732952
ATL	99ØØ	2317+11	2423+Ø7	2428+Ø1	2549-12	2651-25	266349	266549	256859
BNA	18Ø6	2418+Ø7	2428+Ø3	2438-Ø2	2453-14	256Ø-26	256849	257Ø49	247158
BRO	24Ø8	2614+18	252Ø+11	2425+Ø4	244Ø-11	235Ø-21	236335	236744	247Ø54

145. What information is provided by the Radar Summary Chart?

K07
1- Areas of clear weather.
2- Lines, cells, and areas of hazardous thunderstorms.
3- Ceilings and precipitation between reporting stations.
4- Areas of cloud cover and fog.

146. Which chart would be useful in preflight planning to identify the movement of a thunderstorm cell?

K07
1- Prognostic Chart.
2- Surface Weather Map.
3- Weather Depiction Chart.
4- Radar Summary Chart.

147. In a Winds and Temperatures Aloft Forecast, the wind direction and windspeed are referenced to

K06
1- magnetic north and knots.
2- magnetic north and statute miles per hour.
3- true north and knots
4- true north and statute miles per hour.

148. Refer to the Winds and Temperatures Aloft Forecast above. What is the wind direction, windspeed, and temperature forecast for Abilene (ABI) at 34,000 feet?

K06
1- 240° @ 129 knots; temperature -45° C.
2- 070° @ 142 knots; temperature -74° C.
3- 290° @ 145 knots; temperature -29° C.
4- 045° @ 74 knots; temperature -42° C.

149. Refer to the Winds and Temperatures Aloft Forecast above. What is the wind direction, windspeed, and temperature forecast for Amarillo (AMA) at 30,000 feet?

K06
1- 130° @ 142 knots; temperature -41° C.
2- 240° @ 73 knots; temperature -10° C.
3- 073° @ 41 knots; temperature -73° C.
4- 230° @ 142 knots; temperature -41° C.

150. Refer to the Winds and Temperatures Aloft Forecast above. Which station forecasts the coldest temperature at or below 24,000 feet?

K06
1- ABI.
2- ABQ.
3- BNA.
4- AMA.

151. Refer to the Winds and Temperatures Aloft Forecast above for Atlanta (ATL). The wind and temperature at 6,000 feet is forecast to be from

K06
1- 170° @ 23 knots; temperature 11° C.
2- 230° @ 17 knots; temperature 11° C.
3- 023° @ 11 knots; temperature 17° C.
4- 170° @ 11 knots; temperature 17° C.

152. In decoding a Winds and Temperatures Aloft Forecast, the coded group 9900+00 means

K06
1- winds light and variable, temperature 0° C.
2- wind from 90° at 9 knots, temperature 0° C.
3- there is no forecast of wind and temperature at a prescribed level.
4- wind in excess of 90 knots, temperature 90° F.

153. Based on the amended forecast for Cape Girardeau (CGI) below, you determine

K09
1- at 15Z the ceiling is forecast to be 600 feet, sky obscured.
2- the surface winds are forecast to change from the northwest to a southwesterly direction by the end of the forecast period.
3- the issue time of this forecast was 1325Z.
4- the fog to be dissipating after 17Z with visibilities improving during the remainder of the forecast period.

154. Based on the Terminal Forecast for Joplin (JLN) below, you determine

K09
1- this forecast is valid beginning on the sixth day of the month at 1000Z valid until 1000Z the following day.
2- after 18Z the surface wind is forecast to be from 315° gusting to 22 knots.
3- the visibility at 18Z is forecast to be 3 miles with freezing drizzle and snow showers.
4- this forecast was amended at 1010Z.

155. Based on the corrected forecast below for Cape Girardeau (CGI) you should expect

K09
1- gusty surface winds from 020° after 14Z.
2- after 01Z the visibility to be 4 miles in thunderstorms.
3- southwesterly surface winds at the beginning of the forecast period.
4- higher ceilings after 04Z.

156. Refer to the Terminal Forecast below for Springfield (SGF). What is the lowest ceiling forecast prior to 04Z?

K09
1- 1,000 feet overcast.
2- 1,400 feet overcast.
3- 800 feet overcast.
4- 1,600 feet broken.

157. Select the true statement concerning Radar Summary Charts.

K07
1- The symbol "NA" on the chart means -- no echo (equipment operating but no echoes observed).
2- These charts can be used to identify areas of clear weather because the absence of echoes guarantees clear skies.
3- Boxes enclosed by a dashed line on the chart indicate a severe weather watch in effect.
4- The symbol "NE" on the chart means -- observation not available.

158. The movement of individual thunderstorm cells often differ from the movement of the overall storm pattern. To which chart would you refer to detect the movement of individual echoes or a line of echoes?

K07
1- Stability Chart.
2- Surface Analysis.
3- Weather Depiction Chart.
4- Radar Summary Chart.

SELECTED TERMINAL FORECASTS

CGI FT COR Ø61Ø1Ø 1Ø28Z 8Ø SCT Ø21Ø. 14Z 4Ø SCT C8Ø BKN Ø213G21
SCT OCNL BKN. Ø1Z C4Ø OVC Ø214 CHC 4R-. Ø4Z MVFR CIG..

JLN FT COR Ø61Ø1Ø 1Ø3ØZ C16 BKN 8Ø OVC Ø315G22 BKN OCNL SCT.
18Z C14 OVC Ø315G22 CHC 5R-. Ø1Z C1Ø OVC Ø414 CHC 3ZR-S-.
Ø4Z IFR CIG ZR-S-..

SGF FT COR Ø61Ø1Ø 1Ø3ØZ C16 BKN 8Ø OVC Ø315G22 BKN OCNL SCT.
18Z C14 OVC Ø315G22 CHC 5R-. Ø1Z C1Ø OVC Ø414 CHC 3ZR-S-.
Ø4Z IFR CIG ZR-S-..

CGI FT AMD1 Ø613Ø 1325Z C6X3F 33Ø. 15Z C1Ø BKN 5F Ø112.
17Z C2Ø BKN 8Ø OVC Ø112G2Ø. Ø1Z C14 OVC Ø214 CHC 4R-.
Ø4Z MVFR CIG R BCMG IFR CIG R..

AREA FORECAST

DFW FA 131240
131300Z-140700Z
OTLK 140700Z-141900Z

NM OK TX AND CSTL WTRS...

HGTS ASL UNLESS NOTE...

FLT PRCTN...E OF PNC-SPS-LRD LN FOR TSTMS AND ICG. ERN HLF TX FOR CIGS BLO 10 VSBY BLO 3 TIL ARND 18Z. PTNS WRN TX SERN NM FOR BD AND TURBC 17Z-02Z.

SYNS... AT 13Z CDFNT NR A GCK-SPS-DLF LN MOVG EWD ABT 20 KTS TO NR A SHV-BRO LN BY 07Z.

CLDS AND WX...
OK AND TX ALG AND AHD CDFNT...
WDSPRD CIGS BLO 10 OVC VSBYS LCLY BLO 3L-F OVR TX PTN AND CIGS 15-25 OVC OK PTN. TOPS LYRD TO 150. SCT RW OVR AREA WITH ISOLD TRW OK PTN. CB TOPS 280. 16Z-18Z OVR TX CIGS IPVG TO 15-25 BKN-OVC VSBYS 7 MI OR BTR WITH RW/TRW INCRG OVR ENTR AREA. AFT 19Z OVR ERN THIRD TX PSBL SVR TSTMS TOPS ABV 350. OTLK...MVFR CIG.

SERN QTR NM RMNDR TX AND OK BHND CDFNT...
MSTLY CLR BCMG AFT 17Z PTCHY CIGS 80-100 BKN 120-150. ALSO AFT 17Z VSBYS LCLY 2-4BD IN CDS-ABI-INK-CVS AREA. D TOPS 100-120 WITH VSBYS IPVG ARND 02Z. SFC WIND 3020G35 17Z-02Z. OTLK...VFR CLR.

WRN AND NRM NM...
PTCHY 80-100 BKN-SCT 120 WRN HLF OTRW MSTLY CLR. AFT 17Z MSTLY CLR WRN HLF AND PTCHY 80-100 BKN 150 NERN QTR WITH HIR RDGS OCNLY OBSCD. OVR NCNTRL MTNS CHC 2SW- 17Z-01Z. OTLK...VFR.

CSTL WTRS...
10-20 SCT CIG 80-100 BKN TOPS 150 WITH WDLY SCT RW-. AFT 22Z RW INCRG WITH SCT TRW. RW TOPS 180. CB TOPS 300. OTLK...MVFR CIG TRW BCMG VFR 12Z.

ICG AND FRZLVL...MDT MXD ICGICIP ABV FRZLVL AHD CDFNT. LGT RIME ICGIC BHND CDFNT. FRZLVL 70 NRN NM SLPG TO 100 SWRN TX AND 90 NERN OK SLPG TO 120 SRN TX.

TURBC...OCNL MDT TURBC SERN NM AND OVR WRN TX MAINLY 17Z-02Z. ELSW GENLY LGT TURBC.

THIS FA ISSUANCE CANCELS THE FOLLOWING AIRMETS...QUEBEC 1 ROMEO 1.

STATION IDENTIFIERS

ABI	ABILENE, TX	INK	WINK, TX
BRO	BROWNSVILLE, TX	LRD	LAREDO, TX
CDS	CHILDRESS, TX	PNC	PONCA CITY, OK
CVS	CLOVIS, NM	SHV	SHREVEPORT, LA
DLF	DEL RIO, TX	SPS	WICHITA FALLS, TX
GCK	GARDEN CITY, KS		

159. In Area Forecasts, cloud heights are given in reference to

K08
1- ground level only.
2- density altitude.
3- pressure altitude.
4- sea level or ground level.

160. Based on the Area Forecast to the left for the coastal waters of Texas, you determine that

K08
1- widely scattered severe thunderstorms with hail at the surface are forecast prior to 22Z.
2- the cumulonimbus cloud tops are forecast to reach 30,000 feet after 22Z.
3- rain showers are forecast to decrease in intensity after 22Z.
4- ceilings are forecast to be 800 to 1,000 feet broken at the beginning of the forecast period.

161. Refer to the Area Forecast to the left. Which statement is true?

K08
1- Over Oklahoma along and ahead of the cold front, the ceilings are forecast to be below 1,000 feet overcast.
2- The outlook is for weather conditions over the coastal waters to deteriorate after 12Z.
3- The weather in the western half of New Mexico after 17Z is forecast to be mostly clear.
4- Flight precautions are in effect for the western half of Texas for ceilings below 1,000 feet and visibilities less than 3 miles.

162. It is a true statement to say that Area Forecasts are issued every

K08
1- 12 hours and cover a 12-hour period with an additional 6-hour outlook.
2- 6 hours and the distances are in nautical miles, while visibilities are in statute miles.
3- 12 hours and cover an 18-hour period with an additional 12-hour outlook.
4- 18 hours and windspeed is in knots, with wind direction in degrees magnetic.

163. What is the meaning of "MVFR" as used in the categorical outlook portion of Area Forecasts?

K08
1- Ceiling 800 to 1,000 feet; visibility less than 3 miles.
2- Ceiling 1,500 feet; visibility 1 mile to less than 3 miles.
3- Ceiling greater than 3,000 feet; visibility 3 to 5 miles.
4- Ceiling 1,000 to 3,000 feet; and/or visibility 3 to 5 miles.

164. Refer to the Area Forecast on the adjacent page. Which statement is true?

K08
1- The outlook for Oklahoma and Texas along and ahead of the cold front is for ceilings of 1,000 to 3,000 feet; and/or visibility 3 to 5 miles.
2- The weather in the western half of New Mexico after 17Z is forecast to be MVFR.
3- The outlook is for weather conditions over the coastal waters to deteriorate after 12Z.
4- This type forecast is issued every 18 hours and windspeed is in knots with wind direction in degrees magnetic.

165. Which statement is true concerning In-Flight Weather Advisories?

K13
1- AIRMETS will be issued concerning weather phenomena of such severity as tornadoes, embedded thunderstorms, squall lines, severe and extreme turbulence, 3/4" hail, and severe icing.
2- SIGMETS include weather phenomena less severe than those covered by AIRMETS.
3- In-Flight Weather Advisories are also called PIREPS (Pilot Weather Reports).
4- In-flight advisories are unscheduled forecasts to advise en route aircraft of the development of potentially hazardous weather.

IN-FLIGHT ADVISORIES

DFW WA Ø61Ø5Ø
Ø61Ø5Ø-Ø6165Ø

CNL AIRMET CHARLIE 1. CONDS INCLD IN AIRMET ALFA 3.

AIRMET ALFA 3. FLT PRCTN. NM OK PNHDL NWRN TX DUE LOW CIGS LOW VSBYS OBSCMT AND ICG. OVR NM OK PNHDL NWRN TX GENLY N OF 6Ø W DMN-INK-CDS LN CIGS OCNLY BLO 1 THSD VSBYS BLO 3 MIS SNW FRZG DRZL AND FOG MORE FQT OVR NM. MDT MXD ICGICIP BLO 1ØØ OVR OK AND TX AND BLO 14Ø OVR NM. TRRN 7Ø AND ABV FQTLY OBSCD. CONDS CONTG PAST 165ØZ.

DFW WA Ø611Ø5
Ø611Ø5-Ø617Ø5

AIRMET BRAVO 2. FLT PRCTN. NM OK TX CSTL WTRS DUE STG LOW LVL WNDS TURBC AND OVR NM UDDF. OVR NM OK TX AND CSTL WTRS WNDS 3Ø KTS OR MORE WITHIN 2 THSD FT SFC. MDT TURBC BLO 1ØØ OK TX AND CSTL WTRS AND 15Ø AND BLO OVR NM. OCNL STG UDDF ALG ERN SL.

DFW WA Ø6163Ø
Ø6163Ø-Ø618ØØ

AIRMET DELTA 2. FLT PRCTN. PTNS S CNTRL AND SWRN TX DUE LOW CIGS AND LOW VSBYS. OVR S CNTRL AND SWRN TX GENLY W OF AUS-MFE LN AND E OF SJT-DRT LN CIGS BLO 1 THSD VSBYS OCNLY BLO 3 MIS DRZL AND FOG. CONDS IPVG AND ENDG ARND 18Z. CNL AIRMET 18Z.

DFW WA Ø61545 COR
Ø61545-Ø62145

AIRMET ALFA 4. FLT PRCTN. NM OK PNHDL NWRN TX DUE LOW CIGS LOW VSBYS AND OBSCMT. OVR NM OK PNHDL NWRN TX GENLY N OF 6Ø W DMN-INK-MAF-CDS LN CIGS OCNLY BLO 1 THSD VSBYS BLO 3 MIS SNW FRZG DRZL AND FOG. TRRN 7Ø AND ABV GENLY OBSCD. CONDS CONTG PAST 2145Z.

STATION IDENTIFIERS

AUS	Austin, TX	INK	Wink, TX
CDS	Childress, TX	MAF	Midland, TX
DMN	Deming, NM	MFE	McAllen, TX
DRT	Dalhart, TX	SJT	San Angelo, TX

166. Refer to the In-Flight Advisory above. Which statement is true concerning "AIRMET ALFA 4"?

K13
1- Northwestern Texas has moderate turbulence below 6,000 feet MSL.
2- "AIRMET ALFA 4" was issued at 0615 Greenwich time.
3- The terrain 7,000 feet and above is generally obscured in the areas mentioned in the AIRMET.
4- Flight precautions are advised for southern and central Texas, due to blowing snow and strong winds.

167. Which statement is true in regard to In-Flight Weather Advisories?

K13
1- SIGMET advisories include weather phenomena potentially hazardous to all aircraft.
2- AIRMET advisories concern such severe weather phenomena as tornadoes, thunderstorms, and severe turbulence.
3- Both SIGMETS and AIRMETS are broadcast on receipt and at quarter-hour intervals thereafter.
4- SIGMETS include weather phenomena less severe than those covered by AIRMETS.

168. Which statement is true concerning In-Flight Weather Advisories?

K13
1- SIGMETS include weather phenomena less severe than those covered by AIRMETS.
2- Both SIGMETS and AIRMETS are broadcast on receipt and at quarter-hour intervals thereafter.
3- AIRMET advisories concern such severe weather phenomena as tornadoes, thunderstorms, and severe turbulence.
4- The purpose of this service is to notify en route pilots of the possibility of encountering hazardous flying conditions.

169. Refer to the In-Flight advisory to the left. Which statement is true concerning "AIRMET DELTA 2"?

K13
1- The stated conditions are forecast to be improving and to end around 1800Z.
2- "AIRMET DELTA 2" was issued at 0616 Greenwich time.
3- In Texas, west of line between Austin and McAllen, a line of thunderstorms with moderate turbulence is developing.
4- Flight precautions are advised due to freezing rain and drizzle over portions of central and southern Texas.

170. Refer to the In-Flight Advisory to the left above. Which statement is true concerning "AIRMET ALFA 3"?

K13
1- In Oklahoma and Texas, moderate mixed icing in clouds and precipitation is not expected above 1,000 feet.
2- Over portions of New Mexico, Oklahoma, and northwestern Texas, the ceilings will occasionally be below 1,000 feet.
3- Heavy rain, hail, and thunderstorms are occurring in New Mexico and portions of central Texas.
4- Visibilities are expected to be below 1 mile due to blowing dust in the Oklahoma panhandle and surrounding areas.

SELECTED SURFACE AVIATION WEATHER REPORTS

MLC SA 1252 E23 OVC 7 126/34/3Ø/361Ø/991
ADM SA 1252 E2Ø BKN 2Ø 37/26/3612G22/989

171. Which statement regarding the aviation weather reports above for McAlester (MLC) or Ardmore (ADM) is true?

K12
1- At ADM the temperature/dewpoint spread is greater than at MLC.
2- At MLC the altimeter setting is 31.26 inches.
3- At ADM the 20,000-foot broken layer of clouds is more than 0.9 sky cover.
4- At ADM the temperature/dewpoint spread is such that the formation of fog is likely.

172. Suppose a PIREP indicates "moderate clear air turbulence above 5,000 feet." Which statement correctly describes the intensity of this turbulence and aircraft reaction to the turbulence?

K13
1- Rapid jolts or bumps with appreciable change in aircraft altitude or attitude. The aircraft may be momentarily out of control.
2- Large variations in indicated airspeed; large and abrupt changes in altitude and attitude. The aircraft may be momentarily out of control.
3- Variations in indicated airspeed, changes in altitude and/or attitude, but the aircraft is controllable at all times.
4- Rapid and rhythmic bumpiness without appreciable changes in attitude or altitude.

UA /OV MRB-PIT 16ØØ FLØ8Ø /TP BE55 /SK ØØ4 BKN Ø12/Ø22 BKN-OVC /TA Ø1 /IC LGT-MDT RIME Ø35-Ø6Ø /RM WIND COMP HEAD Ø2Ø MH31Ø TAS 18Ø

173. The Pilot Report above for a flight between Martinsburg (MRB) and Pittsburgh (PIT), indicates that a pilot

K13
1- reported three layers of broken/overcast clouds.
2- was flying a compass heading of 020° at the time of the report.
3- did not report the outside air temperature.
4- reported the base of the broken clouds is 1,200 feet with tops at 2,200 feet.

318-376 0 - 80 - 5

SELECTED SURFACE AVIATION WEATHER REPORTS

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     SA21 Ø613ØØ
MLC SA 1252 E23 OVC 7 126/34/3Ø/361Ø/991
ADM SA 1252 E2Ø BKN 2Ø 37/26/3612G22/989
DAL SA 125Ø M35 OVC 15 4Ø/32/3313/988/BINOVC
TYR SA 125Ø M1Ø OVC 7 56/54/34Ø5/982
FTW SA 1255 M3Ø OVC 7 37/32/3213/988
DFW SA 1253 M38 OVC 15 117/39/31/34Ø9/988
CLL RS 1255 E25 OVC 7 Ø93/59/58/36Ø6/982/ OVC75
LFK SA 125Ø E35 BKN 7 1Ø5/59/57/11Ø6/985
OKC SA 1254 M23 OVC 15 156/3Ø/22/Ø119G27/997/PK WND Ø127/48
WDG SA 1245 5Ø -BKN 1Ø 28/M/Ø318/ØØØ
TUL SA 1253 M2Ø OVC 15 159/34/25/Ø318G24/999


→ NO SUMØ613Ø2
→ DAL 11/ØØ1 SLR THR 17 DSPLCD 215Ø/ARPT CLSD NIGHT
→ FTW 11/ØØ2 F16 ALS OTS
→ DFW 11/ØØ1 DFW CRANE 3ØAGL 7ØØNW AER 13L DAY
→ DFW 11/ØØ2 DFW NORTH 75Ø 13L-31R CLSD THRU 5/31
→ CLL 11/ØØ1 CFD RWY LGTS OTS
→ OKC 12/ØØ6 OKC EFAS FORT SMITH OUTLET OTS
→ TUL 11/ØØ5 MEE VOR OTS
→ TUL 11/Ø1Ø TUL ILS GS 17L OTS
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174. Refer to the Aviation Weather Reports and NOTAM Summary above for Dallas (DAL) and for Enid (WDG). Which statement is true?

K12
1- At DAL the surface windspeed is greater than at WDG.
2- Dallas reports a NOTAM for Sulphur Springs (SLR) concerning the displacement of Runway 17 threshold.
3- The altimeter setting for WDG is missing.
4- The WDG dewpoint is below 0° F.

175. Refer to the Aviation Weather Reports above for MLC and for CLL. Which statement is true?

K12
1- The sea level pressure is greater at CLL than at MLC.
2- The temperature/dewpoint spread is greater at CLL than at MLC.
3- There is no reason to believe that fog will develop at CLL.
4- The wind at MLC is from the south at 10 knots.

176. Refer to the Aviation Weather Reports and NOTAM Summary above for Dallas-Fort Worth (DFW) and for Tyler (TYR). Which statement is correct?

K12
1- At DFW the altimeter setting is 31.17 inches.
2- There are two NOTAMS concerning operations from Runway 13L at DFW.
3- The visibility at TYR is greater than at DFW.
4- The temperature/dewpoint spread is greater at TYR than at DFW.

177. Select the true statement pertaining to the Aviation Weather Reports and NOTAM Summary above for Oklahoma City (OKC) or for Tulsa (TUL).

K12
1- Both TUL and OKC have measured overcast ceilings and NOTAMS are listed for both stations.
2- The visibility is greater at OKC than at TUL.
3- The altimeter setting at TUL is 31.59 inches.
4- The temperature at OKC is higher than the temperature at TUL.

178. Cumulonimbus clouds can best be described as

K17
1- thin, white, feather like clouds in patches or narrow bands formed on the crests of waves created by barriers in the windflow.
2- white or gray layers or patches of solid clouds, usually appearing in waves.
3- dense clouds, dark at lower levels extending many thousands of feet upward.
4- fluffy, white clouds appearing in layers and sometimes producing steady precipitation.

179. Consider the following statements about mountain waves.

A. Mountain waves always develop on the upwind (windward) side of mountain ridges.
B. In a mountain wave the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downstream.
C. If the air is humid and the wave is of large amplitude, lenticular (lens-shaped) clouds may mark the wave's crest.
D. In a typical wave, the greatest amplitude is seldom more than 1,000 feet above the ridge crest elevation.

Select from the statements above those which are true.

K17
1- B, C.
2- A, B, C.
3- A, C, D.
4- A, B, C, D.

180. Almond or lens-shaped clouds formed on the leeward side of a mountain range, are known as

K17
1- cirrocumulus clouds.
2- roll clouds.
3- cirrus clouds.
4- lenticular clouds.

181. Hail is most likely to be associated with which type of cloud formation?

K17
1- Cumulonimbus.
2- Cumulus.
3- Stratocumulus.
4- Cirrocumulus.

182. Listed below are factors which change density altitude.

A. Decreasing barometric pressure.
B. Increasing barometric pressure.
C. Decreasing temperature.
D. Increasing temperature.
E. Decreasing relative humidity.
F. Increasing relative humidity.

Select the factors which <u>increase</u> the <u>density altitude</u> at a given airport.

K16
1- B, C, F.
2- A, D, F.
3- B, C, E.
4- A, D, E.

183. Meteorological and Notices to Airmen data are recorded on tapes and broadcast continuously over selected radio facilities, including

K15
1- En Route Flight Advisory Service (EFAS).
2- Automatic Terminal Information Service (ATIS).
3- low-frequency navigational aids and VORs.
4- all Flight Service Stations.

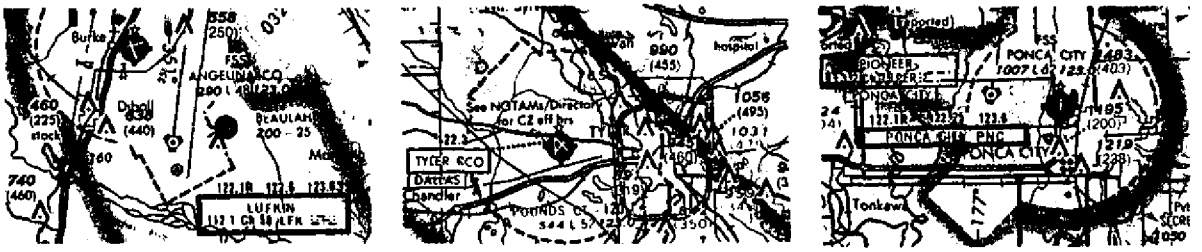
184. Transcribed Weather Broadcasts (TWEB) containing recorded meteorological and Notices to Airmen data are transmitted continuously over which of the following?

K15
1- Automatic Terminal Information Service (ATIS).
2- Selected low-frequency navigational aids and VORs.
3- Stage III, Radar Sequencing and Separation Service for VFR aircraft.
4- Flight Service Stations at 15 and 45 minutes after the hour on 123.5 MHz.

185. Recorded meteorological information and Notices to Airmen data are broadcast continuously over navigational aids by selected Flight Service Stations. These broadcasts are known as

K15
1- Automatic Terminal Information Service (ATIS).
2- En Route Flight Advisories Service (EFAS).
3- Scheduled Weather Broadcasts (SWB).
4- Transcribed Weather Broadcasts (TWEB).

SECTIONAL CHART SEGMENTS



SELECTED SURFACE AVIATION WEATHER REPORTS

SA21 Ø614ØØ
LFK SA 1353 35 SCT 25Ø SCT 7 11Ø/6Ø/57/11Ø9/986
TYR SA 135Ø 28 SCT M35 OVC 15 4Ø/32/3513/991/BINOVC
PNC SA 135Ø 2Ø SCT E5Ø BKN 12Ø BKN 15 171/28/14/Ø416G23/ØØ1

STATION IDENTIFIERS

LFK	Lufkin, Texas
TYR	Tyler, Texas
PNC	Ponca City, Oklahoma

186. According to the Aviation Weather Report and the chart segment above for Ponca City (PNC), you would expect to find the base of the highest layer of clouds above Ponca City Airport at what indicated altitude?

K18
1- 5,000 feet MSL.
2- 6,007 feet MSL.
3- 12,000 feet MSL.
4- 13,007 feet MSL.

187. Based on the Aviation Weather Report and the chart segment above for Tyler, Texas, the ceiling above Pounds Field is at what indicated altitude?

K18
1- 4,044 feet MSL.
2- 3,500 feet MSL.
3- 3,344 feet MSL.
4- 2,800 feet MSL.

188. Based on the Aviation Weather Report and the chart segment above for Tyler, Texas, the base of the lowest clouds above Pounds Field is at what indicated altitude?

K18
1- 2,800 feet MSL.
2- 3,344 feet MSL.
3- 3,500 feet MSL.
4- 4,044 feet MSL.

189. According to the Aviation Weather Report and the chart segment above for Ponca City (PNC), the lowest ceiling above Ponca City Airport is at what indicated altitude?

K18
1- 12,007 feet MSL.
2- 6,007 feet MSL.
3- 5,000 feet MSL.
4- 3,007 feet MSL.

190. Based on the Aviation Weather Report and the chart segment above for Lufkin, Texas, the base of the lowest layer of clouds above Angelina County Airport would be at what indicated altitude?

K18
1- 2,790 feet MSL.
2- 2,500 feet MSL.
3- 3,790 feet MSL.
4- 3,500 feet MSL.

191. Refer to the Aviation Weather Report and the chart segment above for Lufkin, Texas. At what indicated altitude would you expect to find the base of the highest layer of clouds above Angelina County Airport?

K18
1- 25,290 feet MSL.
2- 25,000 feet MSL.
3- 3,790 feet MSL.
4- 2,790 feet MSL.

192. Refer to the Aviation Weather Report and the chart segment above for Ponca City (PNC). The base of the lowest clouds above the Ponca City Airport would be at what indicated altitude?

K18
1- 2,000 feet MSL.
2- 3,007 feet MSL.
3- 5,000 feet MSL.
4- 6,007 feet MSL.

193. Which type of cloud formation is most likely to produce hail?

K17
1- Cirrocumulus.
2- Cumulonimbus.
3- Stratocumulus.
4- Altocumulus castellanus.

194. If the temperature/dewpoint spread is 4° and decreasing, and the temperature is 62° F., what type weather is most likely to develop?

K20
1- Rain showers.
2- Fog or low clouds.
3- Thunderstorms.
4- Freezing precipitation.

195. The temperature to which moist air must be cooled to become saturated is defined as

K20
1- sublimation.
2- condensation nuclei.
3- relative humidity.
4- the dewpoint.

196. If your destination airport reports a temperature of 45° F. and a dewpoint of 41° F. with spread between the two decreasing, which type weather would you most likely encounter upon arrival?

K20
1- Fog or low clouds.
2- Thunderstorms and cold frontal-type weather.
3- An increase in pressure altitude.
4- Freezing precipitation or icing conditions.

197. Low-level wind shear is best described as

K19
1- deflection of wind currents as the result of Coriolis force.
2- a downward motion of the air associated with continuous winds blowing with an easterly component due to the rotation of the earth.
3- a change in wind direction and/or speed in a very short distance in the atmosphere.
4- a violently rotating column of air extending from a cumulonimbus cloud.

198. Which statement is true regarding the in-flight hazard called HAIL?

K19
1- Hail is usually produced by cirrocumulus clouds.
2- Large hailstones usually do not have alternating layers of clear and cloudy ice.
3- Subtropical and tropical thunderstorms contain more hail than thunderstorms in northern latitudes.
4- Large hail is most commonly found in thunderstorms which have strong updrafts and large liquid water content.

199. Which statement is true regarding HAIL?

K19
1- Subtropical and tropical thunderstorms contain more hail than thunderstorms in northern latitudes.
2- Large hailstones are entirely composed of clear ice.
3- Hail is usually produced by cirrocumulus clouds.
4- Hail is usually produced during the mature stage of a thunderstorm's life span.

200. Low-level wind shear occurs

K19
1- when surface winds are 15 knots and there is no change in wind direction and windspeed with height.
2- when there is a low-level temperature inversion with strong winds above the inversion.
3- after a warm front has passed.
4- when surface winds are light and variable.

201. Suppose hazardous low-level wind shear is encountered during the initial climb after takeoff. Select the true statement.

K19
1- The wind direction will always change from a headwind to a tailwind when flying through wind shear.
2- When passing through wind shear the groundspeed will usually remain constant.
3- Low-level wind shear may be associated with a thunderstorm's gust front that precedes the actual storm by 15 nautical miles.
4- The pilot should decrease power to compensate for the increase in lift.

202. Cloud heights as reported in the Surface Aviation Weather Reports are reported in hundreds of feet above

K21
1- mean sea level (MSL).
2- ground level at the station of observation.
3- the highest terrain within the Airport Traffic Area of the station of observation.
4- the highest terrain within 5 statute miles from the station of observation.

203. Supercooled rain falling through colder air may freeze during its descent, falling as

K22
1- ice pellets.
2- rime ice.
3- snow.
4- hail.

204. Which of the following would decrease the stability of an air mass?

K22
1- Warming from below.
2- Cooling from below.
3- Decrease in water vapor.
4- Sinking of the air mass.

205. A moist, cold air mass that is being warmed from below is characterized, in part, by

K22
1- smooth air.
2- fog and drizzle.
3- continuous heavy precipitation.
4- showers and thunderstorms.

206. Select the true statement concerning a temperature inversion.

K22
1- A temperature inversion normally develops with a decrease in the temperature as height is increased.
2- A temperature inversion occurs when unstable air rapidly transfers heat from the surface upward.
3- A temperature inversion often develops near the ground on clear, cool nights when the wind is light.
4- A temperature inversion is usually indicated by the base of a line of cumulus clouds.

207. Suppose conditionally unstable air with high moisture content and very warm surface temperatures are forecast. From these conditions you should expect

K22
1- continuous heavy precipitation.
2- fog and drizzle.
3- strong updrafts and cumuliform clouds.
4- smooth air and excellent weather for flying.

208. A temperature inversion would most likely result in which of the following weather conditions?

K22
1- Clouds with extensive vertical development above an inversion aloft.
2- Good visibility in the lower levels of the atmosphere and poor visibility above an inversion aloft.
3- An increase in temperature as altitude is increased.
4- A decrease in temperature as altitude is increased.

209. The weather condition normally associated with unstable air is

K22
1- good visibility, except in blowing sand or snow.
2- stratiform clouds.
3- fair to poor visibility.
4- continuous precipitation.

210. Advection fog is formed as a result of

K21
1- moist air condensing as it moves over a cooler surface.
2- the ground cooling adjacent air to the dewpoint temperature on clear, calm nights.
3- the addition of moisture to a mass of cold air as it moves over a body of water.
4- moist, unstable air being cooled as it is forced up a sloping land surface.

211. Radiation fog is most likely to occur under which of the following conditions?

K21
1- Low temperature/dewpoint spread, calm wind conditions, the presence of hydroscopic nuclei, low overcast, and favorable topography.
2- Warm, moist air being forced upslope by light winds resulting in the air being cooled and condensed.
3- Warm, moist air flowing from a body of water over a cold surface with an 8 to 10 knot wind causing mixing and condensation.
4- A clear sky, little or no wind, and small temperature/dewpoint spread.

212. An advancing warm front containing moist and stable air is characterized, in part, by

K23
1- a wall of turbulent clouds known as a "squall line."
2- stratiform clouds and smooth air.
3- thunderstorms embedded in the cloud masses.
4- tornadic activity and extensive electrical discharges.

213. Regarding the characteristics and weather associated with a warm front, which of the following is a true statement?

K23
1- The presence of thunderstorms in a warm front is usually easy to detect, since they are not embedded in cloud masses.
2- The frontal zone may have low ceilings and zero visibilities over a wide area.
3- Colder air is overtaking and replacing warmer air and this usually produces wide bands of precipitation ahead of the warm front surface position.
4- Squall lines sometimes develop 300 miles ahead of warm fronts.

214. Sometimes the opposing forces exerted by adjacent air masses of different densities are such that the frontal surfaces between them show little or no movement. This is known as

K23
1- an occluded front.
2- a stationary front.
3- a frontogenesis.
4- a frontolysis.

215. The leading edge of an advancing cold air mass overtaking and replacing warmer air at the surface, is

K23
1- a cold front.
2- an occluded front.
3- a warm front.
4- a frontogenesis.

216. When a cold front overtakes a warm front, the two of them join together to form

K23
1- an occluded front.
2- a dewpoint front.
3- a stationary front.
4- a squall line.

217. The temperature at which moisture in the air begins to condense is called

K22
1- dewpoint.
2- lapse rate.
3- relative humidity.
4- divergence.

218. Which statement is true concerning the use of a Pseudo-Adiabatic Chart? The adiabatic chart

K22
1- provides assistance to pilots facing hazardous or unknown weather and winds aloft and is adapted from in-flight advisories.
2- is a forecast of the vertical temperature profile and moist adiabatic changes.
3- is used to graphically compute adiabatic changes in vertically moving air and to determine stability.
4- cannot be relied upon to determine the existence of an inversion aloft.

219. The ratio of the existing water vapor in the air, as compared to the maximum amount that could exist at a given temperature, is called

K22
1- convergence.
2- saturation point.
3- relative humidity.
4- the dewpoint.

220. Which statement is true concerning the use of a Pseudo-Adiabatic Chart or the information it provides?

K22
1- The adiabatic chart provides assistance to pilots facing hazardous or unknown weather and contains data compiled from in-flight advisories.
2- The strength of thermals is in proportion to the magnitude of the positive value of the thermal index (TI).
3- The strength of thermals is in proportion to the magnitude of the negative value of the thermal index (TI).
4- The adiabatic chart is a forecast of the vertical temperature profile and moist adiabatic changes.

221. A nonfrontal, narrow band of active thunderstorms, that often develop ahead of a cold front, is known as

K24
1- an occlusion.
2- a prefrontal system.
3- a squall line.
4- a shear line.

222. Select the statement which is correct in regard to the life cycle of a thunderstorm.

K24
1- Throughout the dissipating stage of a thunderstorm the updrafts continue to develop.
2- The beginning of rain at the earth's surface indicates the dissipating stage of the thunderstorm.
3- The beginning of rain at the earth's surface indicates the mature stage of the thunderstorm.
4- The initial stage of a thunderstorm is always a nimbus cloud which means "rain cloud."

223. If there is thunderstorm activity in the vicinity of an airport at which you plan to land, which hazardous and invisible atmospheric phenomenon might you expect to encounter on the landing approach?

K24
1- St. Elmo's Fire.
2- Wind shear turbulence.
3- Tornadoes.
4- Virga.

224. Tornadoes are most likely to occur with which type of thunderstorms?

K24
1- Squall line thunderstorms that form ahead of warm fronts.
2- Tropical thunderstorms during the mature stage.
3- Steady-state thunderstorms associated with cold fronts or squall lines.
4- Air mass thunderstorms.

225. A squall line preceding a cold front may often be characterized by

K24
1- widespread fog and extremely cold surface temperature.
2- thunderstorms and turbulence.
3- milder weather conditions than the cold front itself.
4- fog, low stratus clouds, and steady drizzle.

226. A squall line is usually associated with which type of frontal weather?

1- A fast-moving cold front.
2- A fast-moving warm front.
3- A stationary front.
4- An occluded front.

227. The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with

K24
1- slow-moving warm fronts.
2- slow-moving cold fronts.
3- squall line thunderstorms.
4- fast-moving fronts.

228. Thunderstorms are produced by which type of clouds?

K24
1- Nimbostratus.
2- Altostratus.
3- Cumulonimbus.
4- Stratocumulus.

229. Which hazardous clouds (among others) are specifically mentioned in Surface Aviation Weather reports?

K24
1- Nimbostratus clouds.
2- Noctilucent clouds.
3- Cirrus clouds.
4- Cumulonimbus mamma clouds.

230. The boundary between two different air masses is referred to as a

K23
1- foehn gap.
2- frontolysis.
3- frontogenesis.
4- front.

231. Which statement is true concerning an approaching warm front that had been forecast for the area?

K23
1- The first clouds that would appear are called cirrus clouds.
2- Squall lines often develop 100 miles ahead of the surface position of a warm front.
3- Warm front weather normally extends only a short distance ahead of and a greater distance behind the surface position of the front.
4- The weather associated with warm fronts normally extends 200-300 miles behind the surface position of the front.

232. Frost which has not been removed from the lifting surfaces of an airplane before flight

K25
1- may prevent the airplane from becoming airborne.
2- may cause the airplane to become airborne with a lower angle of attack and at a lower indicated airspeed.
3- will change the camber (curvature of the wing) thereby increasing lift during the takeoff.
4- would present no problems since frost will blow off when the airplane starts moving during takeoff.

233. Which statement is true regarding frost which has not been removed from the lifting surfaces of an airplane before flight?

K25
1- It may prevent the airplane from becoming airborne at normal takeoff speed.
2- It will change the curvature of the wing (camber) thereby increasing lift during the takeoff.
3- It may cause the airplane to become airborne with a lower angle of attack and at a lower indicated airspeed.
4- It would present no problems since frost will blow off when the airplane starts moving during takeoff.

234. Which statement is true regarding aircraft structural icing?

K25
1- It is impossible for weather forecasters to identify regions where icing will form.
2- Rime ice is the most common type of ice encountered in cumuliform clouds.
3- The most rapid accumulations of clear ice are usually at temperatures from 0° C. to -15° C.
4- The most common type of icing encountered in lower level stratus clouds is clear ice.

235. In flight, clear ice may accumulate on an aircraft structure most rapidly with the outside air temperature between 0° C. to -15° C., in

K25
1- ice fog.
2- any clouds or dry snow.
3- cumuliform clouds.
4- stratiform clouds.

236. The type of ice which forms on an aircraft structure in flight, depends on

K25
1- the increase in flight altitude.
2- the temperature/dewpoint spread.
3- the size of the water droplets that strike the aircraft surface.
4- an inversion aloft.

237. Tornadoes frequently form with which type thunderstorms?

K24
1- Squall line thunderstorms that form ahead of warm fronts.
2- Tropical thunderstorms during the mature stage.
3- Steady-state thunderstorms associated with cold fronts or squall lines.
4- Air mass thunderstorms.

238. When flying in the vicinity of thunderstorms, you should be aware that

K24
1- the most severe conditions, such as heavy hail, destructive winds, and tornadoes are generally associated with squall line thunderstorms.
2- avoidance of severe turbulence is assured by circumnavigating thunderstorms and clearing edges of the storms by 5 miles.
3- the overhanging anvil of a thunderstorm points in the direction from which the storm has moved.
4- avoidance of lightning and hail is assured by flying in the clear air outside the confines of a thunderstorm cell.

239. Consider the following statements in regard to standing mountain waves.

A. Mountain waves always develop in a series on the upwind (windward) side of mountain ridges.
B. In a mountain wave the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downwind.
C. If the air is humid and the wave is of large amplitude, lenticular clouds mark the wave's crest.
D. Clouds are always present to mark the mountain wave.

Select from the statements above those which are ture.

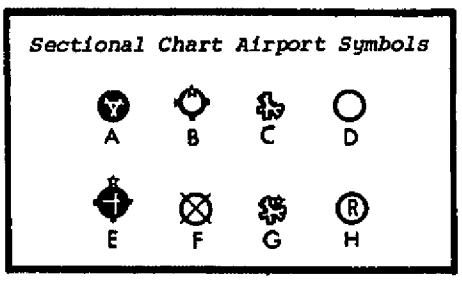
K29
1- A, B, C, D.
2- A, C, D.
3- A, B, C.
4- B, C.

240. Crests of standing mountain waves may be marked by stationary, lens-shaped clouds known as

K29
1- cumulonimbus mamma clouds.
2- standing lenticular clouds.
3- roll clouds.
4- rotor clouds.

241. Refer to the airport symbols below. Select the true statement concerning these symbols.

L01
1- Symbol "H" depicts a Rotorcraft-Helicopter facility.
2- Symbol "A" depicts an airport with emergency service or no service.
3- Symbols "A", "C", "E", and "G" depict airports with services and fuel available.
4- The stars on symbols "B", "E", and "G" indicate that these are military airports.



242. When flying at a low altitude across a mountain range the greatest potential danger, caused by descending air currents, will usually be encountered on the

K29
1- leeward side when flying into the wind.
2- windward side when flying into the wind.
3- leeward side when flying with the wind.
4- windward side when flying with the wind.

243. Select the true statement concerning isobars and windflow patterns around high and low pressure systems that are shown on a Surface Analysis (Surface Weather Map).

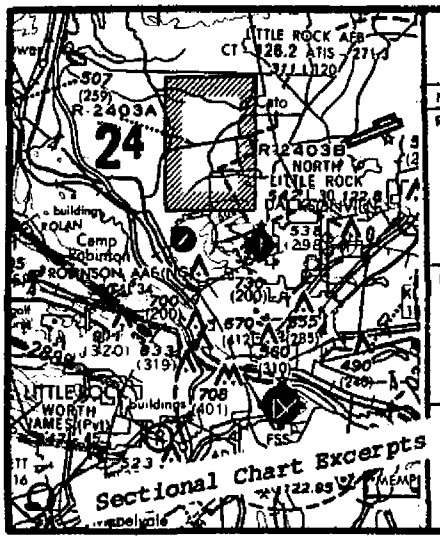
K28
1- When the isobars are far apart, crests of standing waves may be marked by stationary lenticular clouds.
2- Isobars connect contour lines of equal temperature.
3- When the isobars are close together, the pressure gradient force is greater and wind velocities are stronger.
4- Surface winds flow perpendicular to the isobars.

244. A pilot planning a long distance flight from west to east in the conterminous United States would most likely find favorable winds associated with high and low pressure systems by planning to fly a course which is

K28
1- south of both highs and lows.
2- north of a high.
3- north of a low.
4- south of a high.

245. Regarding aircraft structural icing, which statement is true?

K25
1- It is unnecessary for an aircraft to fly through rain or cloud droplets for structural ice to form.
2- Clear ice is most likely to form on an airplane when flying through stratified clouds or light drizzle.
3- In order for structural ice to form, the temperature at the point where moisture strikes the aircraft must be 0° C. (32° F.) or colder.
4- Rime ice gradually freezes on an airplane's surface becoming a smooth sheet of solid ice.



PROHIBITED, RESTRICTED, WARNING, AND ALERT AREAS ON MEMPHIS SECTIONAL CHART

NO.	NAME	ALTITUDE	TIME	APPROPRIATE AUTHORITY
R-2403A	Little Rock, Arkansas	To 16,000	0700 to 2100 May 1 thru Aug. 31 by NOTAM 48 hr in advance. OT 0700 Sat. to 1700 Sun. Sept. 1 thru Apr. 30 by NOTAM 24 hr in advance.	† FAA, Memphis ARTC Center * Area FSS Arkansas Army National Guard.
R-2403B	Little Rock, Arkansas	To 16,000	Daily 0700 to 2100 May 1 thru Aug. 31 by NOTAM 48 hr in advance. OT 0700 Sat. to 1700 Sun. Sep. 1 thru Apr. 30 by NOTAM 24 hr in advance.	† FAA, Memphis ARTC Center * Area FSS Arkansas Army National Guard.

P - Prohibited R - Restricted W - Warning A - Alert † - Controlling Agency * - For Information Only

Unless otherwise noted: Altitudes are MSL and in feet; time is local.

No person shall operate an aircraft within a Prohibited Area, or within a Restricted Area between the designated altitudes during the time of designation unless prior permission has been issued by the appropriate authority as listed above. The appropriate authority is defined as either the controlling agency (†) or the using agency.

Flight within Alert Areas is not restricted, but pilots are advised to exercise extreme caution.

246. Flight through Restricted Areas R-2403A and R-2403B (above) should not be accomplished unless the pilot

LO1
1- has received prior permission from the Commanding Officer of Little Rock, AFB.
2- is aware that the time of designation is continuous for both of these restricted areas.
3- has received prior permission from the appropriate authority.
4- has filed a VFR flight plan with the area FSS.

247. Refer to the chart segment to the right. Select the true statement concerning the areas marked "A" and "B".

LO1
1- Pilots are requested to maintain at least 2,000 feet above the terrain while flying over these areas.
2- A minimum altitude of 1,000 feet above the terrain is required while flying over these areas.
3- These are designated "Alert Areas" and extreme caution is advised when flying over these areas, due to low flying military aircraft.
4- Approval from the appropriate authority is required prior to flying over these areas.

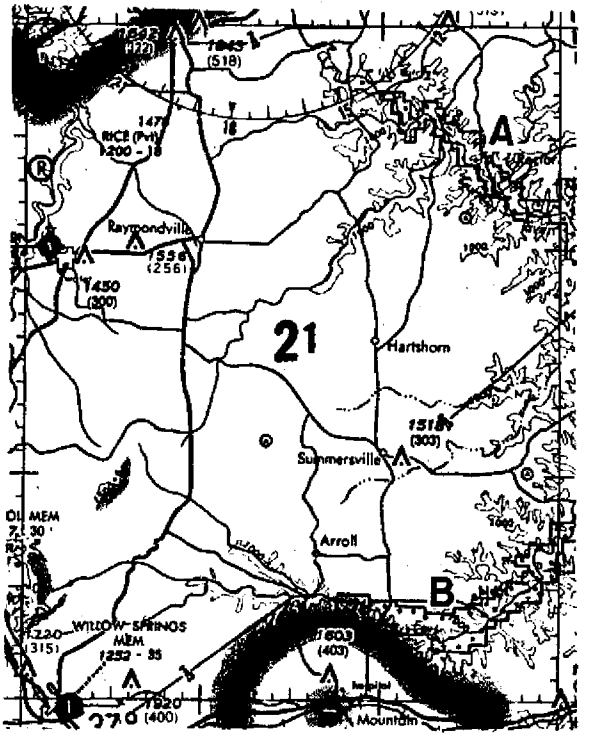
248. Refer to the chart to the right. What is the maximum elevation of the terrain and obstructions (antennas, towers, etc.) within the quadrangle bounded by ticked lines of latitude and longitude?

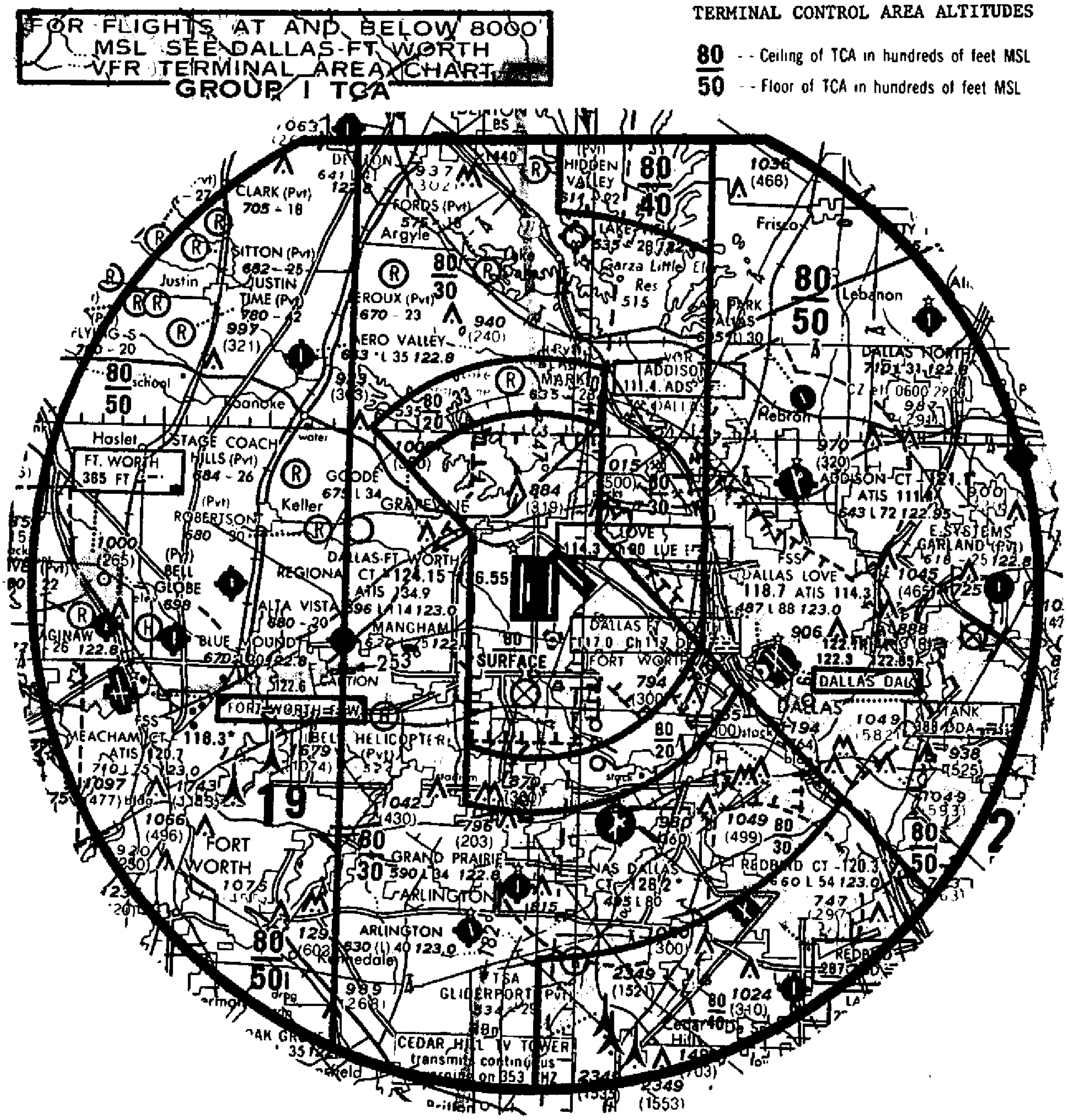
LO1
1- 2,320 feet MSL.
2- 2,100 feet MSL.
3- 1,920 feet MSL.
4- 1,642 feet MSL.

249. Refer to the sectional chart excerpts above. Which statement is true regarding Restricted Area R-2403B?

LO1
1- For information concerning the Restricted Area, contact the area FSS.
2- Permission from the Arkansas Army National Guard is required prior to flight within this area.
3- This is a Military Operation Area of Little Rock AFB, that extends from the surface to 2,200 feet.
4- This is a Military Climb Corridor that is used by aircraft operating from Little Rock AFB.

Sectional Chart Segment




FOR FLIGHTS AT AND BELOW 8000' MSL SEE DALLAS-FT WORTH VFR TERMINAL AREA CHART
GROUP I TCA
TERMINAL CONTROL AREA ALTITUDES
80 - - Ceiling of TCA in hundreds of feet MSL
50 - - Floor of TCA in hundreds of feet MSL
HIDDEN VALLEY
CLARK (Pvt)
705 - 18
Argyle
SITTON (Pvt)
Justin
Frisco
Lebanon
DALLAS NORTH
ADDISON
Hebron
Roanoke
Haslet
STAGE COACH HILLS (Pvt)
FT. WORTH 385 FT
GOODE
Keller
GRAPEVINE
ROBERTSON
BELL GLOBE
DALLAS-FT WORTH REGIONAL
ALTA VISTA
MANGHAM
BLUE MOUND
SURFACE
FORT WORTH
LOVE
DALLAS LOVE
ATIS
GARLAND
DALLAS
FORT WORTH
MEACHAM
BELL HELICOPTER
GRAND PRAIRIE
ARLINGTON
NAS DALLAS
REDBIRD
GLIDERPORT
CEDAR HILL TV TOWER
Cedar Hill

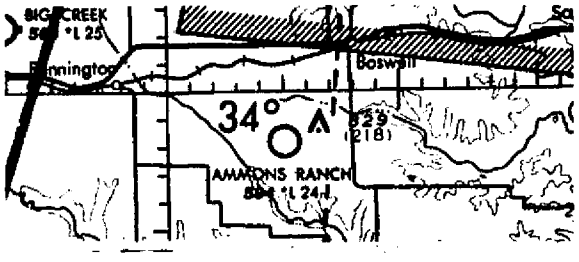
250. Contour lines placed on a Sectional Aeronautical Chart connect points of the same

LO1
1- longitude.
2- variation.
3- latitude.
4- elevation above sea level.

33 37

251. Large numbers on Sectional Aeronautical Charts, such as shown above, indicate

LO1
1- height of vertical obstructions within the areas, but do not include maximum terrain elevations.
2- the base of the controlled airspace over the areas.
3- maximum elevation figures (including terrain and obstructions) shown in quadrangles bounded by ticked lines of latitude and longitude.
4- latitude and longitude coordinates of the areas bounded by ticked lines.



252. The top of the obstruction shown in the sectional chart excerpt above is

LO1
1- 829 feet AGL.
2- 218 feet MSL.
3- 3,400 feet MSL.
4- less than 1,000 feet AGL.

253. Refer to the Terminal Control Area (TCA) to the left. To remain below the TCA when departing Arlington Airport (located south of Dallas-Ft. Worth Airport) VFR on a magnetic course of 182°, a pilot must fly below which altitude?

LO1
1- 4,000 feet AGL.
2- 3,000 feet MSL.
3- 3,000 feet AGL.
4- 2,000 feet MSL.

254. Refer to the Terminal Control Area (TCA) on the adjacent page. To remain below the TCA when departing Addison Airport (located northeast of Dallas-Ft. Worth Airport) VFR eastbound, a pilot must fly below which altitude and not exceed what maximum indicated airspeed?

LO2
1- 8,000 feet MSL; 250 knots.
2- 5,000 feet AGL; 230 knots.
3- 5,000 feet MSL; 200 knots.
4- 3,000 feet AGL; 156 knots.

255. Refer to the chart on the opposite page. What is the lowest appropriate VFR cruising altitude to fly over the Dallas-Ft. Worth TCA from the southwest to the northeast and remain above the TCA?

LO2
1- 9,500 feet MSL.
2- 9,000 feet MSL.
3- 8,500 feet MSL.
4- 8,000 feet MSL.

256. True course measurements on a sectional aeronautical chart should be made using a meridian near the midpoint of the course because the

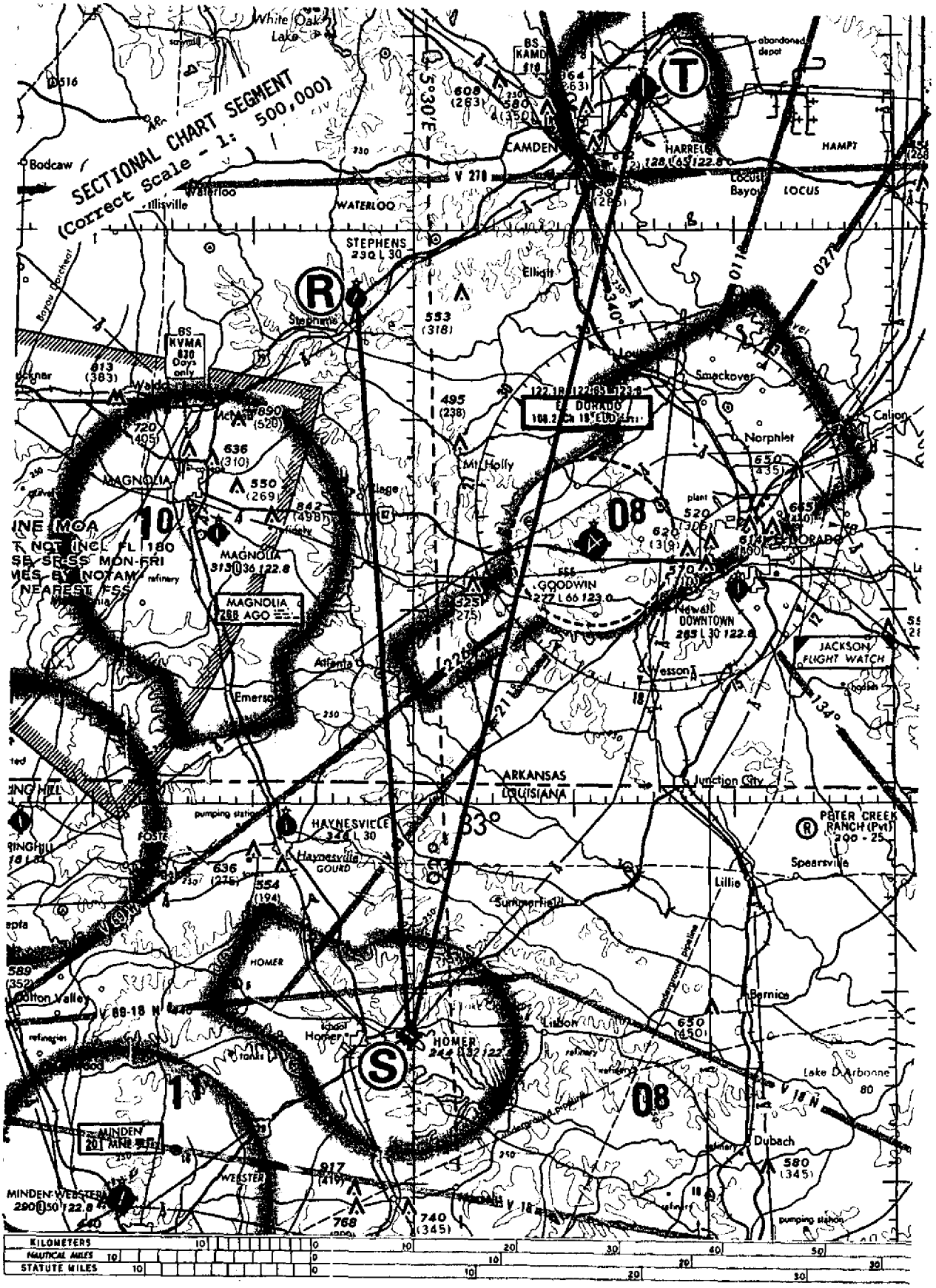
LO4
1- isogonic lines are not parallel.
2- meridians converge toward the poles and the angles formed by lines of longitude and latitude vary from point to point.
3- geographic North Pole from which direction is measured is not located at the magnetic North Pole.
4- lines of latitude vary from point to point.

257. Refer to the chart on the adjacent page. Assume the traffic pattern altitude at Addison Airport (located northeast of Dallas-Ft. Worth Airport) is 900 feet AGL. What would be the approximate altitude indicated by a properly adjusted altimeter on the downwind leg at this airport?

LO5
1- 2,550 feet MSL.
2- 600 feet MSL.
3- 900 feet MSL.
4- 1,550 feet MSL.

258. Refer to the chart on the adjacent page. Suppose the tower advises you that left traffic is in use for landing on Runway 13L at Dallas-Love Field. In calm wind conditions, the magnetic heading on base leg would be approximately

LO5
1- 235°.
2- 220°.
3- 130°.
4- 040°.


SECTIONAL CHART SEGMENT
(Correct Scale - 1: 500,000)
White Oak Lake
Bodcaw
Waterloo
Lillisville
WATERLOO
STEPHENS
230 L 30
Stephens
CAMDEN
HARRELL
HAMPT
LOCUS
Bayou
Smackover
Norphlet
Calion
EL DORADO
Mt Holly
MAGNOLIA
MAGNOLIA
MAGNOLIA
268 AGO
GOODWIN
Newell
DOWNTOWN
JACKSON
FLIGHT WATCH
Atlanta
Emerson
ARKANSAS
LOUISIANA
Junction City
HAYNESVILLE
Haynesville
GOUARD
PETER CREEK
RANCH (Pvt)
200 - 25
Spearsville
Lillie
Sunnyfield
HOMER
Homer
Bernice
Lisbon
Lake D'Arbonne
Dubach
MINDEN
MINDEN-WEBSTER
WEBSTER
KILOMETERS
NAUTICAL MILES
STATUTE MILES

259. Refer to the adjacent chart. What is the MAGNETIC COURSE from Airport "T" direct to Airport "S"?

LO7
1- 194°.
2- 188°.
3- 014°.
4- 008°.

260. Refer to the adjacent chart. The MAGNETIC COURSE from Airport "S' direct to Airport "R" is

LO7
1- 350°.
2- 356°.
3- 176°.
4- 001°.

261. Refer to the chart to the left and consider the following:

GIVEN: True airspeed . . . 150 MPH
Wind from 150° @ . 26 knots

Under these conditions, the magnetic heading and groundspeed from Airport "R" to Airport "S" is

LO7
1- 163° and 123 MPH.
2- 170° and 123 knots.
3- 176° and 150 MPH.
4- 151° and 134 knots.

262. Refer to the chart to the left and consider the following conditions:

GIVEN: True airspeed . . . 160 MPH
Wind from 150° @ . 45 knots

Under the conditions given, the magnetic heading and groundspeed from Airport "T" to Airport "S" is

LO7
1- 169° and 103 knots.
2- 187° and 123 MPH.
3- 181° and 119 knots.
4- 175° and 119 MPH.

263. Refer to the chart to the left and consider the following conditions:

True airspeed . . . 140 MPH
Wind from 240° @ . 13 knots

The magnetic heading and groundspeed from Airport "T" to Airport "S" is

LO7
1- 012° and 134 knots.
2- 191° and 153 MPH.
3- 203° and 155 MPH.
4- 182° and 133 knots.

264. Refer to the chart on the adjacent page and consider the following conditions:

GIVEN: True airspeed . . . 130 MPH
Wind from 120° @ . 13 knots

Under these conditions, the magnetic heading and groundspeed from Airport "S" to Airport "T" is

LO7
1- 195° and 120 knots.
2- 017° and 112 knots.
3- 014° and 116 knots.
4- 011° and 116 knots.

265. Refer to the chart on adjacent page and the compass correction card below.

GIVEN: True airspeed . . . 150 MPH
Wind from 160° @ . 30 knots

Under these conditions, what is the COMPASS HEADING and groundspeed from Airport "R" to Airport "S"?

LO7
1- 164° and 101 knots.
2- 172° and 121 MPH.
3- 176° and 116 knots.
4- 168° and 116 MPH.

266. Refer to the chart on adjacent page, the compass correction card below, and consider the following conditions:

GIVEN: True airspeed . . . 120 MPH
Wind from 160° @ . 30 knots

The COMPASS HEADING from Airport "T" to Airport "S" is

LO7
1- 196°.
2- 186°.
3- 179°.
4- 169°.

267. Refer to the chart on adjacent page, and compass correction card below, and consider the following conditions:

GIVEN: True airspeed . . . 138 MPH
Wind from 210° @ . 35 knots

The compass heading from Airport "R" to Airport "S" is

LO7
1- 187°.
2- 181°.
3- 177°.
4- 171°.

COMPASS CORRECTION CARD

FOR (MH)	N	030	060	E	120	150	S	210	240	W	300	330
STEER (CH)	0	031	062	094	125	154	181	208	237	266	297	328

268. GIVEN:

Flight duration . . . . . 50 minutes
Rate of fuel consumption . 10.7 GPH

How much fuel would be used?

LO8
1- 8.8 gallons.
2- 8.5 gallons.
3- 8.3 gallons.
4- 9.2 gallons.

269. Consider the following data:

Distance . . . . . 258 Statute miles
True course . . . 086°
Wind . . . . . 145° @ 45 knots
True airspeed . . 153 MPH
Rate of fuel consumption . . 11.7 gals./hour

What would be the approximate amount of fuel consumed on this flight?

LO8
1- 29.5 gallons.
2- 25.2 gallons.
3- 21.7 gallons.
4- 19.3 gallons.

270 GIVEN:

Outside air temperature . . -15° C.
Pressure altitude . . . . . 4,500 feet
Indicated airspeed . . . . 180 knots

Based on the above data, what is the true airspeed?

LO8
1- 188 knots.
2- 185 knots.
3- 175 knots.
4- 171 knots.

271. GIVEN:

Outside air temperature . . +15° C.
Pressure altitude . . . . . 3,500 feet
Indicated airspeed . . . . 140 knots

Determine the true airspeed.

LO8
1- 149 knots.
2- 145 knots.
3- 142 knots.
4- 131 knots.

272. You have your student plan a flight of 105 statute miles at a groundspeed of 137 MPH. The airplane has 47 gallons of usable fuel aboard, and the rate of fuel consumption is 11.5 gallons per hour. What would be the maximum flying time available with the remaining fuel upon arrival at the destination?

LO8
1- 3 hours 59 minutes.
2- 3 hours 19 minutes.
3- 3 hours 37 minutes.
4- 3 hours 29 minutes.

273. You plan a flight of 95 statute miles and anticipate a groundspeed of 120 MPH. The airplane has 30 gallons usable fuel aboard, and the rate of fuel consumption is 8 gallons per hour. What would be the maximum flying time available with the remaining fuel when you arrive at your destination?

LO8
1- 2 hours 57 minutes.
2- 2 hours 40 minutes.
3- 1 hour 38 minutes.
4- 1 hour 15 minutes.

274. GIVEN:

Flight duration . . 3 hours 50 minutes
Rate of fuel consumption . . . 8.5 GPH

How much fuel would be used?

LO8
1- 36.5 gallons.
2- 34.5 gallons.
3- 32.6 gallons.
4- 29.5 gallons.

275. Consider the following data:

Distance . . . . . 340 Statute miles
True course . . . 260°
Wind . . . . . 245° @ 45 knots
True airspeed . . 135 MPH
Rate of fuel consumption . . 12.7 gals./hour

What would be the approximate groundspeed and amount of fuel consumed?

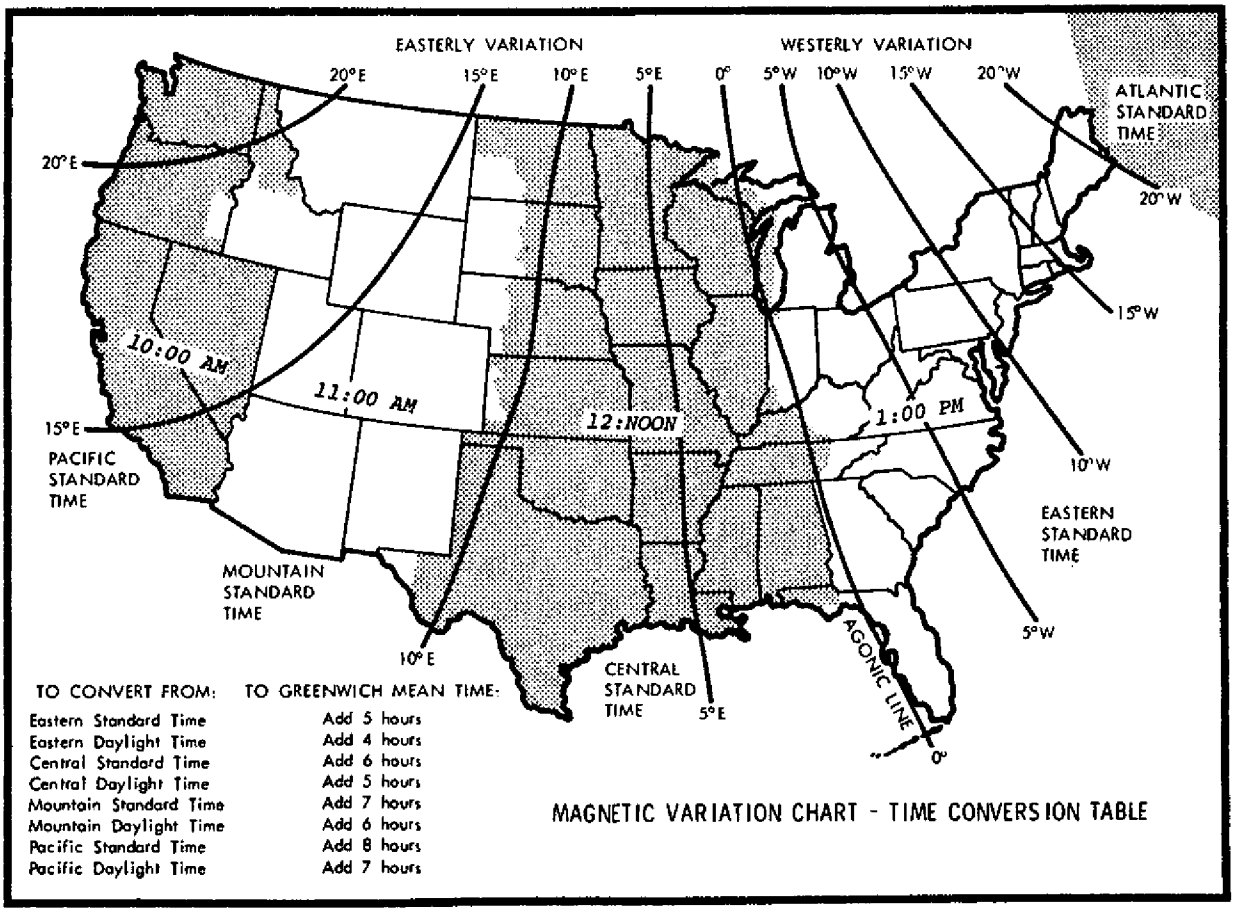
LO8
1- 90 MPH; 47.3 gallons.
2- 74 knots; 50.1 gallons.
3- 84 MPH; 51.2 gallons.
4- 80 knots; 55.3 gallons.

276. GIVEN:

Distance . . . . . 200 Statute miles
True course . . . 320°
Wind . . . . . 215° @ 25 knots
True airspeed . . 128 MPH
Rate of fuel consumption . . 19 gals./hour

What would be the approximate groundspeed and amount of fuel consumed?

LO8
1- 117 knots; 27.3 gallons.
2- 132 MPH; 28.9 gallons.
3- 127 MPH; 33.3 gallons.
4- 115 knots; 31.5 gallons.



MAGNETIC VARIATION CHART - TIME CONVERSION TABLE

277. Assume that you depart an airport in the Pacific Standard Time Zone at 0730 PST, for a 4 hour flight to an airport located in the Central Standard Time Zone. At what Central Standard Time would you expect to land?

L08 1- 1230 CST.
2- 1330 CST.
3- 1430 CST.
4- 1530 CST.

NOTE: See Time Conversion data above.

278. Refer to the illustration above. Assume that you depart an airport in the Central Daylight Time Zone at 1315 CDT, for a 2 hour flight to an airport located in the Mountain Daylight Time Zone. At what Greenwich Mean Time would you expect to land?

L08 1- 1415Z.
2- 1615Z.
3- 1815Z.
4- 2015Z.

279. Refer to the illustration above. Assume you depart an airport in the Eastern Daylight Time Zone at 0815 EDT, for a 2 hour flight to an airport located in the Central Daylight Time Zone. At what Greenwich Mean Time would you expect to land?

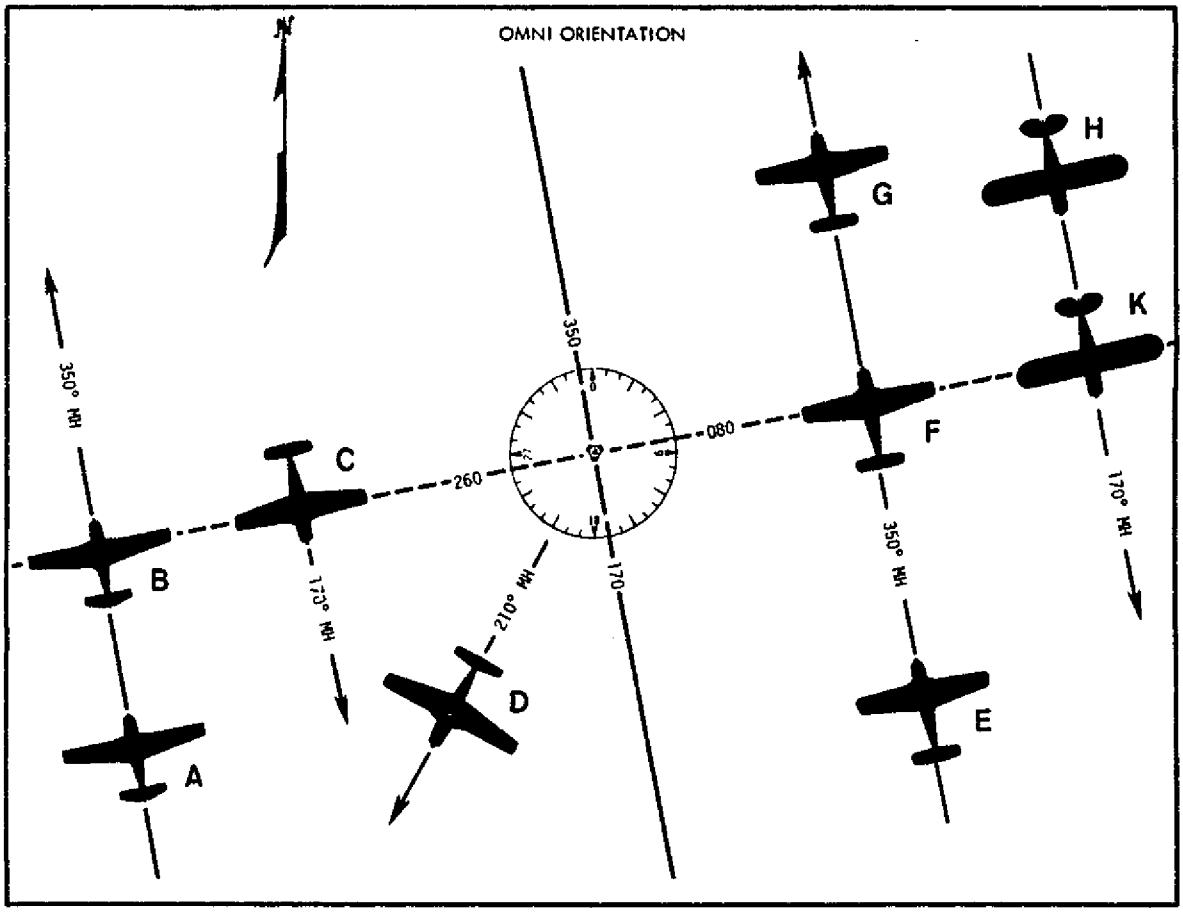
L08 1- 1115Z.
2- 1315Z.
3- 1415Z.
4- 1515Z.

280. Assume that you depart an airport in the Central Standard Time Zone at 1630 CST, for a 2 hour flight to an airport located in the Mountain Standard Time Zone. What would the landing time be?

L08 1- 1230 MST.
2- 1430 MST.
3- 1730 MST.
4- 1830 MST.

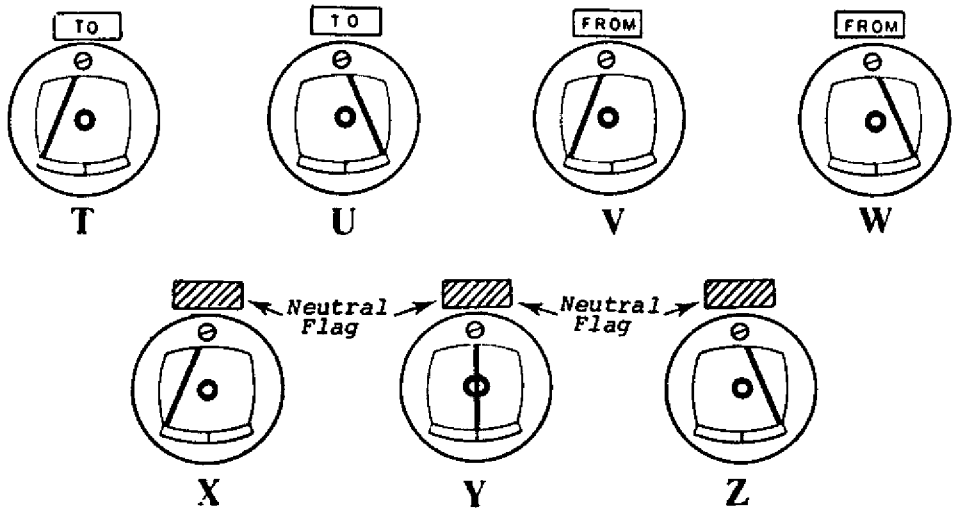
NOTE: See Time Conversion data above.

318-376 0 - 80 - 6



OMNI INDICATIONS

NOTE: ASSUME ALL OMNI BEARING SELECTORS ARE SET TO 350°.



281. Refer to the adjacent illustrations. The omnireceiver indication for airplane position "D" would be

M04
1- W.
2- V.
3- T.
4- U.

282. Refer to the illustrations to the left. The omnireceiver indications for airplane positions "A" and "B" would be, respectively,

M04
1- U and Z.
2- T and X.
3- T and W.
4- U and Y.

283. Refer to the illustrations to the left. Which of the airplanes shown would have omni indication "Z"?

M04
1- B and F.
2- B and C.
3- F and C.
4- F and K.

284. Refer to the illustrations to the left. At which airplane position(s) would you receive omni indication "U"?

M04
1- A and B.
2- A only.
3- E and D.
4- A and D.

285. Select the true statement concerning characteristics of VHF radio reception.

M01
1- VHF reception distance varies in proportion to the altitude of the receiving equipment.
2- Unlike reception with low or medium frequency (L/MF) equipment, VHF reception is not subject to line-of-sight restrictions.
3- VHF reception distance remains constant regardless of altitude.
4- Reception of VHF signals is more subject to signal fades and interference from distant stations than reception of low or medium frequency (L/MF) signals.

286. Refer to the illustrations on the opposite page. The omnireceiver indications for airplane positions "E," "F," and "G" would be, respectively,

M04
1- U, Z, W.
2- T, Y, V.
3- T, X, V.
4- W, Y, T.

287. Refer to the illustrations on the opposite page. At which airplane position(s) would you receive omni indication "U"?

M04
1- A and B.
2- A only.
3- E and F.
4- A and D.

288. Refer to the illustrations on the opposite page. At which airplane positions would you receive omni indication "V"?

M04
1- H and K.
2- F and G.
3- G and H.
4- A and D.

289. Refer to the illustrations on the opposite page. At which airplane position(s) would you receive omni indication "X" or "Z"?

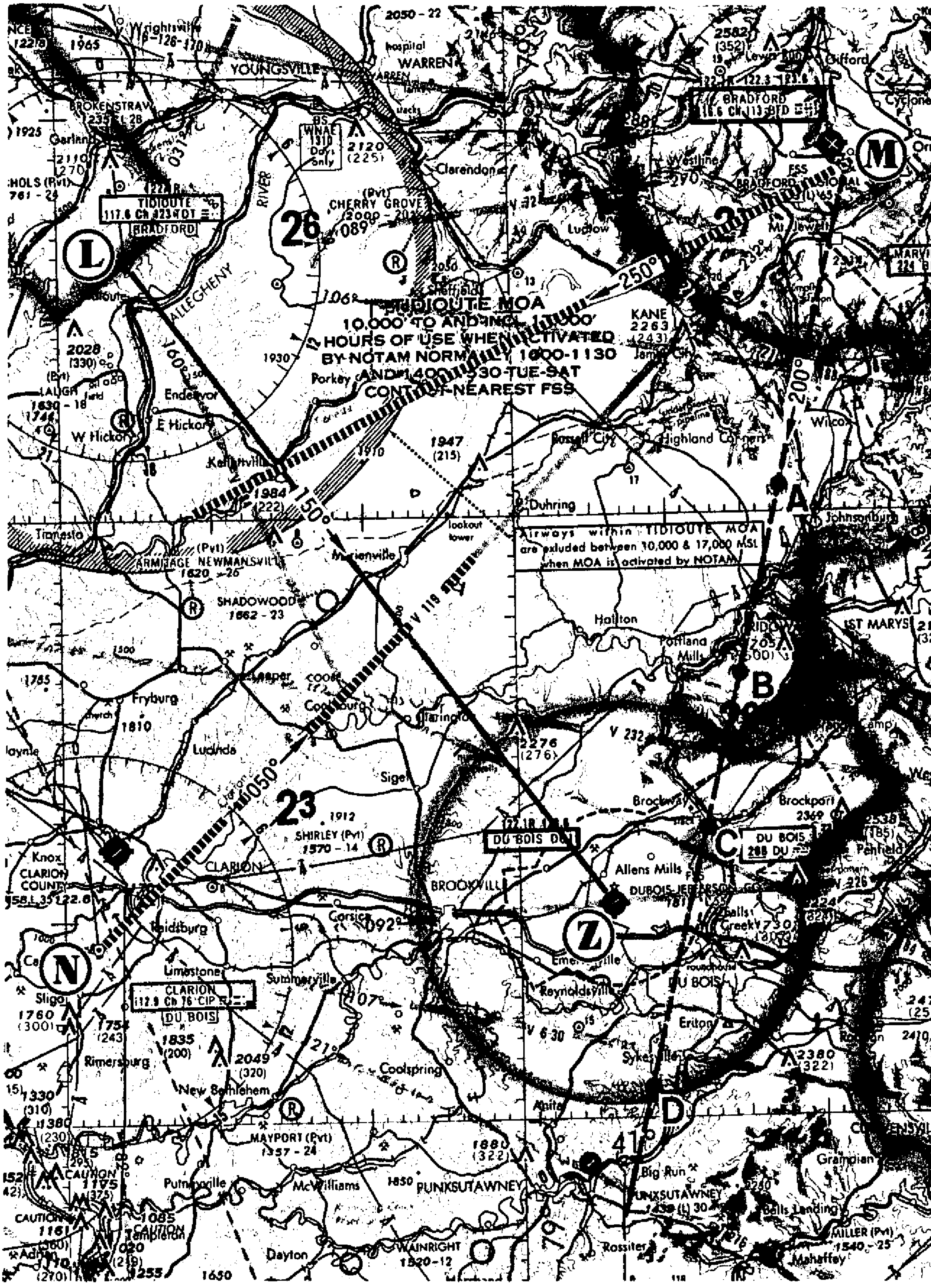
M04
1- C and K.
2- B, C, F, and K.
3- B and F.
4- D only.

290. Refer to the illustrations on the opposite page. If you were receiving indication "Y," what would be your position in relation to the station?

M04
1- Directly over the station.
2- At position K.
3- At position C.
4- At position B or F.

291. Refer to the illustrations on the opposite page. Which of the airplanes shown would have omni indication "X"?

M04
1- F only.
2- B and K.
3- F and K.
4- B and C.



YOUNGSVILLE
WARREN
BROKENSTRAW
Clarendon
CHERRY GROVE
TIDIOUTE
117.6 Ch 123 TDT
BRADFORD
RIVER
ALLEGHENY
26
TIDIOUTE MOA
10,000' TO AND INCL 17,000'
HOURS OF USE WHEN ACTIVATED
BY NOTAM NORMALLY 1000-1130
AND 1400-1530 TUE-SAT
CONTACT NEAREST FSS
250°
KANE
2263
(243)
Highland Corners
Ludlow
Sheffield
BRADFORD
Westline
Johnsonburg
Endeavor
W Hickory
E Hickory
Kellettville
1947
(215)
Duhring
150°
1984
(222)
Tionesta
Marienville
lookout tower
Airways within TIDIOUTE MOA are exluded between 10,000 & 17,000 MSL when MOA is activated by NOTAM
SHADOWOOD
1662 - 23
Hallton
Portland Mills
ST MARYS
Fryburg
Lucinda
Cooksburg
Clarington
V 232
2276
(276)
V 118
200°
050°
23
SHIRLEY (Pvt)
1570 - 14
Sigel
Brockway
Brockport
DU BOIS
Allens Mills
DUBOIS-JEFFERSON CO
Penfield
Knox
CLARION COUNTY
CLARION
BROOKVILLE
Corsica
092°
Reidsburg
Emerickville
Reynoldsville
DU BOIS
Limestone
Summerville
CLARION
112.9 Ch 76 CIP
Sligo
1760
(300)
1835
(200)
2049
(320)
Rimersburg
New Bethlehem
Coolspring
Sykesville
Erilton
2380
(322)
Anita
MAYPORT (Pvt)
1357 - 24
1880
(322)
41
Big Run
Grampian
PUNXSUTAWNEY
Putneyville
McWilliams
Dayton
WAINRIGHT
1520-12
Rossiter
MILLER (Pvt)
1540 - 25
Mahaffey
Bells Landing
L
M
N
Z
A
B
C
D

292. Refer to the chart to the left. Assume that you are flying outbound from Bradford VORTAC (M) on the 200 radial. Which radial of Tidioute VORTAC (L) intersects your course at point B?

MO5
1- 130.
2- 125.
3- 120.
4- 115.

293. Refer to the adjacent chart. Assume you are outbound on the 200 radial of Bradford VORTAC (M). If you have one omnireceiver tuned to Tidioute VORTAC (L), to what radial of this VORTAC should the omnibearing selector be set for determining when you reach point "A"?

MO5
1- 135 radial.
2- 125 radial.
3- 115 radial.
4- 105 radial.

294. Refer to the opposite page. Assume you are flying outbound on the 200 radial of Bradford VORTAC (M), and one omnireceiver is tuned to Tidioute VORTAC (L). With the omnibearing selector set to 125°, the CDI needle is centered and the TO-FROM indicator reads "FROM". What is your position?

MO5
1- Between points C and D.
2- Between points B and C.
3- Between points A and B.
4- Between point A and VORTAC "M".

295. Refer to the chart to the left. Assume you are outbound on the 200 radial of Bradford VORTAC (M), and one omnireceiver is tuned to Clarion VORTAC (N). To what radial of this VORTAC should the omnibearing selector be set for determining when you reach point "C"?

MO5
1- 100 radial.
2- 095 radial.
3- 090 radial.
4- 085 radial.

296. Refer to the adjacent chart. While flying eastbound, one omnireceiver indicates you are crossing the 200 radial of Bradford VORTAC (M). Another receiver tuned to Clarion VORTAC (N), indicates you are on the 085 radial of this VORTAC. Your position is at

MO5
1- Point D.
2- Point C.
3- Point B.
4- Point A.

297. Refer to the opposite page. While on course from Tidioute VORTAC "L" to airport "Z", you tune the omnireceiver to Clarion VORTAC "N" to check your progress along the route. With the omnibearing selector set to 050° (V-119) and the TO-FROM indicator reading FROM, the Course Deviation Indicator shows a full-scale deflection to the left. This means that you

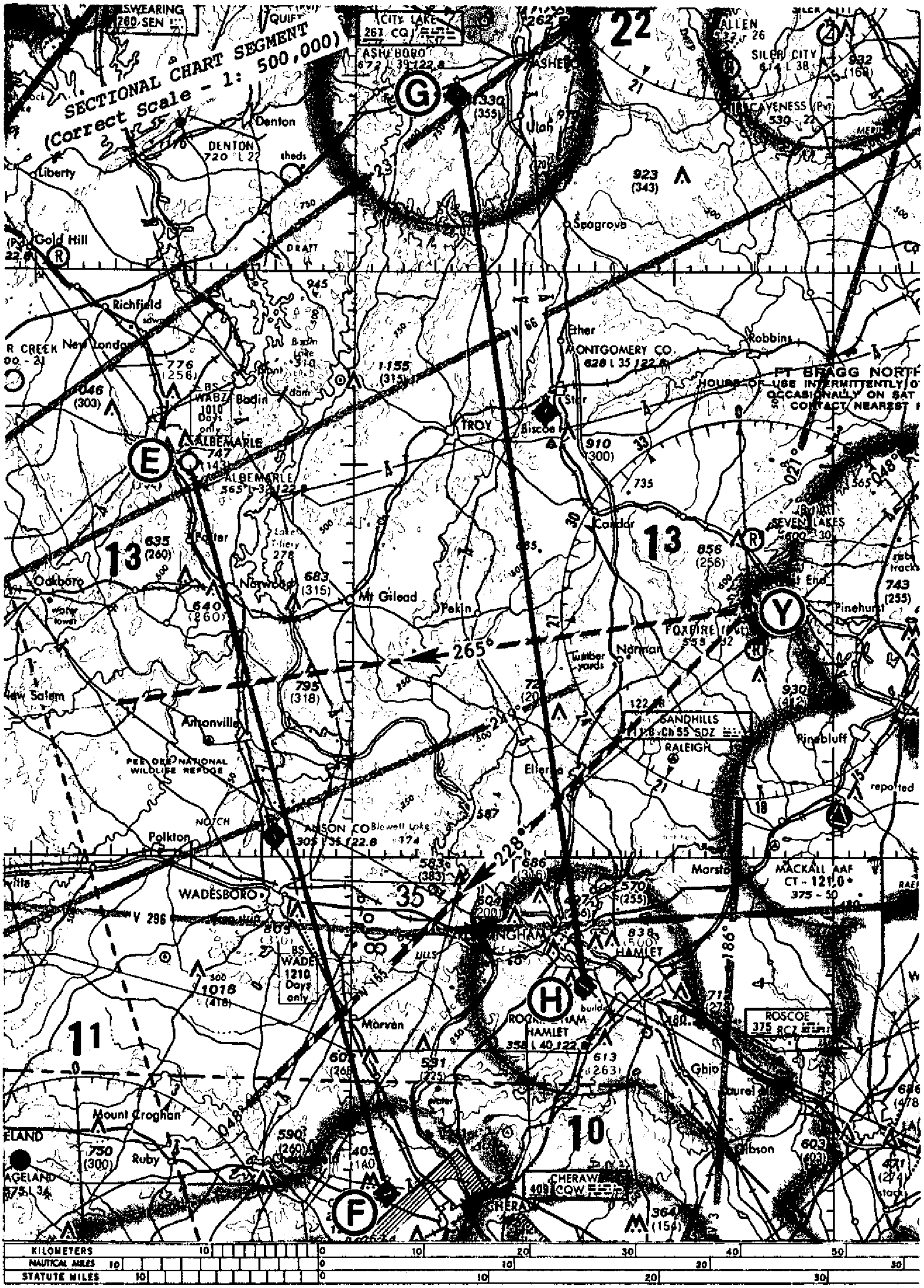
MO5
1- have already crossed the 050 radial (V-119).
2- have a malfunction in your omni-equipment since Clarion VORTAC is to the right of course.
3- have not crossed the 050 radial (V-119).
4- are not using a proper method of determining your position.

298. To check your progress on course from airport "Z" to Tidioute VORTAC "L" (see opposite page), you tune to Clarion VORTAC "N". With the omnibearing selector set to 050° (V-119) and the TO-FROM indicator reading FROM, the Course Deviation Indicator shows a full-scale deflection to the right. This means that you

MO5
1- are not using a proper method of determining your position.
2- have not crossed the 050 radial (V-119).
3- have a malfunction in your omni-equipment since Clarion VORTAC is to the left of course.
4- have already crossed the 050 radial (V-119).

299. To check your progress on course from VORTAC "L" to airport "Z" (see opposite page), you tune to the Bradford VORTAC. With the omnibearing selector set to 250° and the TO-FROM indicator reading "FROM", the Course Deviation Indicator shows a full-scale deflection to the left. This means that you

MO5
1- are presently on the 250 radial.
2- are not using a proper method of determining your position.
3- have not crossed the 250 radial.
4- have already crossed the 250 radial.


SECTIONAL CHART SEGMENT
(Correct Scale - 1: 500,000)
G
E
F
H
Y
Denton
DENTON
Liberty
Gold Hill
Richfield
New London
Badin
ALBEMARLE
Oakboro
Norwood
Mt Gilead
TROY
Biscoe
Star
Ether
MONTGOMERY CO.
Robbins
FT BRAGG NORTH
Seagrove
Utah
SILER CITY
CAVENESS (Pvt)
Candor
SEVEN LAKES
Pinehurst
FOXFIRE (Pvt)
Norman
Pekin
New Salem
Ansonville
PEE DEE NATIONAL WILDLIFE REFUGE
Polkton
ANSON CO
Blewett Lake
WADESBORO
V 296
V 66
SANDHILLS
RALEIGH
Ellerbe
Pinebluff
MACKALL AAF
HAMLET
ROCKINGHAM HAMLET
ROSCOE
Marston
Ghio
Laurel Hill
Gibson
Marven
Mount Croghan
Ruby
CHERAW
265°
228°
186°
021°
048°
13
13
22
11
10
35
KILOMETERS
NAUTICAL MILES
STATUTE MILES

300. Refer to the adjacent chart. Suppose while on course from airport "G" to airport "H" you crossed the 265 radial of Sandhills VORTAC (Y) at 1212 EST and the 228 radial 5 minutes later. By maintaining the same groundspeed your arrival time over airport "H" should be approximately

M07
1- 1303 EST.
2- 1227 EST.
3- 1223 EST.
4- 1217 EST.

301. Refer to the adjacent chart. Suppose while on course from airport "E" to airport "F" you crossed the 265 radial of Sandhills VORTAC (Y) at 1240 EST and the 228 radial 9 minutes later. By maintaining the same groundspeed your arrival time over airport "F" should be approximately

M07
1- 1307 EST.
2- 1259 EST.
3- 1254 EST.
4- 1245 EST.

302. Assume that you desire to fly inbound to a VOR station on the 310 radial. The recommended procedure is to set the course selector to

M06
1- 310° and make heading corrections away from the Course Deviation Indicator (CDI needle).
2- 310° and make heading corrections toward the Course Deviation Indicator (CDI needle).
3- 130° and make heading corrections toward the Course Deviation Indicator (CDI needle).
4- 130° and make heading corrections away from the Course Deviation Indicator (CDI needle).

303. You wish to track inbound on the 060 radial of a VOR station. The recommended procedure is to set the course selector to

M06
1- 240° and make heading corrections toward the Course Deviation Indicator (CDI needle).
2- 240° and make heading corrections away from the Course Deviation Indicator (CDI needle).
3- 060° and make heading corrections away from the Course Deviation Indicator (CDI needle).
4- 060° and make heading corrections toward the Course Deviation Indicator (CDI needle).

304. When the course deviation indicator (CDI needle) is centered during an omnireceiver check using a VOT, the omnibearing selector and the TO-FROM indicator should read

M09
1- 180° FROM, only if you are due north of the VOT.
2- 0° TO or 180° FROM, regardless of your position from the VOT.
3- 0° FROM or 180° TO, regardless of your position from the VOT.
4- 0° TO, only if you are due south of the VOT.

305. Refer to the chart to the left. Suppose while on course from airport "F" to airport "E", you crossed the 228 radial of Sandhills VORTAC at 0837 EST and the 265 radial 9 minutes later. By maintaining the same groundspeed your arrival time over airport "E" should be

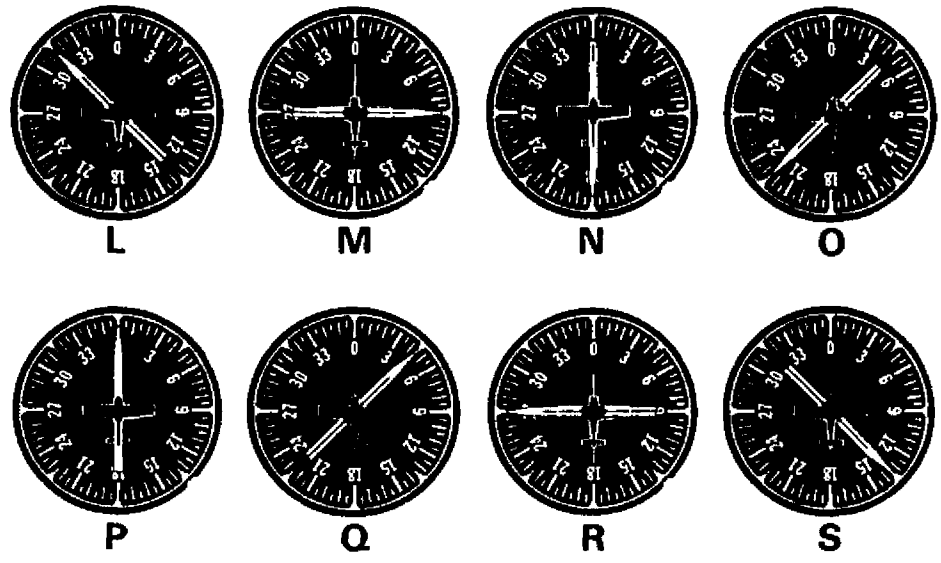
M07
1- 0855 EST.
2- 0852 EST.
3- 0848 EST.
4- 0843 EST.

306. Refer to the chart on opposite page. Suppose while on course from airport "H" to airport "G", you crossed the 228 radial of Sandhills VORTAC at 1328 EST and the 265 radial 4 minutes later. By maintaining the same groundspeed you should arrive over airport "G" at approximately

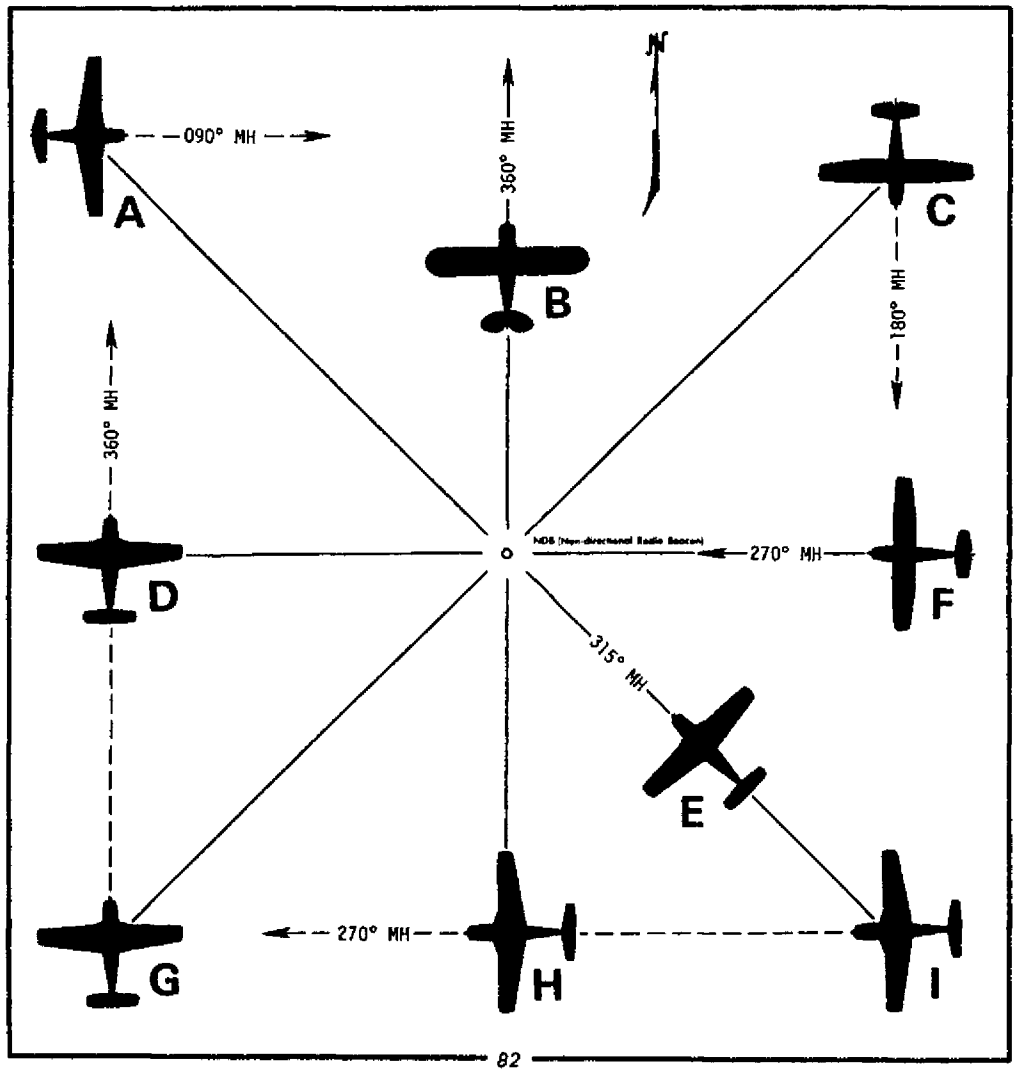
M07
1- 1349 EST.
2- 1346 EST.
3- 1343 EST.
4- 1341 EST.

307. Refer to the chart to the left. Suppose while on course from airport "F" to airport "E" you tune the omnireceiver to Sandhills VORTAC (Y). You crossed the 228 radial of Sandhills VORTAC at 1618 EST and the 265 radial 8 minutes later. By maintaining the same groundspeed your arrival time over airport "E" should be approximately

M07
1- 1641 EST.
2- 1635 EST.
3- 1631 EST.
4- 1623 EST.



ADF DIALS (Fixed-Scale)



308. Refer to the illustrations to the left. At which of the aircraft positions would you expect ADF indication "P"?

M13
1- F only.
2- E only.
3- E and F.
4- B and H.

309. Refer to the illustrations to the left. At which of the aircraft positions would you expect ADF indication "M"?

M13
1- F, H, and I.
2- D only.
3- D and H.
4- A only.

310. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "C"?

M13
1- S.
2- Q.
3- L.
4- O.

311. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "F"?

M13
1- M.
2- N.
3- R.
4- P.

312. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "A"?

M13
1- S.
2- M.
3- Q.
4- L.

313. According to ADF indication "O" (top of opposite page), you would be headed directly toward the station if you turned

M13
1- 215° to the left.
2- 135° to the left.
3- 45° to the right.
4- 45° to the left.

314. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "I"?

M13
1- Q.
2- R.
3- L.
4- O.

315. According to ADF indication "S" (top of opposite page), you would be headed directly toward the station if you turned

M13
1- 135° to the left.
2- 135° to the right.
3- 45° to the left.
4- 45° to the right.

316. According to ADF indication "L" (top of opposite page), you would be headed toward the station if you turned

M13
1- 315° to the left.
2- 225° to the right.
3- 45° to the left.
4- 45° to the right.

317. Refer to the ADF illustrations to the left. Which aircraft would most likely depict your position if the ADF indicated as illustrated by dial "Q"?

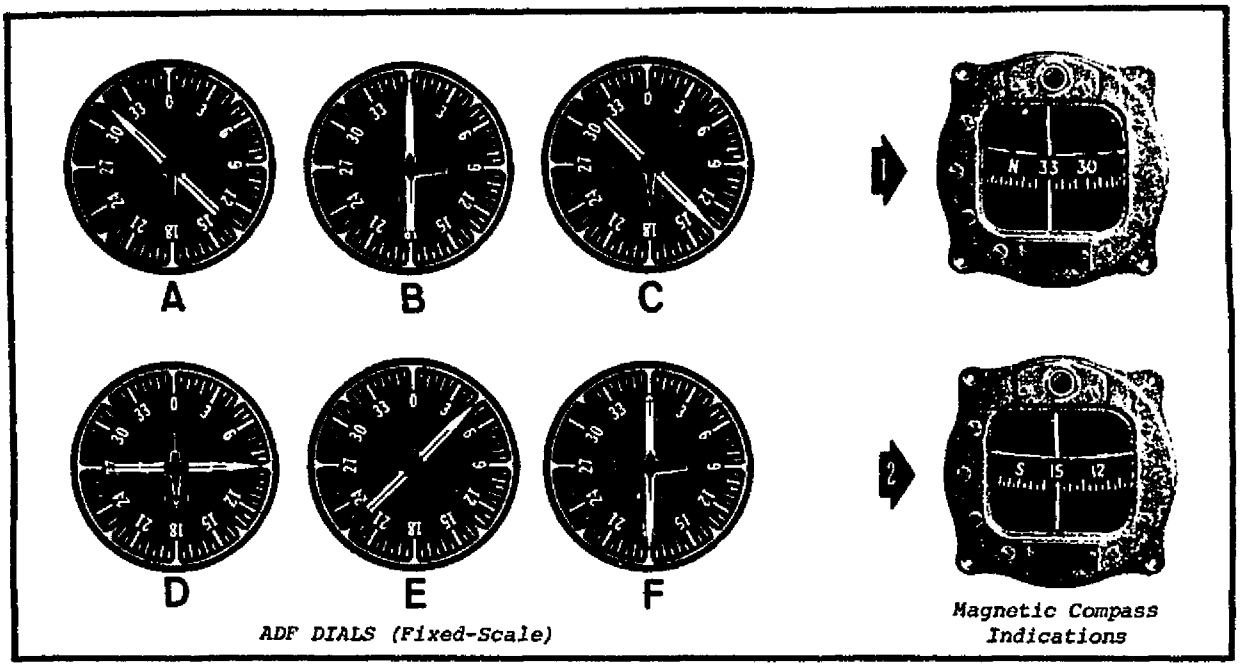
M13
1- G and I only.
2- G only.
3- A, C, G, and I.
4- A and G only.

318. Refer to the ADF illustrations to the left. If turned 45° to the right, which of the airplanes shown would have a relative bearing as indicated by dial "P"?

M13
1- A, C, G, and I.
2- E and F only.
3- G and I only.
4- A and C only.

319. Refer to the ADF illustrations on opposite page. At which of the aircraft positions would you expect indication "P"?

M13
1- C only.
2- E and F.
3- B, D, and G.
4- B only.



ADF DIALS (Fixed-Scale)

Magnetic Compass Indications

320. According to ADF dial "C" and magnetic compass "2" above, what is the MAGNETIC BEARING to the station?

M13
1- 285°.
2- 150°.
3- 135°.
4- 105°.

321. Refer to ADF dial "A" and magnetic compass "2" above. The MAGNETIC BEARING to the station is

M13
1- 315°.
2- 150°.
3- 105°.
4- 100°.

322. If ADF dial "F" above is observed and the magnetic heading is 270°, what is the MAGNETIC BEARING to the station?

M13
1- 270°.
2- 180°.
3- 090°.
4- 080°.

323. According to ADF dial "E" and magnetic compass number "2" above, the MAGNETIC BEARING to the station is

M13
1- 045°.
2- 150°.
3- 195°.
4- 015°.

324. If ADF dial "C" above is observed and the magnetic heading is 090°, what is the MAGNETIC BEARING to the station?

M13
1- 255°.
2- 225°.
3- 135°.
4- 045°.

325. Refer to magnetic compass illustration "1" above and ADF dial "D". What is the magnetic bearing to the station?

M13
1- 060°.
2- 330°.
3- 090°.
4- 240°.

326. According to magnetic compass illustration "2" above and ADF dial "B", the MAGNETIC BEARING to the station is

M13
1- 330°.
2- 180°.
3- 150°.
4- 360°.

327. Refer to ADF dial "A" and magnetic compass "1" above. The MAGNETIC BEARING to the station is

M13
1- 105°.
2- 315°.
3- 330°.
4- 285°.

§ **PORT COLUMBUS INTL** (CMH) 6.1 E GMT-5(-4DT) 39°59'40"N 82°53'07"W — CINCINNATI H-3C, L-23C UAP
816 B S4 OX 3, 4 LRA CFR Index D
RWY 10R-28L: H10700X150 (ASPH-CONC) S-100, D-150, DT-300 HIRL
RWY 10R: Transmission lines. MALSR RWY 28L: Road. SSALR
RWY 10L-28R: H6000X150 (ASPH) S-100, D-160, DT-275 HIRL
RWY 10L: Trees. SSALR RWY 28R: Trees. REIL. VASI
RWY 13-31: H5001X150 (ASPH) S-65, D-95, DT-170 MIRL
RWY 13: Antenna. Thld dsplcd 1318' RWY 31: Road. Thld dsplcd 1209'
RWY 05-23: H4483X150 (ASPH) S-65, D-95, DT-170 MIRL
RWY 05: Road. Thld dsplcd 390' RWY 23: Trees. Thld dsplcd 583'
RWY 01-19: H3551X150 (ASPH) S-65, D-95, DT-170 MIRL
RWY 01: Road. Thld dsplcd 200' RWY 19: Fence
AIRPORT REMARKS: Attended continuously. Landing Fee.
COMMUNICATIONS: ATIS 109.1 135.4 UNICOM 123.0
COLUMBUS FSS (CMH) on Fld 122.3 122.2 122.1R (614) 237-7461
® COLUMBUS APP CON 123.8 (100°-279°) 125.95 (280°-099°) 118.2 119.65 124.2
COLUMBUS TOWER 120.5 125.4 GND CON 121.9 CLNC DEL 126.3
® COLUMBUS DEP CON 123.8 (100°-279°) 125.95 (280°-099°)
STAGE III SVC contact APP CON
RADIO AIDS TO NAVIGATION: VOT 111.0 VHF/DF ctc COLUMBUS FSS
APPLETON (H) BVORTAC 238°/16.6 NM
COLUMBUS NDB (H-SAB) 391 ■ CMH 39°59'19"N 82°55'17.7"W 070° 1.0 NM to fld
GRANDVIEW NDB (LOM) 272 CB 40°00'36.4"N 83°01'44.5"W 101° 5.6 NM to fld
SUMMIT STATION NDB (LOM) 245 CM 39°59'10.2"N 82°45'16.6"W 276° 5.4 NM to fld
ILS 109.1 I-CBP Rwy 10L LOM GRANDVIEW NDB
ILS 109.3 I-CMH Rwy 28L LOM SUMMIT STATION NDB
ILS 108.7 I-AQI Rwy 10R
ASR
COMM/NAVAID REMARKS: Route forecast available only 0300-1000Z‡

328. Frost, which has not been removed from the wings of an airplane before flight

009 1- will change the camber (curvature of the wing) thereby increasing lift during takeoff.

2- would present no problems since frost will blow off when the airplane starts moving during takeoff.

3- may make it difficult or impossible to become airborne.

4- may cause the airplane to become airborne with a lower angle of attack and at a lower than normal indicated airspeed.

329. Refer to the excerpt above. If you were approaching Port Columbus Intl. Airport from the north, what is the proper sequence of using radio frequencies prior to landing at this airport?

N07 1- 122.3; 123.8; 120.5 MHz.
2- 125.95; 120.5; 121.9 MHz.
3- 109.1; 125.95; 120.5 MHz.
4- 122.3; 109.1; 123.8; 120.5 MHz.

330. Refer to the excerpt above. To activate or close a VFR flight plan with Columbus FSS, you could transmit and receive on which frequency?

N07 1- 123.8 MHz.
2- 109.1 MHz.
3- 122.1R MHz.
4- 122.3 MHz.

331. See above excerpt. Assume you are approaching Port Columbus Intl. Airport from the southwest and intend to land at this airport. What is the proper sequence of using radio frequencies to contact approach control, tower, and ground control?

N07 1- 123.8; 120.5; 121.9 MHz.
2- 125.95; 125.4; 121.9 MHz.
3- 123.8; 121.9; 125.4 MHz.
4- 109.1; 121.9; 125.95 MHz.

332. Refer to the excerpt above. The proper sequence of using radio frequencies to contact clearance delivery, ground control, tower, and departure control for a northeast departure from Port Columbus Intl. Airport would be

N07 1- 125.95; 120.5; 121.9; 126.3 MHz.
2- 123.8; 121.9; 120.5; 126.3 MHz.
3- 126.3; 125.4; 121.9; 123.8 MHz.
4- 126.3; 121.9; 120.5; 125.95 MHz.

333. After landing at a tower-controlled airport when should you contact ground control?

N03 1- After leaving the runway and crossing the taxiway holding lines.

2- Prior to turning off the runway.

3- After reaching a taxiway that leads directly to the parking area.

4- When the tower instructs you to do so.

334. What effect would FROST have on airplane performance?

009
1- It may result in the engine being overboosted during takeoff.
2- It may cause an airplane to become airborne sooner than anticipated.
3- It may prevent an airplane from becoming airborne.
4- The greater induced drag will shorten the takeoff roll.

335. An airplane is usually affected by "ground effect" at what height above the surface?

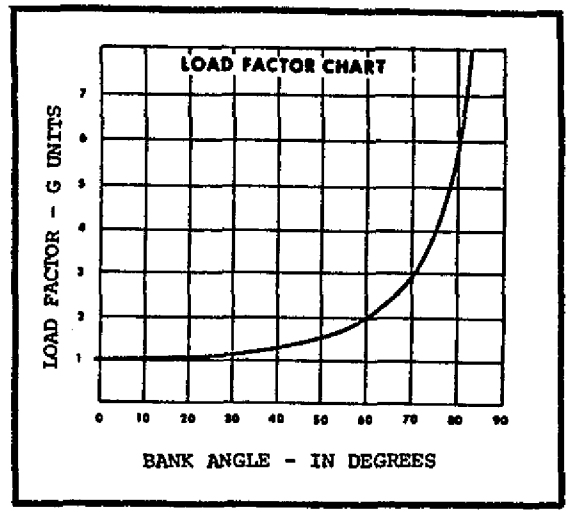
014
1- Between 100 and 200 feet above the surface in calm wind conditions.
2- Less than half the airplane's wingspan above the surface.
3- Twice the airplane's wingspan above the surface.
4- Three to four times the airplane's wingspan.

336. Select the true statement regarding "ground effect."

014
1- Ground effect may cause an airplane to float on landings or permit it to become airborne with insufficient power to sustain flight outside of ground effect.
2- Light single-engine airplanes usually encounter "ground effect" at 200 or 300 feet above the surface.
3- In conditions of high gross weight, high density altitude, and high temperature an airplane will usually not encounter "ground effect."
4- Ground effect often causes an airplane to settle to the surface immediately after becoming airborne.

337. Refer to the chart to the right above. If the maximum load factor for a particular airplane is +4.4 G units, the maximum bank during a level turn without exceeding this load factor would be approximately

017
1- 72°
2- 82°
3- 67°
4- 77°



338. Use the chart above. If an airplane weighs 3,400 lbs., what approximate weight would the airplane structure be supporting during a 60° banked turn while maintaining altitude?

017
1- 8,400 lbs.
2- 6,800 lbs.
3- 4,400 lbs.
4- 3,400 lbs.

339. Refer to the chart above. If the airplane has a maximum positive load factor of +3.8 G units, the maximum bank in a level turn without exceeding this load factor would be

017
1- unobtainable from the Load Factor Chart.
2- approximately 82°
3- approximately 74°
4- approximately 67°

340. Which aerodynamic condition causes an airplane to spin?

019
1- When the ailerons lose their effectiveness due to a decrease in angle of attack and the airplane begins to roll.
2- When one wing is producing effective lift while the other wing is stalled.
3- When the airplane yaws and rolls and the forward center of gravity limit is exceeded.
4- When the elevators lose their effectiveness due to a decrease in angle of attack.

300. Refer to the adjacent chart. Suppose while on course from airport "G" to airport "H" you crossed the 265 radial of Sandhills VORTAC (Y) at 1212 EST and the 228 radial 5 minutes later. By maintaining the same groundspeed your arrival time over airport "H" should be approximately

M07
1- 1303 EST.
2- 1227 EST.
3- 1223 EST.
4- 1217 EST.

301. Refer to the adjacent chart. Suppose while on course from airport "E" to airport "F" you crossed the 265 radial of Sandhills VORTAC (Y) at 1240 EST and the 228 radial 9 minutes later. By maintaining the same groundspeed your arrival time over airport "F" should be approximately

M07
1- 1307 EST.
2- 1259 EST.
3- 1254 EST.
4- 1245 EST.

302. Assume that you desire to fly inbound to a VOR station on the 310 radial. The recommended procedure is to set the course selector to

M06
1- 310° and make heading corrections away from the Course Deviation Indicator (CDI needle).
2- 310° and make heading corrections toward the Course Deviation Indicator (CDI needle).
3- 130° and make heading corrections toward the Course Deviation Indicator (CDI needle).
4- 130° and make heading corrections away from the Course Deviation Indicator (CDI needle).

303. You wish to track inbound on the 060 radial of a VOR station. The recommended procedure is to set the course selector to

M06
1- 240° and make heading corrections toward the Course Deviation Indicator (CDI needle).
2- 240° and make heading corrections away from the Course Deviation Indicator (CDI needle).
3- 060° and make heading corrections away from the Course Deviation Indicator (CDI needle).
4- 060° and make heading corrections toward the Course Deviation Indicator (CDI needle).

304. When the course deviation indicator (CDI needle) is centered during an omnireceiver check using a VOT, the omnibearing selector and the TO-FROM indicator should read

M09
1- 180° FROM, only if you are due north of the VOT.
2- 0° TO or 180° FROM, regardless of your position from the VOT.
3- 0° FROM or 180° TO, regardless of your position from the VOT.
4- 0° TO, only if you are due south of the VOT.

305. Refer to the chart to the left. Suppose while on course from airport "F" to airport "E", you crossed the 228 radial of Sandhills VORTAC at 0837 EST and the 265 radial 9 minutes later. By maintaining the same groundspeed your arrival time over airport "E" should be

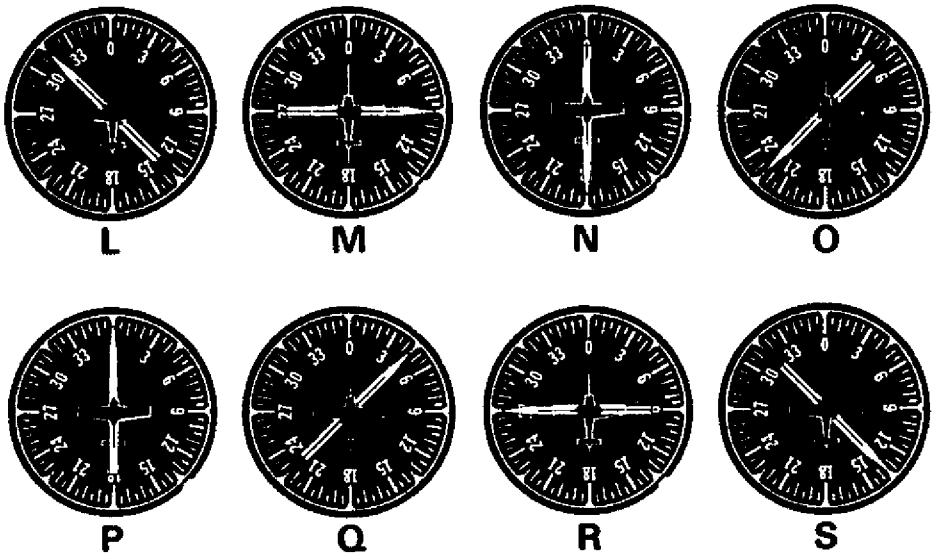
M07
1- 0855 EST.
2- 0852 EST.
3- 0848 EST.
4- 0843 EST.

306. Refer to the chart on opposite page. Suppose while on course from airport "H" to airport "G", you crossed the 228 radial of Sandhills VORTAC at 1328 EST and the 265 radial 4 minutes later. By maintaining the same groundspeed you should arrive over airport "G" at approximately

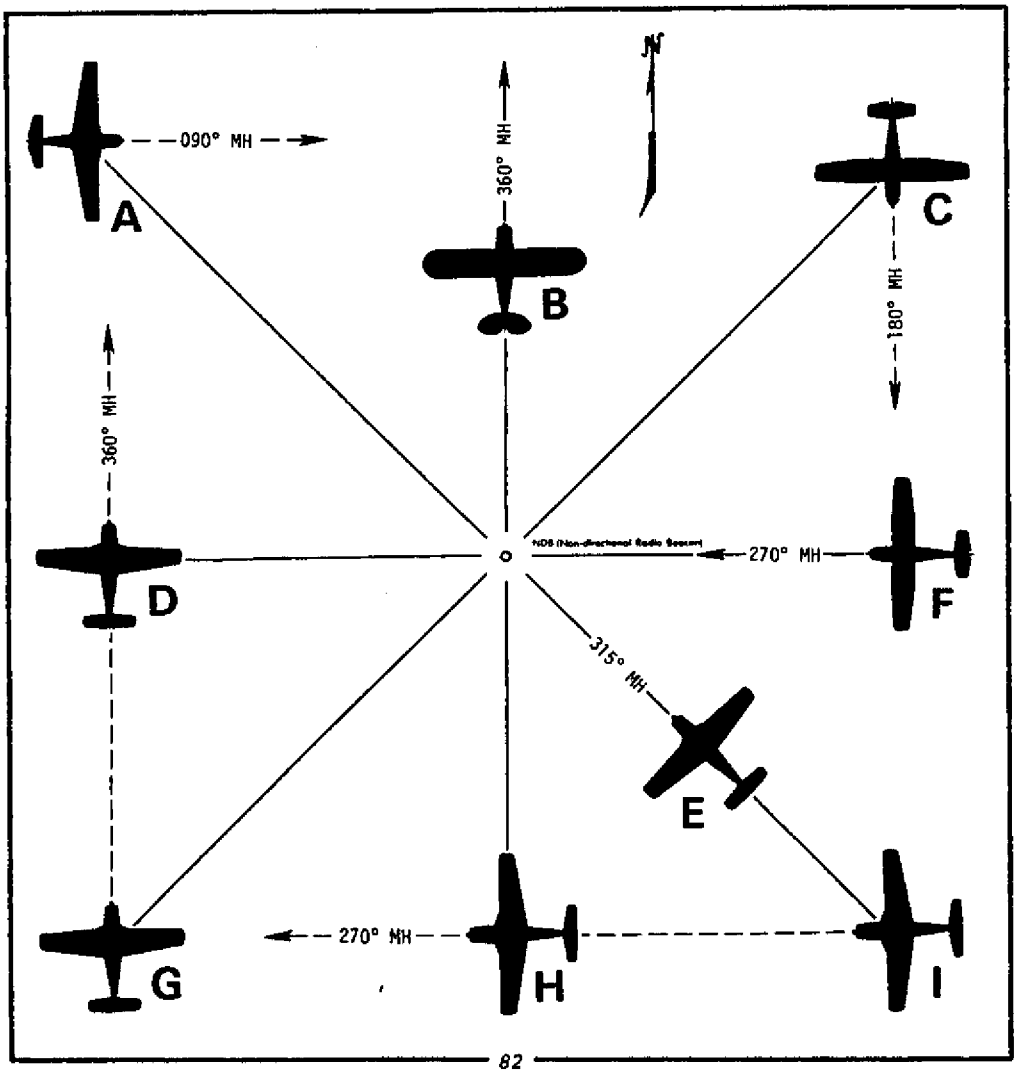
M07
1- 1349 EST.
2- 1346 EST.
3- 1343 EST.
4- 1341 EST.

307. Refer to the chart to the left. Suppose while on course from airport "F" to airport "E" you tune the omnireceiver to Sandhills VORTAC (Y). You crossed the 228 radial of Sandhills VORTAC at 1618 EST and the 265 radial 8 minutes later. By maintaining the same groundspeed your arrival time over airport "E" should be approximately

M07
1- 1641 EST.
2- 1635 EST.
3- 1631 EST.
4- 1623 EST.



ADF DIALS (Fixed-Scale)



308. Refer to the illustrations to the left. At which of the aircraft positions would you expect ADF indication "P"?

M13
1- F only.
2- E only.
3- E and F.
4- B and H.

309. Refer to the illustrations to the left. At which of the aircraft positions would you expect ADF indication "M"?

M13
1- F, H, and I.
2- D only.
3- D and H.
4- A only.

310. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "C"?

M13
1- S.
2- Q.
3- L.
4- O.

311. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "F"?

M13
1- M.
2- N.
3- R.
4- P.

312. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "A"?

M13
1- S.
2- M.
3- Q.
4- L.

313. According to ADF indication "O" (top of opposite page), you would be headed directly toward the station if you turned

M13
1- 215° to the left.
2- 135° to the left.
3- 45° to the right.
4- 45° to the left.

314. Refer to the illustrations to the left. Which ADF indication would the pilot most likely have at aircraft position "I"?

M13
1- Q.
2- R.
3- L.
4- O.

315. According to ADF indication "S" (top of opposite page), you would be headed directly toward the station if you turned

M13
1- 135° to the left.
2- 135° to the right.
3- 45° to the left.
4- 45° to the right.

316. According to ADF indication "L" (top of opposite page), you would be headed toward the station if you turned

M13
1- 315° to the left.
2- 225° to the right.
3- 45° to the left.
4- 45° to the right.

317. Refer to the ADF illustrations to the left. Which aircraft would most likely depict your position if the ADF indicated as illustrated by dial "Q"?

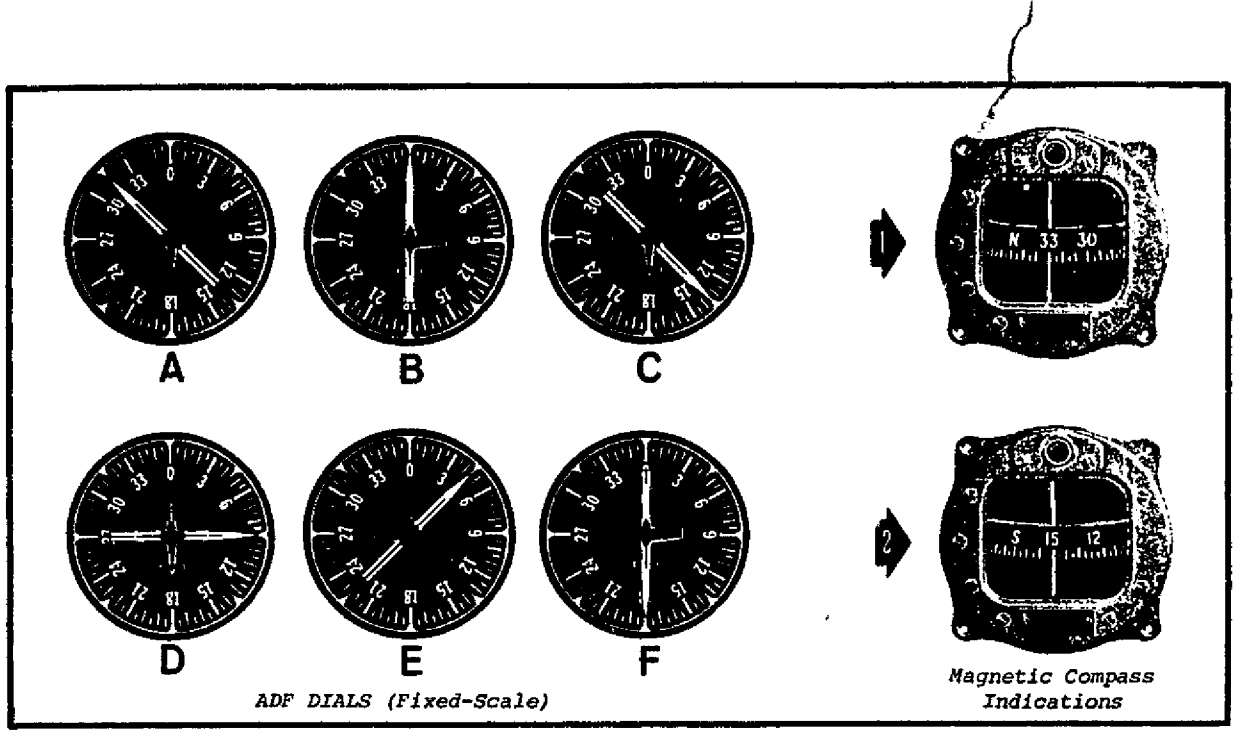
M13
1- G and I only.
2- G only.
3- A, C, G, and I.
4- A and G only.

318. Refer to the ADF illustrations to the left. If turned 45° to the right, which of the airplanes shown would have a relative bearing as indicated by dial "P"?

M13
1- A, C, G, and I.
2- E and F only.
3- G and I only.
4- A and C only.

319. Refer to the ADF illustrations on opposite page. At which of the aircraft positions would you expect indication "P"?

M13
1- C only.
2- E and F.
3- B, D, and G.
4- B only.



ADF DIALS (Fixed-Scale)

Magnetic Compass Indications

320. According to ADF dial "C" and magnetic compass "2" above, what is the MAGNETIC BEARING to the station?

M13
1- 285°.
2- 150°.
3- 135°.
4- 105°.

321. Refer to ADF dial "A" and magnetic compass "2" above. The MAGNETIC BEARING to the station is

M13
1- 315°.
2- 150°.
3- 105°.
4- 100°.

322. If ADF dial "F" above is observed and the magnetic heading is 270°, what is the MAGNETIC BEARING to the station?

M13
1- 270°.
2- 180°.
3- 090°.
4- 080°.

323. According to ADF dial "E" and magnetic compass number "2" above, the MAGNETIC BEARING to the station is

M13
1- 045°.
2- 150°.
3- 195°.
4- 015°.

324. If ADF dial "C" above is observed and the magnetic heading is 090°, what is the MAGNETIC BEARING to the station?

M13
1- 255°.
2- 225°.
3- 135°.
4- 045°.

325. Refer to magnetic compass illustration "1" above and ADF dial "D". What is the magnetic bearing to the station?

M13
1- 060°.
2- 330°.
3- 090°.
4- 240°.

326. According to magnetic compass illustration "2" above and ADF dial "B", the MAGNETIC BEARING to the station is

M13
1- 330°.
2- 180°.
3- 150°.
4- 360°.

327. Refer to ADF dial "A" and magnetic compass "1" above. The MAGNETIC BEARING to the station is

M13
1- 105°.
2- 315°.
3- 330°.
4- 285°.

§ **PORT COLUMBUS INTL** (CMH) 6.1 E GMT-5(-4DT) 39°59'40"N 82°53'07"W — CINCINNATI
816 B S4 OX 3, 4 LRA CFR Index D — H-3C, L-23C
RWY 10R-28L: H10700X150 (ASPH-CONC) S-100, D-150, DT-300 HIRL — IAP
RWY 10R: Transmission lines. MALSR **RWY 28L:** Road. SSALR
RWY 10L-28R: H6000X150 (ASPH) S-100, D-160, DT-275 HIRL
RWY 10L: Trees. SSALR **RWY 28R:** Trees. REIL. VASI
RWY 13-31: H5001X150 (ASPH) S-65, D-95, DT-170 MIRL
RWY 13: Antenna. Thld dsplcd 1318' **RWY 31:** Road. Thld dsplcd 1209'
RWY 05-23: H4483X150 (ASPH) S-65, D-95, DT-170 MIRL
RWY 05: Road. Thld dsplcd 390' **RWY 23:** Trees. Thld dsplcd 583'
RWY 01-19: H3551X150 (ASPH) S-65, D-95, DT-170 MIRL
RWY 01: Road. Thld dsplcd 200' **RWY 19:** Fence
AIRPORT REMARKS: Attended continuously. Landing Fee.
COMMUNICATIONS: ATIS 109.1 135.4 UNICOM 123.0
COLUMBUS FSS (CMH) on Fld 122.3 122.2 122.1R (614) 237-7461
Ⓡ **COLUMBUS APP CON** 123.8 (100°-279°) 125.95 (280°-099°) 118.2 119.65 124.2
COLUMBUS TOWER 120.5 125.4 **GND CON** 121.9 **CLNC DEL** 126.3
Ⓡ **COLUMBUS DEP CON** 123.8 (100°-279°) 125.95 (280°-099°)
STAGE III SVC contact **APP CON**
RADIO AIDS TO NAVIGATION: VOT 111.0 VHF/DF ctc COLUMBUS FSS
APPLETON (H) BVORTAC 238°/16.6 NM
COLUMBUS NDB (H-SAB) 391 ∎ CMH 39°59'19"N 82°55'17.7"W 070° 1.0 NM to fld
GRANDVIEW NDB (LOM) 272 CB 40°00'36.4"N 83°01'44.5"W 101° 5.6 NM to fld
SUMMIT STATION NDB (LOM) 245 CM 39°59'10.2"N 82°45'16.6"W 276° 5.4 NM to fld
ILS 109.1 I-CBP Rwy 10L LOM GRANDVIEW NDB
ILS 109.3 I-CMH Rwy 28L LOM SUMMIT STATION NDB
ILS 108.7 I-AQI Rwy 10R
ASR
COMM/NAVAID REMARKS: Route forecast available only 0300-1000Z‡

328. Frost, which has not been removed from the wings of an airplane before flight

009 1- will change the camber (curvature of the wing) thereby increasing lift during takeoff.

2- would present no problems since frost will blow off when the airplane starts moving during takeoff.

3- may make it difficult or impossible to become airborne.

4- may cause the airplane to become airborne with a lower angle of attack and at a lower than normal indicated airspeed.

329. Refer to the excerpt above. If you were approaching Port Columbus Intl. Airport from the north, what is the proper sequence of using radio frequencies prior to landing at this airport?

NO7 1- 122.3; 123.8; 120.5 MHz.
2- 125.95; 120.5; 121.9 MHz.
3- 109.1; 125.95; 120.5 MHz.
4- 122.3; 109.1; 123.8; 120.5 MHz.

330. Refer to the excerpt above. To activate or close a VFR flight plan with Columbus FSS, you could transmit and receive on which frequency?

NO7 1- 123.8 MHz.
2- 109.1 MHz.
3- 122.1R MHz.
4- 122.3 MHz.

331. See above excerpt. Assume you are approaching Port Columbus Intl. Airport from the southwest and intend to land at this airport. What is the proper sequence of using radio frequencies to contact approach control, tower, and ground control?

NO7 1- 123.8; 120.5; 121.9 MHz.
2- 125.95; 125.4; 121.9 MHz.
3- 123.8; 121.9; 125.4 MHz.
4- 109.1; 121.9; 125.95 MHz.

332. Refer to the excerpt above. The proper sequence of using radio frequencies to contact clearance delivery, ground control, tower, and departure control for a northeast departure from Port Columbus Intl. Airport would be

NO7 1- 125.95; 120.5; 121.9; 126.3 MHz.
2- 123.8; 121.9; 120.5; 126.3 MHz.
3- 126.3; 125.4; 121.9; 123.8 MHz.
4- 126.3; 121.9; 120.5; 125.95 MHz.

333. After landing at a tower-controlled airport when should you contact ground control?

NO3 1- After leaving the runway and crossing the taxiway holding lines.

2- Prior to turning off the runway.

3- After reaching a taxiway that leads directly to the parking area.

4- When the tower instructs you to do so.

334. What effect would FROST have on airplane performance?

009
1- It may result in the engine being overboosted during takeoff.
2- It may cause an airplane to become airborne sooner than anticipated.
3- It may prevent an airplane from becoming airborne.
4- The greater induced drag will shorten the takeoff roll.

335. An airplane is usually affected by "ground effect" at what height above the surface?

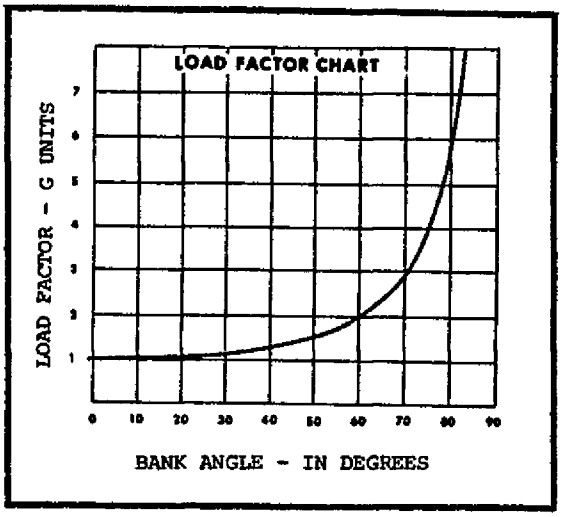
014
1- Between 100 and 200 feet above the surface in calm wind conditions.
2- Less than half the airplane's wingspan above the surface.
3- Twice the airplane's wingspan above the surface.
4- Three to four times the airplane's wingspan.

336. Select the true statement regarding "ground effect."

014
1- Ground effect may cause an airplane to float on landings or permit it to become airborne with insufficient power to sustain flight outside of ground effect.
2- Light single-engine airplanes usually encounter "ground effect" at 200 or 300 feet above the surface.
3- In conditions of high gross weight, high density altitude, and high temperature an airplane will usually not encounter "ground effect."
4- Ground effect often causes an airplane to settle to the surface immediately after becoming airborne.

337. Refer to the chart to the right above. If the maximum load factor for a particular airplane is +4.4 G units, the maximum bank during a level turn without exceeding this load factor would be approximately

017
1- 72°
2- 82°
3- 67°
4- 77°



338. Use the chart above. If an airplane weighs 3,400 lbs., what approximate weight would the airplane structure be supporting during a 60° banked turn while maintaining altitude?

017
1- 8,400 lbs.
2- 6,800 lbs.
3- 4,400 lbs.
4- 3,400 lbs.

339. Refer to the chart above. If the airplane has a maximum positive load factor of +3.8 G units, the maximum bank in a level turn without exceeding this load factor would be

017
1- unobtainable from the Load Factor Chart.
2- approximately 82°
3- approximately 74°
4- approximately 67°

340. Which aerodynamic condition causes an airplane to spin?

019
1- When the ailerons lose their effectiveness due to a decrease in angle of attack and the airplane begins to roll.
2- When one wing is producing effective lift while the other wing is stalled.
3- When the airplane yaws and rolls and the forward center of gravity limit is exceeded.
4- When the elevators lose their effectiveness due to a decrease in angle of attack.

341. Select the true statement concerning the use of flaps during the landing approach.

020
1- The use of flaps increases the airplane's controllability.
2- The use of flaps permits a decreased approach angle.
3- By using flaps, a steeper than normal angle of descent is possible without increasing the airspeed.
4- The use of flaps requires a higher indicated airspeed on the final approach.

342. In all cases for an airplane to spin, it must first be

019
1- partially stalled with one wing low and the throttle closed.
2- placed in a steep diving spiral.
3- stalled.
4- placed in a steep nose-high pitch attitude.

343. Regarding stalls, which statement is true?

019
1- An airplane can be stalled only when the nose is high and the airspeed is low.
2- An airplane can be stalled only when the airspeed decreases to the published stalling speed.
3- An airplane can be stalled only when the nose is too high in relation to the horizon.
4- An airplane can be stalled at any airspeed and in any flight attitude.

344. If an airplane is loaded 102 lbs. over maximum certificated gross weight, and gasoline is drained to bring the aircraft weight within limits, how much fuel should be drained?

017
1- 23 gallons.
2- 21 gallons.
3- 17 gallons.
4- 11 gallons.

345. Which statement is true relative to trimming to compensate for the effects of torque in a single-engine propeller-driven airplane?

023
1- If power is reduced (airspeed constand), right rudder trim must be added.
2- If power is increased (airspeed constant), left rudder trim must be added.
3- If airspeed is decreased (power constant), right rudder trim must be added.
4- If airspeed is increased (power constant), right rudder trim must be added.

346. The effect of torque is most noticeable during

023
1- maximum speed in level flight with maximum continuous power.
2- flight at a critically slow airspeed with full throttle.
3- maximum structural cruising speed.
4- gliding flight with a reduced throttle setting.

347. The term "angle-of-attack" is best defined as the

021
1- angle between the wing chord line and the direction of the relative wind.
2- angle between the airplane's climb angle and the horizon.
3- angle formed by the longitudinal axis of the airplane and the chord line of the wing.
4- specific angle at which the ratio between lift and drag is the highest.

348. Excessively high cylinder head and oil temperatures, either in the air or on the ground, will

P02
1- cause damage to heat-conducting hoses and warping of the cylinder cooling fins.
2- cause loss of power, excessive oil consumption, and possible permanent internal engine damage.
3- not appreciably affect an aircraft engine.
4- increase fuel consumption and may increase power due to the increased heat.

349. What change occurs in the fuel/air mixture when carburetor heat is applied?

P01
1- The mixture becomes leaner and causes a decrease in RPM.
2- No change occurs in the fuel/air mixture.
3- The fuel/air mixture becomes leaner.
4- The fuel/air mixture becomes richer.

350. Float-type carburetor systems, compared to fuel injection systems, are generally considered to be

P01
1- equally susceptible to icing as a fuel injection unit.
2- susceptible to icing only when visible moisture is present.
3- more susceptible to icing than a fuel injection unit.
4- less susceptible to icing than a fuel injection unit.

351. To counteract the effect of torque in a conventional single-engine propeller-driven airplane, a pilot should normally apply

023
1- left rudder pressure during the takeoff roll and while climbing with full power.
2- right rudder pressure when entering a glide from level cruising flight.
3- right rudder pressure during the takeoff roll and while climbing with full power.
4- left rudder pressure when entering a climb from level cruising flight.

352. Detonation occurs in a reciprocating aircraft engine when

P08
1- the spark plugs are "fouled" or "shorted out" or the wiring is defective.
2- hot spots in the combustion chamber ignite the fuel/air mixture in advance of normal ignition.
3- the fuel/air mixture is too rich.
4- the unburned charge in the cylinders explodes instead of burning normally.

353. Running a fuel tank dry before switching tanks is considered unwise because

P06
1- the engine-driven fuel pump or electric fuel boost pump may draw air into the fuel system causing vapor lock.
2- the engine-driven fuel pump is lubricated by fuel and operating on a dry tank may cause pump failure.
3- any foreigh matter in the tank will be pumped into the fuel system.
4- the fuel pump is located above the bottom portion of the fuel tank.

354. If the grade of fuel used in an aircraft engine is lower than specified for the engine, it will most likely cause

P05
1- a fuel/air mixture that is not uniform in all cylinders.
2- lower cylinder head temperatures.
3- an increase in power which could overstress internal engine components.
4- detonation.

355. Which of these may result in overstressing and damaging aircraft engine crankshafts?

P04
1- carburetor ice forming on the throttle valve.
2- rapid opening and closing of the throttle.
3- operating with an excessively rich fuel/air mixture.
4- extended glides with reduced power.

356. Wingtip vortices are created only when the generating airplane is

P12
1- developing lift.
2- heavily loaded.
3- operating at high airspeeds.
4- using high power settings.

357. Concerning carburetor icing, which statement is true?

P11
1- Carburetor icing would most likely form when the air temperature is between 20° F. and 70° F. with visible moisture or high humidity.
2- The carburetor heater is a deicing device that heats the air after it enters the carburetor.
3- The first indication of carburetor icing in an airplane equipped with a fixed-pitch propeller is an increase in RPM, followed by a decrease in RPM.
4- Carburetor icing will form in a carburetor whenever the temperature is below freezing 32° F. (0° C.).

358. Suppose that battery and alternator failure occurred during flight. In this situation, you would experience

P10
1- avionics equipment failure.
2- engine failure due to the loss of the engine-driven fuel pump and also experience failure of the radio equipment, lights, and all instruments that require AC current.
3- failure of the ignition system, fuel gauges, lighting system, and avionics equipment.
4- high cylinder head temperature and low oil pressure indications.

359. Filling the fuel tanks after the last flight of the day is a good operating procedure because this will

P09
1- force any existing water to the top of the tank away from the fuel lines to the engine.
2- prevent expansion of the fuel by eliminating airspace in the tanks.
3- prevent moisture condensation by eliminating airspace in the tanks.
4- eliminate vaporization of the fuel.

360. Concerning the advantages of an aircraft generator or alternator, select the true statement.

P16
1- An alternator provides more electrical power at lower engine RPM than a generator.
2- A generator charges the battery during low engine RPM; therefore, the battery has less chance to become fully discharged, as often occurs with an alternator.
3- An alternator provides electrical current and eliminates the need for an aircraft to be equipped with a battery.
4- A generator always provides more electrical current than an alternator.

361. What is one result of permitting an airplane engine to idle for a long period of time while on the ground?

P16
1- A hydraulic lock may develop in one or more cylinders.
2- It may cause excessively high oil pressure.
3- The lean mixture may cause the engine to misfire or to quit.
4- The spark plugs may become fouled.

362. Which operating procedure would most likely cause the cylinder head and oil temperature gauges to exceed the normal operating ranges?

P15
1- Using fuel that has a fuel rating lower-than-specified for the engine.
2- Using fuel that has a fuel rating higher-than-specified for the engine.
3- Operating with higher-than-normal oil pressure.
4- Operating with the mixture control set too rich.

TAKE-OFF DATA

TAKE-OFF DISTANCE FROM HARD SURFACE RUNWAY WITH FLAPS UP

GROSS WEIGHT POUNDS	IAS AT 50' MPH	HEAD WIND KNOTS	AT SEA LEVEL & 59°		AT 2500 FT. & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32°F	
			GROUND RUN	TOTAL TO CLEAR 50 FT OBS	GROUND RUN	TOTAL TO CLEAR 50 FT OBS	GROUND RUN	TOTAL TO CLEAR 50 FT OBS	GROUND RUN	TOTAL TO CLEAR 50 FT OBS
2300	68	0	865	1525	1040	1910	1255	2480	1565	3055
		10	615	1170	750	1485	920	1935	1160	3110
		20	405	850	505	1100	630	1480	810	2425
2000	63	0	630	1095	755	1325	905	1625	1120	2155
		10	435	820	530	1005	645	1250	810	1685
		20	275	580	340	720	425	910	595	1255
1700	58	0	435	780	520	920	625	1095	765	1370
		10	290	570	355	680	430	820	535	1040
		20	175	385	215	470	270	575	345	745

NOTES: 1. Increase distance 10% for each 25°F above standard temperature for particular altitude.
2. For operation on a dry, grass runway, increase distances (both "ground run" and "total to clear 50 ft. obstacle") by 7% of the "total to clear 50 ft. obstacle" figure.

363. Assume these conditions exist:

Gross weight . . . . . 2000 lbs.
Outside temperature . . . 100° F.
Pressure altitude . . . . 2,500 feet
Wind (Headwind) . . . . . 20 knots

According to the chart above, the TOTAL TAKEOFF DISTANCE required to clear a 50-foot obstacle is

Q01 1- 995 feet.
2- 910 feet.
3- 864 feet.
4- 720 feet.

364. Given data:

Gross weight . . . . . 1700 lbs.
Pressure altitude . . . . Sea level
Outside temperature . . . 84° F.
Wind (Headwind) . . . . . 10 knots

Applying the given data to the chart above, the total takeoff distance required to clear a 50-foot obstacle is

Q01 1- 990 feet.
2- 920 feet.
3- 780 feet.
4- 627 feet.

365. Refer to the chart below and apply the following data:

Pressure altitude . . . . Sea level
Temperature . . . . . 89° F.
Gross weight . . . . . 1,700 lbs.
Indicated airspeed . . . 77 MPH

If after takeoff a climb was made for a period of 4 minutes 30 seconds, what would be the approximate indicated altitude?

Q02 1- 5,212 feet.
2- 4,998 feet.
3- 4,882 feet.
5- 4,612 feet.

366. Use the following data and the chart below to obtain the approximate gain in altitude after a 6-minute climb:

Pressure altitude . . . . . Sea level
Temperature . . . . . 79° F.
Gross weight . . . . . 2,300 lbs.
Indicated airspeed . . . . 82 MPH

The gain in altitude would be

Q02 1- 3,630 feet.
2- 3,440 feet.
3- 3,210 feet.
4- 3,000 feet.

MAXIMUM RATE-OF-CLIMB DATA

GROSS WEIGHT POUNDS	AT SEA LEVEL & 59°F			AT 5000 FT. & 41°F			AT 10,000 FT. & 23°F			AT 15,000 FT. & 5°F		
	IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FROM S.L. FUEL USED
2300	82	645	1.0	81	435	2.6	79	230	4.8	78	22	11.5
2000	79	840	1.0	79	610	2.2	76	380	3.6	75	155	6.3
1700	77	1085	1.0	76	825	1.9	73	570	2.9	72	315	4.4

NOTES: 1. Flaps up, full throttle, mixture leaned for smooth operation above 5000 ft.
2. Fuel used includes warm up and take-off allowance.
3. For hot weather, decrease rate of climb 20 ft./min. for each 10°F above standard day temperature for particular altitude.

CRUISE & RANGE PERFORMANCE

Gross Weight- 2300 Lbs.
Standard Conditions
Zero Wind Lean Mixture

NOTE: Maximum cruise is normally limited to 75% power.

ALT.	RPM	% BHP	TAS MPH	GAL / HOUR	38 GAL (NO RESERVE) ENDR. HOURS	38 GAL (NO RESERVE) RANGE MILES	48 GAL (NO RESERVE) ENDR. HOURS	48 GAL (NO RESERVE) RANGE MILES
2500	2700	86	134	9.7	3.9	525	4.9	660
	2600	79	129	8.6	4.4	570	5.6	720
	2500	72	123	7.8	4.9	600	6.2	760
	2400	65	117	7.2	5.3	620	6.7	780
	2300	58	111	6.7	5.7	630	7.2	795
	2200	52	103	6.3	6.1	625	7.7	790
5000	2700	82	134	9.0	4.2	565	5.3	710
	2600	75	128	8.1	4.7	600	5.9	760
	2500	68	122	7.4	5.1	625	6.4	790
	2400	61	116	6.9	5.5	635	6.9	805
	2300	55	108	6.5	5.9	635	7.4	805
	2200	49	100	6.0	6.3	630	7.9	795
7500	2700	78	133	8.4	4.5	600	5.7	755
	2600	71	127	7.7	4.9	625	6.2	790
	2500	64	121	7.1	5.3	645	6.7	810
	2400	58	113	6.7	5.7	645	7.2	820
	2300	52	105	6.2	6.1	640	7.7	810
10,000	2650	70	129	7.6	5.0	640	6.3	810
	2600	67	125	7.3	5.2	650	6.5	820
	2500	61	118	6.9	5.5	655	7.0	830
	2400	55	110	6.4	5.9	650	7.5	825
	2300	49	100	6.0	6.3	635	8.0	800

367. Refer to the above chart. If the cruise altitude is 7,500 feet, using 64% power at 2500 RPM, what would be the range with 48 gallons of usable fuel?

Q03
1- 685 miles.
2- 635 miles.
3- 810 miles.
4- 645 miles.

368. Refer to the above chart. You plan to cruise at 2,500 feet, using 58% BHP and 2300 RPM. How long could the airplane be flown with 48 gallons of usable fuel aboard?

Q03
1- 7.7 hours.
2- 7.2 hours.
3- 6.1 hours.
4- 5.7 hours.

369. With the conditions shown on the above chart, what would be the flight hours' endurance at an altitude of 7,500 feet, using 52% power?

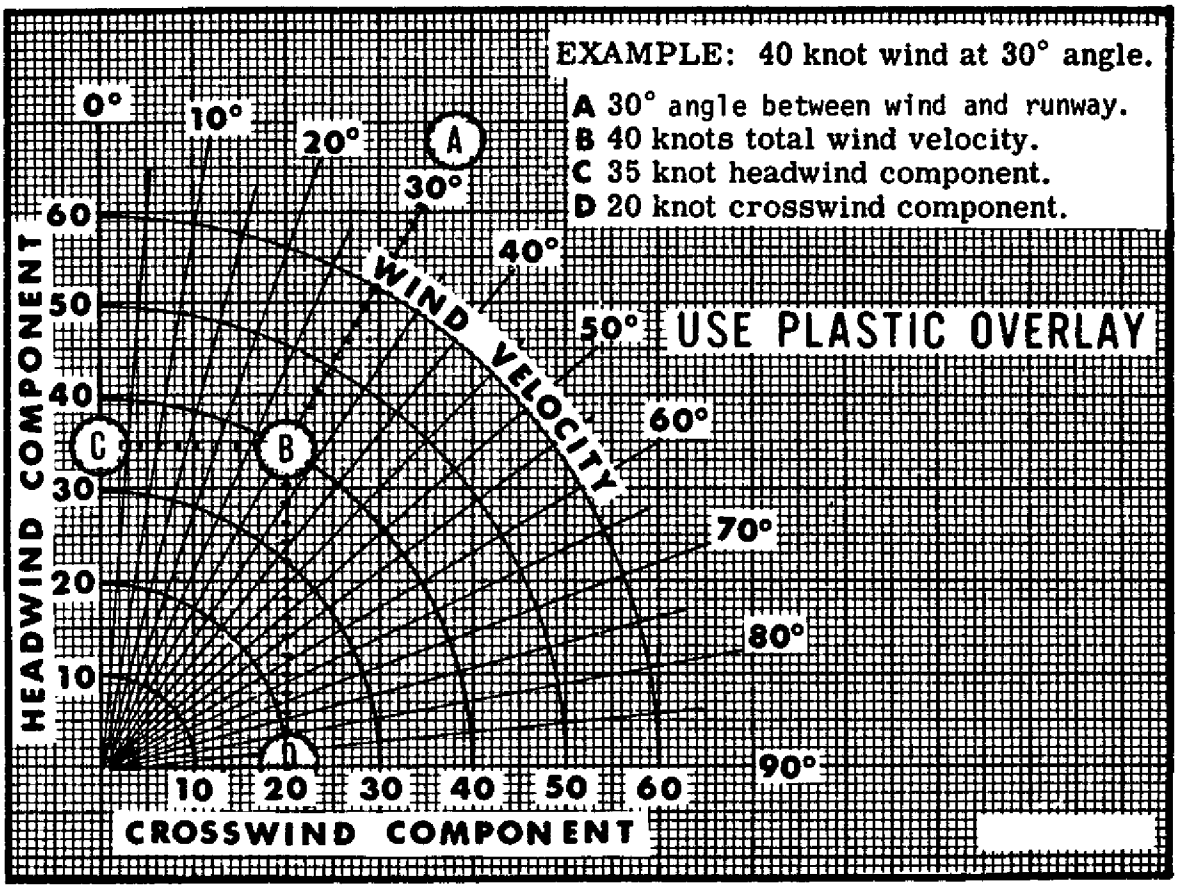
Q03
1- 8.4 hours.
2- 8.0 hours.
3- 7.7 hours.
4- 6.1 hours.

NOTE: With 48 gals. fuel - no reserve.

370. With the conditions shown on the chart above, what would be the approximate true airspeed and fuel consumption per hour at an altitude of 5,000 feet, using 55% power?

Q03
1- 100 MPH TAS, 6.0 GPH.
2- 108 MPH TAS, 6.5 GPH.
3- 116 MPH TAS, 6.9 GPH.
4- 111 MPH TAS, 7.4 GPH.

318-376 O - 80 - 7



371. GIVEN:

Landing runway 27
Wind . . . . . 290° @ 25 knots

The headwind component is

Q04
1- 31 knots.
2- 26 knots.
3- 23 knots.
4- 9 knots.

NOTE: Use chart above.

372. GIVEN:

Max. crosswind component for your airplane . . . . 15 knots
Landing runway 18
Wind from 225° at . . . . . 20 knots

Which of the following statements is true? (Use chart above.)

Q04
1- The maximum crosswind component is not exceeded.
2- A left quartering headwind exists.
3- The maximum crosswind component is exceeded.
4- The crosswind component exceeds the headwind component.

373. The wind is reported to be from 070° at 15 knots and you plan to land on Runway 14. What will be the crosswind component? (Use chart above.)

Q04
1- 30 knots.
2- 20 knots.
3- 14 knots.
4- 12 knots.

374. The wind is reported to be from 010° at 30 knots and you plan to land on Runway 5. What will be the crosswind component? (Use chart above.)

Q04
1- 25 knots.
2- 19 knots.
3- 15 knots.
4- 10 knots.

NORMAL LANDING DISTANCES

ASSOCIATED CONDITIONS

POWER	OFF
FLAPS	35°
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
WEIGHT	2750 POUNDS
APPROACH SPEED	85 MPH/74 KTS IAS

NOTES:

1. GROUND ROLL IS APPROXIMATELY 45% OF TOTAL DISTANCE OVER 50 FT. OBSTACLE
2. FOR EACH 100 LBS. BELOW 2750 LBS. REDUCE TABULATED DISTANCE BY 3% AND APPROACH SPEED BY 1 MPH.

WIND COMPONENT DOWN RUNWAY KNOTS	SEA LEVEL OAT °F	SEA LEVEL TOTAL OVER 50 FT OBSTACLE FEET	2000 FT OAT °F	2000 FT TOTAL OVER 50 FT OBSTACLE FEET	4000 FT OAT °F	4000 FT TOTAL OVER 50 FT OBSTACLE FEET	6000 FT OAT °F	6000 FT TOTAL OVER 50 FT OBSTACLE FEET	8000 FT OAT °F	8000 FT TOTAL OVER 50 FT OBSTACLE FEET
0	23	1578	16	1651	9	1732	2	1820	-6	1916
	41	1624	34	1701	27	1787	20	1880	13	1983
	59	1670	52	1752	45	1842	38	1942	31	2050
	77	1717	70	1804	63	1899	56	2004	49	2118
	95	1764	88	1856	81	1956	74	2068	66	2187
15	23	1329	16	1397	9	1472	2	1555	-6	1644
	41	1372	34	1444	27	1524	20	1611	13	1707
	59	1414	52	1491	45	1575	38	1668	31	1770
	77	1458	70	1540	63	1626	56	1727	49	1833
	95	1502	88	1588	81	1682	74	1784	66	1898
30	23	1079	16	1142	9	1212	2	1289	-6	1372
	41	1119	34	1186	27	1260	20	1341	13	1430
	59	1158	52	1230	45	1308	38	1395	31	1489
	77	1199	70	1275	63	1357	56	1449	49	1548
	95	1240	88	1320	81	1407	74	1502	66	1608

375. Apply the following conditions to the chart above:

Gross weight . . . . . 2,750 lbs.
Outside air temperature . . 78° F.
Pressure altitude . . . . . 5,000 ft.
Wind (down runway) . . . . . 15 knots

The total landing distance over a 50-foot obstacle would be

Q06
1- 2,011 feet.
2- 1,933 feet.
3- 1,733 feet.
4- 1,454 feet.

376. Assume the following conditions exist and apply them to the chart below:

Gross weight . . . . . 1,600 lbs.
Pressure altitude . . Sea level
Headwind . . . . . 20 knots
Temperature . . . . . 59° F.

What would be the landing ground roll distance?

Q06
1- 222 feet.
2- 267 feet.
3- 445 feet.
4- 623 feet.

377. Given data:

Gross weight . . . . . 2,750 lbs.
Outside air temperature . . 20° F.
Pressure altitude . . . . . 6,000 ft.
Wind (down runway) . . . . . 30 knots

Using the given data and the chart above, the approximate ground roll would be

Q06
1- 903 feet.
2- 846 feet.
3- 724 feet.
4- 603 feet.

378. Consider the following conditions and use the chart below:

Gross weight . . . . . 1,600 lbs.
Pressure altitude . . . 7,500 feet
Headwind . . . . . 16 knots
Temperature . . . . . 32° F.

The approximate total distance required to land over a 50-foot obstacle is

Q06
1- 1,255 feet.
2- 502 feet.
3- 753 feet.
4- 2,259 feet.

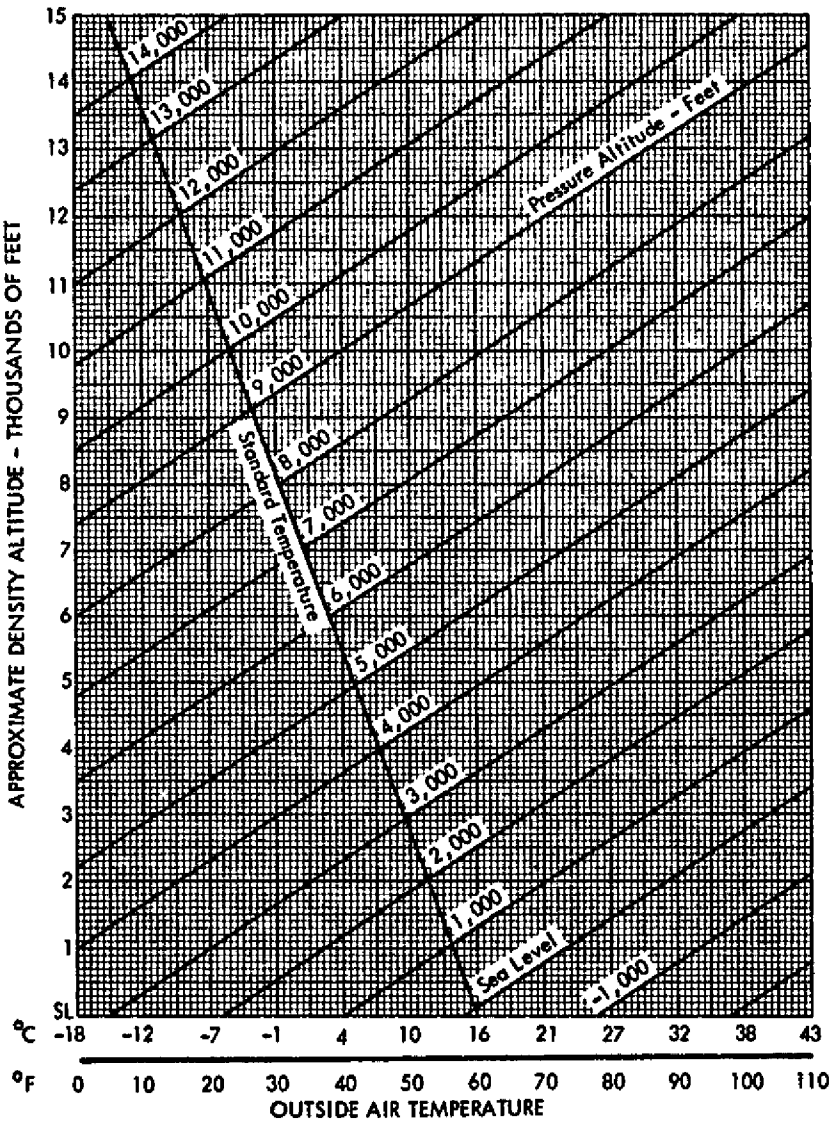
—LANDING DISTANCE—

FLAPS LOWERED TO 40° - POWER OFF
HARD SURFACE RUNWAY - ZERO WIND

GROSS WEIGHT LBS.	APPROACH SPEED, IAS, MPH	AT SEA LEVEL & 59° F. GROUND ROLL	AT SEA LEVEL & 59° F. TOTAL TO CLEAR 50 FT. OBS	AT 2500 FT. & 50° F. GROUND ROLL	AT 2500 FT. & 50° F. TOTAL TO CLEAR 50 FT. OBS	AT 5000 FT. & 41° F. GROUND ROLL	AT 5000 FT. & 41° F. TOTAL TO CLEAR 50 FT. OBS	AT 7500 FT. & 32° F. GROUND ROLL	AT 7500 FT. & 32° F. TOTAL TO CLEAR 50 FT. OBS
1600	60	445	1075	470	1135	495	1195	520	1255

NOTES: 1. Decrease the distances shown by 10% for each 4 knots of headwind.
2. Increase the distance by 10% for each 60°F. temperature increase above standard.
3. For operation on a dry, grass runway, increase distances (both "ground roll" and "total to clear 50 ft. obstacle") by 20% of the "total to clear 50 ft. obstacle" figure.

DENSITY ALTITUDE CHART



Altimeter Setting (In. Hg.)	*Altitude Correction For Obtaining Pressure Alt.*
28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983

DO NOT MARK ON CHART

USE PLASTIC OVERLAY

379. Assume these conditions exist:

Outside air temperature . . 95° F.
Altimeter setting . . . . . 30.40" Hg.
Airport elevation . . . . . 3,450 feet.

You determine the density altitude to be approximately

Q12
1- 7,200 feet.
2- 7,650 feet.
3- 6,650 feet.
4- 5,950 feet.

NOTE: Use chart on opposite page.

380. GIVEN:

Airport elevation . . . . . 5,515 feet.
Outside air temperature . . 85° F.
Altimeter setting . . . . . 29.40" Hg.

Determine the density altitude.

Q12
1- 9,250 feet.
2- 9,050 feet.
3- 8,400 feet.
4- 6,000 feet.

NOTE: Use chart on opposite page.

381. GIVEN:

Airport elevation . . . . . 608 feet.
Outside air temperature . . 70° F.
Altimeter setting . . . . . 29.40" Hg.

Determine the density altitude.

Q12
1- 4,000 feet.
2- 3,000 feet.
3- 2,100 feet.
4- 1,100 feet.

NOTE: Use chart on opposite page.

382. GIVEN:

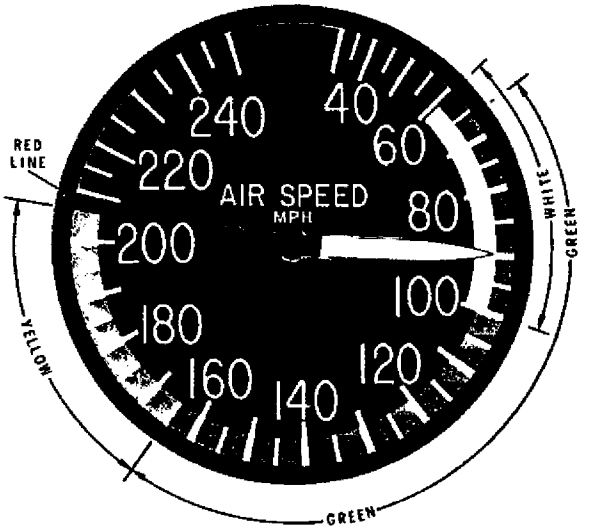
Altimeter setting . . . . . 29.70" Hg.
Airport elevation . . . . . 3,795 feet
Outside air temperature . . 75° F.

Using the chart on the opposite page, determine the DENSITY ALTITUDE.

Q12
1- 6,200 feet.
2- 5,900 feet.
3- 3,900 feet.
4- 3,000 feet.

383. While on the ground at an airport, you can determine the pressure altitude by

Q12
1- setting the altimeter to the field elevation and reading the value in the altimeter setting window.
2- setting the altimeter to zero and reading the value in the altimeter setting window.
3- setting 29.92 in the airplane's altimeter setting window and reading the indicated altitude.
4- setting the field elevation in the altimeter setting window and reading the indicated altitude.



384. Refer to the airspeed indicator above. Which color-coded marking identifies the power-off stalling speed with flaps and landing gear in the retracted position?

Q15
1- Upper A/S limit of the green arc.
2- Upper A/S limit of the white arc.
3- Lower A/S limit of the green arc.
4- Lower A/S limit of the white arc.

385. Refer to the color-coded markings on the airspeed indicator above. What is the "caution range" of the airplane?

Q15
1- 208 to 210 MPH.
2- 165 to 208 MPH.
3- 60 to 100 MPH.
4- 0 to 60 MPH.

386. Refer to the airspeed indicator above. What is the "maximum structural cruising speed?"

Q15
1- 240 MPH.
2- 208 MPH.
3- 165 MPH.
4- 100 MPH.

387. Refer to the airspeed indicator above. The maximum speed at which the airplane can be operated in smooth air is

Q15
1- 208 MPH.
2- 165 MPH.
3- 100 MPH.
4- 65 MPH.

388. Suppose that an airplane has been loaded in such a manner that the center of gravity is located aft of the CG limit. One characteristic that a pilot might experience with this airplane would be

Q14
1- a longer takeoff run.
2- the inability to recover from a stalled condition.
3- stalling at higher than normal airspeed.
4- the inability to flare during landings.

389. What is an important airspeed limitation that is <u>not</u> color-coded on airspeed indicators?

Q15
1- Never-exceed speed.
2- Maximum structural cruising speed.
3- Maneuvering speed.
4- Maximum flaps-extended speed.

390. Which important airspeed limitation is not color-coded on the airspeed indicator?

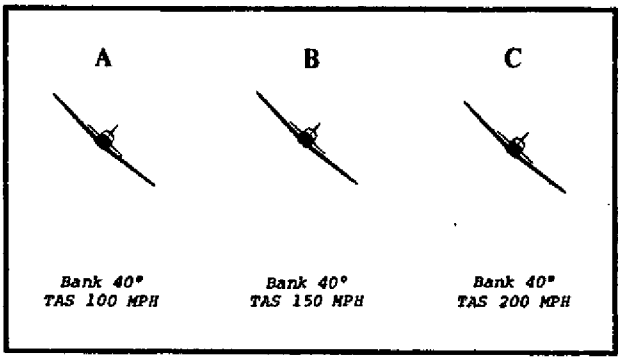
Q15
1- The maneuvering speed.
2- The maximum power-off stalling speed with the landing gear and wing flaps retracted.
3- The never-exceed speed.
4- The maximum structural cruising speed.

391. The upper airspeed limit of the green arc on an airspeed indicator represents the maximum

Q15
1- landing gear lowering speed.
2- structural cruising speed.
3- design maneuvering speed.
4- allowable speed for smooth-air operations.

392. Concerning airplane structural limitations, if moderate to severe turbulence is encountered, the indicated airspeed should not exceed the

Q15
1- minimum design cruise speed.
2- maximum structural cruising speed.
3- maximum flaps-extended speed.
4- maneuvering speed.



393. Assume that the airplanes in the above illustration are making coordinated turns. Which statement is true?

Q17
1- Airplane "A" has the greatest rate of turn and the smallest radius of turn.
2- Airplanes "A," "B," and "C" have equal rates of turn, but airplane "C" has the largest radius of turn.
3- Airplane "C" has the greatest rate of turn and the largest radius of turn.
4- Airplane "A" has the smallest rate of turn and the greatest radius of turn.

394. As you maneuver an airplane you should realize that it can be stalled

Q18
1- only when the nose is too high in relation to the horizon.
2- at any airspeed and in any flight attitude.
3- only when the airspeed decreases to the published stalling speed.
4- only when the nose is high and the airspeed is low.

395. Assume that the normal landing approach speed of your airplane is 75 MPH indicated airspeed at sea level. If you plan to land at an airport where the elevation is 7,500 ft. MSL, the indicated approach speed should be

Q18
1- higher than at sea level and the true airspeed will be higher.
2- the same as at sea level and the true airspeed will be the same.
3- higher than at sea level, but the true airspeed will be the same.
4- the same as at sea level, but the true airspeed will be higher.

STALL SPEEDS

GROSS WEIGHT 2750 LBS		ANGLE OF BANK			
		LEVEL	30°	45°	60°
POWER		GEAR AND FLAPS UP			
ON	MPH	62	67	74	88
	KTS	54	58	64	76
OFF	MPH	75	81	89	106
	KTS	65	70	77	92
		GEAR AND FLAPS DOWN			
ON	MPH	54	58	64	76
	KTS	47	50	56	66
OFF	MPH	66	71	78	93
	KTS	57	62	68	81

396. Refer to the chart above. Select the true statement concerning the effect on stall speeds when operating with the gear and flaps up and with the gear and flaps down.

Q18
1- In a 45° bank with power on, the stall occurs at a higher airspeed with gear and flaps down than when they are up.
2- In power-off turns, regardless of the gear and flaps position, the stall will occur at an airspeed 7-8 MPH higher with 45° of bank than with 30° of bank.
3- In level flight with power off, a stall would occur at a higher airspeed with gear and flaps down than with gear and flaps up.
4- In a 60° bank with power on or power off, the airplane will stall at a lower airspeed with gear and flaps up than with the gear and flaps down.

397. Refer to the Stall Speeds Chart above and select the true statement.

Q18
1- The airplane with gear and flaps down and power on, would stall at a 30 MPH higher airspeed in a 45° bank than in level flight.
2- The stalling speed in a 30° bank with power on or power off, would be the same regardless of whether the gear and flaps are up or down.
3- The power-on stalling speed in a 30° bank is 4-5 MPH higher than level flight stalling speed with gear and flaps either up or down.
4- The stall speed in level flight, with power on and gear and flaps up, is the same as the stall speed in a 45° bank, with power off and gear and flaps down.

398. When computing weight and balance, the "empty weight" includes the weight of the airframe, engine(s), and all items of operating equipment permanently installed. Empty weight also includes

Q22
1- all usable fuel and oil, but does not include any radio equipment or instruments that were installed by someone other than the manufacturer.
2- all usable fuel, maximum oil, hydraulic fluid, but does not include the weight of pilot, passengers, or baggage.
3- the unusable fuel, hydraulic fluid, and undrainable oil (or, in some aircraft all of the oil).
4- all usable fuel and oil.

399. Which items are included in the certificated empty weight of an airplane?

Q22
1- Only the airframe, powerplant, and equipment installed by the manufacturer.
2- Hydraulic fluid and usable fuel.
3- Full fuel tanks and engine oil to capacity, but excluding crew and baggage.
4- Unusable fuel and optional equipment.

400. Which of the following would provide the greatest gain in altitude in the shortest distance during climb after takeoff?

Q21
1- Steepest pitch attitude.
2- Cruising climb speed.
3- Best rate-of-climb speed.
4- Best angle-of-climb speed.

401. After takeoff, which airspeed would permit the pilot to gain the most altitude in a given period of time?

Q21
1- Cruising climb speed.
2- Best rate-of-climb speed.
3- Best angle-of-climb speed.
4- Minimum control speed.

PILOT'S OPERATING HANDBOOK
(Excerpt)

AIRCRAFT DESIGNATION:- *Mark A5*
Single-Engine, Four-place Land Monoplane
Seating Arrangement
--Pilot and passenger - front seat
Two passengers -- rear seat

ENGINE OPERATING LIMITS:- 150 HP @ 2700 RPM

FUEL SYSTEM:- Float Type Carburetor
Fuel Capacity 19 gallons in each wing tank (2 tanks)
37 gallons usable

OIL CAPACITY:- 8 quarts (not included in empty weight)

PROPELLER:- Fixed Pitch
LANDING GEAR:- Fixed Tricycle Gear
WING FLAPS:- Electrically operated 0° to 40°

EMPTY WEIGHT:- 1271 lbs.
(moment/1000 pound inches 102.04)

MAXIMUM GROSS WEIGHT:- 2200 lbs.

MAXIMUM WEIGHT IN BAGGAGE COMPARTMENT - 120 lbs.

402. Refer to the excerpt above and assume the airplane is loaded as follows:

Pilot	185 lbs.
Front seat passenger	140 lbs.
Rear seat passenger	150 lbs.
Rear seat passenger	167 lbs.
Baggage	40 lbs.
Oil	Full
Fuel	Full

This airplane is loaded

Q22
1- 5 lbs. more than the maximum allowable gross weight.
2- 11 lbs. more than the maximum allowable gross weight.
3- 10 lbs. less than the maximum allowable gross weight.
4- 14 lbs. less than the maximum allowable gross weight.

403. Refer to the excerpt above. What is the combined maximum weight of four persons and baggage that can be loaded, without exceeding the maximum certificated gross weight, if the airplane is serviced to capacity with oil and fuel?

Q22
1- 707 lbs.
2- 698 lbs.
3- 692 lbs.
4- 697 lbs.

404. Refer to the excerpt to the left and assume the airplane is loaded as follows:

Pilot	165 lbs.
Passengers	450 lbs.
Fuel	Full
Oil	Full

Determine the amount of baggage that can be loaded aboard without exceeding the maximum certificated gross weight of the airplane.

Q22
1- 97 lbs.
2- 89 lbs.
3- 87 lbs.
4- 77 lbs.

405. Refer to the excerpt to the left. Assume you plan to load the airplane with 105 lbs. of baggage, 8 qts. of oil, and four persons whose total weight is 625 lbs. What is the maximum amount of usable fuel that can be aboard without exceeding the maximum certificated gross weight?

Q22
1- 36.5 gallons.
2- 30.6 gallons.
3- 33.1 gallons.
4- 11.0 gallons.

406. Refer to the excerpt to the left above and assume the airplane is loaded as follows:

Pilot and front seat passenger	295 lbs.
Rear seat passengers	325 lbs.
Fuel	Full
Oil	Full

What is the total weight of baggage that can be loaded aboard without exceeding the maximum certificated gross weight of the airplane?

Q22
1- 93 lbs.
2- 87 lbs.
3- 72 lbs.
4- No baggage, as the airplane is already overloaded.

407. Refer to the excerpt to the left above. Assume that you plan to load the airplane with three persons whose total weight is 580 lbs., and baggage that weighs 120 lbs. There are 8 qts. of oil in the engine. Under these conditions, the maximum usable fuel that can be carried without exceeding the maximum certificated gross weight is

Q22
1- 41.6 gallons.
2- 38.1 gallons.
3- 35.6 gallons.
4- 32.0 gallons.

PILOT'S OPERATING HANDBOOK
(Excerpt)

AIRCRAFT DESIGNATION:- *Jancraft 15*
Single-Engine, Land Monoplane
(Seating Arrangement--Pilot and passenger side-by-side plus a child's seat in the baggage area)

ENGINE OPERATING LIMITS:- 100 HP

FUEL SYSTEM:- Float-Type Carburetor
- Fuel Capacity Standard Tanks - two 13 gal. tanks (capacity 26 gals.) - maximum usable 22.5 gals.
- *Optional long range tanks* - total capacity 38 gals. - maximum usable 35 gals.

OIL CAPACITY:- 6 quarts - included in empty weight

PROPELLER:- Fixed Pitch
LANDING GEAR:- Fixed Tricycle Gear
WING FLAPS:- Electrically operated 0° to 40°

EMPTY WEIGHT:- 1,104 lbs.
MAX. GROSS WEIGHT:- 1,600 lbs.

MAX. WEIGHT IN BAGGAGE COMPARTMENT - 120 lbs.

408. Refer to the excerpt above and assume the airplane is loaded as follows:

Pilot	160 lbs.
Passenger	145 lbs.
Baggage	55 lbs.
Oil	Full
Fuel (standard tanks)	Full

This airplane is loaded

Q22
1- 74 pounds more than the maximum allowable gross weight.
2- 10 pounds more than the maximum allowable gross weight.
3- 10 pounds less than the maximum allowable gross weight.
4- 1 pound less than the maximum allowable gross weight.

409. Refer to the excerpt above and assume the airplane is loaded as follows:

Pilot	190 lbs.
Passenger	175 lbs.
Oil	Full
Fuel (standard tanks)	Full

With reference to maximum certificated gross weight, the airplane is loaded

Q22
1- 19 pounds under maximum allowable.
2- 15 pounds over maximum allowable.
3- 7 pounds under maximum allowable.
4- 4 pounds over maximum allowable.

410. Refer to the excerpt to the left. Assume that the total weight of the pilot and passenger is 305 pounds, and the airplane's standard fuel tanks are full. Under these conditions, how much baggage could be loaded without exceeding the maximum certificated gross weight?

Q22
1- 78 pounds.
2- 72 pounds.
3- 66 pounds.
4- 56 pounds.

411. Refer to the excerpt to the left. What is the combined maximum weight of two persons (with no baggage) that can be loaded, without exceeding the maximum certificated gross weight, if the airplane is serviced to oil capacity and the long range fuel tanks are full?

Q22
1- 361 pounds.
2- 330 pounds.
3- 306 pounds.
4- 286 pounds.

412. GIVEN:

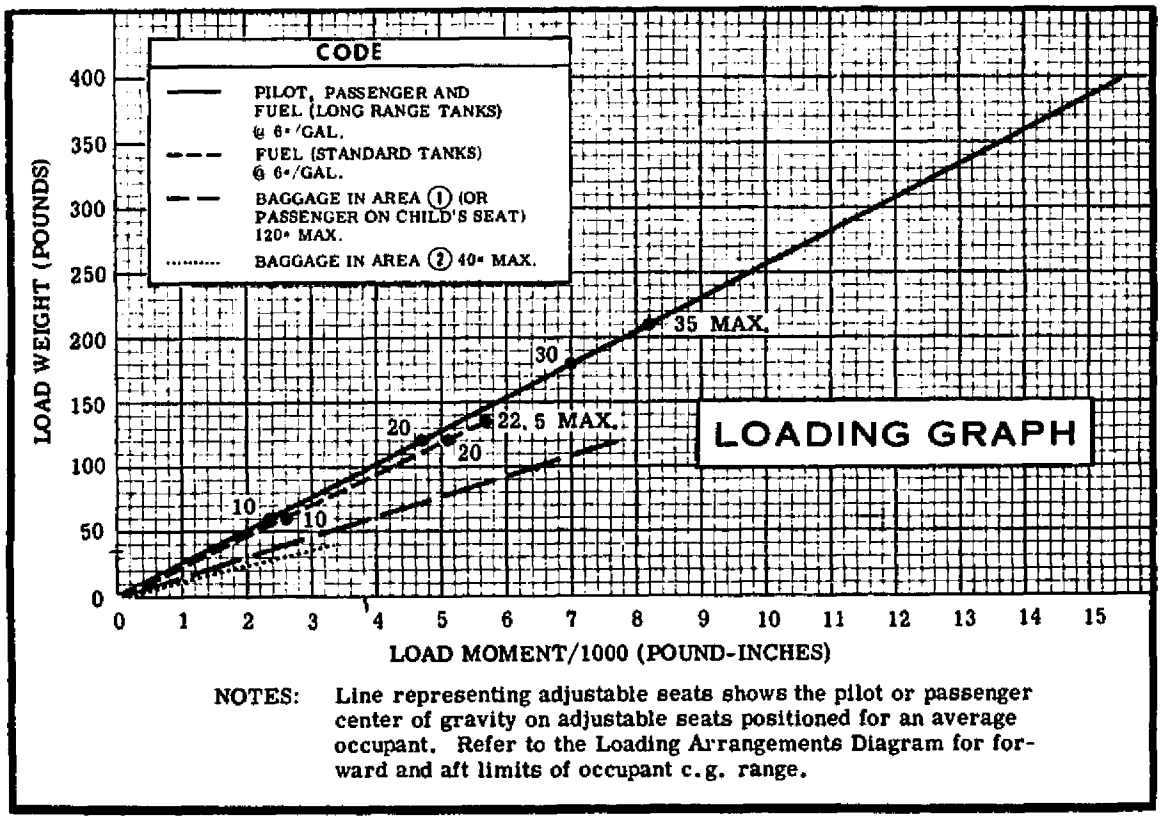
Pilot	150 lbs.
Passenger	129 lbs.
Baggage	18 lbs.
Oil	Full
Fuel (long range tanks)	Full

Using the given data and the excerpt above left, you determine the airplane, in respect to maximum certificated gross weight limit, is loaded

Q22
1- 56 pounds over maximum allowable.
2- 64 pounds under maximum allowable.
3- 11 pounds over maximum allowable.
4- 11 pounds under maximum allowable.

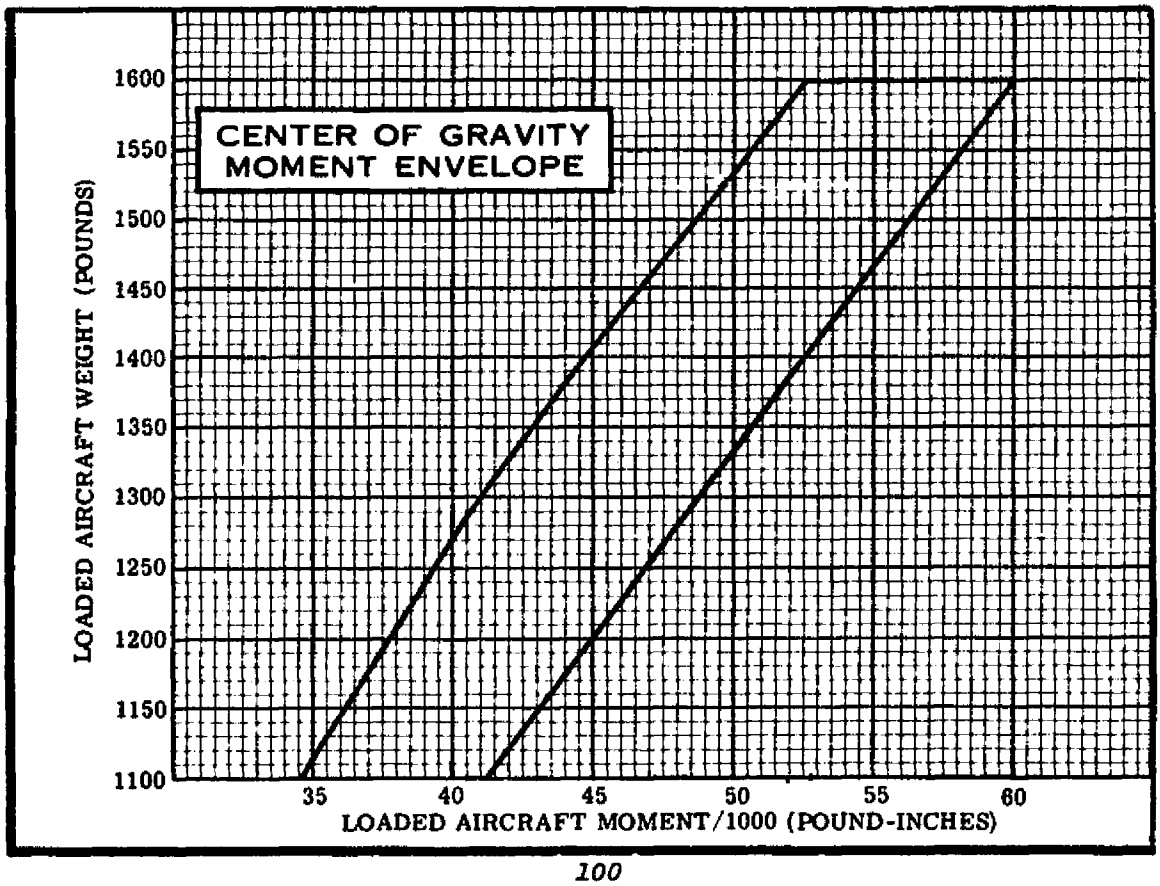
413. Refer to the excerpt to the left above. Assume you plan to load your airplane with 30 pounds of baggage, 6 quarts of oil, and three persons whose total weight is 360 pounds. What is the total amount of usable fuel that can be in the standard tanks without exceeding the maximum certificated gross weight?

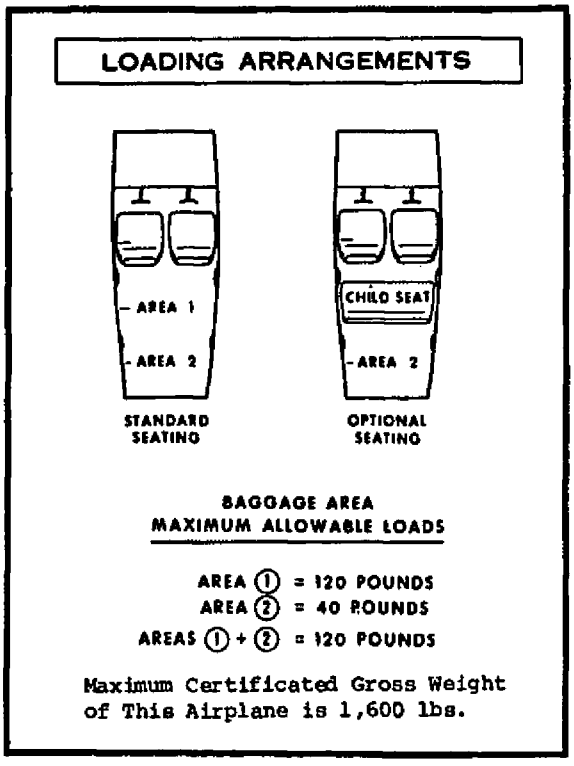
Q22
1- 23.9 gallons.
2- 21.7 gallons.
3- 19.3 gallons.
4- 17.6 gallons.



NOTES: Line representing adjustable seats shows the pilot or passenger center of gravity on adjustable seats positioned for an average occupant. Refer to the Loading Arrangements Diagram for forward and aft limits of occupant c.g. range.

NOTE: Empty weight of this airplane includes unusable fuel, full oil, and hydraulic fluid.





414. Refer to the appropriate chart to the left and the illustration above. Assume an airplane is loaded as follows:

	WEIGHT (LBS.)
Empty weight	1,100
Pilot & front passenger	305
Baggage (area 1)	70

What is the maximum amount of usable fuel that may be put into the standard tanks without exceeding the maximum gross weight limit?

Q22
1- 20.8 gallons.
2- 18.2 gallons.
3- 17.0 gallons.
4- 15.8 gallons.

415. GIVEN:

	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight (oil included)	1,100	35.9
Pilot & passenger (front seat)	290	?
Fuel (standard tanks)	125	?
Baggage (area 1)	65	?

Based on this information and using the appropriate chart to the left and illustration above, what would be the center of gravity moment/1000?

Q22
1- 56.8 pound-inches.
2- 54.1 pound-inches.
3- 51.8 pound-inches.
4- 48.5 pound-inches.

416. Refer to the illustration to the left and charts on the opposite page.

GIVEN:

	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight	1,100	35.9
Pilot & full fuel (long range tanks)	360	?
Baggage (area 1)	85	?
Baggage (area 2)	40	?

You determine that the airplane is

Q22
1- over gross weight limit, but within CG limits.
2- within gross weight limit, but exceeds aft CG limit.
3- over gross weight limit and exceeds the aft CG limit.
4- within gross weight limit and within CG limits.

417. Refer to the appropriate chart on opposite page and the illustration to the left. Assume an airplane is loaded as follows:

	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight	1,100	35.9
Pilot & passenger (front seat)	328	?
Fuel, 12 gals. usable (standard tanks)	72	?
Baggage (area 2)	25	?

What would be the gross weight and center of gravity moment/1000?

Q22
1- 1,525 lbs.; 56.3 pound-inches.
2- 1,525 lbs.; 53.9 pound-inches.
3- 1,500 lbs.; 50.9 pound-inches.
4- 1,490 lbs.; 49.7 pound-inches.

418. GIVEN:

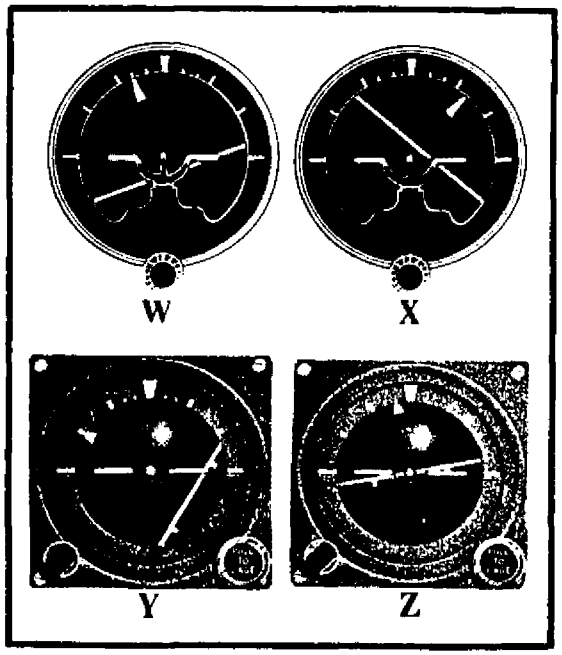
	WEIGHT (LBS.)	MOMENT/1000 LB. INCHES
Empty weight	1,100	35.9
Pilot & passenger	300	?
Fuel, 22.5 gals. usable (standard tanks)	?	?
Passenger on child seat (area 1)	65	?

Based on this information and the charts on opposite page and to the left above, what would be the maximum allowable load that can be placed in baggage area 2, without exceeding the gross weight and center of gravity aft limits?

Q22
1- 40 pounds.
2- 10 pounds.
3- 5 pounds.
4- No additional baggage in area 2.

419. Assume that baggage in the baggage compartment (located aft of the cabin) was moved into the cabin area, how would this affect the airplane's center of gravity?

Q23
1- The CG would be unpredictable with flight altitude changes.
2- The CG would move forward.
3- The CG would remain the same.
4- The CG would move aft.



420. Refer to the attitude indicators illustrated above and select the true statement concerning the attitude of the airplane.

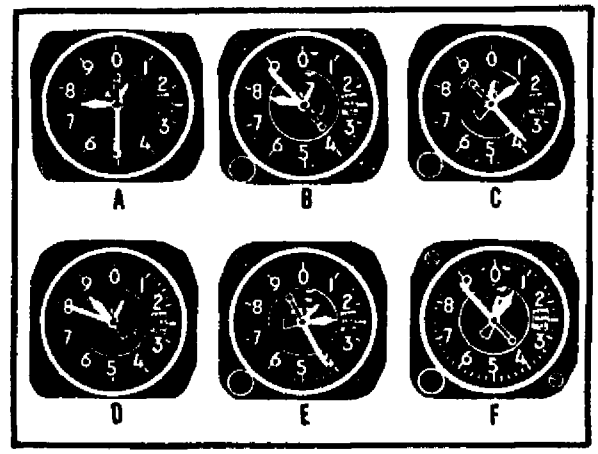
R01
1- Instrument "Z" depicts a 10° banked level turn to the left.
2- Instrument "Y" depicts a 60° banked turn to the right.
3- Instrument "X" depicts a 40° banked turn to the right.
4- Instrument "W" depicts a 20° banked turn to the left.

421. GIVEN:

Indicated altitude . . . . . 7,000 feet
Outside air temperature . . +20° C.
Pressure altitude . . . . . 7,000 feet

Based on these conditions what is the true altitude?

R04
1- 7,475 feet.
2- 7,275 feet.
3- 6,775 feet.
4- 6,550 feet.



422. Which of the altimeters above display an indicated altitude of more than 8,000 feet?

R04
1- A, B, C, D.
2- B, E, F.
3- D, E.
4- A, B, F.

423. Refer to altimeter "B" above. Which one of the following indications is correct?

R04
1- 7,880 feet.
2- 1,880 feet.
3- 8,880 feet.
4- 880 feet.

424. Which of the altimeters above display an indicated altitude of less than 2,000 feet?

R04
1- D, E.
2- C, F.
3- B, E, F.
4- A, C, E.

425. Which statement is true in regard to the effects of atmospheric conditions on the indication of a pressure altimeter? When flying in air that is

R04
1- COLDER than standard temperature the aircraft will be higher than the altimeter indicates.
2- WARMER than standard temperature the aircraft will be at the altitude indicated on the altimeter.
3- COLDER than standard temperature the aircraft will be lower than the altimeter indicates.
4- WARMER than standard temperature the aircraft will be lower than the altimeter indicates.

426. Assume a constant indicated altitude were flown from an area of high pressure into an area of lower pressure without adjusting the altimeter. Under these conditions the altimeter would indicate

R04
1- the actual altitude above sea level.
2- the actual altitude above ground level.
3- higher than the actual altitude above sea level.
4- lower than the actual altitude above sea level.

427. The pitot system provides impact pressure for which instrument(s)?

R08
1- Airspeed indicator, vertical-speed indicator, and altimeter.
2- Altimeter and vertical-speed indicator.
3- Vertical-speed indicator.
4- Airspeed indicator.

428. What causes deviation errors in a magnetic compass?

R08
1- magnetic dip.
2- acceleration and deceleration.
3- the difference in location of true north and magnetic north.
4- certain metals and electrical systems within the airplane.

429. In the Northern Hemisphere, if an airplane is accelerated or decelerated, the magnetic compass will normally indicate

R09
1- a turn momentarily, with changes in airspeed on any heading.
2- a turn toward south while accelerating on a west heading.
3- correctly only when on a north or south heading.
4- a turn toward north while decelerating on an east heading.

430. Which statement is true about magnetic deviation of a compass?

R09
1- Deviation is different in a given airplane in different localities.
2- Deviation is the same for all airplanes on different headings.
3- Deviation varies for different headings of the same airplane.
4- Deviation is the same for all airplanes in the same locality.

431. In the Northern Hemisphere, a magnetic compass will normally indicate initially a turn toward the WEST if

R09
1- an aircraft is decelerated while on a south heading.
2- an aircraft is accelerated while on a north heading.
3- a left turn is entered from a north heading.
4- a right turn is entered from a north heading.

432. The pressure altitude at a given location is indicated by the altimeter after it is set to

R11
1- the current altimeter setting.
2- 29.92
3- the density altitude.
4- the field elevation.

433. Pressure altitude can be determined by which one of the following methods?

R11
1- Adjust the altimeter setting window to 29.92 and read pressure altitude directly from the altimeter.
2- Adjust the altimeter to the airport elevation and read pressure altitude.
3- Pressure altitude can be determined only by the use of a computer.
4- Set the altimeter to the current altimeter setting and read pressure altitude directly from the altimeter.

434. The most important rule to remember in the event of engine failure after becoming airborne, is to

U03
1- quickly check the fuel supply for possible fuel exhaustion.
2- determine the wind direction to plan for your forced landing.
3- turn back immediately to the takeoff runway.
4- maintain a safe airspeed.

435. If severe turbulence is encountered during flight, the pilot should reduce the airspeed to

U04
1- maximum structural cruising speed.
2- never exceed speed.
3- minimum control speed.
4- design maneuvering speed or less.

436. The maneuvering speed (V_a) of an airplane should be explained as that speed at which

U04
1- abrupt attitude changes can be made without exceeding the load limits; or the maximum speed in rough air.
2- an airplane should be maneuvered in the traffic pattern.
3- unanticipated stalls, resulting from gusts, will be averted.
4- turbulence will cause structural damage to the airplane.

437. When taxiing with strong quartering tailwinds, which of the following aileron positions should be generally used?

U05
1- Aileron PARALLEL to the ground on the side from which the wind is blowing.
2- Neutral (streamlined position).
3- Aileron UP on the side from which the wind is blowing.
4- Aileron DOWN on the side from which the wind is blowing.

438. Which of the following aileron positions should you generally use when taxiing in strong quartering headwinds?

U05
1- Aileron up on the side from which the wind is blowing.
2- Aileron down on the side from which the wind is blowing.
3- Neutral.
4- Aileron as stated in response 1 for high-wing airplanes, but as stated in response 3 for low-wing airplanes.

439. One of the main purposes of using flaps during the approach and landing is to

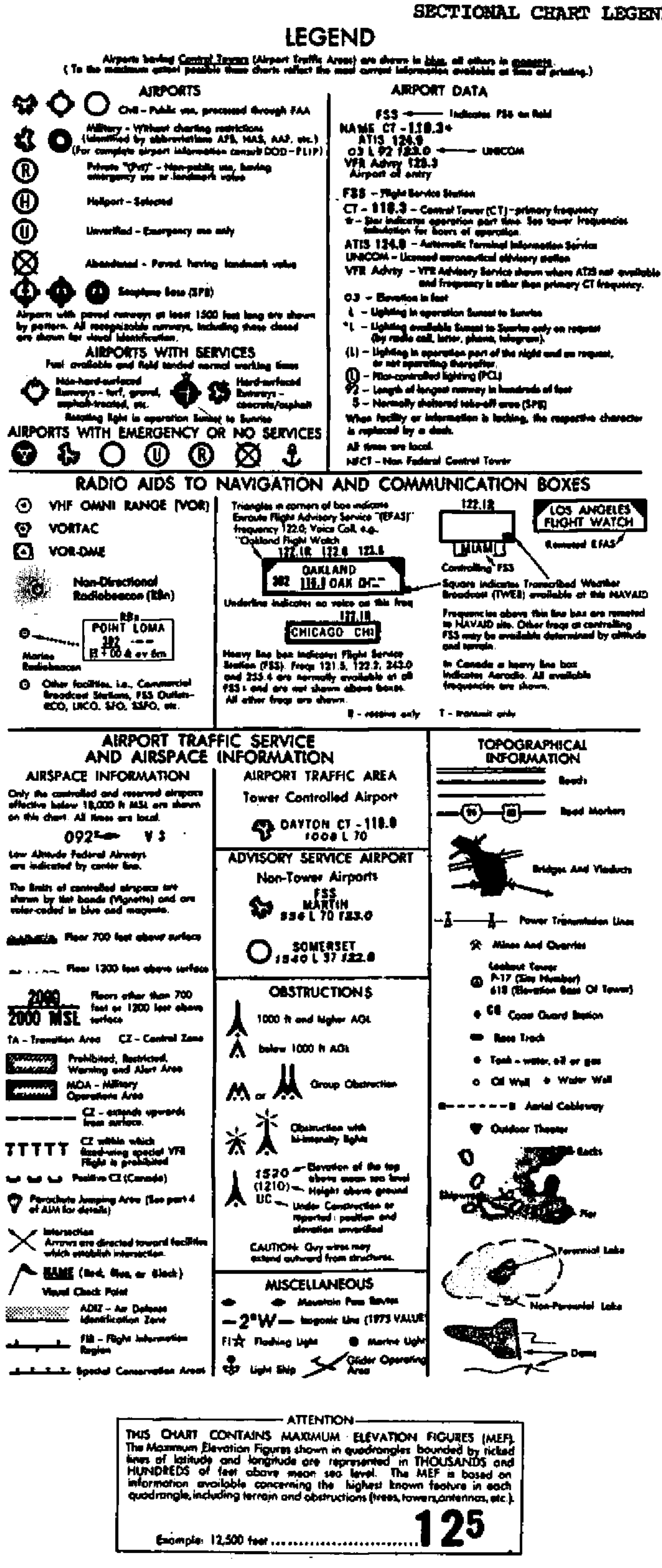
U06
1- decrease lift, thus enabling a steeper-than-normal approach to be made.
2- increase the angle of descent without increasing airspeed.
3- permit a touchdown at a higher indicated airspeed.
4- decrease the angle of descent without increasing the airspeed.

BEFORE TURNING IN YOUR TEST AND ANSWER SHEET, EXAMINE YOUR ANSWER SHEET TO BE SURE THAT

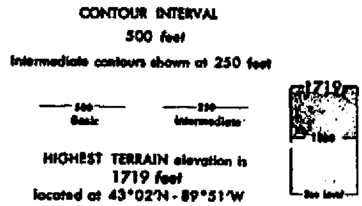
1- the answers are marked on page 4 and are also legible on page 2.
2- only one answer is marked for each test item.
3- each mark on page 4 is black and heavy.
4- all erasures on page 4 are complete and clean.
5- selections changed on page 2 are marked with a slash (/).

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INCORRECT SCORING WHICH WILL LOWER YOUR GRADE.

SECTIONAL CHART LEGEND EXCERPTS



SECTIONAL AERONAUTICAL CHART
SCALE 1:500,000



REGULATIONS REGARDING FLIGHTS OVER CHARTED NATIONAL PARK SERVICE AREAS, U.S. FISH AND WILDLIFE SERVICE AREAS, AND U.S. FOREST SERVICE AREAS

The landing of aircraft is prohibited on lands or waters administered by the National Park Service, U.S. Fish and Wildlife Service or U.S. Forest Service without authorization from the respective agency. Exceptions include: 1) when forced to land due to an emergency beyond the control of the operator, 2) at officially designated landing sites, or 3) on approved official business of the Federal Government.

All aircraft are requested to maintain a minimum altitude of 2,000 feet above the terrain of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas and Scenic Riverways administered by the National Park Service; National Wildlife Refuges, Big Game Refuges, Game Ranges and Wildlife Ranges administered by the U.S. Fish and Wildlife Service; and Wilderness and Primitive areas administered by the U.S. Forest Service.

Federal regulations also prohibit airdrops by parachute or other means of persons, cargo or objects from aircraft on lands administered by the three agencies without authorization from the respective agency. Exceptions include: 1) emergencies involving the safety of human life or 2) threat of serious property loss.

- - - - - Boundary of National Park Service areas, U.S. Fish and Wildlife Service areas and U.S. Forest Service Wilderness and Primitive areas.

PROHIBITED, RESTRICTED, WARNING, AND ALERT AREAS ON CHICAGO SECTIONAL CHART

NO.	NAME	ALTITUDE	TIME	APPROPRIATE AUTHORITY
R-3302	Savanna, Ill.	To 2300	0800 to 2200	C.O., Ordnance Depot, Savanna, Ill.
R-6901	Camp McCoy, Wis.	To 20,000	Continuous	† FAA, Chicago ARTC Center or area FSS. C.O., Camp McCoy, Wis.
R-6903	Sheboygan, Wis.	To FL 450	Continuous sunrise to sunset.	† FAA, Chicago ARTC Center or area FSS. Comdr., Volk Field, Wis.
R-6904	Volk Field, Wis.	To 15,000	Continuous sunrise to sunset.	† FAA, Chicago ARTC Center or area FSS. Comdr., Volk Field, Wis.

P - Prohibited   R - Restricted   W - Warning   A - Alert   † - Controlling Agency

Unless otherwise noted: Altitudes are MSL and in feet; time is local.

No person shall operate an aircraft within a Prohibited Area, or within a Restricted Area between the designated altitudes during the time of designation unless prior permission has been issued by the appropriate authority as listed above. The appropriate authority is defined as either the controlling agency (†) or the using agency.

Flight within Alert Areas is not restricted, but pilots are advised to exercise extreme caution.

SE

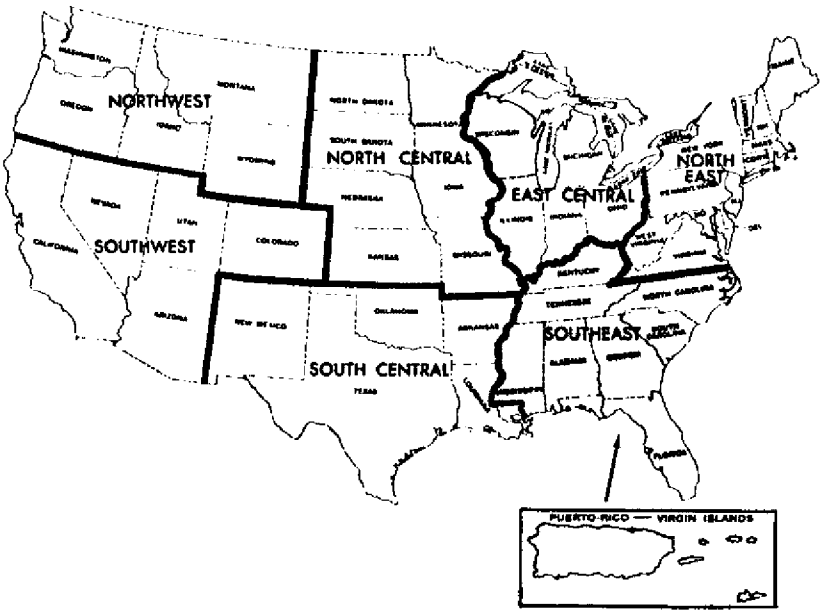
UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION

AIRPORT/FACILITY DIRECTORY

SOUTHEAST U.S.

EFFECTIVE 0901Z 18 MAY
TO 0901Z 13 JUL

Consult NOTAMS for latest information



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National Ocean Survey
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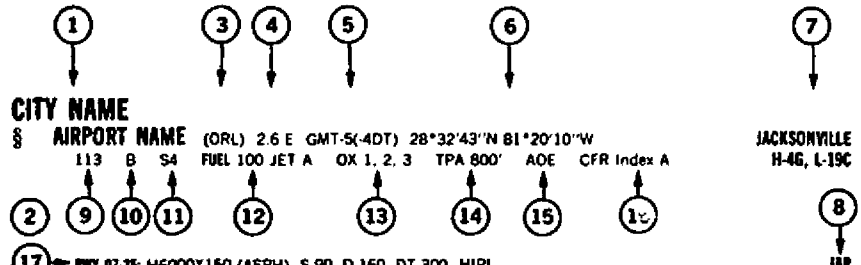
the Federal Aviation Administration and the Department of Commerce

DIRECTORY LEGEND

SAMPLE



CITY NAME

§ **AIRPORT NAME** (ORL) 2.6 E GMT-5(-4DT) 28°32'43"N 81°20'10"W — JACKSONVILLE
113 B S4 FUEL 100 JET A OX 1, 2, 3 TPA 800' AOE CFR Index A — H-4G, L-19C

17 — **RWY 07-25:** H6000X150 (ASPH) S-90, D-160, DT-300 HIRL — IAP
RWY 07: ALSF1 Trees 1700' from thld **RWY 25:** REIL Rgt tfc
RWY 13-31: H4620X100 (ASPH) HIRL
RWY 13: VASI Pole 600' from thld 385' ovrn **RWY 31:** VASI Rgt tfc 569' ovrn. Brush 200' from thld

18 — **AIRPORT REMARKS:** Acft 100,000 lbs or over ctc Director of Aviation for approval (305) 894-9831. Fee for all airline charters, travel clubs and certain revenue producing acft

19 — **COMMUNICATIONS: ATIS** 127.25 **UNICOM** 123.0
NAME FSS (ORL) on fld 123.65 122.65 122.2 122.1R 112.2T (305) 894-0861
Ⓡ **NAME APP CON** 124.8 (337°-179°) 120.15 (180°-336°)
TOWER 118.7 **GND CON** 121.7 **CLNC DEL** 125.55
STAGE I SVC ctc **ORLANDO APP CON**

20 — **RADIO AIDS TO NAVIGATION:** VHF/DF ctc — — FSS
NAME (H) **VORTAC** 112.2 ORL Chan 59 28°32'33"N 81°20'07"W at fld.
VOR unusable 050-060° beyond 5000'
ILS 109.9 I-ORL Rwy 07, LOM Henry 221 OR
ASR

21 — **COMM/NAVAID REMARKS:** Tower operates 1200-0400Z‡

AIRPORT NAME (X30) 7 W GMT-5(-4DT) 28°31'50"N 81°32'26"W — JACKSONVILLE
130 S4 FUEL 100 OX 2
RWY 18-36: 2430X150 (TURF) LIRL
RWY 18: Thld dsplcd 215' **RWY 36:** Thld dsplcd 270'
AIRPORT REMARKS: Attended dawn-0300Z‡
COMMUNICATIONS: UNICOM 122.8
NAME FSS (ORL)

---

§ **AIRPORT NAME** (MCO) 6.1 SE GMT-5(-4DT) 28°25'53"N 81°19'29"W — JACKSONVILLE
96 B FUEL 100, JET A CFR Index D — H-4G, L-19C
RWY 18R-36L: H12004X300 (CONC) S-100, D-200, DT-400 HIRL — IAP
RWY 18R: ALSF1, REIL Rgt tfc **RWY 36L:** ALSF1
RWY 18L-36R: H12004X200 (ASPH) S-165, D-200, DT-400 HIRL
RWY 18L: ALSF1 Thld dsplcd 990' **RWY 36R:** ALSF1 Rgt tfc
AIRPORT REMARKS: Attended 1200-0300Z‡. 1000' ovrns all rwys
COMMUNICATIONS: UNICOM 123.0
NAME FSS (ORL) on Herndon
Ⓡ **APP CON** 124.8 (337°-179°) 120.1 (180°-336°)
TOWER 124.3 **GND CON** 121.85 **CLNC DEL** 134.7
DEP CON 124.8 (337°-179°) 120.1 (180°-336°)
STAGE III SVC ctc **APP CON**
RADIO AIDS TO NAVIGATION:
(H) **VORTAC** 112.2 ORL Chan 59 28°32'33"N 81°20'07"W 173° 5.7 NM to fld
VOR unusable 050°-060° beyond 15 NM below 5000'
ILS 109.3 I-MCO Rwy 36 BC unusable
ASR

AIRPORT NAME (See PLYMOUTH)

DIRECTORY LEGEND

LEGEND

This Directory is an alphabetical listing of data on record with the FAA on all airports that are open to the public, associated terminal control facilities, air route traffic control centers and radio aids to navigation within the conterminous United States, Puerto Rico and the Virgin Islands. Airports are listed alphabetically by associated city name and cross referenced by airport name. Facilities associated with an airport, but with a different name, are listed individually under their own name, as well as under the airport with which they are associated.

The listing of an airport in this directory merely indicates the airport operator's willingness to accommodate transient aircraft, and does not represent that the facility conforms with any Federal or local standards, or that it has been approved for use on the part of the general public.

The information on obstructions is taken from reports submitted to the FAA. It has not been verified in all cases. Pilots are cautioned that objects not indicated in this tabulation (or on charts) may exist which can create a hazard to flight operation.

Detailed specifics concerning services and facilities tabulated within this directory are contained in Airman's Information Manual, Basic Flight Information and ATC Procedures.

The legend items that follow explain in detail the contents of this Directory and are keyed to the circled numbers on the sample on the preceding page.

(1) CITY/AIRPORT NAME

Airports and facilities in this directory are listed alphabetically by associated city and state. Where the city name is different than the airport name the city name will appear on the line above the airport name. Airports with the same associated city name will be listed alphabetically by airport name and will be separated by a dashed rule line. All others will be separated by a solid rule line.

(2) NOTAM SERVICE

The symbol § preceding the airport name indicates NOTAM Service is provided. Notam service is available only at airports with established instrument approach procedures, or high volume VFR activity.

(3) LOCATION IDENTIFIER

A three or four character code assigned to airports. These identifiers are used by ATC in lieu of the airport name in flight plans, flight strips and other written records and computer operations.

(4) AIRPORT LOCATION

Airport location is expressed as distance and direction from the center of the associated city in nautical miles and cardinal points, i.e., 3.5 NE.

(5) TIME CONVERSION

Hours of operation of all facilities are expressed in Greenwich Mean Time (GMT) and shown as "Z" time. The directory indicates the number of hours to be subtracted from GMT to obtain local standard time and local daylight saving time GMT-5(-4DT). The symbol ‡ indicates that during periods of Daylight Saving Time effective hours will be one hour earlier than shown. In those areas where daylight saving time is not observed that (-4DT) and ‡ will not be shown.

(6) GEOGRAPHIC POSITION OF AIRPORT

(7) CHARTS

The Sectional Chart and Low and High Altitude Enroute Chart and panel on which the airport or facility is located.

(8) INSTRUMENT APPROACH PROCEDURES

IAP indicates an airport for which a prescribed (Public Use) FAA Instrument Approach Procedure has been published.

(9) ELEVATION

Elevation is given in feet above mean sea level and is the highest point on the landing surface. When elevation is sea level it will be indicated as (00). When elevation is below sea level a minus (-) sign will precede the figure.

(10) ROTATING LIGHT BEACON

B indicates rotating beacon is available. Rotating beacons operate dusk to dawn unless otherwise indicated in AIRPORT REMARKS.

(11) SERVICING

S1: Minor airframe repairs.
S2: Minor airframe and minor powerplant repairs.
S3: Major airframe and minor powerplant repairs.
S4: Major airframe and major powerplant repairs.

DIRECTORY LEGEND

(12) FUEL

FUEL

CODE	PRODUCT
80	Grade 80 gasoline (Red)
100	Grade 100 gasoline (Green)
100LL	Grade 100LL gasoline (low lead) (Blue)
115	Grade 115 gasoline
A	Jet A—Kerosene freeze point—40° C.
A1	Jet A-1—Kerosene, freeze point—50° C.
A1+	Jet A-1—Kerosene with icing inhibitor, freeze point—50° C.
B	Jet B—Wide-cut turbine fuel, freeze point—50° C.
B+	Jet B—Wide-cut turbine fuel with icing inhibitor, freeze point—50° C.

(13) OXYGEN

OX 1 High Pressure
OX 2 Low Pressure
OX 3 High Pressure—Replacement Bottles
OX 4 Low Pressure—Replacement Bottles

(14) TRAFFIC PATTERN ALTITUDE

TPA—Traffic Pattern Altitude is provided only for those airports without a 24 hour operating control tower. "Altitudes shown are Above Ground Level (AGL)"

(15) AIRPORT OF ENTRY AND LANDING RIGHTS AIRPORTS

AOE—Airport of Entry-A customs Airport of Entry where permission from U.S. Customs is not required, however, at least one hour advance notice of arrival must be furnished.

LRA—Landing Rights Airport-Application for permission to land must be submitted in advance to U.S. Customs. At least one hour advance notice of arrival must be furnished.

NOTE: Advance notice of arrival at both an AOE and LRA airport may be included in the flight plan when filed in Canada or Mexico, if destination is an airport where flight notification service is available. This notice will also be treated as an application for permission to land in the case of an LRA. (See Customs, Immigration and Naturalization, Public Health and Agriculture Department requirements in the International Flight Information Manual for further details.)

(16) CERTIFICATED AIRPORT (FAR 139) and FAA INSPECTION

Airport serving Civil Aeronautics Board certified carriers and certified under FAR, Part 139 are indicated by the CFR Index i.e., CFR Index A, which relates to the availability of Crash, Fire, Rescue equipment.

All airports not inspected by FAA will be identified by the note: Not insp. This indicates that the airport information has been provided by the owner or operator of the field.

Airports serving Civil Aeronautics Board certified carriers and certified under FAR, Part 139, are indicated by the CFR index; i.e., CFR Index A, which relates to the availability of crash, fire, rescue equipment.

FAR—PART 139 CERTIFICATED AIRPORTS

INDICES AND FIRE FIGHTING AND RESCUE EQUIPMENT REQUIREMENTS

Airport Index	*Required No. Vehicles*	*Aircraft Length*	*Scheduled Departures*	*Agent + Water for Protein Foam*
A	1	≤90'	≤5	500#DC or 450#DC + 50 gal H²O
		>90', ≤126'	<5	300#DC + 500 gal H²O
B	2	>90', ≤126'	≤5	Index A + 1500 gal H²O
		>126', ≤160'	<5	
C	3	>126', ≤160'	≤5	Index A + 3000 gal H²O
		>160', ≤200'	<5	
D	3	>160', ≤200'	≤5	Index A + 4000 gal H²O
		>200'	<5	
E	3	>200'	≤5	Index A + 6000 gal H²O
Ltd.	Vehicle and capacity requirements for airports limited operating certificates are determined on a case by case basis.			

> Greater Than; < Less Than; ≤ Equal or Greater Than; ≥ Equal or Less Than; H²O—Water; DC—Dry Chemical.

NOTE: If AFFF (Aqueous Film Forming Foam) is used in lieu of Protein Foam, the water quantities listed for Indices A thru E can be reduced 33-1/3%.

(17) RUNWAY DATA

Runway information is shown on two lines. That information common to the entire runway is shown on the first line while information concerning the runway ends are shown on the second or following line. Lengthy information will be footnoted and placed in the Airport Remarks.

Runway direction, surface, length, width, weight bearing capacity, lighting, gradient (when gradient exceeds 0.3 percent) and appropriate remarks are shown for each runway. Direction, length, width, lighting and remarks are shown for seaplanes.

DIRECTORY LEGEND

RUNWAY SURFACE AND LENGTH

Runway lengths prefixed by the letter "H" indicate that the runways are hard surfaced (concrete, asphalt). If the runway length is not prefixed, the surface is sold, clay, etc. The runway surface composition is indicated in parentheses after runway length as follows:

(ASPH)–Asphalt
(CONC)–Concrete
(DIRT)–Dirt
(GRVL)–Gravel, or cinders
(TURF)–Sod

The full dimensions of helipads are shown, i.e., 50X50.

RUNWAY WEIGHT BEARING CAPACITY

Runway strength data shown in this publication is derived from available information and is a realistic estimate of capability at an average level of activity. It is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights of 25-50% in excess of the published figures. Permissible operating weights, insofar as runway strengths are concerned, are a matter of agreement between the owner and user. When desiring to operate into any airport at weights in excess of those published in the publication, users should contact the airport management for permission. Add 000 to figure following S, D, DT, DDT and MAX for gross weight capacity:

S–Runway weight bearing capacity for aircraft with single-wheel type landing gear, (DC-3), etc.
D–Runway weight bearing capacity for aircraft with dual-wheel type landing gear, (DC-6),etc.
DT–Runway weight bearing capacity for aircraft with dual-tandem type landing gear, (707), etc.
DDT–Runway weight bearing capacity for aircraft with double dual-tandem type landing gear, (747), etc.

Quadricycle and dual-tandem are considered virtually equal for runway weight bearing consideration, as are single-tandem and dual-wheel.
Omission of weight bearing capacity indicates information unknown.

RUNWAY LIGHTING

Lights are in operation sunset to sunrise. Lighting available by prior arrangement only or operating part of the night only and/or pilot controlled and with specific operating hours are indicated under airport remarks as footnotes. Since obstructions are usually lighted, obstruction lighting is not included in this code. Unlighted obstructions on or surrounding an airport will be noted in airport remarks.
Temporary, emergency or limited runway edge lighting such as flares, smudge pots, lanterns or portable runway lights will also be shown in airport remarks, instead of being designated by code numbers.
Types of lighting are shown with the runway or runway end they serve.

LIRL–Low Intensity Runway Lights
MIRL–Medium Intensity Runway Lights
HIRL–High Intensity Runway Lights
REIL–Runway End Identifier Lights
C/L–Centerline Lights
TDZ–Touchdown Zone Lights
ODALS–Omni Directional Approach Lighting System.
USAF OVRN–Air Force Overrun 1000' Standard Approach Lighting System.
LDIN–Lead-In Lighting System.
MALS–Medium Intensity Approach Lighting System.
MALSF–Medium Intensity Approach Lighting System with Sequenced Flasher Lights.
MALSR–Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights.
SALS–Short Approach Lighting System.
SALSF–Short Approach Lighting System with Sequenced Flashing Lights.
SSALS–Simplified Short Approach Lighting System.
SSALF–Simplified Short Approach Lighting System with Sequenced Flashing Lights.
SSALR–Simplified Short Approach Lighting System with Runway Alignment Indicator Lights.
ALSF1–High Intensity Approach Lighting System with Sequenced Flashing Lights, Category I, Configuration.
ALSF2–High Intensity Approach Lighting System with Sequenced Flashing Lights, Category II, Configuration.
VASI–Visual Approach Slope Indicator Systems

VASI approach slope angle and TCH will be shown only when slope angle exceeds 3°

RUNWAY GRADIENT

Runway gradient will be shown only when it is 0.3 percent or more. When available the direction of slope upward will be indicated, i.e., 0.5% up NW.

RUNWAY END DATA

Lighting systems such as VASI, MALSR, REIL; obstructions; displaced thresholds will be shown on the specific runway end. "Rgt tfc"–Right traffic indicates right turns should be made on landing and takeoff for specified runway end.

(18) AIRPORT REMARKS

"Landing Fee" indicates landing charges for private or non-revenue producing aircraft, in addition, fees may be charged for planes that remain over a couple of hours and buy no services, or at major airline terminals for all aircraft.
Obstructions–Because of space limitations only the more prominent obstacles are indicated. Natural obstruction, such as trees, clearly discernible for contact operations are not included. On the other hand, all obstructions within at least a 20:1 approach ratio are indicated.
Remarks–Data is confined to operational items affecting the status and usability of the airport.

(19) COMMUNICATIONS

Communications will be listed in sequence in the order shown below:
Automatic Terminal Information Service (ATIS) and Private Aeronautical Stations (UNICOM) along with their frequency is shown, where available, on the line following the heading "COMMUNICATIONS".
Flight Service Station (FSS) information. The associated FSS will be shown followed by the identifier and information concerning availability of telephone service, e.g. Direct Line (DL), Local Call (LC), etc. Where the airport NOTAM File identifier is different then the associated FSS it will be shown as "NOTAM File DCA". Where the FSS is located

on the field it will be indicated as "on arpt" following the identifier. Frequencies available will follow. The FSS telephone number will follow along with any significant operational information. FSS's whose name is not the same as the airport on which located will also be listed in the normal alphabetical name listing for the state in which located. Limited Remote Communication Outlet (LRCO) or Remote Communications Outlet (RCO) providing service to the airport followed by the frequency and name of the Controlling FSS.

FSS's and CS/Ts provide information on airport conditions, radio aids and other facilities, and process flight plans. Airport Advisory Service is provided at the pilot's request on 123.6 or 123.65 by FSS's located at non-tower airports or when the tower is not in operation. (See AIM Part 1, ADVISORIES AT NON TOWER AIRPORTS.)

Aviation weather briefing service is provided by FSS's and CS/T's: however, CS/T personnel are not certified weather briefers and therefore provide only factual data from weather reports and forecasts. Flight and weather briefing services are also available by calling the telephone numbers listed.

Limited Remote Communications Outlet (LRCO)--Unmanned satellite air/ground communications facility, which may be associated with a VOR. These outlets effectively extend service range of the FSS and provide greater communications reliability.

Remote Communications Outlet (RCO)--An unmanned satellite air to ground communication stations remotely controlled and providing UHF and VHF communications capability to extend the service range of an FSS.

Civil communications frequencies used in the FSS air/ground system are now operated simplex on 122.0, 122.2, 122.3, 122.4, 122.6, 123.6; emergency 121.5; plus receive-only on 122.05, 122.1, 122.15 and 123.6.

a. 122.0 is assigned as the Enroute Flight Advisory Service channel at selected FSS's.

b. 122.2 is assigned to all FSS's as a common enroute simplex service.

c. 123.6 is assigned as the airport advisory channel at non-tower FSS locations, however, it is still in commission at some FSS's collocated with towers to provide part-time Airport Advisory Service.

d. 122.1 is the primary receive-only frequency at VORs. 122.05, 122.15 and 123.6 are assigned at selected VORs meeting certain criteria.

e. Some FSS's are assigned 50kHz channels for simplex operation in the 122-123 MHz band (e.g. 122.35).

Pilots using the FSS A/G system should refer to this directory or appropriate charts to determine frequencies available at the FSS or remoted facility through which they wish to communicate.

Part time FSS hours of operation are shown in remarks under facility name.

Emergency frequency 121.5 is available at all Flight Service Stations Towers, Approach Control and RADAR facilities, unless indicated as not available.

TERMINAL SERVICES

ATIS--A continuous broadcast of recorded non-control information in selected areas of high activity.

UNICOM--A non-government air/ground radio communications facility utilized to provide general airport advisory service.

APP CON--Approach Control. The symbol Ⓡ indicates radar approach control.

TOWER--Control tower

GND CON--Ground Control

DEP CON--Departure Control. The symbol Ⓡ indicates radar departure control.

CLNC DEL--Clearance Delivery.

VFR ADVSY SVC--VFR Advisory Service. Service provided by Non-Radar Approach Control.

STAGE I SVC--Radar Advisory Service for VFR aircraft

STAGE II SVC--Radar Advisory and Sequencing Service for VFR aircraft

STAGE III SVC--Radar Sequencing and Separation Service for participating VFR Aircraft within a Terminal Radar Service Area (TRSA)

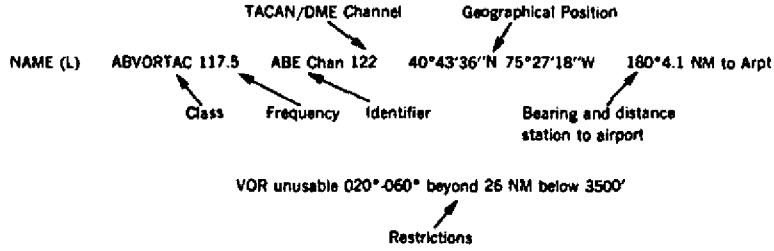
TCA--Radar Sequencing and Separation Service for all aircraft in a Terminal Control Area (TCA)

(20) RADIO AIDS TO NAVIGATION

The Airport/Facility Directory lists by facility name all Radio Aids to Navigation in the National Airspace System and those upon which the FAA has approved an instrument approach. Private or military Radio Aids to Navigation not in the National Airspace System are not tabulated.

All VOR, VORTAC and ILS equipment in the National Airspace System has an automatic monitoring and shutdown feature in the event of malfunction. Unmonitored as used in the publication means that FSS or tower personnel cannot observe the malfunction or shutdown signal.

NAVAID information is tabulated as indicated in the following sample:



ASR--indicates that civil radar instrument approach minimums are published.

DIRECTORY LEGEND

RADIO CLASS DESIGNATIONS

Identification of VOR/VORTAC/TACAN Stations by Class (Operational Limitations):

Normal Usable Altitudes and Radius Distances

Class	Altitudes	Distance (miles)
(T)	12,000' and below	25
(L)	Below 18,000'	40
(H)	Below 18,000'	40
(H)	Within the Conterminous 48 States only, between 14,500' and 17,999'	100
(H)	18,000'-FL 450	130
(H)	Above FL 450	100

(H) = High (L) = Low (T) = Terminal

NOTE: An (H) facility is capable of providing (L) and (T) service volume and an (L) facility additionally provides (T) service volume.

The term VOR is, operationally, a general term covering the VHF omnidirectional bearing type of facility without regard to the fact that the power, the frequency-protected service volume, the equipment configuration, and operational requirements may vary between facilities at different locations.

AB — Automatic Weather Broadcast (also shown with e following frequency.)
B — Scheduled Broadcast Station (broadcasts weather at 15 minutes after the hour.)
DF — Direction Finding Service.
DME — UHF standard (TACAN compatible) distance measuring equipment.
H — Non-directional radio beacon (homing), power 50 watts to less than 2,000 watts.
HH — Non-directional radio beacon (homing), power 2,000 watts or more.
H-SAB — Non-directional radio beacons providing automatic transcribed weather service.
ILS — Instrument Landing System (voice, where available, on localizer channel).
LDA — Localizer Directional Aid.
LMM — Compass locator station when installed at middle marker site.
LOM — Compass locator station when installed at outer marker site.
MH — Non-directional radio beacon (homing) power less than 50 watts.
S — Simultaneous range homing signal and/or voice.
SABH — Non-directional radio beacon not authorized for IFR or ATC. Provides automatic weather broadcasts.
SDF — Simplified Direction Facility.
TACAN — UHF navigational facility-omnidirectional course and distance information.
VOR — VHF navigational facility-omnidirectional course only.
VOR/DME — Collocated VOR navigational facility and UHF standard distance measuring equipment.
VORTAC — Collocated VOR and TACAN navigational facilities.
W — Without voice on radio facility frequency.
Z — VHF station on location marker at a LF radio facility.

(21) COMM/NAVAID REMARKS:

Pertinent remarks concerning communications and NAVAIDS.

DIRECTORY LEGEND

ABBREVIATIONS

The following abbreviations are those commonly used within this Directory. Other abbreviations may be found in the Legend and are not duplicated below.

acft	aircraft	ldg	landing
apch	approach	*med*	*medium*
arpt	airport	ngt	night
avbl	available	ntc	notice
bcn	beacon	opr	operate
blo	below	ops	operates operation
byd	beyond	ovrn	overrun
ctc	contact	p-line	power line
daigt	daylight	req	request
dsplc	displace	rqr	requires
dsplcd	displaced	rgt tfc	right traffic
emerg	emergency	rwy	runway
fld	field	svc	service
ints	intensity	tkf	take off
lgtd	lighted	tfc	traffic
lgts	lights	thld	threshold

ABBREVIATIONS

NOTICES TO AIRMEN EXCERPT

Note: "s" may be added for plural, or as appropriate.

A

AAS..... Airport Advisory Service
A/C..... Approach Control
acft..... aircraft
Ad Cus.. Advise Customs
ADF..... Automatic Direction Finder
AGL..... above ground level
AID..... Airport Information Desk
AIM..... Airman's Information Manual
ALS..... Approach light system
apch..... approach
apchg... approaching
aprx..... approximate
arpt..... airport
ARSR.... Air Route Surveillance Radar
ARTCC... Air Route Traffic Control Center
ASDE.... airport surface detection equipment
ASR..... Arpt Surveillance Radar
TC..... air traffic control
CT.... air traffic control tower
ATIS..... Automatic Terminal Information Service
avbl..... available
awy..... airway

B

BC..... back course
bcn..... beacon
bcst..... broadcast
bldg..... building
brg..... bearing
btn..... between

C

CFR..... crash fire rescue
clsd..... closed
cmsnd... commissioned
cntr..... center
cntrln.... centerline
Comlo... Compass locator
const.... construction
CS/T.... combined station/tower
ctc..... contact
CTLZ.... Control Zone

D

dalgt.... daylight
dcmsnd.. decommissioned
degs..... degrees
DF..... direction finder
DME..... UHF standard (TACAN compatible) distance measuring equipment
dsplcd... displaced
durg..... during
DVFR.... Defense Visual Flight Rule

E

E..... east
elev..... elevation
emerg... emergency
equip.... equipment

F

FL..... Flight Level
FM..... fan marker
freq..... frequency
FSS..... Flight Service Station

G

GS..... glide slope
GWT.... gross weight

H

HIRL.... High intensity Runway Lights
hwy..... highway

I

ident.... identification
IFR..... Instrument Flight Rules
IFSS..... International Flight Service Station
ILS..... instrument landing system
info..... information
intl..... international
ISMLS... Interim Standard Microwave Landing System

J

J-bar.... jet runway barrier

K

kHz..... kilohertz

L

lat..... latitude
lctd..... located
LDA..... Localizer type directional aid
lgts..... lights
lgtd..... lighted
LMM.... compass locator at middle marker ILS
lndg..... landing
loc..... localizer
LOM.... compass locator at outer marker ILS
long..... longitude
LRCO.... Limited Remote Communications Outlet

M

MAA.... maximum authorized altitude
mag..... magnetic
maint.... maintain, maintenance
MALS... Medium Intensity Approach Light System
MALSR.. Medium Intensity Simplified Short Approach Light System with Rail
max..... maximum
MCA.... minimum crossing altitude
MEA..... minimum enroute IFR altitude
MHz..... megahertz
min..... minimum or minute
MIRL.... Medium Intensity Runway Edge Lights
MM..... middle marker ILS
MOCA... minimum obstruction clearance altitude
MRA..... minimum reception altitude
MSL..... mean sea level
muni.... municipal

N

N..... north
natl..... national
navaid... navigational aid
NDB..... Non-directional rdo bcn
ngt..... night
NM..... nautical mile(s)
Nr..... number

O

obstn.... obstruction
OM..... outer marker ILS
oper..... operate
opn..... operation
OTS..... Out of Service
ovrn..... overrun

P

PAR..... Precision Apch Radar
permly... permanently

Q

quad.... quadrant

R

RAIL.... Runway Alignment Indicator Lights
RAPCON. radar approach control (USAF)
RCAG... Remote Center air/ground
RCLS.... Runway Centerline Lights System
RCO..... Remote Communications Outlet
rcv..... receive
rcvg..... receiving
rcvr..... receiver
REIL..... Runway End Identifier Lights
req..... request
rqrd..... required
rgt..... right
RRP..... Runway Reference Point
ruf..... rough
RVR..... runway visual range
RVRC.... Runway Visual Range Center
RVRT.... Runway Visual Range Touchdown
RVRR.... Runway Visual Range Rollout
RVV..... runway visibility values
RWY.... Runway

S

S..... south
SDF..... Simplified Directional Facility
sfc..... surface
SID..... Standard Instrument Departure
SM..... statute mile(s)
SR..... sunrise
SS..... sunset
STAR.... Standard Terminal Arrival Route
STOL.... Short take-off & landing rnwy
svc..... service

T

T..... true (after a bearing)
TACAN.. UHF navigational facility—omnidirectional course and distance information
TCA..... Terminal Control Area
TCH..... Threshold Crossing Height
tfc..... traffic
thr..... threshold
tkof..... take-off
tmprly... temporarily
tmpry.... temporary
TPA..... Traffic Pattern Altitude
TRACON. Terminal Radar approach control
TRSA.... Terminal Radar Service Area
tsmt..... transmit
tsmtg.... transmitting
tsmtr.... transmitter
TV..... television
TWEB.... transcribed weather bcst
twy..... taxiway

U

UHF..... Ultra high frequency
unavbl... unavailable
unctld... uncontrolled
unlgtd... unlighted

V

VASI.... Visual Approach Slope Indicator
VFR..... visual flight rules
VGS..... Visual Guidance System
VHF..... Very high frequency
VOR.... VHF Omni-Directional Radio Range
VORTAC. Combined VOR and TACAN System
VOT..... a VOR Receiver testing facility
vsby..... visibility

W

W..... west
WS..... Weather Service
wt..... weight

Z

Z..... Greenwich mean time

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AAS..... Airport Advisory Service
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ADF..... Automatic Direction Finder
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bcn..... beacon
bcst..... broadcast
bldg..... building
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btn..... between

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CFR..... crash fire rescue
clsd..... closed
cmsnd... commissioned
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Comlo... Compass locator
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intl..... international
ISMLS... Interim Standard Microwave Landing System

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LOM.... compass locator at outer marker ILS
long..... longitude
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