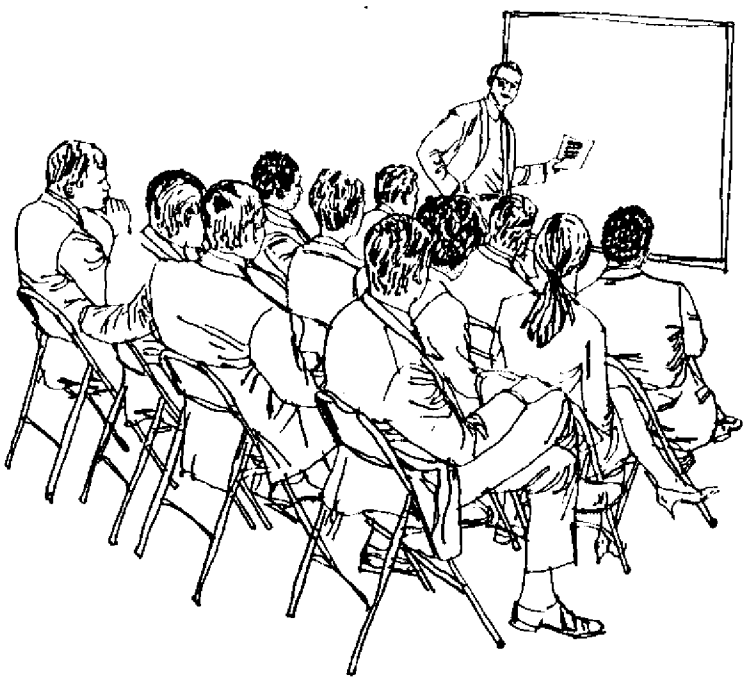
AC 143-4

ADVANCED GROUND INSTRUCTOR

WRITTEN TEST GUIDE



U.S. Department of Transportation

Federal Aviation Administration

ADVANCED

GROUND INSTRUCTOR

WRITTEN TEST GUIDE

1980

U.S. Department of Transportation
Federal Aviation Administration
Office of Flight Operations

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PREFACE

The Office of Flight Operations of the Federal Aviation Administration has developed this guide to help applicants prepare for the Advanced 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 an Advanced 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 Advanced 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

GROUND INSTRUCTORS

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 career of teaching aviation.

GROUND INSTRUCTOR CERTIFICATION

Required Tests

To be certificated as an Advanced Ground Instructor, applicants must pass the FAA's Fundamentals of Instructing (FOI) and Advanced Ground Instructor Written Tests. However, if an applicant already holds a valid FAA Ground or Flight Instructor Certificate and is applying for an instructor certificate <u>other</u> than that held, or for the addition of a rating to the certificate, that person <u>need not</u> take the FOI test again.

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

The Advanced 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.

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

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

The Advanced Ground Instructor Written Test contains 100 test items and 5 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 Advanced Ground Instructor Written Test will be supplied a question book containing several hundred questions, a 100-item 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, Airman 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 Advanced Ground Instructor question book.

Always remember the following when taking the test:

1. Enter personal data in appropriate spaces on the test answer sheet in a complete and legible manner.

2. Answer only the 100 questions whose numbers appear on your Question Selection Sheet.

3. 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.

4. 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.

5. 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.

6. 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.

Airman Written Test Report

After completing the test, your answer sheet is forwarded to the Federal Aviation Administration, Mike Monroney Aeronautical

Center in Oklahoma City for scoring by electronic computer (ADP). You will be mailed 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 will accompany the report. It must be emphasized here that the total number of subject codes shown on the test report is not necessarily an indication of the total number of test items answered incorrectly. When one or more questions are missed in a given subject area, the code for that subject appears only once on the grade report.

The written tests are administered by FAA General Aviation District Offices (GADO), Flight Standards District Offices (FSDO), some Air Carrier District Offices (ACDO), and Designated Written Test Examiners.

Retesting After Failure

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

RECOMMENDED STUDY MATERIALS

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

FAA ADVISORY CIRCULARS

The FAA issues Advisory Circulars to inform the aviation public in a systematic way of nonregulatory material of interest. Advisory circulars are issued in a number-subject system corresponding to the subject area of the Federal Aviation Regulations. A brief explanation of the contents is given for each listing in AC 00-2, (latest revision), Advisory Circular Checklist.

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

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

Request free advisory circulars from:

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

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

U.S. Department of Transportation
Distribution Requirements Section,
M 482.2
Washington, D.C. 20590

It is recommended that the ground instructor applicant obtain advisory circulars in at least the following subjects:

Subject Number and Subject Matter

00 . . . . . General
20 . . . . . Aircraft
60 . . . . . Airmen
70 . . . . . Airspace
90 . . . . . Air Traffic and General Operating Rules
120 . . Air Carriers, Air Travel Clubs, and Operators for Compensation or Hire: Certification and Operations
140 . . . . Schools and Other Certificated Agencies
170 . . . . . Navigational Facilities

AVIATION INSTRUCTOR'S HANDBOOK, AC 60-14. (Sup't. Doc's.) 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 61-23B. (Sup't. Doc's.) SN 050-011-00077-1. Contains authoritative information used in training and guiding private pilots, and most subject areas in which an applicant may be tested.

FLIGHT TRAINING HANDBOOK, AC 61-21A. (Sup't. Doc's.) 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. (Sup't. Doc's.) 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.

FEDERAL AVIATION REGULATIONS WRITTEN TEST GUIDE FOR PRIVATE, COMMERCIAL AND MILITARY PILOTS. AC 61-34B. (Sup't. Doc's.) SN 050-007-00288-2. Outlines the scope of the basic knowledge required of civilian or military pilots who are studying FARs as they pertain to the regulations terminology, to the certification of private and commercial pilots; to the operation of aircraft in the national airspace; and to the requirements of the National Transportation Safety Board. For use as a guide in preparing for the FAR Written Test.

COMMERCIAL PILOT—AIRPLANE—WRITTEN TEST GUIDE, AC 61-71B. (Sup't. Doc's.) SN 050--007-00482-6. Outlines the aeronautical knowledge requirements for a commercial pilot rating. 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. (Sup't. Doc's.) 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. (Sup't. Doc's.) SN 050-007-00283-1. Contains information on weather phenomena for pilots and other flight operations personnel whose interest in meteorology is primarily in its application to flying.

AVIATION WEATHER SERVICES, AC 00-45B. (Sup't. Doc's.) SN 050-007-00513-0. 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. (Sup't. Doc's.) SN 050-007-00254-8. An aviation medicine handbook written in pilots' language that provides guidance on when, and when not, to fly. Emphasizes the fact that a good pilot must be physically fit, psychologically sound, and well trained.

PILOT'S WEIGHT AND BALANCE HANDBOOK, AC 91-23A. (Sup't. Doc's.) 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 frequently amended 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 from FAA upon request.

A check or money order made payable to the Superintendent of Documents should be included with each order. Submit orders for single-sale 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 135, Air Taxi Operators and Commercial Operators.

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, Sup't. Doc's.) 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, Sup't. Doc's.) 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. It also includes current FDC NOTAMs, which are regulatory in nature, issued every 14 days. (Subscription, Sup't. Doc's.) 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, preferred routes, FSS/Weather Service telephone numbers, Air Route Traffic Control Center (ARTCC) frequencies, part-time control zones, and various other pertinent, special notices essential to air navigation. These publications are available upon subscription from the National Ocean Survey (NOS), Distribution Division (C44), 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. Provide brief explanations of important aeronautical subjects. These include concepts and procedures critical to aviation safety, common misconceptions among pilot applicants, and areas which cause general difficulty in written tests. Exam-O-Grams are for sale and may be purchased from the Superintendent of Documents.

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.

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 Sanderson, Inc., 8025 East 40th Ave., Denver, Colorado 80207.

HOW TO OBTAIN PUBLICATIONS SOLD BY THE SUPERINTENDENT OF DOCUMENTS

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

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

2. Send separate orders for subscription and nonsubscription items.

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

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

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

6. All prices are subject to change. The Advisory Circular Checklist, AC 00-2, (latest revision), 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."

STUDY OUTLINE

This study outline is the framework of the basic aeronautical knowledge that the prospective advanced ground 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. Part 1: Definitions and Abbreviations.
   1. General definitions
   2. Abbreviations and symbols

B. Part 23: Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes.
   1. Subpart A - General
   2. Subpart B - Flight
   3. Subpart C - Structure
   4. Subpart D - Design and construction
   5. Subpart E - Powerplant
   6. Subpart F - Equipment
   7. Subpart G - Operating limitations and information

C. Part 71: Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points.
   1. General
   2. Colored federal airways
   3. VOR federal airways
   4. Continental control area
   5. Control areas and control area extensions
   6. Control zones
   7. Transition areas
   8. Positive control areas
   9. Reporting points
   10. Area low routes
   11. Terminal control areas

D. Part 61: Certification: Pilots and Flight Instructors.
   1. Required certificates/ratings
   2. Certificates and ratings issued
   3. Expired pilot certificates/ reissuance
   4. Offenses involving narcotic drugs, marihuana, and depressant or stimulant drugs or substances
   5. Duration of pilot and flight instructor 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, or alteration of applications, certificates, logbooks, reports, or records
   14. Change of address
   15. Glider towing: experience and instruction requirements
   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

E. Part 91: General Operating and Flight Rules.
   1. Subpart A: General
      a. Responsibility and authority of the pilot in command
      b. Pilot in command of aircraft requiring more than one required pilot
      c. Preflight action
      d. Flight crewmembers at stations
      e. Interference with crewmembers
      f. Careless or reckless operation
      g. Liquor and drugs
      h. Carriage of narcotic drugs, marihuana, and depressant or stimulant drugs or substances
      i. Dropping objects
      j. Fastening of safety belts
      k. Parachutes and parachuting
      l. Towing: gliders
      m. Portable electronic devices
      n. Flight instruction; simulated instrument flight and certain flight tests
      o. Fuel requirements for flight under VFR
      p. ATC transponder equipment
      q. Civil aircraft: certifications required
      r. Civil aircraft airworthiness
      s. Civil aircraft operating limitations and marking
      t. Supplemental oxygen
      u. Powered civil aircraft instrument and equipment requirements
      v. Flight recorders and cockpit voice recorders

w. Automatically reported pressure altitude data and the pilot's altitude reference
x. Restricted/limited/ provisional certificated civil aircraft; operating limitations
y. Aircraft having experimental certificates: operating limitations
z. Emergency exits for airplanes carrying passengers for hire
aa. Emergency locator transmitters

2. Subpart B: Flight Rules
a. Waivers
b. Operating near other aircraft
c. Right-of-way rules
d. Aircraft speed
e. Acrobatic flight
f. Aircraft lights
g. Complying -- ATC clearances/ instructions
h. ATC light signals
i. Minimum safe altitudes; general
j. Altimeter settings
k. Flight plan; information required
l. Flights between Mexico/ Canada/U.S.A.
m. Operation--on or in vicinity of airport
n. Operation--airport with control tower
o. Operation--airport without control tower
p. Flight in terminal control areas
q. Temporary flight restrictions
r. Flight test areas
s. Restricted and prohibited areas
t. Positive control areas; route segments
u. *Operations to/over Cuba*
v. Basic VFR weather minimums
w. Special VFR weather minimums
x. VFR cruising altitude or flight level
y. ATC transponder test/ inspection

3. Subpart C: Maintenance, Preventive Maintenance, and Alterations
a. General
b. Maintenance required
c. Carrying passengers after aircraft repair or alterations
d. Inspections
e. Altimeter system tests and inspections
f. Progressive inspections
g. Maintenance records
h. Transfer of maintenance records
i. Rebuilt engine maintenance records
j. ATC transponder tests and inspections

4. Subpart D: Large and Turbine-powered Multiengine Airplanes
a. Flying equipment and operating information
b. Operating limitations and emergency equipment
c. Equipment requirements: over-the-top, or night VFR operations
d. Survival equipment for over-water operations
e. Radio equipment for overwater operations
f. *Emergency equipment*
g. Flight altitude rules
h. Smoking and safety belt signs
i. Passenger briefing
j. Carry-on baggage
k. Carriage of cargo
l. Transport category airplane weight limitations
m. Operating in icing conditions
n. Flight engineer requirements
o. Second in command requirements
p. Flight attendant requirements
q. Inspection program
r. Availability of inspection program

F. Part 135: Air Taxi Operators and Commercial Operators.
1. Applicability
2. Operating rules
3. Crewmember qualification
4. Aircraft and equipment

II. Title 49--Transportation, National *Transportation Safety Board*, Part 830

A. 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.
1. §830.1 Applicability.
2. §830.2 Definitions.
3. §830.5 Immediate notification.
4. §830.6 Information to be given in notification.
5. §830.10 Preservation of aircraft wreckage, mail, cargo, and records.
6. §830.15 Reports and statements to be filed.

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 120 - Air Carrier, Air Travel Clubs, and Operators for Compensation or Hire: Certification and Operations
G. Series 140 - Schools and Other Certificated Agencies
H. Series 170 - Navigational Facilities

IV. Flight Information/Operational Publications

A. AIM - Basic Flight Information and ATC Procedures.
1. Navigation Aids
a. Air navigation radio aids
b. Radar services and procedures
2. Airport, air navigation lighting and marking aids
a. Airport lighting aids
b. Airport air navigation lighting
c. Airport marking aids
3. Airspace
a. General
b. Uncontrolled airspace
c. Controlled airspace
d. Special use airspace
e. Other airspace areas
4. Air Traffic Control
a. Services available to pilots
b. Radio communications phraseology and techniques
c. Airport operations
d. ATC clearance/separations
e. Preflight
f. Departures
g. En route
h. Arrival
i. Pilot/controller roles and responsibilities
j. National security and interception procedures
5. Emergency procedures
a. General
b. Search and rescue coordination centers
c. Procedures and signals for aircraft in emergency
d. Two-way radio communications failure
e. Safety, accident and hazard reports
6. Safety of flight
a. Weather
b. Altimeter setting procedures
c. Wake turbulence
d. Bird hazard and migratory patterns
7. Good operating practices
8. Medical facts for pilots
9. Aeronautical charts and related publications
10. Supplement
a. Pilot/controller glossary

B. Graphic Notices and Supplemental Data.
1. Area Advisories
2. Area Navigation (RNAV) Routes
3. Civil Flight Test Areas
4. Military Refueling, Tracks and Areas
5. National Weather Service (Upper Air Observing Stations)
6. North Atlantic Minimum Navigation Requirements
7. North Atlantic Standardized Air/Ground Messages
8. North American Routes for North Atlantic Traffic (NAR)
9. Parachute Jumping Areas
10. Terminal Area Graphics
11. Terminal Radar Service Area Graphics (TRSA)

C. Notices to Airmen (NOTAMS).
1. Extended NOTAMS
2. FDC NOTAMS
3. Special NOTAMS

D. Airport/Facility Directory
1. General information
2. Abbreviations
3. Legend, Airport/Facility Directory
4. Airport/Facility Directory
5. Special Notices
6. VOR Receiver Check Points
7. Air Route Traffic Control Centers
8. Preferred IFR Routes
9. Aeronautical Chart Bulletin
10. Enroute Flight Advisory Service (EFAS)

V. Physiological Factors Related to Flight

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

B. Reaction of the Body to Changes in Atmospheric Pressure
1. Changes in altitude
2. Aerotitis
3. Aerosinusitis

C. Reaction of the Body to Changes in Oxygen Partial Pressure.
   1. Hypoxia
   2. Causes of carbon monoxide poisoning
   3. Time of useful consciousness
   4. Cabin pressurization and decompression

D. Self Imposed Stress.
   1. Fatigue and its effect on the body
   2. Alcohol and its effect on the body
   3. Drugs and their effects on the body
   4. Scuba diving and its effect on the body
   5. Panic causes and prevention--hyperventilation

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

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

G. Noise, Vibration, and Temperature.

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

VI. Aviation Weather

A. The Earth's Atmosphere.
   1. Composition
   2. Vertical structure
   3. The standard atmosphere
   4. Density and hypoxia

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

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

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

E. Moisture.
   1. Measurements
      a. Relative humidity
      b. Dewpoint
   2. Change of state
   3. Cloud formation precipitation
   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. Airmasses.
   1. Source regions
   2. Classification of airmasses
   3. Airmass modification
   4. Summer and winter airmass weather

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

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

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

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

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

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

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

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

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

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

VII. Airplane Operation

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

B. Performance.
   1. Takeoff charts
   2. Rate-of-climb charts
   3. Cruise charts
   4. Maximum safe crosswind charts
   5. Use of Denalt computer
   6. Landing charts

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

VIII. Engine Operation

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

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

IX. Navigation

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

B. Pilotage.
1. Plotting course
2. Identifying landmarks

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

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

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

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

X. Aerodynamics and Principles of Flight

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

B. Functions of the Flight Controls.

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

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

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

F. Flight Controls/Axes of an Airplane.

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

H. Lift Versus Angle of Attack.

I. Lift/Thrust Versus Air Density.

J. Types/Effect of Flaps, Spoilers, Divebrakes

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

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

M. Power Versus Climb/Descent/ Level Flight.

N. Gyroscopic Principles.

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

P. Ground Effect.

Q. Principles of Propellers.

R. Loads/Load Factors.

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

T. Airplane Peformance Characteristics.

XI. Flight Instruments and Systems

A. Attitude Indicator Operation/Errors.

B. Heading Indicator Operation/Errors.

C. Turn Indicator Operation/Errors.

D. Altimeter Operation/Errors.

E. Vertical Speed Indicator Operation/ Errors.

F. Airspeed Indicator Operation/ Errors.

G. Vacuum Systems/Instruments.

H. Pitot/Static Systems/Instruments.

I. Magnetic Compass Operation/Errors.

J. Altimeter Setting Procedure/ Significance.

K. Pressure Altitude Significance/ Obtaining.

L. Gyroscopic Principles.

XII. Radio Communications

A. VHF Radio Communications/ Phraseology.

B. Postion Reporting Procedures.

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

D. FSS Communications Procedures.

E. Obtaining Emergency Assistance.

F. Lost Procedure When Radio is Inoperative.

G. Use of Proper Communications Frequencies.

XIII. Basic Instrument Flying

A. Components of Attitude Instrument Flying.

B. Pitch, Bank, Power Control.

C. Straight-and Level Flight.

D. Turns/Turns to Predetermined Headings.

E. Constant Rate Climbs/Descents/ Leveloffs.

F. Constant Speed Climbs/Descents/ Leveloffs.

G. Magnetic Compass Turns.

H. Effect of Changes in Airspeed.

I. False Sensations in Flight.

MAXIMUM TIME ALLOWED FOR TEST: FIVE HOURS

GENERAL INSTRUCTIONS

READ CAREFULLY

1. This book contains 550 questions beginning with number 1001. You are required to answer 100 QUESTIONS ONLY.

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

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

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

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

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

7. The MINIMUM passing grade is 70 percent.

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.

AIRMAN WRITTEN TEST APPLICATION

PRIVACY ACT STATEMENT

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

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

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

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

INSTRUCTIONS TO APPLICANT:

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

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

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

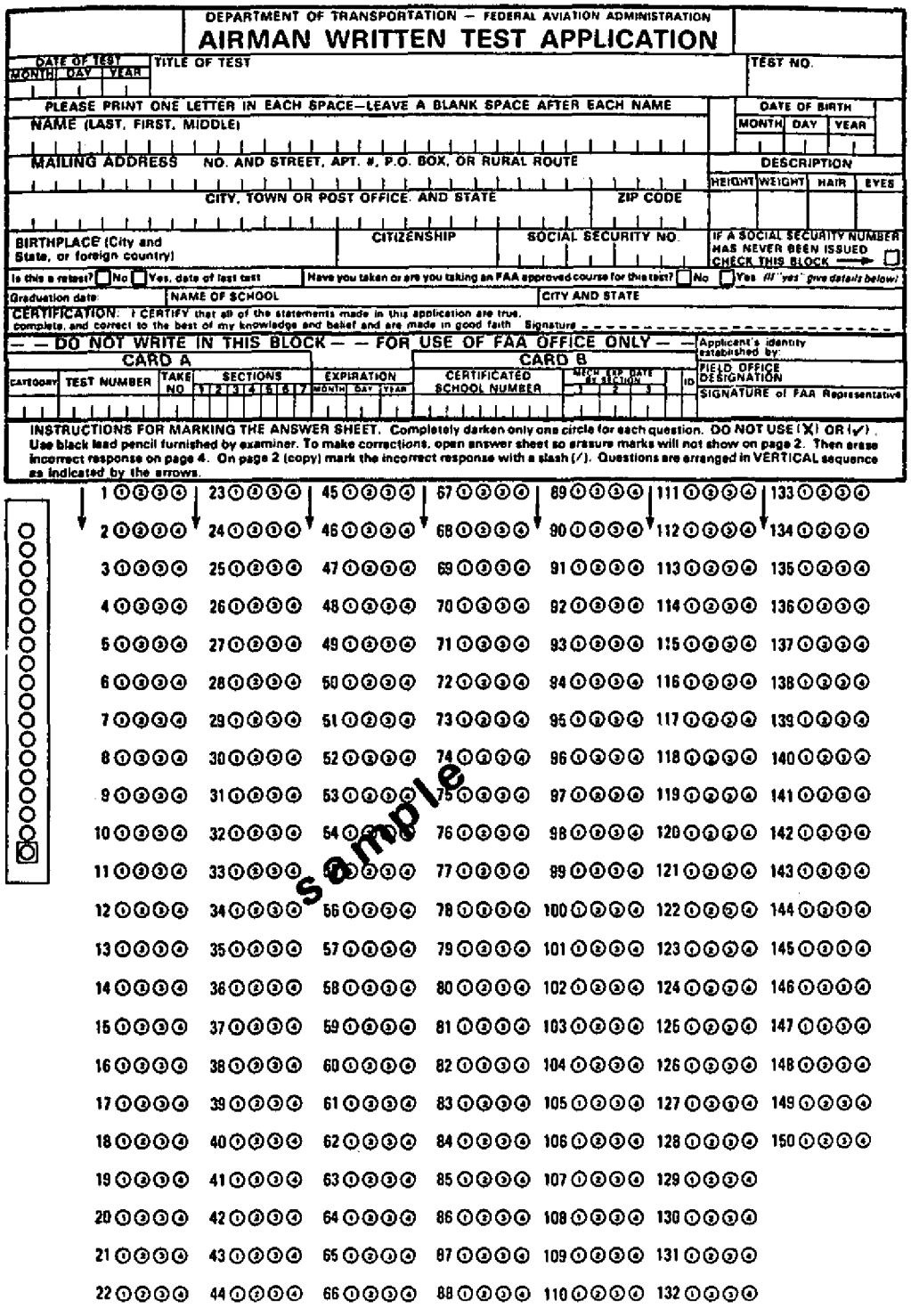
* DO NOT TEAR SHEETS APART.

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

INSTRUCTIONS TO FAA PERSONNEL:

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

SAMPLE ANSWER SHEET



DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

AIRMAN WRITTEN TEST APPLICATION

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

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

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

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

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

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

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

Graduation date | NAME OF SCHOOL | CITY AND STATE

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

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

Applicant's identity established by:

CARD A

CATEGORY	TEST NUMBER	TAKE NO	SECTIONS 1 2 3 4 5 6 7	EXPIRATION MONTH DAY YEAR

CARD B

CERTIFICATED SCHOOL NUMBER	MECH. EXP. DATE BY SECTION 1 2 3	ID

FIELD OFFICE DESIGNATION

SIGNATURE of FAA Representative

INSTRUCTIONS FOR MARKING THE ANSWER SHEET. Completely darken only one circle for each question. DO NOT USE (X) OR (✓). Use black lead pencil furnished by examiner. To make corrections, 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 Ⓐ Ⓑ Ⓒ Ⓓ	23 Ⓐ Ⓑ Ⓒ Ⓓ	45 Ⓐ Ⓑ Ⓒ Ⓓ	67 Ⓐ Ⓑ Ⓒ Ⓓ	89 Ⓐ Ⓑ Ⓒ Ⓓ	111 Ⓐ Ⓑ Ⓒ Ⓓ	133 Ⓐ Ⓑ Ⓒ Ⓓ
2 Ⓐ Ⓑ Ⓒ Ⓓ	24 Ⓐ Ⓑ Ⓒ Ⓓ	46 Ⓐ Ⓑ Ⓒ Ⓓ	68 Ⓐ Ⓑ Ⓒ Ⓓ	90 Ⓐ Ⓑ Ⓒ Ⓓ	112 Ⓐ Ⓑ Ⓒ Ⓓ	134 Ⓐ Ⓑ Ⓒ Ⓓ
3 Ⓐ Ⓑ Ⓒ Ⓓ	25 Ⓐ Ⓑ Ⓒ Ⓓ	47 Ⓐ Ⓑ Ⓒ Ⓓ	69 Ⓐ Ⓑ Ⓒ Ⓓ	91 Ⓐ Ⓑ Ⓒ Ⓓ	113 Ⓐ Ⓑ Ⓒ Ⓓ	135 Ⓐ Ⓑ Ⓒ Ⓓ
4 Ⓐ Ⓑ Ⓒ Ⓓ	26 Ⓐ Ⓑ Ⓒ Ⓓ	48 Ⓐ Ⓑ Ⓒ Ⓓ	70 Ⓐ Ⓑ Ⓒ Ⓓ	92 Ⓐ Ⓑ Ⓒ Ⓓ	114 Ⓐ Ⓑ Ⓒ Ⓓ	136 Ⓐ Ⓑ Ⓒ Ⓓ
5 Ⓐ Ⓑ Ⓒ Ⓓ	27 Ⓐ Ⓑ Ⓒ Ⓓ	49 Ⓐ Ⓑ Ⓒ Ⓓ	71 Ⓐ Ⓑ Ⓒ Ⓓ	93 Ⓐ Ⓑ Ⓒ Ⓓ	115 Ⓐ Ⓑ Ⓒ Ⓓ	137 Ⓐ Ⓑ Ⓒ Ⓓ
6 Ⓐ Ⓑ Ⓒ Ⓓ	28 Ⓐ Ⓑ Ⓒ Ⓓ	50 Ⓐ Ⓑ Ⓒ Ⓓ	72 Ⓐ Ⓑ Ⓒ Ⓓ	94 Ⓐ Ⓑ Ⓒ Ⓓ	116 Ⓐ Ⓑ Ⓒ Ⓓ	138 Ⓐ Ⓑ Ⓒ Ⓓ
7 Ⓐ Ⓑ Ⓒ Ⓓ	29 Ⓐ Ⓑ Ⓒ Ⓓ	51 Ⓐ Ⓑ Ⓒ Ⓓ	73 Ⓐ Ⓑ Ⓒ Ⓓ	95 Ⓐ Ⓑ Ⓒ Ⓓ	117 Ⓐ Ⓑ Ⓒ Ⓓ	139 Ⓐ Ⓑ Ⓒ Ⓓ
8 Ⓐ Ⓑ Ⓒ Ⓓ	30 Ⓐ Ⓑ Ⓒ Ⓓ	52 Ⓐ Ⓑ Ⓒ Ⓓ	74 Ⓐ Ⓑ Ⓒ Ⓓ	96 Ⓐ Ⓑ Ⓒ Ⓓ	118 Ⓐ Ⓑ Ⓒ Ⓓ	140 Ⓐ Ⓑ Ⓒ Ⓓ
9 Ⓐ Ⓑ Ⓒ Ⓓ	31 Ⓐ Ⓑ Ⓒ Ⓓ	53 Ⓐ Ⓑ Ⓒ Ⓓ	75 Ⓐ Ⓑ Ⓒ Ⓓ	97 Ⓐ Ⓑ Ⓒ Ⓓ	119 Ⓐ Ⓑ Ⓒ Ⓓ	141 Ⓐ Ⓑ Ⓒ Ⓓ
10 Ⓐ Ⓑ Ⓒ Ⓓ	32 Ⓐ Ⓑ Ⓒ Ⓓ	54 Ⓐ Ⓑ Ⓒ Ⓓ	76 Ⓐ Ⓑ Ⓒ Ⓓ	98 Ⓐ Ⓑ Ⓒ Ⓓ	120 Ⓐ Ⓑ Ⓒ Ⓓ	142 Ⓐ Ⓑ Ⓒ Ⓓ
11 Ⓐ Ⓑ Ⓒ Ⓓ	33 Ⓐ Ⓑ Ⓒ Ⓓ	55 Ⓐ Ⓑ Ⓒ Ⓓ	77 Ⓐ Ⓑ Ⓒ Ⓓ	99 Ⓐ Ⓑ Ⓒ Ⓓ	121 Ⓐ Ⓑ Ⓒ Ⓓ	143 Ⓐ Ⓑ Ⓒ Ⓓ
12 Ⓐ Ⓑ Ⓒ Ⓓ	34 Ⓐ Ⓑ Ⓒ Ⓓ	56 Ⓐ Ⓑ Ⓒ Ⓓ	78 Ⓐ Ⓑ Ⓒ Ⓓ	100 Ⓐ Ⓑ Ⓒ Ⓓ	122 Ⓐ Ⓑ Ⓒ Ⓓ	144 Ⓐ Ⓑ Ⓒ Ⓓ
13 Ⓐ Ⓑ Ⓒ Ⓓ	35 Ⓐ Ⓑ Ⓒ Ⓓ	57 Ⓐ Ⓑ Ⓒ Ⓓ	79 Ⓐ Ⓑ Ⓒ Ⓓ	101 Ⓐ Ⓑ Ⓒ Ⓓ	123 Ⓐ Ⓑ Ⓒ Ⓓ	145 Ⓐ Ⓑ Ⓒ Ⓓ
14 Ⓐ Ⓑ Ⓒ Ⓓ	36 Ⓐ Ⓑ Ⓒ Ⓓ	58 Ⓐ Ⓑ Ⓒ Ⓓ	80 Ⓐ Ⓑ Ⓒ Ⓓ	102 Ⓐ Ⓑ Ⓒ Ⓓ	124 Ⓐ Ⓑ Ⓒ Ⓓ	146 Ⓐ Ⓑ Ⓒ Ⓓ
15 Ⓐ Ⓑ Ⓒ Ⓓ	37 Ⓐ Ⓑ Ⓒ Ⓓ	59 Ⓐ Ⓑ Ⓒ Ⓓ	81 Ⓐ Ⓑ Ⓒ Ⓓ	103 Ⓐ Ⓑ Ⓒ Ⓓ	125 Ⓐ Ⓑ Ⓒ Ⓓ	147 Ⓐ Ⓑ Ⓒ Ⓓ
16 Ⓐ Ⓑ Ⓒ Ⓓ	38 Ⓐ Ⓑ Ⓒ Ⓓ	60 Ⓐ Ⓑ Ⓒ Ⓓ	82 Ⓐ Ⓑ Ⓒ Ⓓ	104 Ⓐ Ⓑ Ⓒ Ⓓ	126 Ⓐ Ⓑ Ⓒ Ⓓ	148 Ⓐ Ⓑ Ⓒ Ⓓ
17 Ⓐ Ⓑ Ⓒ Ⓓ	39 Ⓐ Ⓑ Ⓒ Ⓓ	61 Ⓐ Ⓑ Ⓒ Ⓓ	83 Ⓐ Ⓑ Ⓒ Ⓓ	105 Ⓐ Ⓑ Ⓒ Ⓓ	127 Ⓐ Ⓑ Ⓒ Ⓓ	149 Ⓐ Ⓑ Ⓒ Ⓓ
18 Ⓐ Ⓑ Ⓒ Ⓓ	40 Ⓐ Ⓑ Ⓒ Ⓓ	62 Ⓐ Ⓑ Ⓒ Ⓓ	84 Ⓐ Ⓑ Ⓒ Ⓓ	106 Ⓐ Ⓑ Ⓒ Ⓓ	128 Ⓐ Ⓑ Ⓒ Ⓓ	150 Ⓐ Ⓑ Ⓒ Ⓓ
19 Ⓐ Ⓑ Ⓒ Ⓓ	41 Ⓐ Ⓑ Ⓒ Ⓓ	63 Ⓐ Ⓑ Ⓒ Ⓓ	85 Ⓐ Ⓑ Ⓒ Ⓓ	107 Ⓐ Ⓑ Ⓒ Ⓓ	129 Ⓐ Ⓑ Ⓒ Ⓓ	
20 Ⓐ Ⓑ Ⓒ Ⓓ	42 Ⓐ Ⓑ Ⓒ Ⓓ	64 Ⓐ Ⓑ Ⓒ Ⓓ	86 Ⓐ Ⓑ Ⓒ Ⓓ	108 Ⓐ Ⓑ Ⓒ Ⓓ	130 Ⓐ Ⓑ Ⓒ Ⓓ	
21 Ⓐ Ⓑ Ⓒ Ⓓ	43 Ⓐ Ⓑ Ⓒ Ⓓ	65 Ⓐ Ⓑ Ⓒ Ⓓ	87 Ⓐ Ⓑ Ⓒ Ⓓ	109 Ⓐ Ⓑ Ⓒ Ⓓ	131 Ⓐ Ⓑ Ⓒ Ⓓ	
22 Ⓐ Ⓑ Ⓒ Ⓓ	44 Ⓐ Ⓑ Ⓒ Ⓓ	66 Ⓐ Ⓑ Ⓒ Ⓓ	88 Ⓐ Ⓑ Ⓒ Ⓓ	110 Ⓐ Ⓑ Ⓒ Ⓓ	132 Ⓐ Ⓑ Ⓒ Ⓓ	

DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

AGI-1A

USE ONLY WITH AGI QUESTION BOOK NO. 1*

TITLE	TEST NO.
GROUND INSTRUCTOR TEST ADVANCED	664806

NAME _____

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	1001	26	1111	51	1267	76	1388
2	1009	27	1114	52	1275	77	1393
3	1012	28	1118	53	1277	78	1403
4	1015	29	1126	54	1282	79	1407
5	1018	30	1130	55	1284	80	1412
6	1024	31	1139	56	1288	81	1425
7	1027	32	1145	57	1294	82	1429
8	1034	33	1149	58	1299	83	1438
9	1035	34	1154	59	1304	84	1451
10	1038	35	1159	60	1308	85	1463
11	1046	36	1172	61	1312	86	1466
12	1048	37	1180	62	1317	87	1478
13	1051	38	1189	63	1321	88	1482
14	1055	39	1195	64	1323	89	1484
15	1060	40	1201	65	1332	90	1489
16	1064	41	1206	66	1336	91	1495
17	1068	42	1212	67	1338	92	1510
18	1072	43	1219	68	1342	93	1516
19	1077	44	1239	69	1349	94	1520
20	1082	45	1241	70	1354	95	1529
21	1084	46	1247	71	1364	96	1532
22	1088	47	1250	72	1367	97	1534
23	1094	48	1254	73	1370	98	1537
24	1099	49	1257	74	1378	99	1542
25	1101	50	1265	75	1384	100	1545

FOR OFFICIAL USE ONLY

SAMPLE

ADVANCED

GROUND INSTRUCTOR

WRITTEN TEST

001. Control Areas within the contiguous U.S. extend upward from either 700 feet or 1,200 feet above the surface to but not including

1- 18,000 feet MSL.
2- 24,000 feet MSL.
3- the base of the Continental Control Area.
4- 3,000 feet MSL.

002. Unless specified otherwise, Federal airways extend from

1- 700 feet above the surface upward to the Continental Control Area and are 10 nautical miles wide.
2- 1,200 feet above the surface upward to 18,000 feet MSL and are 8 nautical miles wide.
3- the surface upward to 18,000 feet MSL and are 4 nautical miles wide.
4- 1,200 feet above the surface upward to 14,500 feet MSL and are 16 nautical miles wide.

003. As used in aviation, what does "flight visibility" mean?

1- The prevailing horizontal visibility as reported by the United States National Weather Service or an accredited observer.
2- The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.
3- The average visibility in all directions as seen from the cockpit of an aircraft in flight.
4- The average slant range distance that the pilot can see from the cockpit of an aircraft in flight.

004. Regulations which refer to "commercial operators" relate to that person who

1- is a required crewmember aboard an airline transport aircraft.
2- for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier.
3- acts as pilot in command of an air carrier aircraft.
4- is the owner of a scheduled airline.

005. Regulations which refer to the "operational control" of a flight are in relation to

1- exercising the privileges of pilot in command of an aircraft.
2- performing the specific duties of any required crewmember.
3- acting as the sole manipulator of the aircraft's controls.
4- exercising authority over initiating, conducting, or terminating a flight.

006. Regulations which refer to "operator" relate to that person who

1- causes the aircraft to be used or authorizes its use.
2- is a required crewmember aboard the aircraft.
3- acts as pilot in command of the aircraft.
4- is the sole manipulator of the aircraft controls.

007. "Ceiling" as used in aviation weather reports is the height above the earth's surface of the

1- highest layer of clouds located above the reporting station.
2- lowest layer of clouds or obscuration phenomena located above the reporting station.
3- highest layer of clouds that is reported as "overcast" and not classified as "thin" or "partial."
4- lowest layer of clouds or obscuration phenomena that is reported as "broken," "overcast," or "obscuration" and not classifed as "thin" or "partial."

008. Specific requirements pertinent to operating in an Airport Traffic Area apply only at an airport where

1- a Terminal Control Area is established.
2- a Control Zone is in effect.
3- an approach control facility is available.
4- a control tower is in operation.

009. Rules governing Airport Traffic Areas apply when flying into all

1- airports with operating control towers.
2- control zones.
3- airports with operating Flight Service Stations.
4- airports.

010. Airport Traffic Areas are in effect at all airports where

1- a Flight Service Station is in operation.
2- a control tower is in operation.
3- the airport is located within the lateral limits of controlled airspace.
4- a control zone is in effect.

011. An Airport Traffic Area extends upward to, but not including

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

012. When the control tower at an airport is in operation, what designated airspace associated with that airport is in effect?

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

013. Unless otherwise designated, Airport Traffic Areas extend upward to, but do not include

1- 3,000 feet above sea level.
2- 2,000 feet above the elevation of the airport.
3- 3,000 feet above the elevation of the airport.
4- the base of the Continental Control Area.

014. What designated airspace associated with an airport becomes inactive when the control tower at that airport is not in operation?

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

015. Which statement is true regarding Control Areas?

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

016. Which statement is true regarding control zones?

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

017. A control zone may include one or more airports and is normally a circular area with a radius of

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

018. One of the major differences between Control Zones and Control Areas is that all Control Zones

1- always begin at 700 feet AGL while Control Areas always begin at 1,200 feet above the surface.
2- are located around tower-controlled airports only.
3- have higher basic VFR weather minimums than Control Areas.
4- begin at the surface, while all Control Areas begin at an altitude of 700 feet or higher above the surface.

019. Within the contiguous U.S., the vertical limit of Control Zones extends from the surface upward to

1- but not including 10,000 feet MSL.
2- the base of the Continental Control Area.
3- infinity.
4- but not including 3,000 feet AGL.

020. With certain exceptions, the Continental Control Area extends upward from

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

021. Which statement is true concerning the requirements for flight within a Group I Terminal Control Area?

1- At least a Commercial Pilot Certificate is required.
2- Automatic altitude alerting system is required.
3- 4096 radar beacon transponder and automatic altitude reporting equipment are required.
4- Distance measuring equipment is required.

022. Special VFR weather minimums apply to operations within what type airspace?

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

023. The pilot in command is required to hold a category and class rating appropriate to the aircraft being flown, in which of the following?

1- All flights.
2- Flights for compensation or hire.
3- All solo flights.
4- Flight tests given by the Federal Aviation Administration.

024. Unless otherwise authorized, a pilot in command is required to possess a type rating for that aircraft when operating

1- a lighter-than-air category aircraft.
2- any military surplus aircraft.
3- an airplane in air commerce between the United States and other countries.
4- a turbojet powered airplane.

025. Which statement concerning Terminal Control Areas (TCAs) is true?

1- No person may operate an aircraft in either a Group I or a Group II TCA unless prior authorization from ATC has been received.
2- Flight under Visual Flight Rules is not permitted in Group I TCAs.
3- Flight plans are required for flight operations in Group II TCAs.
4- TCAs start at ground level and extend upward to 10,000 feet MSL.

026. Which of the following is permitted if a pilot has a commmercial pilot certificate, airplane category, with only a multiengine land class, and DC-3 type rating?

1- Operating any multiengine airplane, regardless of weight.
2- Carrying passengers for hire in a light multiengine land airplane.
3- Carrying passengers not for hire in a single-engine airplane.
4- Operating any large airplane for hire.

027. Unless otherwise authorized, a pilot in command is required to possess a type rating when operating

1- any airplane or helicopter having a gross weight in excess of 12,500 pounds.
2- any aircraft with a gross weight in excess of 6,000 pounds.
3- any multiengine airplane with a gross weight in excess of 6,000 pounds.
4- any aircraft that requires more than one pilot.

023. Suppose a First-Class Medical Certificate was issued to the pilot on November 18, 1980. Match the last date on which this medical certificate is valid for these operations.

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

a. May 18, 1981.
b. May 31, 1981.
c. November 18, 1981.
d. November 30, 1981.
e. December 31, 1981.
f. November 30, 1982.
g. December 31, 1980.

The correct matchings are

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

029. What is the earliest date a Second-Class Medical Certificate could have been issued to exercise the privileges of a Commercial Pilot Certificate on December 11, 1981?

1- November 31, 1980.
2- December 11, 1980.
3- December 1, 1980.
4- December 31, 1980.

030. A Second-Class Medical Certificate which was issued on March 18, 1980, permits a commercial pilot to exercise which of the following privileges?

1- Commercial pilot privileges until, but not after March 31, 1981.
2- Private pilot privileges until, but not after March 18, 1981.
3- Private pilot privileges until, but not after April 30, 1981.
4- Commercial pilot privileges until, but not after March 18, 1982.

031. A commercial pilot who carries passengers for hire at night is required to hold

1- an airplane instrument rating.
2- a type rating for the airplane being flown.
3- a Commercial Pilot Certificate with a gold seal.
4- a First-Class Medical Certificate.

032. Which of the following are considered aircraft "class ratings"?

1- Standard; restricted; experimental; limited.
2- Transport; normal; utility; acrobatic.
3- Airplane; rotorcraft; glider; lighter-than-air.
4- Single-engine land; multiengine land; single-engine sea; multiengine sea.

033. Appropriate and current pilot and medical certificates must be in one's personal possession

1- only when carrying passengers while acting as pilot in command.
2- only when acting as pilot in command during flight operations involving interstate commerce.
3- at all times while acting in any capacity as a required pilot flight crewmember.
4- only when acting as pilot in command for compensation or hire.

034. According to FARs, a Second-Class Medical Certificate issued January 18 of this year will

1- be issued without a specific expiration date if there are no limitations that would affect the safe operation of an aircraft.
2- expire January 31 of next year for commercial pilot privileges, but may be used for private pilot privileges until January 31, two years hence.
3- expire for commercial pilot privileges January 31, two years hence.
4- expire January 18 of next year.

035. For recently certificated commercial pilots to carry passengers for hire on a VFR flight at night in a multiengine land airplane within a radius of 25 NM from the departure airport, they are required to hold

1- airplane multiengine land ratings.
2- airplane single-engine land ratings.
3- airplane multiengine land and either airplane or helicopter pilot instrument ratings.
4- airplane multiengine land and airplane instrument ratings.

036. If a pilot receives a biennial flight review on September 3, 1980, and an instrument rating on March 28, 1981, the next biennial flight review for this pilot would be due

1- September 30, 1982.
2- March 28, 1983.
3- March 31, 1982.
4- September 3, 1981.

037. Which statement is true regarding Commercial Pilot Certificates?

1- They expire if recency of experience requirements are not met.
2- They expire after a duration of 12 months.
3- They expire after a duration of 24 months.
4- There is no expiration date on these certificates.

038. Examples of the term "Category" as used with respect to certification, and privileges and limitations of airmen, include

1- transport; normal; utility; acrobatic; restricted.
2- airplane; rotorcraft; glider; lighter-than-air.
3- DC-8 and DC-9; Lear Jet; Jet Commander 1121.
4- single-engine; multiengine; land; water; helicopter.

039. In regard to the expiration of Commercial Pilot Certificates, which statement is true?

1- They expire after a duration of 24 months unless the pilot receives a biennial flight review.
2- They expire when recency of experience requirements are not met.
3- They are issued without a specific expiration date.
4- They expire after a duration of 12 months unless the pilot meets the recency of experience requirements.

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

1- logged at least 200 hours of flight time.
2- at least 100 hours of pilot in command time.
3- an instrument pilot rating, if the flights extend beyond a 25-mile radius.
4- special authorization from FAA.

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

1- 60 days after the date of the move.
2- 90 days after the date of the move.
3- 120 days after the date of the move.
4- 30 days after the date of the move.

042. Which statement is true concerning a commercial or private pilot who holds a Second-Class Medical Certificate which was issued May 17, 1980?

1- A certificated commercial pilot is permitted to exercise commercial pilot privileges until April 30, 1982.
2- A certificated commercial pilot may exercise commercial pilot privileges until June 1, 1981, and private pilot privileges until June 1, 1982.
3- A certificated private pilot is permitted to exercise private pilot privileges only until the end of April 30, 1981.
4- A certificated private pilot is permitted to exercise private pilot privileges until May 1, 1981, and student pilot privileges until May 1, 1982.

043. A person may not act as a crewmember of an aircraft if alcoholic beverages have been consumed by that person within the preceding

1- 12 hours.
2- 24 hours.
3- 36 hours.
4- 8 hours.

044. To act as pilot in command of an aircraft that is type-certificated for more than one required pilot crewmember, a pilot must be type rated for that specific type aircraft and have satisfactorily completed a proficiency or flight check in that type aircraft, or an approved simulator, within the preceding

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

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

1- at least a Private Pilot Certificate with a glider rating and made and logged at least three flights as pilot or observer in a glider being towed by an airplane.
2- a logbook record of having made at least three flights as sole manipulator of the controls of a glider being towed by an airplane.
3- at least a Commecial Pilot Certificate with a glider rating.
4- a logbook endorsement for receipt of ground and flight instruction in gliders and familiarity with techniques and procedures for glider towing.

046. What recent flight experience must be met before a commercial airplane pilot may fly solo in an airplane?

1- Accomplish three takeoffs and landings within the preceding 90 days in any aircraft.
2- Satisfactorily accomplish a flight review in any aircraft for which rated, within the preceding 24 months.
3- Satisfactorily accomplish a flight review within the preceding 24 months, but this review must be in an airplane.
4- Accomplish three takeoffs and landings within the preceding 90 days in an airplane.

047. The maximum period of time that a satisfactorily completed FLIGHT REVIEW is valid is

1- one year.
2- two years.
3- three years.
4- six months.

048. The preflight action required by regulations relative to alternatives available if the planned flight cannot be completed is applicable to

1- any flight conducted for hire or compensation.
2- any flight not in the vicinity of an airport.
3- all IFR and night VFR flights.
4- IFR flights only.

049. Which statement is true regarding civil aircraft airworthiness?

1- If an unairworthy mechanical or structural condition exists, that aircraft can be flown only in solo flight.
2- The pilot in command is responsible for determining that the aircraft is in condition for safe flight.
3- The commercial operator is responsible for determining that the aircraft is in condition for safe flight.
4- An FAA certificated mechanic is responsible for determining that the aircraft is in condition for safe flight.

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

1- a type rating if the airplane is of the multiengine class.
2- a First-Class Medical Certificate.
3- an airplane instrument pilot rating.
4- a Third-Class Medical Certificate that was issued within the preceding 12 calendar months.

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

1- Carrying passengers in airplanes is prohibited at night.
2- Carrying passengers for hire at night and on cross-country flights of more than 50 NM in airplanes is prohibited.
3- Flying at night and on cross-country flights in airplanes is prohibited.
4- Carrying passengers on a cross-country flight in airplanes is prohibited.

052. In addition to other preflight action for a VFR flight away from the vicinity of the departure airport, regulations require the pilot in command to

1- check each fuel tank visually to ensure that it is full.
2- check the accuracy of the omni-navigation equipment and the emergency locator transmitter.
3- determine runway lengths of airports of intended use and the airplane's takeoff and landing distance data.
4- file a flight plan.

053. What limitation is imposed on a newly certificated commercial airplane pilot if that person does not hold an instrument pilot rating?

1- The carrying of passengers or property for hire on cross-country flights at night is limited to a radius of 50 NM.
2- The carrying of passengers for hire on cross-country flights is limited to 50 NM and the carrying of passengers for hire at night is prohibited.
3- The carrying of passengers for hire on cross-country flights is limited to 50 NM for night flights, but not limited for day flights.
4- That person is limited to private pilot privileges.

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

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

055. A pilot holding a commercial certificate must show, by a reliable record, the logging of only

1- pilot in command flight time.
2- the flight time necessary to meet the recent experience requirements.
3- flight time with passengers aboard the aircraft.
4- the additional flight instruction time received.

056. Suppose a pilot had a flight review on May 4, 1980, and received a Commercial Pilot Certificate on January 17, 1981. When is the next flight review normally due?

1- January 17, 1983.
2- May 4, 1982.
3- May 4, 1983.
4- January 17, 1982.

057. Which of the following types of landings are required to meet the recency of experience requirements for a VFR night flight carrying passengers in a single-engine nosewheel-type airplane?

1- Three full stops at night in any single-engine airplane.
2- Three full stops during daytime and three full stops at night in any single-engine nosewheel-type airplane.
3- Three touch-and-go's during daytime in single-engine or multiengine airplanes and three full stops in any nosewheel-type airplane.
4- Three full stops during daytime in any nosewheel-type airplane and three full stops at night in either a single-engine or multiengine airplane.

058. Prior to flying an airplane solo, a pilot who holds a Commercial Pilot Certificate must meet which of the following requirements?

1- Hold a Second-Class Medical Certificate issued within the preceding 12 months.
2- Satisfactorily completed a flight review or proficiency check within the preceding 24 months.
3- Accomplish three takeoffs and landings within the preceding 90 days.
4- Hold an instrument rating.

059. To serve as second in command of "large" airplanes a person must hold at least

1- a Commercial Pilot Certificate with the appropriate category, class, and type ratings.
2- a Commercial Pilot Certificate, an appropriate instrument rating, and be type certificated in the airplane.
3- an Airline Transport Pilot Certificate with the appropriate category and type ratings.
4- a Private Pilot Certificate with appropriate category and class ratings.

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

1- Received flight instruction in an airplane that has more than 200 horsepower.
2- Pass a flight test in such an airplane.
3- Hold a 200-horsepower class rating.
4- Make three solo takeoffs and landings in such an airplane.

061. If a pressurized airplane is not equipped with a quick-donning type oxygen mask, one pilot at the controls must wear and use an oxygen mask when operating above which Flight Level?

1- 250.
2- 300.
3- 350.
4- 180.

062. A pilot may log flight time as second in command during what portion of a flight?

1- All flight time while acting as second in command of aircraft on which more than one pilot is required.
2- Only that flight time during which the second in command is the sole manipulator of the aircraft's controls.
3- One-half of the total flight time while acting as second in command regardless of aircraft crew requirements.
4- All flight time when performing second in command duties in any aircraft.

063. If an unpressurized aircraft is operated at 15,500 feet MSL for 1 hour 30 minutes, who is required to use supplemental oxygen while at that altitude?

1- The flight crew during the entire time.
2- The pilot at the controls of the aircraft, but only for 30 minutes.
3- The pilot in command of the aircraft, but only for 1 hour.
4- All occupants, but only for the time exceeding 30 minutes.

064. If you plan to fly an unpresssurized airplane at 13,500 feet MSL for 1 hour 30 minutes, what minimum supply of supplemental oxygen is required by regulations?

1- 30-minute supply for all occupants.
2- 1-hour supply for the required minimum flight crew.
3- 1-hour 30-minute supply for all occupants.
4- 20-minute supply for the required minimum flight crew.

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

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

066. Which of the following is permitted in a "normal" category airplane?

1- Any maneuver requiring an abrupt change in attitude.
2- Any maneuver except acrobatics or spins.
3- All acrobatic maneuvers.
4- Mild acrobatics, including spins.

067. Regarding certificates and documents, no person may operate an aircraft unless it has within it

1- an Airworthiness Certificate, and aircraft and engine logbooks.
2- an Airworthiness Certificate, Registration Certificate, and Operating limitations.
3- a Registration Certificate, aircraft and engine logbooks, and Owner's Handbook.
4- a Registration Certificate and Owner's Handbook.

068. Airworthiness Directives for general aviation aircraft are published as

1- amendments to FARs.
2- nonregulatory directives.
3- supplements to the Advisory Circular System.
4- Notices to Airmen.

069. Airworthiness Directives for general aviation aircraft must be complied with in the same manner as

1- Federal Aviation Regulations.
2- Advisory Circulars.
3- nonregulatory directives.
4- Notices to Airmen.

070. A "utility" category airplane is one in which the pilot is permitted to perform

1- any maneuver except acrobatics or spins.
2- any maneuver that requires an abrupt change in attitude.
3- mild acrobatics, including spins.
4- all types of acrobatics.

071. An altitude alerting system or device is required to be installed in the aircraft when operating which of the following?

1- All turbojet airplanes.
2- All large airplanes.
3- All transport type aircraft.
4- All airplanes under IFR.

072. When are non-rechargable batteries of an Emergency Locator Transmitter (ELT) required to be replaced?

1- Every 24 months.
2- When 50% of their useful life expires or they were in use for 1 hour.
3- At the time of each 100-hour or annual inspection.
4- Annually.

073. Unless authorized, a "Restricted" category civil aircraft should not be operated over

1- large bodies of water.
2- designated mountainous areas.
3- any aircarrier airport.
4- densely populated areas.

074. Unless authorized, a "Restricted" category civil aircraft should not be operated within

1- congested airways.
2- Control Areas.
3- transition areas.
4- Control Zones.

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

1- Limited category aircraft.
2- Utility category aircraft.
3- Restricted, Limited, and Utility category aircraft.
4- Restricted category aircraft.

076. The carriage of passengers for hire by a commercial pilot is

1- not authorized in Utility category aircraft.
2- not authorized in Limited category aircraft.
3- authorized in Restricted category aircraft.
4- authorized in Experimental category aircraft.

077. What equipment is required if an aircraft is operated for hire on a day VFR flight conducted over water and beyond power-off gliding distance from shore?

1- A sensitive altimeter adjustable for barometric pressure.
2- An approved system of dispensing at least two different colors of water dye.
3- An approved radar altimeter.
4- Approved flotation gear readily available to each occupant, and at least one pyrotechnic signaling device.

078. Which is required equipment for powered aircraft during VFR night flights?

1- Gyroscopic direction indicator.
2- Anticollision light system.
3- Gyroscopic pitch and bank indicator.
4- Appropriate radio navigational equipment.

079. The required minimum flight crew must use supplemental oxygen at all times at cabin pressure altitudes above which altitude?

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

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

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

098. All aircraft (except gliders) are required to be equipped with operable Mode A 4096 transponders with automatic pressure altitude reporting capability when operating in

1- all airspace above 10,000 feet MSL.
2- controlled airspace above 10,000 feet MSL.
3- all airspace above 12,000 feet MSL that is not in the Continental Control Area.
4- controlled airspace above 12,500 feet MSL.

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

1- Approval from ATC to tow the glider in a Control Zone.
2- A certificate of waiver issued by the Administrator.
3- A Special Purpose Airworthiness Certificate issued by the controlling General Aviation District Office.
4- A glider rating on the pilot in command's pilot certificate.

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

1- A record of training in towing for the pilot in command.
2- A safety link at each end of the towline which has a breaking strength not less than 80% of the aircraft's gross weight.
3- A certificate of waiver issued by the Administrator.
4- Approval from ATC to operate in a control area.

101. Portable electronic devices which may cause interference with the navigation or communication system may not be operated on any aircraft while being flown under IFR

1- along federal airways.
2- by a commercial operator.
3- at altitudes above 14,500 feet MSL.
4- within the United States.

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

1- Seatbelts must be fastened about passengers during takeoff and landing only, while required flight crewmembers' seatbelts must be fastened during the entire flight.
2- Seatbelts must be fastened about passengers and required crewmembers during takeoff and landing only.
3- Seatbelts must be fastened about passengers during takeoff and landing only, while each required crewmember's seatbelt must be fastened at all times while occupying an assigned station.
4- All persons on board must have their seatbelts fastened during the entire flight.

103. One may not act as pilot in command of an aircraft while carrying passengers who are obviously under the influence of intoxicating liquors or drugs unless

1- these passengers are medical patients under proper care.
2- liquors or drugs are not to be served aboard the aircraft.
3- these passengers remain seated with the seatbelts fastened.
4- it is decided the safety of the flight would not be affected.

104. To comply with regulations, required flight crewmembers' seatbelts must be fastened

1- only during takeoff and landing when passengers are aboard the aircraft.
2- at all times while the aircraft is being operated in clouds.
3- only during takeoff and landing.
4- while the crewmembers are at their stations.

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

1- 18,000 feet MSL.
2- 24,000 feet AGL.
3- 29,000 feet MSL.
4- 10,000 feet AGL.

106. To determine cruising flight levels the minimum altitude at which a sensitive altimeter should be set to 29.92" Hg is

1- 12,500 feet MSL.
2- 18,000 feet MSL.
3- 22,500 feet MSL.
4- 10,000 feet MSL.

107. If an altimeter setting is not available at a departure airport, the sensitive altimeter should be set to indicate

1- the elevation of the departure airport.
2- the elevation of the departure airport corrected to mean sea level.
3- pressure altitude corrected for non-standard temperature.
4- the standard pressure 29.92" Hg.

108. The minimum safe altitude which applies anywhere is

1- an altitude which permits a safe emergency landing in the event of a power failure.
2- 500 feet above the surface, except over open water or sparsely populated areas.
3- 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.
4- 500 feet above the surface.

109. What is the minimum safe altitude above the highest obstacle that must be maintained over congested areas?

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

110. Suppose while on the final approach for landing, an alternating green and red light followed by a flashing red light is received from the control tower. Under these circumstances the pilot should

1- discontinue the approach, fly the same traffic pattern and approach again, and land.
2- abandon the approach, realizing the airport is unsafe for landing.
3- abandon the approach, circle the airport to the right, and expect a flashing white light when the airport is safe for landing.
4- land and clear the runway in use as safely and quickly as possible.

111. A flashing green light from the control tower to an aircraft in flight means

1- continue, because this light signal is not applicable to aircraft in flight.
2- circle the airport to the left and reenter the traffic pattern.
3- return for a landing, and expect a steady green light at the proper time.
4- continue, but exercise extreme caution.

112. If a flashing red light from the tower is received while holding on a runway for takeoff, the pilot should

1- take off immediately.
2- taxi clear of the runway.
3- return to the starting point on the ramp.
4- hold that position.

113. A flashing red light from the control tower during a landing approach means

1- give way to other aircraft in the traffic pattern.
2- the airport is unsafe; do not land.
3- exercise extreme caution while landing.
4- give way to faster aircraft; circle until cleared.

080. In addition to that required for unpressurized aircraft, at least a 10-minute supply of supplemental oxygen must be available for each occupant of a pressurized aircraft when operating above which Flight Level?

1- 190.
2- 200.
3- 250.
4- 180.

081. Formation flight while carrying passengers for hire is

1- not authorized, except when operating outside of controlled airspace.
2- authorized, if previous arrangements have been made with the other pilot/pilots.
3- authorized if the passengers are so informed prior to the flight.
4- not authorized under any circumstances.

082. What is the maximum distance from an airport that an airplane engaged in training operations may be operated without an Emergency Locator Transmitter?

1- 25 miles.
2- 50 miles.
3- 75 miles.
4- 10 miles.

083. If on a night flight the pilot of airplane A observes only the green wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

1- Airplane B; it is to the right of airplane A.
2- Airplane A; it is to the right of airplane B.
3- Airplane A; it is to the left of airplane B.
4- Airplane B, it is to the left of airplane A.

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

1- 12 months.
2- 16 months.
3- 24 months.
4- 9 months.

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

1- Formation flights are not permitted within controlled airspace.
2- Parachutes are required to be worn during formation flights.
3- Formation flights are prohibited when carrying passengers for hire.
4- Formation flights must be performed above 1,500 feet AGL.

086. Unless coordinated with ATC, operational testing of Emergency Locator Transmitters should be made only within the

1- last 5 minutes before any hour.
2- last 10 minutes before any hour.
3- first 10 minutes before any one-half hour.
4- first 5 minutes after any hour.

087. If on a night flight the pilot of airplane A observes only the red wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

1- Airplane B; it is to the left of airplane A.
2- Airplane A; it is to the left of airplane B.
3- Airplane A; it is to the right of airplane B.
4- Airplane B; it is to the right of airplane A.

088. May an airplane be operated in formation flight while passengers are carried for hire?

1- Yes, if operating outside controlled airspace.
2- Yes, if the passengers approve.
3- Yes, provided it is pre-arranged between the pilots.
4- No, this is not authorized.

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

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

090. Unless otherwise authorized or required by ATC, the maximum indicated airspeed at which a reciprocating engine equipped aircraft should be flown within an Airport Traffic Area is

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

091. What is the maximum indicated airspeed allowed in a VFR corridor designated through a Terminal Control Area?

1- 180 knots.
2- 200 knots.
3- 230 knots.
4- 156 knots.

092. When flying beneath the lateral limits of a Terminal Control Area, the maximum indicated airspeed authorized is

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

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

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

094. Unless otherwise authorized or required by ATC, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL?

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

095. You are flying an airplane at 6,500 feet while on a heading of 300°. You see an airplane headed west and converging from your right. According to Regulations, which pilot should give way and why?

1- You should give way, since the airplane on your right has the right-of-way.
2- The pilot of the other airplane should give way, since you are to its left and you have the right-of-way.
3- The pilot of the other aircraft should give way, since it is not flying at a proper VFR altitude.
4- Each pilot should alter course to the right, since safety requires constant vigilance of all pilots.

096. If airplane A is overtaking airplane B, which airplane has the right-of-way?

1- Airplane B, and it should expect to be passed on the right.
2- Airplane A, and it should alter course to the right to pass.
3- Airplane A, and it should alter course to the left to pass.
4- Airplane B, and it should expect to be passed on the left.

114. Unless otherwise authorized, all airplanes being operated within a Group I Terminal Control Area are required to be equipped with an operable

1- 4096 radar beacon transponder with automatic altitude reporting capability.
2- ADF receiver and VOR receiver.
3- DME receiver and an Emergency Locator Transmitter.
4- ILS receiver and marker beacon receiver.

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

1- Solo student pilots are not authorized to take off or land at airports that are located within Group I TCAs.
2- When operating within Group II TCAs, VOR receivers are not required.
3- Flight plans are rquired to be filed prior to operating within Group II TCAs.
4- Flight under Visual Flight Rules is not authorized within Group I TCAs.

116. What is the correct departure procedure at a noncontrolled airport?

1- The FAA approved departure procedure for that airport.
2- Depart in the same manner as at other airports.
3- Make all left turns, except a 45° right turn on the first crosswind leg.
4- Departure in any direction consistent with safety, after crossing the airport boundary.

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

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

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

1- When passing over these areas, aircraft are required to be at least 4,000 feet above the surface.
2- These areas should be avoided unless landing or taking off from airports within the areas, or unless otherwise authorized by Air Traffic Control.
3- Airport Traffic Areas are depicted on Sectional Aeronautical Charts by a broken line circle.
4- To operate within these areas, the pilot must possess at least a Private Pilot Certificate.

119. What type of speed at the planned cruise altitude should be entered on a flight plan?

1- Estimated groundspeed.
2- Calibrated airspeed.
3- True airspeed.
4- Indicated airspeed.

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

1- both airports, as well as to fly through the area.
2- both airports, but not required to fly through the area.
3- the tower-controlled airport only, but not required to fly through the area.
4- the tower-controlled airport only, as well as to fly through the area.

121. When entering an airport traffic area, what is the minimum altitude at which a turbine-powered or large aircraft may be flown until further descent is required for a safe landing?

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

122. What is the minimum basic VFR flight visibility for all flights at or above 10,000 feet MSL except when less than 1,200 feet AGL?

1- 3 miles.
2- 3 miles during daylight hours and 5 miles during official night hours.
3- 5 miles.
4- 1 mile in uncontrolled airspace, 3 miles in controlled airspace.

123. To operate an airplane VFR outside controlled airspace at an altitude of more than 1,200 feet AGL but less than 10,000 feet MSL, regulations require a flight visibility of no less than

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

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

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

125. What is the minimum distance from clouds that must be maintained when operating an aircraft outside controlled airspace at an altitude above 1,200 feet AGL but less than 10,000 feet MSL?

1- 1,000 feet above or 1,000 feet below and 1 mile horizontally.
2- 1,000 feet above or 500 feet below and 2,000 feet horizontally.
3- Clear of clouds.
4- 500 feet above or 1,000 feet below and 2,000 feet horizontally.

126. The minimum flight visibility for VFR flight increases from 3 to 5 miles at and above an altitude of

1- 10,000 feet MSL.
2- 14,500 feet MSL.
3- 18,000 feet MSL.
4- 1,200 feet AGL.

127. Regarding the operation of an airplane within a Group I Terminal Control Area, which of the following is true?

1- The airplane must be equipped with an operable VOR receiver, two-way communications radio, and a radar beacon transponder.
2- The pilot in command must hold an instrument pilot rating, and be prepared to be vectored through clouds if necessary.
3- The airplane must be certificated for flight under Instrument Flight Rules.
4- The pilot in command must hold at least a Commercial Pilot Certificate.

128. Flight within a Positive Control Area must be conducted under

1- VFR if the aircraft is equipped with a 4096 radar beacon transponder with automatic altitude reporting capability.
2- IFR only, and at a specific flight level assigned by ATC.
3- VFR or IFR, depending upon pilot qualifications and recent experience.
4- VFR, except when the weather is less than the required basic VFR minimums.

129. A disaster area within which a "Temporary Flight Restriction" is in effect can be determined by referring to

1- Airman's Information Manual, Part 1.
2- Notices to Airmen.
3- AIRMETS.
4- Federal Aviation Regulations, Part 91.

130. Which is true for flight within Terminal Control Areas (TCAs)?

1- VFR operations are not authorized within Group I TCAs.
2- Operable transponders are required when operating within all TCAs.
3- Takeoffs and landings at airports within Group I TCAs are not authorized unless the pilot holds at least a Private Pilot Certificate.
4- All pilots operating within TCAs are required to file a flight plan.

131. Suppose an aircraft is being flown before sunrise and official sunrise is 0718. When are the aircraft's position lights required to be lighted?

1- They must remain lighted until 0748 then may be turned off.
2- They must remain lighted until 0613 then may be turned off.
3- They must remain lighted until 0718 then may be turned off.
4- They must remain lighted until 0648 then may be turned off.

132. Suppose after declaring an emergency with ATC and being given priority over other air traffic, a landing is made without incident. In this case

1- the pilot shall under all circumstances, submit a detailed report of that emergency to the chief of the ATC facility involved.
2- a detailed report must be submitted to the nearest General Aviation District or Regional Office of the FAA within 7 days.
3- the pilot must personally report to the chief of the facility involved to explain the reason for the emergency.
4- the pilot shall, if requested by ATC, submit a detailed report of that emergency within 48 hours to the chief of that ATC facility.

133. Suppose a pilot operating VFR while under radar control is assigned a vector and an altitude by ATC. The pilot should

1- deviate from the assigned altitude to avoid entering clouds, but should maintain the assigned heading.
2- deviate from the assigned heading to avoid entering clouds, but should maintain the assigned altitude.
3- not enter clouds, and should advise ATC that VFR conditions cannot be maintained.
4- maintain the assigned heading and altitude until a change is received from ATC even if clouds will be entered.

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

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

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

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

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

The correct matching is

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

136. What is the minimum allowable flight visibility for acrobatic flight?

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

137. What is the minimum allowable altitude for acrobatic flight?

1- 1,500 feet AGL.
2- 2,000 feet MSL.
3- 3,000 feet AGL.
4- 1,000 feet MSL.

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

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

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

1- 500 feet beneath clouds, and the ground visibility must be at least 1 mile.
2- Clear of clouds, and the flight visibility must be at least 1 mile.
3- 500 feet beneath clouds, and the flight and ground visibility must be at least 3-5 miles. (Marginal VFR).
4- Clear of clouds, and the ground visibility must be at least 2 miles.

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

1- The flight visibility must be at least 3 miles.
2- The flight must be able to remain at least 500 feet below the clouds.
3- The airplane must be equipped for IFR flight.
4- The pilot must hold at least a Commercial Pilot Certificate.

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

1- The ceiling within the Control Zone must be at least 500 feet.
2- The pilot must hold an instrument pilot rating and the airplane must be equipped for instrument flight.
3- The Control Zone must be specifically designated as a night Special VFR Control Zone.
4- The Control Zone must have an approach control facility.

142. A special VFR clearance requires that while in the control zone, you remain

1- at least 500 feet from clouds.
2- at least 1,000 feet from clouds.
3- at least 1,500 feet from clouds.
4- clear of clouds.

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

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

144. During which of these situations is prior authorization required from ATC to operate an airplane within a Control Zone?

1- When operating within the control zone in weather conditions that are classified as marginal VFR.
2- When operating within the control zone, regardless of weather conditions.
3- When surface weather conditions in the control zone are less than VFR minimums, even if operating above the clouds.
4- When operating within the control zone beneath a 1,000-foot ceiling.

145. Assuring compliance with an Airworthiness Directive is the responsibility of the

1- owner or operator of that aircraft.
2- National Transportation Safety Board.
3- FAA certificated mechanic.
4- pilot in command of that aircraft.

146. Automatic pressure altitude reporting equipment associated with a radar beacon transponder must be deactivated when

1- operating within an Airport Traffic Area.
2- directed by ATC.
3- operating VFR within a Control Zone.
4- operating VFR within Terminal Control Areas.

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

1- a visibility of at least 1 mile, regardless of the ceiling.
2- a ceiling of 1,000 feet or more, and a visibility of at least 3 miles.
3- such that the pilot can remain clear of clouds and have 1 mile visibility regardless of the ceiling.
4- a ceiling of 500 feet or more, and a visibility of at least 5 miles.

148. Which statement pertaining to Airworthiness Directives (ADs) is true?

1- Aircraft Maintenance personnel are responsible to see that all ADs are complied with.
2- ADs, when complied with chronologically, eliminate the need for maintenance records.
3- If the provisions of an AD have not been complied with, an aircraft cannot be considered to be in an airworthy condition.
4- ADs are nonregulatory in nature.

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

1- magnetic course being flown, beginning more than 3,000 feet above the surface.
2- true heading being flown, beginning at 3,000 feet above mean sea level.
3- magnetic heading being flown, beginning at 3,000 feet above mean sea level.
4- true course being flown, beginning at more than 3,000 feet above the surface.

150. If the 100-hour inspection for an aircraft which is used to carry persons for hire was exceeded by 8 hours, the next inspection is due within how many hours time in service?

1- 100 hours.
2- 102 hours.
3- 110 hours.
4- 92 hours.

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

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

152. Altitudes are referred to as flight levels starting from

1- 14,500 feet MSL.
2- 18,000 feet MSL.
3- 29,000 feet MSL.
4- 10,000 feet MSL.

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

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

154. Airworthiness Directives (ADs) issued for a given airplane, engine, or propeller are amendments to

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

155. The appropriate altitudes required by regulations relating to VFR level cruising flight begin above which altitude?

1- 3,000 feet MSL and are based on magnetic heading.
2- 3,000 feet MSL and are based on true heading.
3- 3,000 feet AGL, and are based on magnetic course.
4- 3,000 feet AGL, and are based on true course.

156. The altitudes to be maintained for VFR level cruising flight are required when

1- more than 3,000 feet above MSL, and are based on true heading.
2- at 3,000 feet or more AGL and are based on true course.
3- at 3,000 feet or more above MSL, and are based on magnetic heading.
4- more than 3,000 feet AGL, and are based on magnetic course.

157. Before passengers can be carried in an aircraft that has been altered in a manner that may have appreciably changed its flight characteristics, it must be flight tested by an appropriately rated pilot with at least a

1- commercial pilot certificate and an instrument rating.
2- private pilot certificate.
3- commercial pilot certificate and a mechanic's certificate.
4- commercial pilot certificate.

158. Frequent inspections should be made of the exhaust manifold heating system on aircraft so equipped to minimize the possibility of

1- a power loss due to back pressure in the exhaust system.
2- exhaust gases leaking into the cockpit.
3- a power loss due to leaking exhaust connections.
4- a cold-running engine due to the heat withdrawn by the heater.

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

1- An annual inspection may be substituted for a 100-hour inspection.
2- It is not permissible to substitute one inspection for another.
3- A 100-hour inspection may be substituted for an annual inspection.
4- An annual inspection is required even if a progressive inspection system has been approved.

160. Who is responsible for determining when maintenance is to be performed on an aircraft?

1- Pilot in command.
2- Maintenance personnel.
3- FAA certificated mechanic.
4- Owner or operator.

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

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

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

1- At the completion of each 100-hour or annual inspection of the aircraft.
2- When the engine has been overhauled or replaced.
3- When additional equipment has been installed in the aircraft.
4- Whenever repair or alteration may have changed the aircraft's flight or operating characteristics.

163. The validity of the Airworthiness Certificate is maintained by

1- performance of an annual and a 100-hour inspection prior to their expiration date.
2- applying for a new Airworthiness Certificate each year, prior to its expiration date.
3- an appropriate "return to service" statement in the aircraft maintenance records upon the completion of required inspections.
4- performance of an annual inspection.

164. After only 70 hours time in service, an annual inspection was completed on an aircraft which is operated for hire. The next 100-hour inspection will be due when the aircraft has flown an additional

1- 100 hours time in service.
2- 120 hours time in service.
3- 130 hours time in service.
4- 30 hours time in service.

165. Suppose an aircraft has 235 hours time in service when it receives a 100-hour inspection. If the inspection was 10 hours overdue, when is the next 100-hour inspection due?

1- At 345 hours time in service.
2- At 325 hours time in service.
3- At 315 hours time in service.
4- At 335 hours time in service.

166. Which of these operations is prohibited if the aircraft being used has not had a 100-hour inspection or annual inspection within the preceding 100 hours time in service?

1- Conducting any commercial operation.
2- Carrying passengers.
3- Giving flight instructions for hire.
4- Carrying property for hire.

167. What information from the aircraft's maintenance records may be discarded after the maintenance has been repeated or superseded by other maintenance?

1- The time since the last required overhaul.
2- The list of current major alterations to the aircraft.
3- The current status of applicable Airworthiness Directives.
4- The description of the maintenance performed.

168. The expiration date of an annual inspection can be determined from the date of the last inspection as entered in the

1- Repair and Alteration Form.
2- Aircraft Use and Inspection Report.
3- Airworthiness Certificate.
4- Aircraft and Engine Maintenance Records.

169. What information from the aircraft maintenance records must be retained for an indefinite period of time?

1- The description of work performed on the aircraft.
2- The signature of the person approving the aircraft for return to service after an inspection, alteration or repair.
3- The total time in service of the airframe.
4- The completion date of any work performed on the aircraft.

170. What information from the aircraft maintenance records must be transferred with the aircraft at the time it is sold?

1- The date of completion of all work which has been performed on the aircraft.
2- The current status of all applicable Airworthiness Directives.
3- The signature and certificate number of each person who has approved the aircraft for return to service after an inspection, alteration, or repair.
4- A description of all work performed on the aircraft.

171. Aircraft accident reporting rules are contained in

1- Federal Aviation Regulations, Part 61.
2- Federal Aviation Regulations, Part 91.
3- National Transportation Safety Board Regulation, Part 830.
4- Federal Aviation Regulations, Part 1.

172. Which of the following operations is governed by Federal Aviation Regulation, Part 135?

1- Operations that carry persons in air commerce for compensation or hire in small aircraft.
2- Nonstop sightseeing flights that begin and end at the same airport and do no exceed a 25-mile radius.
3- Student instruction, ferry flights, and aerial work operations such as chemical applications and pipeline patrol.
4- Air carrier operations and emergency mail service conducted under the Federal Aviation Act of 1958.

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

1- sightseeing flights within a 25-mile radius of the airport.
2- the transportation of mail conducted under a "star route" contract.
3- aerial photography or survey operations.
4- student instruction flights.

174. Part 135 of the Federal Aviation Regulations applies to which operation?

1- Aerial operations for compensation, such as aerial photography, pipeline patrol, rescue, and crop dusting.
2- Civil aircraft being ferried to a foreign country.
3- Flight instruction conducted by an FAA approved flight school.
4- Commercial operations other than air carrier in small aircraft.

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

1- 30 days.
2- 12 calendar months.
3- 24 calendar months.
4- 10 hours time in service.

176. A new maintenance record being used for a rebuilt aircraft engine must include previous

1- changes as required by Airworthiness Directives.
2- operating history of the engine.
3- operating hours of the engine.
4- annual inspections performed on the engine.

177. No person may use an ATC transponder in an airspace which requires a transponder, unless that transponder has passed an inspection within the preceding

1- 180 days.
2- 12 calendar months.
3- 24 calendar months.
4- 90 days.

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

1- It may be used when outside controlled airspace.
2- It may be used for VFR flight but not for IFR flight.
3- Its use is not permitted.
4- It may be used anywhere except in Terminal Control Areas.

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

1- When aircraft collide while in flight.
2- Damage to an aircraft's propeller while the aircraft is parked or taxiing on the surface.
3- The failure of an aircraft's generator/alternator while the aircraft is in flight.
4- An engine failure for any reason while the aircraft is in flight.

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

1- Flight control system malfunction or failure.
2- Damage to a landing gear.
3- A near midair collision.
4- An in-flight generator/alternator failure.

181. The nearest field office of the National Transportation Safety Board should be notified immediately when

1- damage limited to the wingtips of an aircraft occurs.
2- an overdue aircraft is thought to have been involved in an accident.
3- the pilot of an aircraft uses evasive action to avoid a midair collision with another aircraft.
4- damage to an aircraft's landing gear or wheels occur.

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

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

183. Part 135 regulations governing interstate air commerce apply to flights conducted

1- between locations in the same state through the airspace of another state.
2- between Mexico and the United States.
3- from one state into another state, excluding the District of Columbia.
4- only from one state into and terminating in another state.

184. To comply with regulations, which aircraft incident would require an immediate notification?

1- Engine failure for any reason during flight.
2- Any electrical fire occurring during flight.
3- Generator failure in flight which results in the loss of the electrical system.
4- Damage to the landing gear as a result of a hard landing.

185. Procedures regarding aircraft accident reports are found in

1- Federal Aviation Regulations, Part 61.
2- Federal Aviation Regulations, Part 91.
3- Federal Aviation Regulations, Part 135.
4- National Transportation Safety Board Regulation, Part 830.

186. When a runway on an airport is closed, how is it identified as being closed?

1- Red lights are placed at the approach end of the runway.
2- Yellow chevrons are painted on the runway beyond the threshold.
3- An "X" is painted on each end of the runway.
4- The letter "C" is painted in red after the runway number.

187. Which incident do Regulations require an immediate notification?

1- Damage to the landing gear as the result of a hard landing.
2- Any required flight crewmember being unable to perform flight duties because of illness.
3- Generator failure in flight which results in the loss of the electrical system.
4- Engine failure for any reason during flight.

188. Where can information be found concerning the reporting of an accident which has resulted in substantial damage to an aircraft?

1- In Federal Aviation Regulation, Part 61, and in Part I of the Airman's Information Manual.
2- In Federal Aviation Administration Compliance and Security Regulations.
3- In National Transportation Safety Board Regulation, Part 830, or the Airman's Information Manual.
4- In Federal Aviation Regulation, Part 91.

189. With regard to the operational status of a VORTAC, what is indicated if the coding identification is received approximately once every 30 seconds?

1- The VOR component is inoperative, the DME component only is operative.
2- Neither the VOR component nor the DME component is operating normally.
3- This facility uses voice identification and both VOR and DME components are operating normally.
4- The VOR component only is operative, the DME component is inoperative.

190. When landing at night on a runway equipped with in-runway lighting, the pilot sees a series of red lights in the centerline lighting, this indicates that

1- 3,000 feet of runway remain.
2- one-half of the runway remains.
3- there are no taxiway turnoffs until the end of the runway is reached.
4- 1,000 feet of runway remain.

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

1- That portion of the runway is not suitable for landing.
2- All landings and takeoffs on that runway must be made in the direction of the arrows.
3- That portion of the runway is the designated touchdown zone.
4- That runway is a precision instrument approach runway.

192. What restriction is represented by the operation of a rotating beacon during daylight hours in a control zone?

1- The tower is temporarily shut down.
2- There are unreported obstructions on the airport.
3- An ATC clearance is required for takeoffs and landings.
4- The airport is temporarily closed.

193. Operation of an airport rotating beacon during the hours of daylight would mean

1- right-hand traffic is in effect.
2- that takeoffs and landings only are authorized at the present time.
3- nothing to the pilot because these beacons operate continuously.
4- that weather in the control zone is below basic VFR weather minimums.

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

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

195. When making an approach to a runway equipped with a Visual Approach Slope Indicator (VASI), the VASI lights are observed to be red. Under these conditions, the pilot should

1- ignore these lights as they apply to IFR flights only.
2- level off momentarily to reach the glidepath.
3- continue the same rate of descent.
4- descend rapidly to reach the glidepath.

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

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

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

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

198. A pilot approaching to land an aircraft on a runway served by a Visual Approach Slope Indicator (VASI) at an airport with an operating control tower shall

1- not use the VASI unless a clearance for a VASI approach is received from the control tower.
2- use the VASI only when weather conditions are below basic VFR.
3- maintain an altitude at or above the glide slope until a lower altitude is necessary for a safe landing.
4- use the VASI only when executing an approved instrument approach procedure.

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

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

200. Airspace established as "Warning Areas" are located

1- along military low-altitude training routes.
2- in international airspace.
3- where hazardous terrain exists.
4- in the immediate vicinity of military bases.

201. Transition areas are designed for the purpose of

1- controlling all aircraft within 25 miles of an airport that lies within a control zone.
2- extending control zones laterally from 5 to 25 miles from the primary airport.
3- separating control zones from control areas.
4- containing IFR operations within controlled airspace during specific operations.

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

1- Distance information is obtained automatically when a VOR receiver is tuned to a VORTAC.
2- Distance information is the slant range distance in nautical miles.
3- Distance is the actual horizontal distance and may be in statute or nautical miles, depending on the airborne equipment.
4- Distance information is the actual horizontal distance in statute miles.

203. Regulations require that an aircraft pilot approaching to land on a runway served by a Visual Approach Slope Indicator (VASI) shall use the VASI

1- and stay at or above the glide slope until a lower altitude is necessary for a safe landing.
2- only when weather conditions are below basic VFR.
3- only when executing an approved instrument approach procedure.
4- only if a clearance for VASI approach is received from the control tower.

204. When on the proper glide slope of a standard 2-bar Visual Approach Slope Indicator (VASI) installation, the far lights should be

1- pink and the near lights should be white.
2- pink and the near lights should be pink.
3- white and the near lights should be red.
4- red and the near lights should be white.

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

1- DME operates on frequencies in the VHF spectrum.
2- Distance information received from DME is the actual horizontal distance from the station.
3- DME coded identification is transmitted once for each four times the VOR coded identification of a VORTAC is transmitted.
4- Aircraft must have TACAN equipment to obtain distance information from a VORTAC.

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

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

207. The absence of a sky condition/ceiling on an ATIS broadcast indicates a sky condition/ceiling of

1- 3,000 feet or above.
2- 4,000 feet or above.
3- 5,000 feet or above.
4- 1,000 feet or above.

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

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

209. Special authorization is required prior to conducting flights within which airspace during both VFR and IFR weather conditions?

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

210. Special authorization is not required for VFR flight within which airspace?

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

211. Special authorization is required prior to conducting VFR flights within which airspace?

1- Military Operations Areas.
2- Airport Advisory Areas.
3- Restricted Areas.
4- Alert Areas.

212. As standard operating practice, all inbound aircraft to an uncontrolled airport should continuously monitor the appropriate field facility frequency or frequency 122.9 MHz from which distance until landing?

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

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

1- traffic information and positive control of all aircraft within the Terminal Control Area (TCA).
2- traffic information and headings to fly to join the traffic pattern or to a position behind the preceding aircraft in the approach sequence.
3- traffic information and limited vectoring to VFR aircraft on a workload permitting basis.
4- separation between participating VFR aircraft and all IFR aircraft within the Terminal Radar Service Area (TRSA).

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

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

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

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

216. Radar-equipped FAA Air Traffic Control facilities can provide adequate radar assistance only to aircraft

1- identified by radar and capable of communicating with a radar facility.
2- within 50 NM of the radar site.
3- equipped for instrument flight and flown by an instrument-rated pilot.
4- equipped with at least a 64 code capability transponder.

217. When climbing or descending in VFR conditions between the surface and 12,500 feet MSL, unless otherwise advised by ATC, what transponder code should be used and how should the "ident" feature be used?

1- Code 1200, and the "ident" feature should be engaged.
2- Code 1400, and the "ident" feature should not be engaged.
3- Code 1400, and the "ident" feature should be engaged.
4- Code 1200, and "ident" feature should not be engaged.

218. What minimum aircraft equipmment is required to receive ATC radar advisory service?

1- Two-way communications radio.
2- Distance measuring equipment.
3- ATC transponder.
4- VOR or ADF receivers.

219. If Air Traffic Control instructs a pilot to "squawk VFR" when departing a Terminal Radar Service Area, under Visual Flight Rules, the pilot should

1- set transponder code to 1400, and engage "ident" feature.
2- set transponder code to 1200, but do not engage "ident" feature.
3- set transponder code to 1200, and engage "ident" feature.
4- set transponder code to 1400, but do not engage "ident" feature.

220. When a pilot accepts an ATC clearance to follow another aircraft to a landing, that pilot is responsible for maintaining

1- wake turbulence separation.
2- a minimum of 5 miles separation from all other aircraft in the traffic pattern.
3- a minimum of 2 minutes elapsed time before landing behind another aircraft.
4- a minimum of 2 miles separation from all other aircraft in the traffic pattern.

221. A cause of hypoxia other than reduced atmospheric pressure is

1- hyperventilation.
2- vertigo.
3- toxic substances in the blood.
4- high rates of descent.

222. When the hairs in the semi-circular canals of the inner ear are deflected, the pilot may experience

1- hypoxia.
2- hyperventilation.
3- discomfort or pain of the eardrum.
4- spatial disorientation or vertigo.

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

1- Tingling of the hands, legs, and feet.
2- Decreased breathing rate.
3- Increased vision acuity.
4- An increased sense of well-being.

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

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

225. Susceptibility to carbon monoxide poisoning increases as

1- altitude decreases.
2- air pressure increases.
3- humidity of the air decreases.
4- altitude increases.

226. An early symptom of carbon monoxide poisoning is

1- a dimming of one's vision.
2- an increased sense of well-being.
3- a feeling of sluggishness.
4- a ringing in the ears.

227. Breathing carbon monoxide results in

1- an increase in mental activity.
2- reduced ability to reason and make decisions.
3- increased muscular activity.
4- an increased sense of well-being.

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

1- traffic information and limited vectoring to VFR aircraft on a workload-permitting basis.
2- traffic information and positive control of all aircraft within the Terminal Control Area (TCA).
3- traffic information and headings to fly to join the traffic pattern or to a position in the approach sequence.
4- separation between participating VFR aircraft and all IFR aircraft within the Terminal Radar Service Area (TRSA).

229. The primary purpose of Aeronautical Advisory Stations (UNICOM) is to provide information to pilots pertaining to

1- Air Traffic Control.
2- takeoff and landing clearances.
3- radar assistance to VFR aircraft.
4- runway and wind conditions.

230. If prior to landing you desire to request ground transportation, the proper radio frequency to use would be one assigned to

1- Control Towers.
2- UNICOM.
3- Approach Control.
4- Flight Service Stations.

231. Large accumulations of carbon monoxide in the human body results in

1- loss of muscular power.
2- an increased sense of well-being.
3- being too warm.
4- tightness across the forehead.

232. Which statement is true regarding frequency assignments for UNICOM?

1- 122.8, 123.0, and 122.7 MHz are assigned to airports without an ATC tower or FSS.
2- 122.8 MHz is assigned to airports served by an FSS.
3- 122.95 MHz is assigned to uncontrolled airports.
4- 123.0 MHz is assigned only to airports served by a control tower.

233. When approaching a VOR which is being used for navigation on flights conducted under Visual Flight Rules, it is important to

1- pass the VOR on the right side of the radial to allow room for aircraft flying in the opposite direction on the same radial.
2- concentrate on the omni indicator and carefully make corrections so as to fly directly over the VOR.
3- exercise sustaining vigilance to avoid aircraft that may be converging on the VOR from other directions.
4- attempt to locate the VOR visually to insure that the station was actually passed when the TO-FROM indicator changed.

234. While operating in the traffic pattern of a controlled airport, pilots may adjust flight to achieve proper spacing without ATC approval by

1- executing shallow "S" turns.
2- climbing or descending at the pilot's discretion.
3- executing 180° turns with shallow banks.
4- executing 360° turns.

235. Rapid or extra deep breathing while using oxygen can cause a condition known as

1- aerosinusitis.
2- aerotitis.
3- hyperventilation.
4- hypoxia.

236. The shortage of oxygen in the human body results in which condition?

1- Aerosinusitis.
2- Aerotitis.
3- Hyperventilation.
4- Hypoxia.

237. Which physiological condition normally encountered during flight should a pilot be able to overcome through practice and experience?

1- Aerotitis.
2- Hypoxia.
3- Vertigo.
4- Aerosinusitis.

238. Which statement concerning hypoxia is true?

1- The body has a built-in alarm system to warn of the onset of hypoxia.
2- Heavy smokers may experience symptoms of hypoxia at lower altitudes than nonsmokers.
3- Closing the eyes for a short time may help to overcome the effects of hypoxia.
4- It is possible to predict exactly when and at what flight level hypoxia will occur.

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

1- An increase in altitude decreases the adverse effect of alcohol.
2- Judgment and decision-making abilities may be adversely affected by even small amounts of alcohol.
3- The human body metabolizes alcohol at a faster rate if bolstered with coffee.
4- A small amount of alcohol increases vision acuity.

240. Pilots using Air Traffic Control radar services when operating under VFR within a Stage III Terminal Radar Service Area (TRSA) are

1- expected to coordinate altitude change with ATC even if an altitude has not been assigned.
2- relieved of the responsibility to avoid flying into clouds if assigned an altitude.
3- allowed to fly just clear of clouds necessary to comply with ATC instructions.
4- required to maintain assigned vectors in all situations.

241. Which of the following symbols on a surface weather map represents a cold front?

1-


2-


3-


4-


242. In which areas is it permissible to operate an airplane under VFR, if that airplane is not equipped with a 4096 code transponder?

1- Continental Control Area.
2- Stage III Terminal Radar Service Areas (TRSAs).
3- Group II Terminal Control Areas (TCAs).
4- Group I Terminal Control Areas (TCAs).

243. By referring to surface weather maps, what can a person determine?

1- Temperature changes.
2- Current, most up-to-date weather data.
3- The ceilings at reporting stations.
4- Frontal positions.

244. The purpose of a Terminal Radar Service Area (TRSA) is to

1- adjust the flow of VFR traffic into the traffic pattern.
2- provide limited vectoring to VFR and IFR aircraft operating within this area.
3- provide Air Traffic Control separation between VFR aircraft operating within the area on a Special VFR Clearance.
4- provide Air Traffic Control separation between participating VFR aircraft and all IFR aircraft operating within this area.

245. Air Traffic Control authorization is not required prior to operating within the boundaries of a

1- Group I Terminal Control Area (TCA).
2- Group II Terminal Control Area (TCA).
3- Airport Traffic Area inside a TCA.
4- Stage III Terminal Radar Service Area (TRSA).

246. The most current information on communication and NAVAID frequencies of specific radio facilities are contained in the latest issue of the appropriate

1- Sectional Aeronautical Chart.
2- World Aeronautical Chart.
3- Low Altitude En Route Chart.
4- Terminal Area Chart.

247. The reason altimeters should be adjusted to the same altimeter setting for a specific area is

1- the elimination of a need to make in-flight calculations of true altitude.
2- to provide better vertical separation of aircraft.
3- the cancellation of altimeter error due to position of static source.
4- for more accurate terrain clearance in mountainous areas.

248. Which statement concerning hypoxia is true?

1- Tingling or warm sensations and sweating may be symptoms of hypoxia.
2- Hypoxia is caused by nitrogen bubbles in the joints and bloodstream.
3- Forcing oneself to concentrate on the flight instruments will help to overcome the effects of hypoxia.
4- It is possible to predict exactly when and at what flight level hypoxia will occur, and how it will manifest itself.

249. U.S. Low Level Significant Weather Prognostic charts are used to assist the pilot in

1- estimating the movement, development and decay of weather patterns which might occur within the following 12- and 24-hour periods.
2- determining the position of fronts and pressure systems during the preceding 6 hours.
3- determining the areas where ceilings are less than 1,000 feet and visibilities are less than 3 miles.
4- estimating the direction and speed of surface winds and the winds aloft for the following 6 hours.

250. A U.S. Low Level Significant Weather Prognostic chart provides which of the following?

1- The weather forecast to exist within a specific time in the future.
2- An analysis of weather conditions as observed by weather radar.
3- An interpretation of conditions existing in specific areas based on pilot reports.
4- A representation of weather conditions existing at the time of the observation.

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

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

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

1- Ceiling greater than 3,000 feet and/or visibility greater than 5 miles.
2- Ceiling between 5,000 and 7,000 feet and/or visibility greater than 5 miles.
3- Ceiling less than 1,000 feet and/or visibility less than 3 miles.
4- Ceiling between 1,000 feet and 3,000 feet and/or visibility between 3 and 5 miles.

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

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

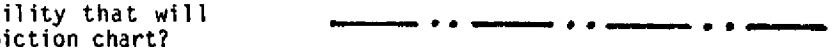
254. On a weather depiction chart, areas enclosed by a smooth solid line contain weather conditions that are classified as

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

255. Information on Surface Weather Maps that should be of greatest value to a pilot is the

1- direction and speed of surface winds and winds aloft.
2- locations of icing, turbulence, and thunderstorms.
3- pressure patterns and front locations.
4- amount, type, and height of clouds.

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



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

257. Which statement is true regarding Winds and Temperatures Aloft Forecast?

1- The temperatures showing neither + nor - should be considered + temperatures at all altitudes.
2- The windspeeds are given in miles per hour.
3- The temperatures are given in degrees Fahrenheit.
4- The wind directions are given in true directions.

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

1- Winds aloft forecasts.
2- Significant weather prognostic charts.
3- Constant pressure charts.
4- Stability charts.

259. When using a constant-pressure chart for planning a flight at 5,000 feet MSL, to which of the following should the pilot refer?

1- 500-millibar analysis chart.
2- 700-millibar analysis chart.
3- 850-millibar analysis chart.
4- 200-millibar analysis chart.

260. A pilot who wishes to determine the observed air temperature-dewpoint spread at FL180 should refer to which of the following?

1- U.S. High Level Significant Weather Prognostic chart.
2- Constant pressure analysis for 500 millibars.
3- Winds and temperature aloft forecast for 18,000 feet.
4- Stability charts for 18,000 feet.

261. To determine the freezing level and areas of probable icing aloft, you should refer to the

1- Radar Summary Chart.
2- Weather Depiction Chart.
3- Area Forecast.
4- Surface Analysis.

262. A U.S. Low Level Significant Weather Prognostic chart shows weather conditions

1- that exist at the time the chart was prepared.
2- for the past 12 to 24 hours.
3- as they are forecast to be 48 hours from the time the chart was prepared.
4- as they are forecast to be at the valid time of the chart.

263. A visibility entry does not appear in a Terminal Forecast when the visibility is expected to

1- be less than minimum for IFR operations.
2- meet the minimum required for VFR operations.
3- be unlimited.
4- be more than 6 miles.

264. What valuable information, as of map time, is provided by a Radar Summary Chart?

1- The intensity and intensity trend of precipitation.
2- The location of VFR and IFR weather.
3- The location of major fronts.
4- The observed winds aloft.

265. Radar Weather Reports are of special interest to pilots because they report

1- large areas of low ceilings and fog.
2- location of precipitation along with type, intensity, and trend.
3- location of broken to overcast clouds.
4- icing conditions.

266. Which statement is true concerning this Radar Weather Report for TUL?

TUL 1130 SPL LN 10TRWX/NC 196/100 220/200 310/240 345/80 C3140 MT 49 AT 290/40 015.

1- The most intense cell is located 15 NM West-Northwest of the station.
2- Thunderstorm cells are moving from 310° at 40 knots.
3- There are four cells with tops at 10,000, 20,000, 24,000 and 8,000 feet.
4- The visibility is 10 miles in rain-showers.

267. Consider this Terminal Forecast excerpt:

OKC 120940
OKC 121010 C4 OVC 1L-F URBL 4 SCT C10 OVC 6H. 04Z VFR..
TUL 121010 C15 OVC. 15Z C12 OVC VRBL C5 OVC 1L-F. 04Z LIFR CIG 4F..

Select the true statement with respect to this excerpt.

1- The surface wind at both OKC and TUL is expected to be less than 10 knots during the first 12 hours of the forecast.
2- The valid period of this forecast is 12 hours.
3- The visibility at OKC after 04Z is expected to be 3 to 5 miles.
4- The categorical outlook for TUL implies that the wind is expected to be greater than 25 knots.

268. Terminal Forecasts are issued how many times a day and cover what period of time?

1- Three times daily and are valid for 24 hours with a 6-hour categorical outlook.
2- Four times daily and are valid for 8 hours with a 4-hour categorical outlook.
3- Six times daily and are valid for 12 hours with an additional 6-hour categorical outlook.
4- Two times daily and are valid for 24 hours with an additional 4-hour categorical outlook.

269. Which situation would most likely result in freezing precipitation?

1- Rain falling from air which has a temperature of 32° F. or less into air having a temperature of more than 32° F.
2- Rain falling from air which has a temperature of 0° C. or less into air having a temperature of 0° C. or more.
3- Rain which has a super-cooled temperature of 0° C. or less falling into air having a temperature of more than 0° C.
4- Rain falling from air which has a temperature of more than 32° F. into air having a temperature of 32° F. or less.

270. Select the true statement pertaining to Terminal Forecasts.

1- A forecast of prevailing visibility appears only if it is expected to be 3 miles or less.
2- Terminal Forecasts include specific information concerning cloud tops, icing, and turbulence.
3- If the speed of the surface wind is forecast to be less than 10 knots, the entire wind group is omitted.
4- Terminal Forecasts do not include surface wind forecast.

271. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

1- unstable air containing an excess of condensation nuclei.
2- unstable, moist air.
3- either stable or unstable air.
4- stable, moist air.

272. When conditionally unstable air with a high moisture content and a very warm surface temperature are forecast, what type of weather can be expected?

1- Strong updrafts and cumulonimbus clouds.
2- Smooth, cloudless skies.
3- Continuous heavy precipitation.
4- Fog and low stratus clouds.

273. Which condition is most likely to exist within a stable air mass?

1- Good visibility at the surface.
2- Moderate to severe turbulence in low levels.
3- Smoke, dust, haze, etc. concentrated in lower levels with resulting poor visibility.
4- Towering cumulus and cumulonimbus clouds.

274. To best determine weather conditions between weather reporting stations, the pilot should refer to

1- Pilot Reports.
2- Prognostic Charts.
3- Weather Maps.
4- Area Forecasts.

UA/OV OKC-AMA1530 FL080/TP C310/SK 085 BKN-OVC/RM LRG TSTM 95M OKC 15 WIDE

UA/OV AMA-GAG 1640 FL055/TP BE35/SK 070 BKN/RM LRG TSTM SE GAG.

UA/OV OKC-PNC 1645 FL075/TP BE58/SK 080 SCT-BKN/TP SUR TUR3C SHORT DUR 3L/LRG TSTM WOKC

275. One of the above reports indicates that a pilot reported

1- buildups to 3,500 feet east of OKC.
2- tops of the broken-overcast clouds at AMA are 8,500 feet.
3- a large thunderstorm is located 95 miles west of OKC.
4- a ceiling of 3,100 feet between OKC-AMA.

276. According to the above reports, a pilot reported

1- clear weather 95 miles west of OKC.
2- large thunderstorms between GAG and OKC.
3- a line of showers 15 miles wide located 95 miles west of OKC.
4- severe turbulence for short duration from OKC to PNC.

277. In an aviation weather report, which symbol designates a ceiling when used in connection with a cloud height?

1- -BKN
2- -X
3- M, E, W.
4- -OVC

278. Consider the following aviation weather report.

OKC-XM6 OVC 1 1/2 R-F 990/68/67/2908/ 990/RF2 R814

What does the item RF2 mean?

1- The horizontal visibility is 2 miles with rain and fog.
2- The vertical visibility is 200 feet in rain and fog.
3- The runway visibility range is 2,000 feet.
4- Two-tenths of the sky is obscured by rain and fog.

279. Suppose the remarks section of the hourly aviation weather report contains the following coded information.

RADAT 92050

What is the meaning of this information?

1- A pilot reported thunderstorms 92 DME miles distance on the 050 radial of the VORTAC.
2- Relative humidity was 92% and the freezing level (0° C.) was at 5,000 feet MSL.
3- Radar echoes with tops at 5,000 feet were observed on the 092 radial of the VORTAC.
4- Radar echoes were observed at a distance of 92 miles on a bearing of 050°.

280. Consider the following aviation weather report:

OKC SP W5X 1/2 R+F 180/63/61/2204/000/ RF3 R819 TWR VSBY 1/4

Which of the following is true regarding OKC weather?

1- At the time of the report rain had been occurring for 41 minutes.
2- The wind is calm.
3- Runway visibility is 1/4 mile.
4- Runway is flooded with 3 inches of water.

281. Transcribed weather broadcasts (TWEB) can be monitored by tuning the appropriate radio communications receiver to which frequencies?

1- VOR and NDB frequencies.
2- Airport communications frequencies.
3- FSS communications frequencies.
4- NDB frequencies only.

282. If a strong temperature inversion is encountered immediately after takeoff or during an approach to a landing, a potential hazard exists because of turbulence created by

1- strong surface winds.
2- strong convective winds.
3- cold air overriding calm, warm air.
4- wind shear.

283. Suppose an airport has an elevation of 4,000 feet. Assuming standard temperature and dewpoint lapse rates, if the temperature at this airport is 80° F. and the surface dewpoint temperature is 62° F., the base of the clouds formed by a lifting process would be located approximately

1- 6,000 feet MSL.
2- 8,000 feet MSL.
3- 10,000 feet MSL.
4- 4,000 feet MSL.

284. Suppose an airport has an elevation of 2,000 feet. Assuming standard temperature and dewpoint lapse rates, if the temperature at that airport is 92° F. and the surface dewpoint temperature is 72° F., the base of the clouds formed by a lifting process would be located at approximately

1- 4,500 feet MSL.
2- 5,500 feet MSL.
3- 6,500 feet MSL.
4- 3,500 feet MSL.

285. Suppose an airport has an elevation of 1,000 feet. Assuming standard temperature and dewpoint lapse rates, if the temperature at this airport is 70° F. and the dewpoint temperature is 52° F., the base of the clouds formed by a lifting process would be located at approximately

1- 5,000 feet MSL.
2- 6,000 feet MSL.
3- 7,000 feet MSL.
4- 4,000 feet MSL.

286. Surface wind direction is given relative to

1- magnetic north in written weather reports and forecasts.
2- true north in scheduled weather broadcasts for all stations except the broadcasting station.
3- true north when received from FSS Airport Advisories or from control tower instruction for takeoff and landing.
4- magnetic north, regardless of the means used to disseminate wind information.

287. Suppose an airport is at sea level. Assuming standard temperature and dewpoint lapse rates, if the temperature at this airport is 92° F. and the surface dewpoint temperature is 72° F., the base of the clouds formed by a lifting process would be located at approximately

1- 3,500 feet MSL.
2- 4,500 feet MSL.
3- 5,500 feet MSL.
4- 2,500 feet MSL.

288. Individual forecast for specific routes of flight can be obtained from which of the following weather services?

1- Area Forecasts.
2- In-flight Advisories.
3- Transcribed Weather Broadcasts (TWEB).
4- Terminal Forecasts.

289. Which statement is true regarding a cold front occlusion?

1- The air ahead of the warm front has the same temperature as the air behind the overtaking cold front.
2- The air between the warm front and cold front is colder than either the air ahead of the warm front or the air behind the overtaking cold front.
3- The air ahead of the warm front is colder than the air behind the overtaking cold front.
4- The air ahead of the warm front is warmer than the air behind the overtaking cold front.

290. Radiation fog is most likely to occur with which of the following conditions?

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 over a cold surface with an 8- to 10-knot wind causing mixing and condensation.
4- High humidity during the early evening, cool cloudless night with light winds, and favorable topography.

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

1- long-lasting heavy precipitation.
2- fog and drizzle.
3- smooth air.
4- showers and thunderstorms.

292. What causes radiation fog to form?

1- Moist, unstable air being cooled as it is forced up a sloping land surface.
2- The addition of moisture to a mass of cold air as it moves over a body of water.
3- The ground cooling the adjacent air to the dewpoint temperature during conditions of little or no wind, and clear skies.
4- Moist air being warmed by the ground over which it passes.

293. Which of the following is the cause of advection fog?

1- Saturation of cool air as the precipitation falling through it is evaporated.
2- Warm moist air moving over colder ground or water.
3- Moist stable air being cooled adiabatically as it flows up sloping terrain.
4- Terrestrial radiation cooling the ground which in turn cools the air in contact with it.

294. When the air temperature is within 4° of the dewpoint temperature and the spread is decreasing, it is likely that you would encounter

1- fog and low clouds.
2- icing conditions or freezing rain.
3- thundershowers or thunderstorms.
4- clear cool weather.

295. Which of the following types of clouds would indicate areas of convective turbulence?

1- Towering cumulus clouds.
2- Cirrus clouds.
3- Standing lenticular altocumulus clouds.
4- Nimbostratus clouds.

296. Which statement is true regarding air temperature and dewpoint temperature spread?

1- The temperature spread decreases as the relative humidity decreases.
2- The temperature spread increases as the relative humidity increases.
3- Temperature and dewpoint spread are not related to relative humidity.
4- The temperature spread decreases as the relative humidity increases.

297. In the Northern Hemisphere, which of the following is a true statement with regard to the flow of air within a low-pressure system?

1- Air flows inward, downward, and clockwise.
2- Air flows outward, upward, and clockwise.
3- Air flows outward, downward, and counterclockwise.
4- Air flows inward, upward, and counterclockwise.

298. In the Northern Hemisphere, what causes the wind to be deflected to the right?

1- Centrifugal force.
2- Coriolis force.
3- Surface friction.
4- The pressure gradient force.

299. Which statement is true regarding high- or low-pressure systems?

1- A high-pressure area or ridge is an area of rising air.
2- A low-pressure area or trough is an area of descending air.
3- Both high- and low-pressure areas are characterized by descending air.
4- A high-pressure area or ridge is an area of descending air.

300. If the air temperature is 22° C. at an elevation of 3,500 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 9,786 feet MSL.
2- 11,000 feet MSL.
3- 14,500 feet MSL.
4- 6,286 feet MSL.

301. At about what average rate do temperature lapse rates converge in a convective current with unsaturated air?

1- 2.0° C. per 1,000 feet.
2- 2.5° C. per 1,000 feet.
3- 3.0° C. per 1,000 feet.
4- 5/9° C. per 1,000 feet.

302. If the air temperature is 10° C. at an elevation of 2,000 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 4,857 feet MSL.
2- 5,000 feet MSL.
3- 7,000 feet MSL.
4- 2,857 feet MSL.

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

1- fast moving warm front.
2- slow moving cold front that is underrunning warm, moist, and stable air.
3- squall lines.
4- slow-moving warm front.

304. What are the standard atmosphere temperature and pressure values for sea level?

1- 15° C. and 29.92 inches of mercury.
2- 59° C. and 760.0 millibars.
3- 0° F. and 29.92 millibars.
4- 0° C. and 1013.2 inches of mercury.

305. Which of the following is considered to be the most hazardous condition associated with thunderstorms?

1- Lightning.
2- Static electricity.
3- Wind shear and turbulence.
4- St. Elmo's Fire.

306. The factor which determines whether the type of cloudiness associated with a front will be predominantly stratiform or cumuliform is the

1- pressure of the air behind the front.
2- degree of stability of the air being lifted.
3- relative humidity of the air behind the front.
4- dewpoint of the air being lifted.

307. Which statement is true relating to the blue and magenta colors used to depict airports on Sectional Aeronautical Charts?

1- Airports having air-to-ground communications are shown in blue; airports with no means of communication are shown in magenta.
2- Airports having runways capable of handling large aircraft are shown in blue; all others in magenta.
3- Airports having Airport Traffic Areas are shown in blue; all others in magenta.
4- Airports having concrete runways are shown in blue; all others in magenta.

308. When turbulence causes changes in altitude and/or attitude but aircraft control remains positive, that turbulence should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

309. When unsecured objects are tossed about the cockpit or cabin due to turbulence, that turbulence should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

310. Turbulence that causes a pilot to feel a slight strain against the seatbelt or shoulder straps should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

311. Turbulence that causes a pilot to feel definite strains against the seatbelt or shoulder straps should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

312. To take advantage of favorable winds on an extended flight from west to east in the Northern Hemisphere, a pilot should plan the course so as to fly

1- north of both low- and high-pressure areas.
2- south of low-pressure areas and north of high-pressure areas.
3- south of both low- and high-pressure areas.
4- north of low-pressure areas and south of high-pressure areas.

313. To take advantage of favorable winds on an extended flight from east to west in the Northern Hemisphere, a pilot should plan the course so as to fly

1- south of low-pressure areas and north of high-pressure areas.
2- south of both low- and high-pressure areas.
3- north of both low- and high-pressure areas.
4- north of the low-pressure areas and south of high-pressure areas.

314. Which statement is true with regard to the general circulation of air associated with a high-pressure area in the Northern Hemisphere?

1- Air flows outward, downward, and clockwise.
2- Air flows inward, downward, and counterclockwise.
3- Air flows inward, upward and clockwise.
4- Air flows outward, upward, and counterclockwise.

315. If an aircraft travels 4 nautical miles in 1 minute, what is the groundspeed?

1- 220 knots.
2- 230 knots.
3- 240 knots.
4- 210 knots.

316. If an aircraft travels 5 nautical miles in 2 minutes, what is the groundspeed?

1- 90 knots.
2- 150 knots.
3- 180 knots.
4- 80 knots.

317. How far will an aircraft travel in 3-1/2 minutes if its groundspeed is 165 knots?

1- 9.6 NM.
2- 12.8 NM.
3- 28.2 NM.
4- 1.3 NM.

318. Five statute miles is equal to how many nautical miles?

1- 8.75 NM.
2- 5.75 NM.
3- 4.35 NM.
4- 11.25 NM.

319. One nautical mile is equal to how many statute miles?

1- 1.15 SM.
2- 1.75 SM.
3- 2.15 SM.
4- 0.87 SM.

320. How many nautical miles are equivalent to 375 statute miles?

1- 350 NM.
2- 400 NM.
3- 432 NM.
4- 325 NM.

321. When determining the true course in an easterly or westerly direction on a Sectional Aeronautical Chart, the course measurement should be taken at a meridian near the midpoint of the course because

1- the isogonic lines are not parallel.
2- the lines of latitude are drawn in an arc.
3- the angular measurement changes between points due to convergence of the lines of longitude.
4- the magnetic North Pole from which direction is measured, is not located at the geographic North Pole.

322. To determine the horizontal limits and the base of control areas within the boundaries of the U.S.A., pilots should refer to

1- a World Aeronautical Chart.
2- an En Route Low Altitude Chart.
3- an En Route High Altitude Chart.
4- a Sectional Aeronautical Chart.

323. How is a Control Zone depicted on Sectional Aeronautical Charts?

1- A blue dashed line encircling the airport.
2- The letters CT in the airport data box.
3- A magenta colored band surrounding the airport.
4- A blue airport symbol.

324. Which of the following statements is true in regard to the application of magnetic variation in solving navigation problems?

1- To convert from true course to magnetic heading, add easterly variation to the true course.
2- To convert from true course to magnetic course, subtract westerly variation from the true course.
3- To convert from magnetic course to magnetic heading, subtract westerly variation from the magnetic course.
4- To convert from true course to magnetic course, subtract easterly variation from the true course.

325. Consider the following:

Forecast wind . . . . . 310°/15 knots.
Pressure altitude . . . 8,000 feet.
Ambient temperature . . +05° C.
Indicated airspeed . . 210 knots.
Variation . . . . . 8° W.
True course . . . . . 198°

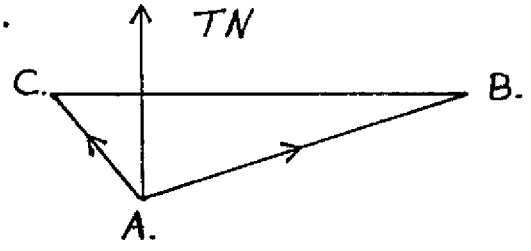
With these conditions, what would be the approximate magnetic heading and groundspeed?

1- 210° and 245 knots.
2- 186° and 215 knots.
3- 194° and 199 knots.
4- 200° and 235 knots.

326. If an aircraft travels 3 nautical miles in 45 seconds, what is the groundspeed?

1- 200 knots.
2- 225 knots.
3- 240 knots.
4- 400 knots.

327.



If the illustration above is used to explain the wind triangle, it would be true to state that

1- line A-B represents true course and groundspeed, and line C-B represents true heading and true airspeed.
2- line A-B represents magnetic heading and true airspeed, and line C-B represents magnetic course and indicated airspeed.
3- line A-B represents magnetic course and indicated airspeed, and line C-B represents true course and groundspeed.
4- line A-B represents true heading and true airspeed, and line C-B represents true course and groundspeed.

328. Consider the following:

Forecast wind . . . . . 210°/26 knots.
Pressure altitude . . . 11,000 feet.
Ambient temperature . . -10° C.
Indicated airspeed . . 140 knots.
Variation . . . . . 10° east.
True course . . . . . 150°

With these conditions, what would be the approximate magnetic heading and groundspeed?

1- 158° and 164 knots.
2- 132° and 178 knots.
3- 168° and 135 knots.
4- 148° and 149 knots.

329. If an aircraft travels 1 nautical mile in 53 seconds, what is the groundspeed?

1- 68 knots.
2- 113 knots.
3- 175 knots.
4- 26.5 knots.

330. If an aircraft travels 2 nautical miles in 50 seconds, what is the groundspeed?

1- 144 knots.
2- 163 knots.
3- 240 knots.
4- 125 knots.

331. If an aircraft travels 1 nautical mile in 40 seconds, what is the groundspeed?

1- 150 knots.
2- 160 knots.
3- 240 knots.
4- 90 knots.

332. Suppose at an altitude of 8,000 feet MSL the temperature is +10° C. If the calibrated airspeed is 155 knots, the true airspeed would be approximately

1- 140 knots.
2- 159 knots.
3- 178 knots.
4- 135 knots.

333. Suppose at an altitude of 9,500 feet MSL the temperature is -20° C. If the calibrated airspeed is 170 knots, the true airspeed would be approximately

1- 152 knots.
2- 190 knots.
3- 205 knots.
4- 141 knots.

334. Given:

Usable fuel at takeoff . . . . 36 gallons
Fuel consumption rate . . . . 12.4 GPH
Constant groundspeed of . . . 140 knots
Flight time since takeoff . . 48 minutes

Based on the above information, how much further can be flown on the fuel remaining?

1- 180 nautical miles.
2- 294 nautical miles.
3- 383 nautical miles.
4- 153 nautical miles.

335. Given:

Usable fuel at takeoff . . . . 40 gallons
Fuel consumption rate . . . . 13.3 GPH
Constant groundspeed of . . . 120 knots
Flight time since takeoff . . 1 hour and 20 min.

Based on the above information how much further can be flown on the fuel remaining?

1- 180 nautical miles.
2- 200 nautical miles.
3- 240 nautical miles.
4- 160 nautical miles.

336. On a cross-country flight, suppose Point A is crossed at 1500 hrs. and the plan is to reach Point B at 1530 hrs. Use the following information to determine the indicated airspeed required to reach Point B on schedule.

Distance between A & B . . 70 NM.
Forecast wind . . . . . 310°/15 knots.
Pressure altitude . . . . 8,000 feet.
Ambient temperature . . . -10° C.
True course . . . . . 270°

The required indicated airspeed would be approximately

1- 137 knots.
2- 152 knots.
3- 168 knots.
4- 126 knots.

337. Consider the conditions listed below:

Departure path . . . . . straight out.
Takeoff time . . . . . 1030 DST.
Winds during climb . . . . 180°/30 knots.
True course during climb . 160°
Airport elevation . . . . 1,500 feet.
True airspeed . . . . . 125 knots.
Rate of climb . . . . . 500 ft/min.

What would be the distance and time upon reaching 8,500 feet MSL?

1- 23 nautical miles and 1044 DST.
2- 25 nautical miles and 1047 DST.
3- 30 nautical miles and 1044 DST.
4- 20 nautical miles and 1047 DST.

338. On a cross-country flight, suppose Point C is crossed at 0900 hrs. and the plan is to reach Point D at 0925 hrs. Use the following information to determine the indicated airspeed required to reach Point D on schedule.

Distance between C & D . . 68 NM.
Forecast wind . . . . . 295°/25 knots.
Pressure altitude . . . . 7,000 feet.
Ambient temperature . . . +10° C.
True course . . . . . 175°

The required indicated airspeed would be approximately

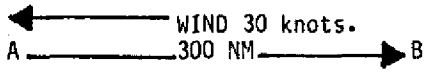
1- 144 knots.
2- 166 knots.
3- 172 knots.
4- 135 knots.

339. Assume a pilot plans to descend from 9,500 feet MSL so as to arrive at 2,500 feet MSL over a VORTAC. With a groundspeed of 175 MPH and a rate of descent of 700 feet per minute, at what distance from the VORTAC should the descent be started?

1- 29.2 statute miles.
2- 24.0 statute miles.
3- 17.5 statute miles.
4- 39.4 statute miles.

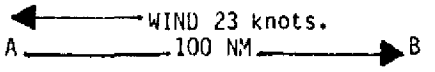
340. Assume it is planned to descend from 11,500 feet MSL so as to arrive at 7,000 feet MSL 5 statute miles from a VORTAC. With a groundspeed of 160 MPH and a rate of descent of 600 feet per minute, at what distance from the VORTAC should the descent be started?

1- 20 statute miles.
2- 25 statute miles.
3- 29 statute miles.
4- 18 statute miles.

341. 

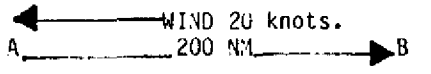
Suppose a nonstop round-trip flight from A to B is planned. If the true airspeed is 160 knots and the rate of fuel consumption is 13 GPH, how much fuel is required?

1- 30.5 gallons.
2- 51.5 gallons.
3- 60 gallons.
4- 20.5 gallons.

342. 

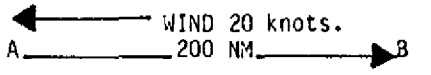
Suppose a nonstop round-trip flight from A to B is planned. If the true airspeed is 127 knots and the rate of fuel consumption is 9.7 GPH, how much fuel is required?

1- 15.9 gallons.
2- 13.4 gallons.
3- 9.4 gallons.
4- 18.3 gallons.

343. 

Suppose a nonstop round-trip flight is made between A and B. If the true airspeed is 100 knots, what is the average groundspeed for the entire flight?

1- 100 knots.
2- 104 knots.
3- 110 knots.
4- 96 knots.

344. 

Suppose a nonstop round-trip flight is made between A and B. If the true airspeed is 100 knots, what is the total time for the flight?

1- 4 hours.
2- 4 hours 10 minutes.
3- 4 hours 20 minutes.
4- 3 hours 50 minutes.

345. Suppose at an altitude of 6,000 feet MSL, the temperature is +5° C. If the calibrated airspeed is 210 knots, the true airspeed would be approximately

1- 230 knots.
2- 210 knots.
3- 196 knots.
4- 192 knots.

346. Suppose at an altitude of 13,000 feet MSL, the temperature is -15° C. If the calibrated airspeed is 174 knots, the true airspeed would be approximately

1- 170 knots.
2- 144 knots.
3- 136 knots.
4- 210 knots.

347. Suppose after 450 miles are flown from the departure point, the aircraft's position is 36 miles off course. If 150 miles remain to be flown, what <u>total</u> correction should be made to converge on the destination?

1- 18.1°
2- 6.0°
3- 43.2°
4- 40.1°

348. Suppose after 185 miles are flown from the departure point, the aircraft's position is 5 miles off course. If 75 miles remain to be flown, what <u>total</u> correction should be made to converge on the destination?

1- 3.8°
2- 5.3°
3- 34°
4- 15°

349. Assume a true heading of 052° results in a groundtrack of 056°, and a true airspeed of 145 knots results in a groundspeed of 168 knots. From this information, what is the approximate wind direction and wind speed?

1- 204° and 29 knots.
2- 258° and 25 knots.
3- 038° and 30 knots.
4- 079° and 23 knots.

350. Assume a true heading of 075° results in a ground track of 087°, and a true airspeed of 140 knots results in a groundspeed of 141 knots. From this information what is the approximate wind speed and wind direction?

1- 25 knots and 162°
2- 30 knots and 183°
3- 29 knots and 349°
4- 26 knots and 003°

351. Assume you plan to begin a descent from 8,500 feet MSL when 20 nautical miles from destination airport. If the groundspeed is 150 knots and you desire to be at 4,500 feet MSL when over the airport, the rate of descent should be

1- 500 feet per minute.
2- 600 feet per minute.
3- 700 feet per minute.
4- 400 feet per minute.

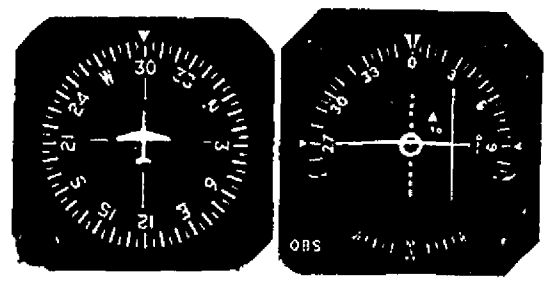
352. Assume a true heading of 118° results in a ground track of 122° and a true airspeed of 160 knots results in a groundspeed of 154 knots. From this information, the wind is from approximately

1- 73° at 12 knots.
2- 178° at 15 knots.
3- 63° at 15 knots.
4- 60° at 12 knots.

353. Assume you plan to descend from 10,000 feet MSL so as to arrive at 4,000 feet MSL 5 nautical miles from a VORTAC. With a groundspeed of 140 knots and a rate of descent of 900 feet per minute, at what distance from the VORTAC should the descent be started?

1- 10.5 nautical miles.
2- 20.5 nautical miles.
3- 3.9 nautical miles.
4- 6.6 nautical miles.

354.



If an aircraft had the instrument indications as shown above, then makes a 180° turn to the left and continues straight ahead, it will intercept the

1- 180 radial.
2- 270 radial.
3- 360 radial.
4- 090 radial.

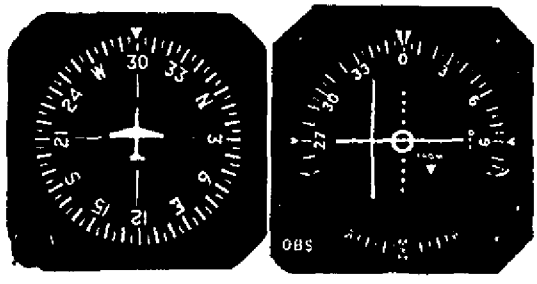
355. Suppose after 200 miles are flown from the departure point the aircraft's position is 9 miles off course. If 250 miles remain to be flown, what <u>total</u> correction should be made to converge on the destination?

1- 2.9°
2- 28.1°
3- 4.7°
4- 44.4°

356. Assume you plan to descend from 7,500 feet MSL so as to arrive at 1,000 feet MSL 6 nautical miles from a VORTAC. With a groundspeed of 156 knots and a rate of descent of 800 feet per minute, at what distance from the VORTAC should the descent be started?

1- 15 nautical miles.
2- 27 nautical miles.
3- 30.2 nautical miles.
4- 11.7 nautical miles.

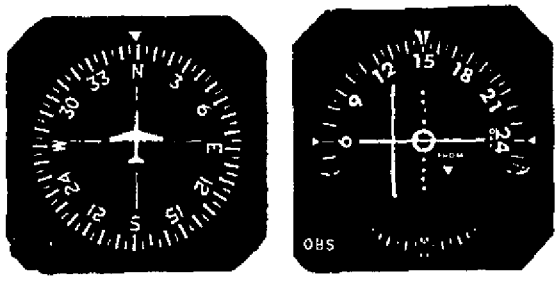
357.



Refer to the illustration above. What is the location of the aircraft in relation to the VORTAC?

1- Northeastly.
2- Southwestly.
3- Southeastly.
4- Northwestly.

358.



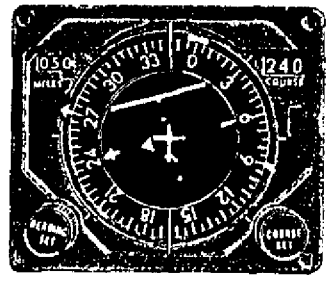
Refer to the illustration above. What is the location of the aircraft in relation to the VORTAC?

1- North-Northwestly.
2- South-Southeastly.
3- South-Southwestly.
4- North-Northeastly.

359. Suppose after 240 miles are flown from the departure point, the aircraft's position is 8 miles off course. If 75 miles remain to be flown, what total correction should be made to converge on the destination?

1- 23.3°
2- 6.0°
3- 44.7°
4- 8.1°

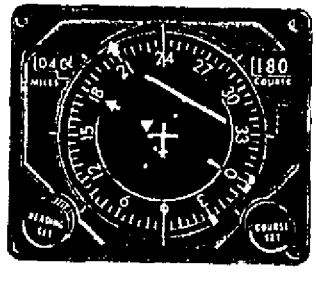
360.



Refer to the illustration above. If the present heading is maintained, what radial will the aircraft intercept at a 75° angle outbound?

1- 090 radial.
2- 240 radial.
3- 270 radial.
4- 060 radial.

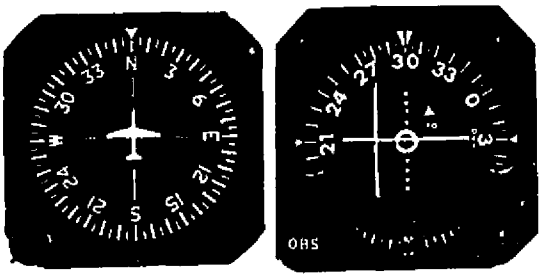
361.



Refer to the above illustration. If the heading is maintained, what radial will the aircraft intercept at a 60° angle inbound?

1- 180 radial.
2- 300 radial.
3- 360 radial.
4- 120 radial.

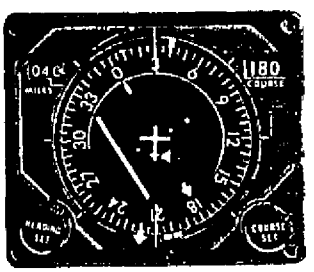
362.



If an aircraft had the instrument indications shown above, then makes a 180° turn and continues straight ahead, it will intercept which of the following radials?

1- 225 radial.
2- 315 radial.
3- 015 radial.
4- 135 radial.

363.



Refer to the illustration above. To intercept the 360 radial at a 60° angle inbound the aircraft should be turned

1- 90° left.
2- 90° right.
3- 150° left.
4- 30° right.

364. Suppose the ADF of an aircraft in flight is tuned to a Non-Directional Radiobeacon and the wing-tip bearing changes from 310° to 320° in 7 minutes elapsed time. Based on this information, the time en route to that station would be approximately

1- 8.5 minutes.
2- 1 hour and 25 minutes.
3- 42 minutes.
4- 7 minutes.

365. When a VOR test facility (VOT) is used to check the accuracy of a VOR receiver, the Course Deviation Indicator should be centered with the omnibearing and the TO-FROM indicator reading

1- 0° FROM or 180° TO, regardless of your position from the VOT.
2- 0° TO only if you are due south of the VOT.
3- 0° TO or 180° FROM, regardless of your position from the VOT.
4- 180° FROM only if you are due north of the VOT.

366. While maintaining a magnetic heading of 310° and a true airspeed of 165 knots, you cross the 040 radial of a VOR at 1710 and the 030 radial at 1719. The time and distance to this station are

1- 1 hour and 165 nautical miles.
2- 54 minutes and 148.5 nautical miles.
3- 42 minutes and 115 nautical miles.
4- 1 hour and 6 minutes and 183.3 nautical miles.

367. While maintaining a magnetic heading of 270° and a true airspeed of 175 knots, you cross the 180 radial of a VOR at 1010 and the 190 radial at 1016. What is the time and distance to this station?

1- 36 minutes and 105 nautical miles.
2- 1 hour and 175 nautical miles.
3- 42 minutes and 122 nautical miles.
4- 1 hr and 4 minutes and 291.6 nautical miles.

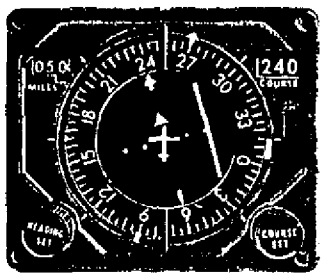
368. While maintaining a magnetic heading of 360° and a true airspeed of 130 knots, you cross the 090 radial of a VOR at 0900 and the 080 radial at 0908. What is the time and distance to this station?

1- 40 minutes and 91 nautical miles.
2- 42 minutes and 96 nautical miles.
3- 48 minutes and 104 nautical miles.
4- 38 minutes and 82 nautical miles.

369. While maintaining a magnetic heading of 180° and a true airspeed of 130 knots, the 270 radial of a VOR is crossed at 1237 and the 260 radial at 1242. The time and distance to this station are

1- 42 minutes and 91 nautical miles.
2- 44 minutes and 96 nautical miles.
3- 42 minutes and 104 nautical miles.
4- 30 minutes and 65 nautical miles.

370.



Which statement is true regarding the illustration above if the aircraft maintains the heading depicted?

1- The magnetic bearing to the station is 240°.
2- The aircraft will intercept the 060 radial at a 15° angle.
3- The aircraft is on a magnetic bearing of 060°.
4- The aircraft is on a magnetic heading of 240°.

371. For a given airfoil the angle of attack which results in a stall

1- is dependent on the load factor.
2- varies with the speed of airflow around the airfoil.
3- varies directly with the degree of bank.
4- remains constant regardless of bank, load factor, or airspeed.

372. The lift produced by an airfoil is the force produced

1- opposite to the relative wind.
2- parallel to the relative wind.
3- perpendicular to the relative wind.
4- halfway between the chord line and the relative wind.

373. The point on an airfoil through which the force known as lift is concentrated is called the

1- center of rotation.
2- center of pressure.
3- midpoint of the chord.
4- center of gravity.

374. Aerodynamically, propeller thrust is the result of

1- deflective forces on the curved side of the blade.
2- shape and angle of attack of the blade.
3- decreased pressure on the flat side of the blade and increased pressure on the curved side.
4- angle of incidence of the blade.

375. Aspect ratio of a wing is defined as the ratio of the

1- square of the chord to the wingspan.
2- wingspan to the mean aerodynamic chord.
3- wingspan to the main compression rib.
4- wingspan to the wing root.

376. What is the primary function of the rudder, while entering a turn from straight-and-level flight?

1- Overcome yaw caused by the raised aileron on the higher wing.
2- Overcome the yaw caused by the lowered aileron on the higher wing.
3- Overcome the yaw caused by the lowered aileron on the lower wing.
4- To turn the aircraft.

377. Suppose the ADF of an aircraft in flight is tuned to a Non-Directional Radiobeacon and the wing-tip bearing changes from 130° to 140° in 3 minutes elapsed time. Based on this information, the time en route to that station would be approximately

1- 18 minutes.
2- 20 minutes.
3- 30 minutes.
4- 9 minutes.

378. Name the four flight fundamentals involved in maneuvering an aircraft?

1- Straight-and-level flight, turns, climbs, and descents.
2- Takeoffs, slow flight, fast flight, and stalls.
3- Starting, taxiing, takeoff, and landing.
4- Aircraft power, pitch, bank, and trim.

379. When entering a turn, the primary function of the rudder is to

1- cause the aircraft to turn.
2- prevent the aircraft from rolling about the longitudinal axis.
3- allow the aircraft to pitch about its lateral axis.
4- control yawing about the vertical axis.

380. If the airspeed of an airplane is doubled while the angle of attack remains the same, the drag will

1- double.
2- decrease as airspeed increases.
3- be four times greater.
4- remain the same.

381. Which statement generally describes the relationship of the forces acting on an airplane that is climbing at a constant airspeed and at constant power?

1- Thrust is equal to drag and lift is greater than weight.
2- Thrust is equal to drag, and lift is equal to weight.
3- Thrust is greater than drag, and lift is equal to weight.
4- Thrust is greater than drag and lift is greater than weight.

382. The acute angle between the wing chord line and the direction of the relative wind is known as the

1- dihedral angle.
2- stalling angle.
3- angle of attack.
4- angle of incidence.

383. When the angle of attack of the wing is increased, the center of pressure of that airfoil will

1- move forward.
2- move erratically aft and forward.
3- remain unaffected.
4- move aft.

384. Assume an airplane is cruising at 100 MPH and is creating 1,000 pounds of drag. If the angle of attack remains the same but the airspeed is doubled, the total drag would increase to

1- 3,000 pounds.
2- 4,000 pounds.
3- 5,000 pounds.
4- 2,000 pounds.

385. The reason a light airplane tends to nose down during power reductions is that the

1- force of drag acts horizontally and above the thrust line.
2- center of pressure is located forward of the center of gravity.
3- center of gravity is located forward of the center of pressure.
4- thrust line acts horizontally and above the force of drag.

386. At a constant power setting, the rate of climb of an airplane is greater when the wings are level than when in a climbing turn because when level the

1- wing loading is greater.
2- relative airspeed is greater.
3- center of lift is nearer the trailing edge of the wing.
4- vertical lift component is greater.

387. The angle between the chord line of the wing and the longitudinal axis of the airplane is known as the angle of

1- relative wind.
2- incidence.
3- dihedral.
4- attack.

388. The angle between the chord line of an airfoil and the relative wind is known as the angle of

1- lift.
2- incidence.
3- longitudinal dihedral.
4- attack.

389. What is the rotation of an airplane about its longitudinal axis called and how is it controlled?

1- Yawing, and it is controlled with the ailerons.
2- Rolling, and it is controlled with the ailerons.
3- Pitching, and it is controlled with the elevator.
4- Yawing, and it is controlled with the rudder.

390. During flight, if a change is made in pitch attitude, an airplane will rotate about its

1- center of gravity.
2- center of lift.
3- chord midpoint.
4- center of pressure.

391. The three axes of an airplane intersect at the

1- center of pressure.
2- midpoint of the datum line.
3- midpoint of the mean chord.
4- center of gravity.

392. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is true?

1- Thrust always acts forward parallel to the relative wind and is greater than drag.
2- Lift always acts perpendicular to the longitudinal axis of the wing and is greater than weight.
3- Weight always acts vertically toward the center of the earth.
4- Drag always acts rearward parallel to relative wind and is less than thrust.

393. Which statement generally describes the relationship of the forces acting on an airplane while it is climbing at constant airspeed and constant rate?

1- Lift is greater than weight; thrust is greater than drag.
2- Lift is equal to weight; thrust is equal to drag.
3- Lift is equal to weight; thrust is greater than drag.
4- Lift is greater than weight; thrust is equal to drag.

394. Which statement generally describes the relationship of the forces acting on an airplane in a constant power and constant airspeed descent?

1- Thrust is equal to drag; lift is equal to weight.
2- Thrust is greater than drag; weight is greater than lift.
3- Thrust is greater than drag; lift is equal to weight.
4- Thrust is equal to drag; weight is greater than lift.

395. Lift on a wing is most properly defined as the

1- force produced perpendicular to the relative wind.
2- partial vacuum produced on top of the wing.
3- reduced pressure resulting from a smooth flow of air over a curved surface and acting perpendicular to the longitudinal axis.
4- differential pressure acting perpendicular to the chord of the wing.

396. What changes in airplane control must be made to maintain altitude while the airspeed is being decreased?

1- Increase the angle of attack to produce more lift than drag.
2- Decrease the angle of attack to compensate for the increasing drag.
3- Maintain a constant angle of attack until the desired airspeed is reached, then increase the angle of attack.
4- Increase the angle of attack to compensate for the decreasing lift.

397. Wing loading of an airplane is determined by a value which is the

1- ratio of the wing area to the horsepower of the engine.
2- gross weight of the airplane divided by the wing area.
3- gross weight of the airplane divided by the wing span.
4- total load the wing can carry.

398. The ratio between the total air load imposed on the wing and the gross weight of an airplane in flight is known as the

1- power loading.
2- aspect ratio.
3- yield load.
4- load factor.

399. It is unwise to operate an airplane in excess of its maximum certificated gross weight primarily because

1- of the significant increase it will cause in fuel consumption.
2- an overloaded airplane is excessively stable in flight.
3- excessive loads may be imposed upon some part of the aircraft's structure.
4- flight at weights in excess of maximum gross weights is not possible.

400. Flight operations approaching maximum speeds, such as V_{NE}, should be avoided because

1- control effectiveness is so greatly impaired that it renders the airplane uncontrollable.
2- of the possibility of inducing flutter or exceeding the design load factors.
3- excessive induced drag will cause structural failures.
4- the stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.

401. If, during takeoff, an airplane becomes airborne at less than the normal takeoff speed, this is probably because of

1- an error in the airspeed indicator.
2- excessive power applied to the engine.
3- ground effect.
4- a strong headwind.

402. The phenomenon of ground effect causes

1- the direction of the relative wind to change, thus producing a smaller angle of attack.
2- the wing to become less efficient, thus requiring a longer ground run for takeoff.
3- the induced drag to increase, thus reducing the groundspeed.
4- the angle of attack to increase, thus increasing the stall speed.

403. Even under conditions of high gross weight, high density altitude, and high temperature, it is possible for an airplane to become airborne at a speed below the stall speed. This is because of

1- an increase in downwash.
2- an increase in upwash.
3- an increase in downwash plus the decrease in upwash.
4- the phenomenon of ground effect.

404. Pilots operating at less than one wingspan length above the surface, such as on takeoff or just before touchdown during landing, can expect

1- a decrease in longitudinal stability.
2- high induced drag, at low airspeed.
3- an overall increase in parasite and induced drag.
4- the necessity for additional up elevator pressure.

405. The phenomenon of "ground effect" is most likely to be involved in which of the following situations?

1- Abruptly settling back to the surface immediately after becoming airborne.
2- Inability to climb once airborne.
3- The absence of normal cushioning on landings in high-wing airplanes.
4- Inability to become airborne even though the airspeed is sufficient for a normal takeoff.

406. How is an airplane's performance affected by frost on the wings?

1- Lift is increased; drag is decreased.
2- Lift is decreased; drag is increased.
3- Lift is increased; drag is increased.
4- Lift is decreased; drag is decreased.

407. Maximum range in a propeller driven airplane is achieved in a flight condition which produces the greatest proportion between

1- speed and power required.
2- flight hours and fuel flow per hour.
3- power required and fuel flow per hour.
4- fuel flow and power required.

408. The critical altitude of an aircraft engine is the maximum altitude at which

1- that engine will no longer create enough power for climb purposes.
2- a supercharger must be placed in high ratio to maintain sea level rated horsepower.
3- the engine rated horsepower is reduced to 75% of its sea level rated value.
4- that engine can develop its sea level rated horsepower.

409. Frost covering the upper surface of an airplane wing will usually cause

1- drag factors so large that sufficient speed cannot be obtained for takeoff.
2- the airplane to stall at an angle of attack that is higher than normal.
3- the airplane to stall at an angle of attack that is lower than normal.
4- no problems for pilots of light aircraft.

410. An accumulation of frost on an airplane wing will result in

1- a decrease in lift and drag.
2- a decrease in lift and an increase in drag.
3- an increase in lift and drag.
4- an increase in lift and a decrease in drag.

411. What is the rotation of an airplane about its lateral axis called, and how is it controlled?

1- Yawing, and is controlled with the ailerons.
2- Rolling, and is controlled with the ailerons.
3- Yawing, and is controlled with the rudder.
4- Pitching, and is controlled with the elevator.

412. During a change in bank, an airplane will rotate about its center of

1- gravity and lateral axis.
2- pressure and longitudinal axis.
3- gravity and longitudinal axis.
4- pressure and lateral axis.

413. During a change in pitch attitude, an aircraft will rotate around its center of

1- gravity and longitudinal axis.
2- pressure and longitudinal axis.
3- pressure and lateral axis.
4- gravity and lateral axis.

414. Which statement is true relating to the use of the rudder in conventional airplanes to compensate for the effects of torque?

1- If airspeed is increased (power constant), right rudder pressure must be added.
2- If power is reduced (airspeed constant), right rudder pressure must be added.
3- If power is increased (airspeed constant), left rudder pressure must be added.
4- If airspeed is decreased (power constant), right rudder pressure must be added.

415. "P factor", the force which produces a yawing effect during takeoffs, climbs at slow airspeeds, and certain other attitudes, is the result of the

1- clockwise rotation of the engine and propeller turning the airplane counterclockwise.
2- propeller blade descending on the right producing more thrust than the ascending blade on the left.
3- gyroscopic force applied to the rotating propeller blades acting 90° in advance of the point where force was applied.
4- spiral characteristic of the air forced rearward by the rotating propeller.

416. Assume an aircraft is indicating 140 knots into a 15-knot headwind. If a 180° turn is made which places the wind directly behind the aircraft, the indicated airspeed would

1- decrease 15 knots and the groundspeed would increase 15 knots.
2- be the same and the groundspeed would increase 15 knots.
3- be the same and the groundspeed would increase 30 knots.
4- increase 30 knots and the groundspeed would remain the same.

417. Assume an aircraft is in cruising flight with a 20-knot tailwind. If a 180° turn is made which places the wind directly on the nose of the aircraft, the indicated airspeed would

1- be the same and the groundspeed would decrease 40 knots.
2- decrease 40 knots and the groundspeed would remain the same.
3- increase 20 knots and the groundspeed would decrease 20 knots.
4- decrease 20 knots and the groundspeed would decrease 20 knots.

418. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

1- equal to atmospheric pressure.
2- greater than atmospheric pressure.
3- greater than the pressure below the wing.
4- less than atmospheric pressure.

419. During flight with zero angle of attack, the pressure below the wing would be

1- equal to atmospheric pressure.
2- greater than atmospheric pressure.
3- less than the pressure along the upper surface of the wing.
4- less than atmospheric pressure.

420. The tendency of an airplane to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as

1- maneuverability.
2- stability.
3- balance.
4- controllability.

421. Which statement is true regarding the use of flaps during turns?

1- The addition of flaps increases the stall speed.
2- The addition of flaps decreases the stall speed.
3- In any given degree of bank, the addition of flaps has no effect on stall speed.
4- Using a constant flap setting and varying the bank has no effect on stall speed.

422. The tendency of an airplane to develop forces that further remove the airplane from its original position, when disturbed from a condition of steady flight, is known as

1- neutral static stability.
2- static instability.
3- positive static stability.
4- dynamic instability.

423. The additional load imposed on the wings of an airplane during a level coordinated turn in smooth air is dependent on the

1- true airspeed.
2- angle of bank.
3- rate of turn.
4- density altitude.

424. In a constant altitude coordinated turn, the load factor imposed on an airplane is the result of

1- rate of turn and airspeed.
2- angle of attack and airspeed.
3- centrifugal force and gravity.
4- wind and density altitude.

425. Load factor is the actual weight supported by the wings of an airplane at any given moment

1- divided by the total weight of the airplane.
2- multiplied by the total weight of the airplane.
3- subtracted from the total weight of the airplane.
4- added to the total weight of the airplane.

426. The angle of attack at which an airplane wing stalls will

1- change with an increase in gross weight.
2- remain the same regardless of gross weight.
3- decrease if the center of gravity is moved aft.
4- increase if the center of gravity is moved forward.

427. An airplane in a steep banked turn stalls at a higher airspeed than it does with the wings level, because the

1- total lift has decreased.
2- total lift has increased.
3- critical angle of attack is reached at a higher airspeed.
4- critical angle of attack has decreased.

428. The primary function of flaps is to

1- provide a steeper gliding angle.
2- increase control effectiveness at slow speeds.
3- permit a safer takeoff over high obstructions.
4- increase lateral stability.

429. Lowering flaps during a landing approach

1- eliminates floating.
2- permits approaches at a higher indicated airspeed.
3- decreases the angle of descent without increasing airspeed.
4- increases the angle of descent without increasing airspeed.

430. The use of flaps will produce

1- decreased lift and decreased drag.
2- increased lift and increased drag.
3- increased lift and decreased drag.
4- decreased lift and increased drag.

431. In addition to the added safety factor, dual-ignition systems also provide

1- better heat control of the engine.
2- shorter engine warmup periods.
3- improved engine performance.
4- easier starting.

432. An airplane certificated in the utility category means that the airplane could be operated in which maneuvers?

1- Any maneuver except acrobatics or spins.
2- Mild acrobatics, including spins.
3- All maneuvers, including acrobatics.
4- Any maneuver requiring an abrupt attitude change.

433. An increase in carburetor air temperature while operating at the same altitude with the same RPM and manifold pressure, will produce

1- more engine horsepower.
2- less engine horsepower.
3- variable or fluctuating engine horsepower.
4- the same engine horsepower.

434. When operating a supercharged engine, the use of carburetor heat should be regulated by reference to the

1- degree of roughness at which the engine is operating.
2- cylinder air temperature gauge.
3- manifold pressure or RPM indicator.
4- carburetor air or mixture temperature gauge.

435. If the ground wire between the magneto and the ignition switch becomes disconnected, the most noticeable result will be that the engine

1- will not operate on the right magneto.
2- cannot be shut down by turning the switch to the "off" position.
3- cannot be started with the switch to the "on" position.
4- will not operate on the left magneto.

436. In an airplane equipped with a manifold pressure gauge, a tachometer, a cylinder head temperature gauge, and an exhaust gas temperature indicator, the first indication of induction icing will be noted by a decrease in engine

1- RPM.
2- manifold pressure.
3- exhaust gas temperature.
4- cylinder head temperature.

437. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is

1- heavily loaded.
2- operating at high airspeeds.
3- using high power settings.
4- developing lift.

438. The loss of aircraft control, which may occur if a light airplane is flown into the wake of a large airplane, is caused principally by

1- the tornado-like vortices produced by the wingtips of the large airplane.
2- high speed sound waves similar to those produced by sonic "booms."
3- meteorological factors which create wind shear.
4- turbulence created by the propellers or jet engine exhaust of the large airplane.

439. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

1- decrease in manifold pressure.
2- rough running engine followed by an increase in manifold pressure.
3- decrease in engine RPM.
4- rough running engine followed by loss of RPM.

440. The installation of oil cooler covers, which have not been recommended by the airplane manufacturer, must be approved by

1- the owner or operator of the airplane.
2- an airplane-engine mechanic.
3- the National Transportation Safety Board.
4- the Federal Aviation Administration.

441. The amount of water absorbed in aviation fuels will

1- decrease as the temperature of the fuel increases.
2- increase as the temperature of the fuel increases.
3- increase as the temperature of the fuel decreases.
4- remain the same regardless of temperature changes.

442. The use of fuel with too low an octane rating may cause

1- a cooling effect on the cylinders.
2- detonation.
3- higher manifold pressure.
4- a prompt preignition reaction.

443. Which statement is true regarding the operation of a typical unsupercharged aircraft engine?

1- Operating with an excessively lean mixture for an extended period of time usually results in "fouled" spark plugs.
2- Most unsupercharged engines are capable of producing 100% of their rated power at or above 5,000 feet.
3- In general, rich mixtures must be used with caution when operating at high power settings.
4- Detonation often cannot be recognized from the cockpit through sound or engine roughness.

444. Which statement is true regarding the operation of an airplane engine during cold weather?

1- Overpriming the engine could result in poor compression and hard starting.
2- Engine parts expand, making it difficult to crank the engine.
3- Prolonged idling causes the spark plug electrodes to become saturated with congealed oil and results in shorting out the spark plugs.
4- Preheating an engine should be done only in an emergency.

445. If it is necessary to use a substitute gasoline in an airplane in lieu of that recommended, it should be remembered that

1- automotive gasolines should not be used, even if the octane is equivalent or better than that of the aviation gasoline recommended.
2- automotive gasolines can be used if the octane is equivalent to that of the aviation gasoline recommended.
3- automotive gasolines are recommended but only for short periods of time.
4- aircraft engines are certificated for operation with either automotive or aviation fuels.

446. The best procedure to use when attempting to start an overprimed engine is to

1- continue to use the starter until the engine fires.
2- follow the manufacturer's instructions.
3- hand crank the engine with the throttle full open and the aircraft brakes set.
4- boost the battery with an auxiliary power unit.

447. When full throttle is used on an unsupercharged engine with the mixture control in the full-rich position, the pilot should realize that the engine is being

1- subjected to damage caused by preignition.
2- provided additional fuel in the cylinders for cooling.
3- provided additional air in the cylinders for cooling.
4- subjected to damage caused by detonation.

448. What pilot action should be taken when using fuel with a higher lead content than that recommended?

1- Avoid manifold pressures in excess of 25" Hg.
2- Operate the engine with an RPM that is lower than the manifold pressure.
3- Operate the engine with a leaner than normal mixture.
4- avoid extremely lean mixture operations.

449. The main purpose of the mixture control is to

1- increase oxygen supplied to the engine.
2- decrease air supplied to the engine.
3- adjust the fuel flow to obtain the proper air/fuel ratio.
4- decrease oxygen supplied to the engine.

450. A clogged oil breather line in a reciprocating engine will cause

1- a lean fuel mixture.
2- a low cylinder head temperature.
3- fuel starvation.
4- excessive oil consumption.

451. If fuel/air mixture adjustments are not made during operation at high altitudes, engine performance will be affected because of

1- a constant volume of air and an increase in the amount of fuel metered by the carburetor.
2- a decrease in the weight of air while approximately the same amount of fuel enters the carburetor.
3- a decrease in the amount of fuel and a decrease in the volume of air entering the carburetor.
4- an increase in the amount of fuel and a decrease in the volume of air entering the carburetor.

452. Which statement is true regarding preheating an airplane during cold weather operations?

1- The cockpit, as well as the engine, should be preheated.
2- The cockpit area should not be preheated with portable heaters.
3- Hot air should be blown directly at the engine through the air intakes.
4- The possibility of fire is rare during preheating.

453. The crankcase breather lines of an aircraft's engine should receive special attention during preflight in cold weather because they are susceptible to being clogged by

1- congealed oil from the crankcase.
2- ice in the breather line.
3- freezing rain or snow.
4- sediment from the crankcase.

454. Assume that prior to starting an engine the manifold pressure gauge indicates 29" Hg. The reason for this is that the

1- throttle is in the full-open position.
2- throttle is closed, trapping high pressure in the manifold.
3- pressure in the manifold is the same as atmospheric pressure.
4- gauge is stuck at the full-power position.

TAKE-OFF DATA

TAKE-OFF DISTANCE WITH 20° FLAPS FROM HARD-SURFACED RUNWAY

GROSS WEIGHT LBS.	IAS AT 50 FT. MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F		AT 2500 FEET & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 32°F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE
2200	55	0	345	680	405	770	480	885	580	1040
		15	205	460	245	525	295	615	365	725
		30	100	275	120	320	155	380	195	460
2600	60	0	500	915	585	1045	705	1230	855	1470
		15	310	635	370	735	435	870	560	1055
		30	165	395	200	465	255	565	325	695
3000	64	0	695	1210	820	1405	990	1675	1205	2045
		15	450	855	535	1005	660	1215	815	1505
		30	250	555	310	665	380	820	500	1030

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

472. Refer to the above chart.

Given: Weight . . . . . 2,200 lbs.
Temperature . . . . 109° F.
Pressure Altitude . 1,666 feet.
Headwind . . . . . 15 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 604 feet.
2- 740 feet.
3- 1,006 feet.
4- 503 feet.

473. Refer to the above chart.

Given: Weight . . . . . 2,400 lbs.
Temperature . . . . 75° F.
Pressure Altitude . 2,500 feet.
Headwind . . . . . 15 MPH

Find the ground run required for takeoff under the given conditions.

1- 283 feet.
2- 308 feet.
3- 338 feet.
4- 258 feet.

474. Refer to the above chart.

Given: Weight . . . . . 2,600 lbs.
Temperature . . . . 84° F.
Pressure Altitude . Sea level
Headwind . . . . . 15 MPH

Find the ground run required for takeoff under the given conditions.

1- 500 feet.
2- 635 feet.
3- 698 feet.
4- 341 feet.

475. Refer to the above chart.

Given: Weight . . . . . 2,500 lbs.
Temperature . . . . 109° F.
Pressure Altitude . 1,000 feet
Headwind . . . . . 15 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 628 feet.
2- 683 feet.
3- 753 feet.
4- 591 feet.

476. Refer to the above chart.

Given: Weight . . . . . 2,900 lbs.
Temperature . . . . 25° F.
Pressure Altitude . 3,000 feet
Headwind . . . . . 5 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 1,277 feet.
2- 1,045 feet.
3- 1,522 feet.
4- 1,235 feet.

477. Refer to the above chart.

Given: Weight . . . . . 2,400 lbs.
Temperature . . . . 84° F.
Pressure Altitude . Sea level
Headwind . . . . . 20 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 653 feet.
2- 812 feet.
3- 893 feet.
4- 524 feet.

SEA LEVEL **HORSEPOWER SETTING - IO-520-B** 2000 FEET

MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH	MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
23.2	-	-	-20	75	214	92 15.3	23.0	-	-
21.1	22.8	-		65	185	80 13.35	20.8	22.5	-
18.8	20.2	22.0		55	157	69 11.5	18.6	20.0	21.7
16.6	17.7	19.1		45	128	58 9.7	16.4	17.5	18.9
23.7	-	-	0	75	214	92 15.3	23.4	-	-
21.4	23.1	-		65	185	80 13.35	21.2	22.9	-
19.1	20.5	22.4		55	157	69 11.5	18.9	20.3	22.1
16.8	18.0	19.5		45	128	58 9.7	16.7	17.8	19.2
24.0	-	-	+20	75	214	92 15.3	23.7	-	-
21.7	23.5	-		65	185	80 13.35	21.5	23.2	-
19.4	20.9	22.7		55	157	69 11.5	19.2	20.6	22.5
17.0	18.2	19.8		45	128	58 9.7	16.8	18.0	19.5
24.4	-	-	+40	75	214	92 15.3	24.1	-	-
22.1	23.9	-		65	185	80 13.35	21.8	23.6	-
19.7	21.2	23.1		55	157	69 11.5	19.5	20.9	22.8
17.2	18.5	20.1		45	128	58 9.7	17.1	18.3	19.8
24.8	-	-	+60	75	214	92 15.3	24.5	-	-
22.4	24.2	-		65	185	80 13.35	22.2	24.0	-
20.0	21.5	23.5		55	157	69 11.5	19.8	21.3	23.2
17.5	18.8	20.4		45	128	58 9.7	17.3	18.6	20.1
25.2	-	-	+80	75	214	92 15.3	24.9	-	-
22.8	24.7	-		65	185	80 13.35	22.5	24.4	-
20.2	21.8	23.8		55	157	69 11.5	20.1	21.6	23.5
17.7	19.0	20.6		45	128	58 9.7	17.5	18.8	20.4
25.5	-	-	+100	75	214	92 15.3	25.2	-	-
23.0	-	-		65	185	80 13.35	22.8	24.7	-
20.5	22.1	-		55	157	69 11.5	20.2	21.9	23.8
17.9	19.2	20.9		45	128	58 9.7	17.7	19.0	20.7

478. Refer to the above chart and the conditions given below. What is the manifold pressure?

Given: OAT . . . . . +10° F.
Altitude . . . . 2,000 ft.
Fuel flow . . . . 12.43 GPH
RPM 2,500

1- 21.5" Hg.
2- 23.4" Hg.
3- 23.7" Hg.
4- 20.2" Hg.

479. Refer to the above chart and the conditions given below. What is the manifold pressure?

Given: OAT . . . . . 100° F.
Altitude . . . . 2,000 ft.
Fuel Flow . . . . 12.43 GPH
RPM 2,300

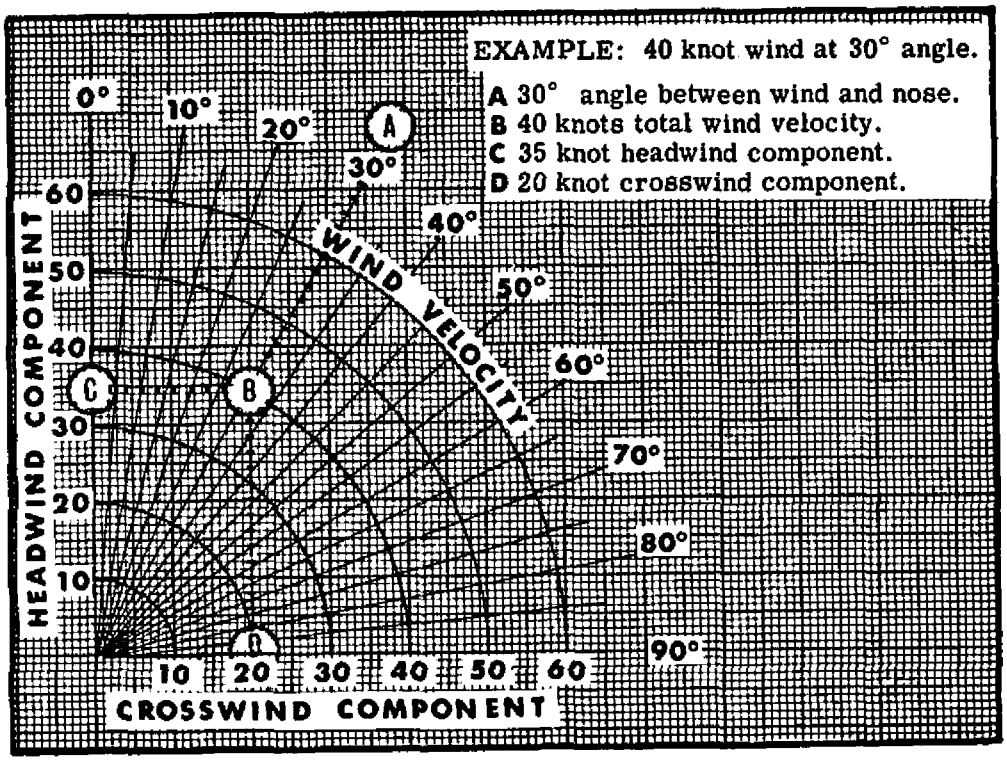
1- 23.3" Hg.
2- 24.7" Hg.
3- 25.2" Hg.
4- 21.9" Hg.

480. Refer to the above chart. With an OAT of +80° F., what is the maximum attainable manifold pressure at sea level with the engine operating at 2,500 RPM with a fuel pressure of 80 pounds per hour?

1- 22.2" Hg.
2- 22.5" Hg.
3- 22.8" Hg.
4- 21.7" Hg.

481. Refer to the above chart. With an OAT of +20° F., what is the maximum attainable manifold pressure at an altitude of 1,000 feet with the engine operating at 2,500 RPM with a fuel flow of 11.5 gallons per hour?

1- 19.3" Hg.
2- 18.65" Hg.
3- 18.5" Hg.
4- 22.7" Hg.



482. Refer to the above chart, and assume Runway 27 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 V_{SO}, if V_{SO} of the airplane is 65 knots?

1- 320° at 15 knots.
2- 220° at 20 knots.
3- 240° at 25 knots.
4- 350° at 10 knots.

483. Refer to the above chart. Suppose the airplane being flown has crosswind capability in direct crosswinds up to 13 knots. Which of these wind conditions would exceed the airplane's crosswind capability?

1- A crosswind of 20 knots at a 30° angle.
2- A crosswind of 50 knots at a 15° angle.
3- A crosswind of 25 knots at a 50° angle.
4- A crosswind of 30 knots at a 25° angle.

484. Refer to the above chart, and assume Runway 22 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 V_{SO}, if V_{SO} of the airplane is 55 knots?

1- 200° at 30 knots.
2- 260° at 15 knots.
3- 270° at 15 knots.
4- 190° at 20 knots.

485. Refer to the above chart. Suppose the airplane being flown has a crosswind capability in direct crosswinds up to 12 knots. Which of these crosswind conditions would exceed the airplane's crosswind capability?

1- A crosswind of 15 knots at a 30° angle.
2- A crosswind of 20 knots at a 40° angle.
3- A crosswind of 15 knots at a 45° angle.
4- A crosswind of 10 knots at a 90° angle.

4000 FEET — **HORSEPOWER SETTING - IO-520-B** — 6000 FEET

MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH		MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
22.6	-	-	-20	75	214	92	15.3	22.2	-	-
20.5	22.2	-		65	185	80	13.35	20.2	21.7	-
18.3	19.7	21.4		55	157	69	11.5	18.0	19.4	21.0
16.2	17.3	18.7		45	128	58	9.7	15.9	17.0	18.3
23.0	-	-	0	75	214	92	15.3	22.5	-	-
20.8	22.5	-		65	185	80	13.35	20.5	22.1	-
18.6	20.1	21.8		55	157	69	11.5	18.2	19.7	21.3
16.4	17.5	19.0		45	128	58	9.7	16.2	17.2	18.6
23.4	-	-	+20	75	214	92	15.3	-	-	-
21.2	22.8	-		65	185	80	13.35	20.8	22.4	-
18.8	20.3	22.1		55	157	69	11.5	18.5	20.0	21.7
16.7	17.8	19.2		45	128	58	9.7	16.4	17.5	18.8
23.8	-	-	+40	75	214	92	15.3	23.3	-	-
21.5	23.3	-		65	185	80	13.35	21.1	22.8	-
19.2	20.7	22.5		55	157	69	11.5	18.8	20.3	22.0
16.8	18.0	19.6		45	128	58	9.7	16.6	17.7	19.2
24.2	-	-	+60	75	214	92	15.3	23.7	-	-
21.9	23.7	-		65	185	80	13.35	21.4	23.2	-
19.5	21.0	22.8		55	157	69	11.5	19.1	20.6	22.4
17.1	18.3	19.9		45	128	58	9.7	16.8	18.0	10.5
24.5	-	-	+80	75	214	92	15.3	24.0	-	-
22.2	24.0	-		65	185	80	13.35	21.7	23.5	-
19.8	21.3	21.2		55	157	69	11.5	19.4	20.9	22.7
17.3	18.6	20.2		45	128	58	9.7	17.0	18.2	19.8
24.8	-	-	+100	75	214	92	15.3	-	-	-
22.5	24.3	-		65	185	80	13.35	22.0	23.8	-
20.0	21.5	23.5		55	157	69	11.5	19.6	21.1	23.0
17.5	18.8	20.4		45	128	58	9.7	17.2	18.4	20.0

486. Refer to the above chart. With an OAT of -10° F., what is the maximum attainable manifold pressure at 2,300 RPM at 4,000 feet?

1- 22.35" Hg.
2- 22.5" Hg.
3- 23.0" Hg.
4- 22.2" Hg.

487. Refer to the above chart. With an OAT of +60° F., what is the maximum attainable manifold pressure at 2,100 RPM at an altitude of 5,000 feet?

1- 23.7" Hg.
2- 23.95" Hg.
3- 24.2" Hg.
4- 23.2" Hg.

488. Refer to the above chart. With an OAT of +90° F., what is the maximum attainable manifold pressure at 2,500 RPM at an altitude of 6,000 feet?

1- 23.0" Hg.
2- 24.65" Hg.
3- 24.8" Hg.
4- 22.0" Hg.

489. Refer to the above chart. With an OAT of +30° F., what is the maximum attainable manifold pressure at 2,300 RPM at an altitude of 6,000 feet?

1- 22.4" Hg.
2- 22.6" Hg.
3- 23.15" Hg.
4- 22.8" Hg.

CONDITIONS:
Flaps 30°
Power Off
Maximum Braking
Paved, Level, Dry Runway
Zero Wind

LANDING DISTANCE

NOTES:

1. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
2. For operation on a dry, grass runway, increase distances by 40% of the "ground roll" figure.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 60 FT OBS
3800	71	S.L.	725	1440	760	1480	780	1520	805	1560	830	1600
		1000	750	1480	780	1520	805	1560	835	1605	860	1645
		2000	780	1525	810	1565	835	1605	865	1650	895	1695
		3000	810	1565	840	1610	870	1660	900	1705	930	1750
		4000	840	1615	870	1660	900	1705	930	1750	965	1800
		5000	870	1660	905	1710	935	1755	965	1805	1000	1855
		6000	905	1710	940	1765	970	1810	1005	1860	1035	1910
		7000	940	1765	975	1815	1010	1870	1045	1920	1075	1970
		8000	975	1815	1010	1870	1050	1930	1085	1980	1120	2035

490. Refer to the above chart to determine the landing distance when the conditions are as given below.

Given:
Weight . . . . . 3,800 lbs.
Pressure Altitude . . 3,000 feet
Temperature . . . . . 0° C.
Tailwind . . . . . 5 knots
Runway, dry grass . . 3,000 feet

The landing distance over a 50-foot obstruction at the threshold would be approximately

1- 1,878 feet.
2- 2,202 feet.
3- 2,629 feet.
4- 1,576 feet.

491. Refer to the above chart to determine the landing ground-roll distance when the conditions are as given below.

Given:
Weight . . . . . 3,800 lbs.
Pressure Altitude . . Sea level
Temperature . . . . . 40° C.
Headwind . . . . . 10 knots
Runway, dry grass . . 3,400 feet

The ground-roll distance would be approximately

1- 1,079 feet.
2- 1,245 feet.
3- 2,080 feet.
4- 913 feet.

492. Refer to the above chart to determine the landing distance with these conditions:

Weight . . . . . 3,800 lbs.
Pressure Altitude . . 5,000 feet
Temperature . . . . . 30° C.
Headwind . . . . . 10 knots

The ground-roll distance would be approximately

1- 1,625 feet.
2- 965 feet.
3- 869 feet.
4- 1,805 feet.

493. Refer to the above chart to determine landing distance with these conditions:

Weight . . . . . 3,800 lbs.
Pressure Altitude . . 4,000 feet
Temperature . . . . . 20° C.
Headwind . . . . . 20 knots

The distance required for a landing over a 50-foot obstruction at the threshold is

1- 1,364 feet.
2- 1,535 feet.
3- 1,705 feet.
4- 720 feet.

AIRSPEED CORRECTION TABLE

Flaps 0°		Flaps 15°*		Flaps 45°**	
IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH
80	84	70	78	70	76
100	102	80	88	80	84
120	122	90	94	90	93
140	141	100	103	100	102
160	161	110	113	110	111
180	181	120	121	120	120
200	201	130	131	130	129
220	221	140	141	140	138
240	242	150	151		
		160	161		

* Maximum Flap Speed 160 MPH ** Maximum Flap Speed 140 MPH

STALL SPEED CHART

MPH - CAS

4990 POUNDS GROSS WEIGHT

CONFIGURATION	ANGLE OF BANK			
	0°	20°	40°	60°
Gear and Flaps Up	64	67	87	110
Gear Down and Flaps 15°	60	63	83	113
Gear Down and Flaps 45°	76	79	87	108

494. Refer to the above charts. What would be the approximate indicated stall speed during a 40° bank with the gear down and flaps set at 15°?

1- 88 MPH.
2- 90 MPH.
3- 92 MPH.
4- 80 MPH.

495. Refer to the above charts. What would be the approximate indicated stalling speed if the angle of bank is 20° and the gear and flaps are up?

1- 83 MPH.
2- 87 MPH.
3- 102 MPH.
4- 70 MPH.

496. Refer to the above charts. What would be the approximate indicated stalling speed during a 20° bank with the gear down and the flaps set at 45°?

1- 74 MPH.
2- 70 MPH.
3- 83 MPH.
4- 72 MPH.

497. Refer to the above charts. If the bank angle is 60°, the gear is down, and the flaps are set at 45°, what would be the indicated stall speed?

1- 93 MPH.
2- 106 MPH.
3- 110 MPH.
4- 84 MPH.

498. Refer to the above charts. What would be the approximate indicated stalling speed if the angle of bank is 0° with the gear down and the flaps set at 15°?

1- 80 MPH.
2- 84 MPH.
3- 88 MPH.
4- 71 MPH.

499. What is calibrated airspeed?

1- Indicated airspeed corrected for outside air temperature.
2- Indicated airspeed corrected for instrument and installation error.
3- Indicated airspeed corrected for pressure altitude.
4- Indicated airspeed corrected for density altitude.

USEFUL LOAD WEIGHTS AND MOMENTS

FUEL LEADING EDGE TANKS ARM 75					
Gallons	Weight	Moment	Gallons	Weight	Moment
5	30	23	45	270	203
10	60	45	49	294	221
15	90	68	55	330	248
20	120	90	60	360	270
25	150	113	65	390	293
30	180	135	70	420	315
35	210	158	75	450	338
40	240	180	80	480	360

OIL ARM 25		
Quarts	Weight	Moment
12	23	6

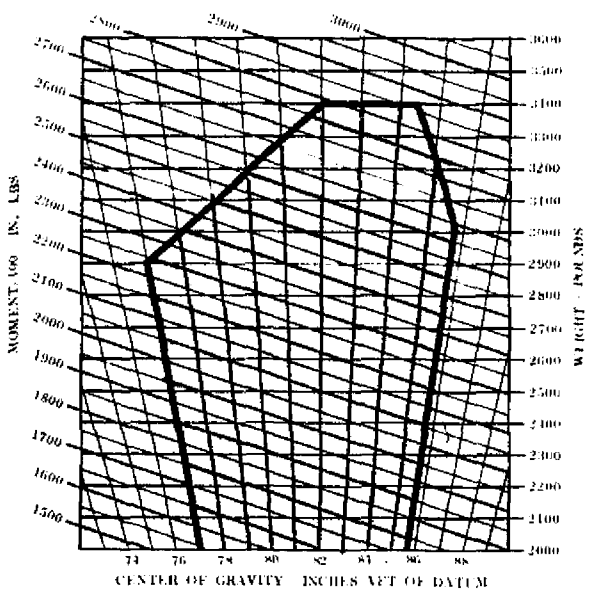
BAGGAGE ARM 150	
Weight	Moment
10	15
20	30
30	45
40	60
50	75
60	90
70	105
80	120
90	135
100	150
110	165
120	180
130	195
140	210
150	225
160	240
170	255
180	270
190	285
200	300
210	315
220	330
230	345
240	360
250	375
260	390
270	405

NOTE: All moments are equal to $\frac{\text{weight X arm}}{100}$

OCCUPANTS				
Front Seats ARM 85		Rear Seats		
			Fwd. Position ARM 121	Aft Position ARM 136
Weight	Moment	Weight	Moment	Moment
120	102	120	145	163
130	111	130	157	177
140	119	140	169	190
150	128	150	182	204
160	136	160	194	218
170	145	170	206	231
180	153	180	218	245
190	162	190	230	258
200	170	200	242	273

EMPTY WEIGHT DATA		
OIL NOT INCLUDED	Empty Weight (Lbs.)	Empty Weight Moment (/100)
Certificated Weight	2110	1652

GROSS WEIGHT MOMENT LIMITS



DO NOT MARK ON CHART

500. During a turn, if the angle of bank is increased and at the same time the airspeed is decreased, a pilot can expect the radius of turn to

1- decrease and the rate of turn to decrease.
2- increase and the rate of turn to decrease.
3- decrease and the rate of turn to increase.
4- increase and the rate of turn to increase.

501. Use the loading data on page 81. What would be the maximum allowable inches aft of datum center of gravity moment if the airplane was loaded to 3,400 pounds gross weight?

1- 82.0 inches.
2- 84.5 inches.
3- 85.8 inches.
4- 77.0 inches.

502. Refer to the loading data on page 81 and assume an airplane is loaded as follows:

Front seat - 1st person . . . 170 lbs.
2nd person . . . 130 lbs.

Rear seat aft position -
1st person . . . 120 lbs.
2nd person . . . 190 lbs.

Baggage . . . . . 150 lbs.
Oil . . . . . Full
Fuel - leading edge tanks . . Full

From the data given, it can be determined that the airplane is loaded

1- over allowable gross weight; CG located outside forward limits.
2- under allowable gross weight; CG located within aft limits.
3- over allowable gross weight; CG located within forward limits.
4- under allowable gross weight; CG located outside aft limits.

503. If all index units are positive when computing weight and balance the location of the datum would be at the

1- centerline of the nosewheel or tailwheel depending on the type airplane.
2- centerline of the main wheels.
3- trailing edge of the wings.
4- nose, or out in front of the airplane.

504. If the landing gear on an airplane moves forward during retraction, the

1- total moments will remain the same.
2- total moments will increase.
3- total moments will decrease.
4- center of gravity will remain the same.

505. Consider the following:

Airplane weight . . . . . 9,500 lbs.
Center of gravity
location . . . . . Station 90.0
Aft center of gravity
limit . . . . . Station 90.5

How much weight could be added at Station 120 without exceeding the aft center of gravity limit?

1- 61.0 lbs.
2- 110.5 lbs.
3- 161.0 lbs.
4- 30.0 lbs.

506. Consider the following:

Aircraft weight . . . . . 5,000 lbs.
Center of gravity . . . . . Station 80.0
Aft center of gravity
limit . . . . . Station 80.5

What is the maximum weight that could be added at Station 150.0 without exceeding the aft center of gravity limit?

1- 69.5 lbs.
2- 70.0 lbs.
3- 160.5 lbs.
4- 35.9 lbs.

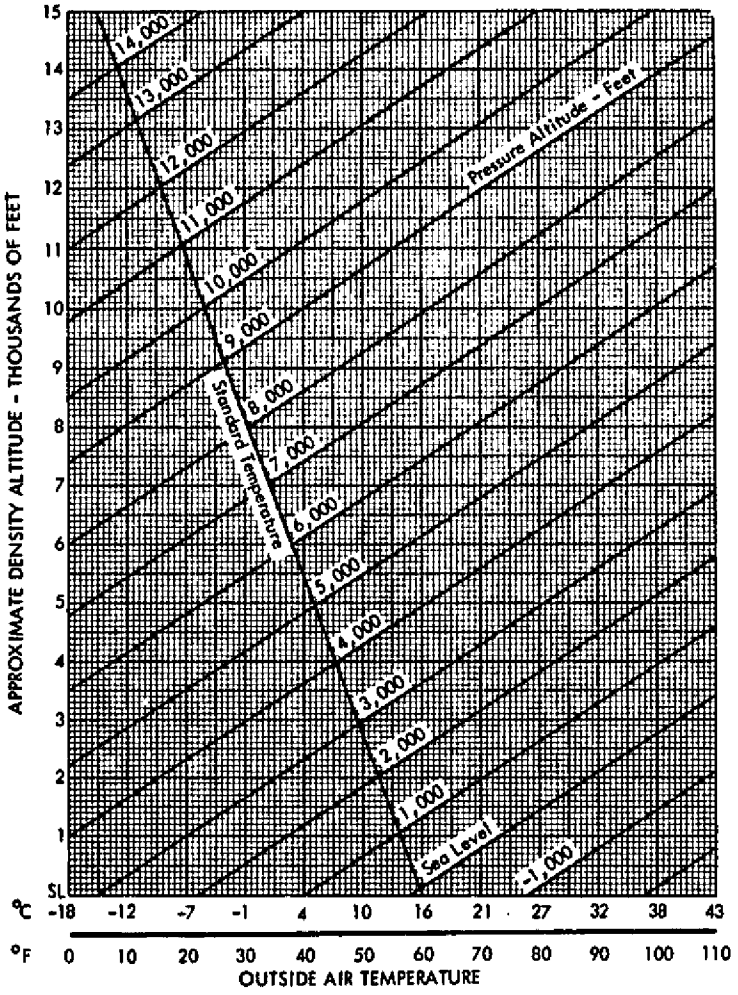
507. Consider the following:

Aircraft weight . . . . . 8,300 lbs.
Center of gravity . . . . . Station 90.0
Aft center of gravity
limit . . . . . Station 90.5

How much weight could be added at Station 160 without exceeding the aft center of gravity limit?

1- 16.5 lbs.
2- 59.7 lbs.
3- 69.5 lbs.
4- 13.9 lbs.

DENSITY ALTITUDE CHART



Altimeter Setting (In. Hg.)	*Pressure Altitude Conversion Factor*
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

508. Refer to the above chart. If, during takeoff at an airport having an elevation of 2,223 feet, a temperature of 95° F., and an altimeter setting of 28.90, the airplane would perform as though it were at

1- 3,200 feet MSL.
2- 4,700 feet MSL.
3- 6,064 feet MSL.
4- 2,223 feet MSL.

509. Refer to the above chart. If the ambient temperature and altimeter setting are 60° F. and 30.40, respectively, at an airport having a field elevation of 2,000 feet, the density altitude at that airport would be approximately

1- 1,200 feet.
2- 1,560 feet.
3- 1,900 feet.
4- 440 feet.

510. Refer to the above chart. When the altimeter setting is 29.30 and the temperature is 80° F. at an elevation of 5,000 feet, the density altitude is approximately

1- 3,580 feet.
2- 5,600 feet.
3- 8,000 feet.
4- 580 feet.

511. Refer to the above chart. Wher the altimeter setting is 29.80 and the temperature is 90° F. at an elevation of 2,000 feet, the density altitude is approximately

1- 110 feet.
2- 2,110 feet.
3- 4,500 feet.
4- sea level.

512. Consider the following:

Airplane weight . . . . . 6,400 lbs.
Center of gravity
location . . . . . Station 80.0
Aft center of gravity
limit . . . . . Station 80.5

How much weight could be added to Station 150.0 without exceeding the aft center of gravity limit?

1- 46.0 lbs.
2- 69.5 lbs.
3- 70.0 lbs.
4- 5.0 lbs.

513. During a level turn, increasing the airspeed while maintaining a constant load factor would result in

1- a decrease in the radius of turn.
2- an increase in the radius of turn.
3- an increase in centrifugal force.
4- the same radius of turn.

514. Which statement is true relating to the effect of low-level wind shear on airplane performance?

1- A headwind which shears to a tailwind causes the airplane to pitch up.
2- A tailwind which shears to a headwind causes an initial decrease in airspeed.
3- A tailwind which shears to a headwind causes the airplane to pitch down.
4- A headwind which shears to a tailwind causes an initial decrease in airspeed.

515. Suppose while flying in a steady wind of 30 knots, the airplane is turned from a direct headwind to a direct tailwind. The indicated airspeed would

1- remain the same but the groundspeed would increase 60 knots.
2- decrease 30 knots and the groundspeed would increase 30 knots.
3- increase 60 knots and the groundspeed would increase 30 knots.
4- increase 30 knots and the groundspeed would increase 30 knots.

516. Which statement concerning airplane speed symbols is true?

1- V_X means the best rate-of-climb speed.
2- V_{FE} means the maximum flap extended speed.
3- V_{LE} means the maximum landing safety speed.
4- V_{SO} means the power-on stalling speed with the gear and flaps retracted.

517. Which of the following airspeed symbols means "never-exceed" speed?

1- V_{NE}
2- V_{NO}
3- V_A
4- V_{SO}

518. Whenever climbing or descending through an inversion or wind-shear zone, the pilot should be alert for which of the following changes in airplane performance?

1- A sudden surge of thrust.
2- A sudden decrease in power.
3- A fast rate of climb and a slow rate of descent.
4- A sudden loss of airspeed.

519. Which of the following airspeeds is identified by color coding on an airspeed indicator?

1- The maximum gear operating or extended speed.
2- The maximum structural cruising speed.
3- The stalling speed for all altitudes and configurations.
4- The design maneuvering speed.

520. In regard to the climb angle, the airplane will climb at

1- a steeper angle when flying downwind than when flying into the wind.
2- a shallower angle when flying downwind than when flying into the wind.
3- the same angle whether flying downwind or upwind.
4- a lesser rate when flying downwind than when flying into the wind.

521. How will an increase in weight (loading) affect the performance of an airplane?

1- The glide ratio will decrease.
2- The power setting required to produce a specific airspeed will change.
3- The indicated stalling speed will decrease.
4- The lift/drag ratio will change.

522. For each 1,000-foot increase in altitude, the true airspeed increases approximately what percent of the indicated airspeed?

1- 3.5%
2- 5%
3- 10%
4- 2%

523. Which of the following procedures could be used to determine density altitude while on the ground?

1- Set the altimeter to field elevation and then by means of a density altitude chart apply temperature to the indicated altitude.
2- Set the altimeter to 29.92" Hg and then by means of a computer apply temperature to the indicated altitude.
3- Set the altimeter to the reported altimeter setting and then by means of a density altitude chart apply temperature to the indicated altitude.
4- Set the altimeter to the current altimeter setting and then apply the standard temperature lapse rate to the indicated altitude.

524. The indicated stalling speed of an airplane is most affected by

1- changes in air density.
2- variations in flight altitude.
3- variations in airplane loading.
4- changes in air temperature.

525. What is the primary reason for computing density altitude?

1- To determine aircraft performance.
2- To establish flight levels (FLs) above 18,000 feet MSL.
3- To ensure safe cruising altitude over mountainous terrain.
4- To determine pressure altitude.

526. Operation in excess of an airplane's V_{NE} should be avoided because

1- flutter or excessive load factors could be induced.
2- the stalling speed would increase to the point that normal maneuvers could not be performed without stalling.
3- control effectiveness would be impaired to the point that the airplane would be uncontrollable.
4- excessive induced drag could cause structural failure.

527. The stalling speed of an airplane will be highest when the airplane is loaded with a

1- low gross weight and forward center of gravity.
2- low gross weight and aft center of gravity.
3- high gross weight and forward center of gravity.
4- high gross weight and aft center of gravity.

528. Which statement is true regarding takeoff performance with high-density altitude conditions?

1- The acceleration rate will increase since the lighter air creates less drag.
2- A shorter distance is required to accelerate to lift-off speed due to the reduced drag of lighter air.
3- A higher than normal indicated airspeed is required to produce sufficient lift since the air is less dense.
4- The acceleration rate is slower because the engine and propeller efficiency is reduced.

529. The reported altimeter setting of a given station is the

1- station's barometric pressure converted to mean sea level pressure.
2- station's pressure altitude adjusted for existing temperatures.
3- actual barometric pressure measured at sea level.
4- actual barometric pressure measured at that station.

530. If an airplane is loaded with the center of gravity aft of the rearward limit, that airplane will tend to become

1- unstable about its longitudinal axis.
2- sluggish in aileron control.
3- sluggish in rudder control.
4- unstable about its lateral axis.

531. The different colored radials and arcs on an airspeed indicator represent

1- equivalent airspeeds.
2- true airspeeds.
3- calibrated airspeeds.
4- indicated airspeeds.

532. Acceleration error will be displayed on the attitude indicator by a false

1- bank to the right.
2- nose-low indication.
3- nose-high indication.
4- bank to the left.

533. The center of gravity of an airplane is computed along the

1- vertical axis.
2- longitudinal axis.
3- horizontal axis.
4- lateral axis.

534. Deceleration error will be displayed on the attitude indicator by a false

1- bank to the right.
2- nose-low indication.
3- nose-high indication.
4- bank to the left.

535. The center of gravity of an airplane can be determined by which of the following methods?

1- Multiplying total weight by total moments.
2- Dividing total arms by total moments.
3- Dividing total moments by total weight.
4- Multiplying total arms by total weight.

536. In a coordinated turn the displacement of the turn needle

1- increases as the angle of bank increases and the airspeed decreases.
2- increases as the angle of bank decreases and the airspeed increases.
3- remains constant for a 30° bank regardless of the airspeed.
4- indicates the angle of bank.

537. Refer to the chart on page 87.

Given: Associated conditions on the chart.
Standard altitude . . . 6,200 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

1- 95 MPH.
2- 110 MPH.
3- 115 MPH.
4- 93 MPH.

538. Refer to the chart on page 87.

Given: Associated conditions on the chart.
Standard altitude . . . 3,600 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

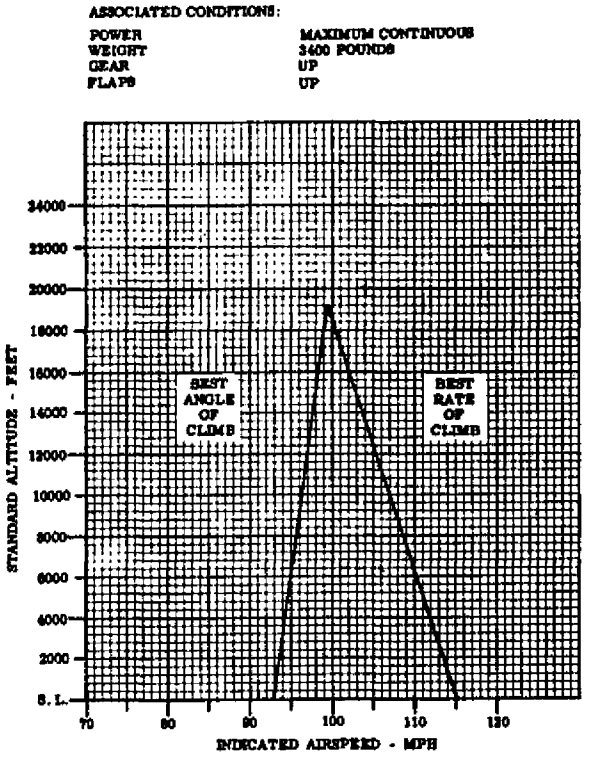
1- 94 MPH.
2- 113 MPH.
3- 115 MPH.
4- 93 MPH.

539. What is the primary advantage of a constant-speed propeller?

1- To obtain a pitch setting that is suitable for each flight situation and power setting.
2- To maintain a specific engine speed.
3- To control the power output developed by the engine.
4- To obtain and maintain a selected pitch angle of the blades regardless of the flight situation or power setting.

MAXIMUM CLIMB

CLIMB SPEED



540. Refer to the chart above.

Given: Associated conditions on the chart.
Standard altitude . . . 6,000 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 95 MPH.
2- 110 MPH.
3- 115 MPH.
4- 93 MPH.

541. Refer to the chart above.

Given: Associated conditions on the chart.
Standard altitude . . . 3,000 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 94 MPH.
2- 113 MPH.
3- 115 MPH.
4- 93 MPH.

CLIMB SPEEDS

Cruising Climb Speed—Normal rate of power, full throttle with Gear and Flaps Up . . . . . 130 mph

At 5000 ft. Altitude	GEAR & FLAP UP	GEAR DOWN	GEAR & FLAP DOWN
Best rate of climb speed	102 mph	86 mph	67 mph
Best angle of climb speed	84 mph	75 mph	64 mph

STALL SPEEDS

CONFIGURATION	ANGLE OF BANK 0°	20°	40°	60°
Gear and Flaps Up Power Off	71.0 mph	73.2 mph	81.1 mph	100.4 mph
Gear and Flaps Up Power On	63.0 mph	65.0 mph	72.0 mph	89.2 mph
Gear and Flaps Down Power Off	60.0 mph	61.9 mph	68.6 mph	84.9 mph
Gear and Flaps Down Power On	54.0 mph	55.7 mph	61.7 mph	76.5 mph

542. Refer to the illustration above. If "V_Y" is maintained during a 20° angle of bank turn with the gear and flaps retracted, how much margin of safety will there be above stalling speed?

1- 19.0 MPH.
2- 28.8 MPH.
3- 37.0 MPH.
4- 10.8 MPH.

543. Refer to the illustration above. If "V_X" is maintained during a straight climb with gear and flaps down, how much margin of safety will there be above stalling speed?

1- 10 MPH.
2- 15 MPH.
3- 20 MPH.
4- 5 MPH.

544. Refer to the illustration above and determine the airspeed that is recommended by FAA when none is specified by the airplane manufacturer for short-field approach. The proper approach speed is

1- 64-68 MPH.
2- 70-74 MPH.
3- 78-84 MPH.
4- 55-59 MPH.

545. If the pitot head were clogged or iced over and the power and pitch were held constant, the indicated airspeed would

1- increase as altitude is decreased.
2- increase as altitude is increased.
3- decrease as altitude is increased.
4- be unaffected by altitude changes.

546. Which statement is true about magnetic deviation of a magnetic compass?

1- Deviation is the same for all aircraft on various headings.
2- Deviation is different in a given aircraft in different localities.
3- Deviation is different on various headings of a given aircraft.
4- Deviation is the same for all aircraft in the same locality.

547. The pressure altitude at a given location is indicated by the altimeter after it is set to

1- 29.92.
2- the density altitude.
3- field elevation.
4- the current altimeter setting.

548. Generally, when severe turbulence is encountered, the airspeed should be reduced to or slightly below the design maneuvering speed, because at that speed the

1- margin of safety above stall speed is increased.
2- airplane will stall before an excessive load factor occurs.
3- angle of the relative wind resulting from vertical gusts will be less and thus prevent a stall.
4- effectiveness of the controls is increased.

549. Which instrument would be affected by excessively low pressure in the airplane's vacuum system?

1- Pressure altimeter.
2- Airspeed indicator.
3- Vertical speed indicator.
4- Heading indicator.

550. Deviation error of the magnetic compass is caused by

1- magnetic dip.
2- acceleration and deceleration.
3- certain metals and electrical systems within the airplane.
4- the difference in location of true north and magnetic north.

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AC 143-4

ADVANCED GROUND INSTRUCTOR

WRITTEN TEST GUIDE

U.S. Department of Transportation

Federal Aviation Administration

ADVANCED

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 Office of Flight Operations of the Federal Aviation Administration has developed this guide to help applicants prepare for the Advanced 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 an Advanced 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 Advanced 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

GROUND INSTRUCTORS

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 career of teaching aviation.

GROUND INSTRUCTOR CERTIFICATION

Required Tests

To be certificated as an Advanced Ground Instructor, applicants must pass the FAA's Fundamentals of Instructing (FOI) and Advanced Ground Instructor Written Tests. 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 Advanced Ground Instructor Written Test, nor is it important which of these tests is taken first.

The Advanced 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.

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

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

The Advanced Ground Instructor Written Test contains 100 test items and 5 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 Advanced Ground Instructor Written Test will be supplied a question book containing several hundred questions, a 100-item 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, Airman 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 Advanced Ground Instructor question book.

Always remember the following when taking the test:

1. Enter personal data in appropriate spaces on the test answer sheet in a complete and legible manner.

2. Answer only the 100 questions whose numbers appear on your Question Selection Sheet.

3. 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.

4. 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.

5. 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.

6. 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.

Airman Written Test Report

After completing the test, your answer sheet is forwarded to the Federal Aviation Administration, Mike Monroney Aeronautical

Center in Oklahoma City for scoring by electronic computer (ADP). You will be mailed 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 will accompany the report. It must be emphasized here that the total number of subject codes shown on the test report is not necessarily an indication of the total number of test items answered incorrectly. When one or more questions are missed in a given subject area, the code for that subject appears only once on the grade report.

The written tests are administered by FAA General Aviation District Offices (GADO), Flight Standards District Offices (FSDO), some Air Carrier District Offices (ACDO), and Designated Written Test Examiners.

Retesting After Failure

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

RECOMMENDED STUDY MATERIALS

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

FAA ADVISORY CIRCULARS

The FAA issues Advisory Circulars to inform the aviation public in a systematic way of nonregulatory material of interest. Advisory circulars are issued in a number-subject system corresponding to the subject area of the Federal Aviation Regulations. A brief explanation of the contents is given for each listing in AC 00-2, (latest revision), Advisory Circular Checklist.

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

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

Request free advisory circulars from:

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

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

U.S. Department of Transportation
Distribution Requirements Section,
M 482.2
Washington, D.C. 20590

It is recommended that the ground instructor applicant obtain advisory circulars in at least the following subjects:

Subject Number	Subject Matter
00	General
20	Aircraft
60	Airmen
70	Airspace
90	Air Traffic and General Operating Rules
120	Air Carriers, Air Travel Clubs, and Operators for Compensation or Hire: Certification and Operations
140	Schools and Other Certificated Agencies
170	Navigational Facilities

AVIATION INSTRUCTOR'S HANDBOOK, AC 60-14. (Sup't. Doc's.) 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 61-23B. (Sup't. Doc's.) SN 050-011-00077-1. Contains authoritative information used in training and guiding private pilots, and most subject areas in which an applicant may be tested.

FLIGHT TRAINING HANDBOOK, AC 61-21A. (Sup't. Doc's.) 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. (Sup't. Doc's.) 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.

FEDERAL AVIATION REGULATIONS WRITTEN TEST GUIDE FOR PRIVATE, COMMERCIAL AND MILITARY PILOTS. AC 61-34B. (Sup't. Doc's.) SN 050-007-00288-2. Outlines the scope of the basic knowledge required of civilian or military pilots who are studying FARs as they pertain to the regulations terminology, to the certification of private and commercial pilots; to the operation of aircraft in the national airspace; and to the requirements of the National Transportation Safety Board. For use as a guide in preparing for the FAR Written Test.

COMMERCIAL PILOT—AIRPLANE—WRITTEN TEST GUIDE, AC 61-71B. (Sup't. Doc's.) SN 050--007-00482-6. Outlines the aeronautical knowledge requirements for a commercial pilot rating. 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. (Sup't. Doc's.) 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. (Sup't. Doc's.) SN 050-007-00283-1. Contains information on weather phenomena for pilots and other flight operations personnel whose interest in meteorology is primarily in its application to flying.

AVIATION WEATHER SERVICES, AC 00-45B. (Sup't. Doc's.) SN 050-007-00513-0. 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. (Sup't. Doc's.) SN 050-007-00254-8. An aviation medicine handbook written in pilots' language that provides guidance on when, and when not, to fly. Emphasizes the fact that a good pilot must be physically fit, psychologically sound, and well trained.

PILOT'S WEIGHT AND BALANCE HANDBOOK, AC 91-23A. (Sup't. Doc's.) 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 frequently amended 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 from FAA upon request.

A check or money order made payable to the Superintendent of Documents should be included with each order. Submit orders for single-sale 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 135, Air Taxi Operators and Commercial Operators.

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, Sup't. Doc's.) 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, Sup't. Doc's.) 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. It also includes current FDC NOTAMs, which are regulatory in nature, issued every 14 days. (Subscription, Sup't. Doc's.) 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, preferred routes, FSS/Weather Service telephone numbers, Air Route Traffic Control Center (ARTCC) frequencies, part-time control zones, and various other pertinent, special notices essential to air navigation. These publications are available upon subscription from the National Ocean Survey (NOS), Distribution Division (C44), 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. Provide brief explanations of important aeronautical subjects. These include concepts and procedures critical to aviation safety, common misconceptions among pilot applicants, and areas which cause general difficulty in written tests. Exam-O-Grams are for sale and may be purchased from the Superintendent of Documents.

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.

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 Sanderson, Inc., 8025 East 40th Ave., Denver, Colorado 80207.

HOW TO OBTAIN PUBLICATIONS SOLD BY THE SUPERINTENDENT OF DOCUMENTS

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

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

2. Send separate orders for subscription and nonsubscription items.

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

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

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

6. All prices are subject to change. The Advisory Circular Checklist, AC 00-2, (latest revision), 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."

STUDY OUTLINE

This study outline is the framework of the basic aeronautical knowledge that the prospective advanced ground 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. Part 1: Definitions and Abbreviations.
1. General definitions
2. Abbreviations and symbols

B. Part 23: Airworthiness Standards: Normal, Utility, and Acrobatic Category Airplanes.
1. Subpart A - General
2. Subpart B - Flight
3. Subpart C - Structure
4. Subpart D - Design and construction
5. Subpart E - Powerplant
6. Subpart F - Equipment
7. Subpart G - Operating limitations and information

C. Part 71: Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points.
1. General
2. Colored federal airways
3. VOR federal airways
4. Continental control area
5. Control areas and control area extensions
6. Control zones
7. Transition areas
8. Positive control areas
9. Reporting points
10. Area low routes
11. Terminal control areas

D. Part 61: Certification: Pilots and Flight Instructors.
1. Required certificates/ratings
2. Certificates and ratings issued
3. Expired pilot certificates/ reissuance
4. Offenses involving narcotic drugs, marihuana, and depressant or stimulant drugs or substances
5. Duration of pilot and flight instructor 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, or alteration of applications, certificates, logbooks, reports, or records
14. Change of address
15. Glider towing: experience and instruction requirements
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

E. Part 91: General Operating and Flight Rules.
1. Subpart A: General
a. Responsibility and authority of the pilot in command
b. Pilot in command of aircraft requiring more than one required pilot
c. Preflight action
d. Flight crewmembers at stations
e. Interference with crewmembers
f. Careless or reckless operation
g. Liquor and drugs
h. Carriage of narcotic drugs, marihuana, and depressant or stimulant drugs or substances
i. Dropping objects
j. Fastening of safety belts
k. Parachutes and parachuting
l. Towing: gliders
m. Portable electronic devices
n. Flight instruction; simulated instrument flight and certain flight tests
o. Fuel requirements for flight under VFR
p. ATC transponder equipment
q. Civil aircraft: certifications required
r. Civil aircraft airworthiness
s. Civil aircraft operating limitations and marking
t. Supplemental oxygen
u. Powered civil aircraft instrument and equipment requirements
v. Flight recorders and cockpit voice recorders

w. Automatically reported pressure altitude data and the pilot's altitude reference
x. Restricted/limited/ provisional certificated civil aircraft; operating limitations
y. Aircraft having experimental certificates: operating limitations
z. Emergency exits for airplanes carrying passengers for hire
aa. Emergency locator transmitters

2. Subpart B: Flight Rules
a. Waivers
b. Operating near other aircraft
c. Right-of-way rules
d. Aircraft speed
e. Acrobatic flight
f. Aircraft lights
g. Complying -- ATC clearances/ instructions
h. ATC light signals
i. Minimum safe altitudes; general
j. Altimeter settings
k. Flight plan; information required
l. Flights between Mexico/ Canada/U.S.A.
m. Operation--on or in vicinity of airport
n. Operation--airport with control tower
o. Operation--airport without control tower
p. Flight in terminal control areas
q. Temporary flight restrictions
r. Flight test areas
s. Restricted and prohibited areas
t. Positive control areas; route segments
u. Operations to/over Cuba
v. Basic VFR weather minimums
w. Special VFR weather minimums
x. VFR cruising altitude or flight level
y. ATC transponder test/ inspection

3. Subpart C: Maintenance, Preventive Maintenance, and Alterations
a. General
b. Maintenance required
c. Carrying passengers after aircraft repair or alterations
d. Inspections
e. Altimeter system tests and inspections
f. Progressive inspections
g. Maintenance records
h. Transfer of maintenance records
i. Rebuilt engine maintenance records
j. ATC transponder tests and inspections

4. Subpart D: Large and Turbine-powered Multiengine Airplanes
a. Flying equipment and operating information
b. Operating limitations and emergency equipment
c. Equipment requirements: over-the-top, or night VFR operations
d. Survival equipment for over-water operations
e. Radio equipment for overwater operations
f. Emergency equipment
g. Flight altitude rules
h. Smoking and safety belt signs
i. Passenger briefing
j. Carry-on baggage
k. Carriage of cargo
l. Transport category airplane weight limitations
m. Operating in icing conditions
n. Flight engineer requirements
o. Second in command requirements
p. Flight attendant requirements
q. Inspection program
r. Availability of inspection program

F. Part 135: Air Taxi Operators and Commercial Operators.
1. Applicability
2. Operating rules
3. Crewmember qualification
4. Aircraft and equipment

II. Title 49--Transportation, National Transportation Safety Board, Part 830

A. 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.
1. §830.1 Applicability.
2. §830.2 Definitions.
3. §830.5 Immediate notification.
4. §830.6 Information to be given in notification.
5. §830.10 Preservation of aircraft wreckage, mail, cargo, and records.
6. §830.15 Reports and statements to be filed.

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 120 - Air Carrier, Air Travel Clubs, and Operators for Compensation or Hire: Certification and Operations
G. Series 140 - Schools and Other Certificated Agencies
H. Series 170 - Navigational Facilities

IV. Flight Information/Operational Publications

A. AIM - Basic Flight Information and ATC Procedures.
1. Navigation Aids
a. Air navigation radio aids
b. Radar services and procedures
2. Airport, air navigation lighting and marking aids
a. Airport lighting aids
b. Airport air navigation lighting
c. Airport marking aids
3. Airspace
a. General
b. Uncontrolled airspace
c. Controlled airspace
d. Special use airspace
e. Other airspace areas
4. Air Traffic Control
a. Services available to pilots
b. Radio communications phraseology and techniques
c. Airport operations
d. ATC clearance/separations
e. Preflight
f. Departures
g. En route
h. Arrival
i. Pilot/controller roles and responsibilities
j. National security and interception procedures
5. Emergency procedures
a. General
b. Search and rescue coordination centers
c. Procedures and signals for aircraft in emergency
d. Two-way radio communications failure
e. Safety, accident and hazard reports
6. Safety of flight
a. Weather
b. Altimeter setting procedures
c. Wake turbulence
d. Bird hazard and migratory patterns
7. Good operating practices
8. Medical facts for pilots
9. Aeronautical charts and related publications
10. Supplement
a. Pilot/controller glossary

B. Graphic Notices and Supplemental Data.
1. Area Advisories
2. Area Navigation (RNAV) Routes
3. Civil Flight Test Areas
4. Military Refueling, Tracks and Areas
5. National Weather Service (Upper Air Observing Stations)
6. North Atlantic Minimum Navigation Requirements
7. North Atlantic Standardized Air/Ground Messages
8. North American Routes for North Atlantic Traffic (NAR)
9. Parachute Jumping Areas
10. Terminal Area Graphics
11. Terminal Radar Service Area Graphics (TRSA)

C. Notices to Airmen (NOTAMS).
1. Extended NOTAMS
2. FDC NOTAMS
3. Special NOTAMS

D. Airport/Facility Directory
1. General information
2. Abbreviations
3. Legend, Airport/Facility Directory
4. Airport/Facility Directory
5. Special Notices
6. VOR Receiver Check Points
7. Air Route Traffic Control Centers
8. Preferred IFR Routes
9. Aeronautical Chart Bulletin
10. Enroute Flight Advisory Service (EFAS)

V. Physiological Factors Related to Flight

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

B. Reaction of the Body to Changes in Atmospheric Pressure
1. Changes in altitude
2. Aerotitis
3. Aerosinusitis

C. Reaction of the Body to Changes in Oxygen Partial Pressure.
   1. Hypoxia
   2. Causes of carbon monoxide poisoning
   3. Time of useful consciousness
   4. Cabin pressurization and decompression

D. Self Imposed Stress.
   1. Fatigue and its effect on the body
   2. Alcohol and its effect on the body
   3. Drugs and their effects on the body
   4. Scuba diving and its effect on the body
   5. Panic causes and prevention--hyperventilation

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

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

G. Noise, Vibration, and Temperature.

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

VI. Aviation Weather

A. The Earth's Atmosphere.
   1. Composition
   2. Vertical structure
   3. The standard atmosphere
   4. Density and hypoxia

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

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

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

E. Moisture.
   1. Measurements
      a. Relative humidity
      b. Dewpoint
   2. Change of state
   3. Cloud formation precipitation
   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. Airmasses.
   1. Source regions
   2. Classification of airmasses
   3. Airmass modification
   4. Summer and winter airmass weather

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

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

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

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

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

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

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

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

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

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

VII. Airplane Operation

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

B. Performance.
   1. Takeoff charts
   2. Rate-of-climb charts
   3. Cruise charts
   4. Maximum safe crosswind charts
   5. Use of Denalt computer
   6. Landing charts

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

VIII. Engine Operation

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

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

IX. Navigation

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

B. Pilotage.
1. Plotting course
2. Identifying landmarks

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

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

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

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

X. Aerodynamics and Principles of Flight

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

B. Functions of the Flight Controls.

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

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

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

F. Flight Controls/Axes of an Airplane.

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

H. Lift Versus Angle of Attack.

I. Lift/Thrust Versus Air Density.

J. Types/Effect of Flaps, Spoilers, Divebrakes

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

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

M. Power Versus Climb/Descent/ Level Flight.

N. Gyroscopic Principles.

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

P. Ground Effect.

Q. Principles of Propellers.

R. Loads/Load Factors.

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

T. Airplane Peformance Characteristics.

XI. Flight Instruments and Systems

A. Attitude Indicator Operation/Errors.

B. Heading Indicator Operation/Errors.

C. Turn Indicator Operation/Errors.

D. Altimeter Operation/Errors.

E. Vertical Speed Indicator Operation/ Errors.

F. Airspeed Indicator Operation/ Errors.

G. Vacuum Systems/Instruments.

H. Pitot/Static Systems/Instruments.

I. Magnetic Compass Operation/Errors.

J. Altimeter Setting Procedure/ Significance.

K. Pressure Altitude Significance/ Obtaining.

L. Gyroscopic Principles.

XII. Radio Communications

A. VHF Radio Communications/ Phraseology.

B. Postion Reporting Procedures.

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

D. FSS Communications Procedures.

E. Obtaining Emergency Assistance.

F. Lost Procedure When Radio is Inoperative.

G. Use of Proper Communications Frequencies.

XIII. Basic Instrument Flying

A. Components of Attitude Instrument Flying.

B. Pitch, Bank, Power Control.

C. Straight-and Level Flight.

D. Turns/Turns to Predetermined Headings.

E. Constant Rate Climbs/Descents/ Leveloffs.

F. Constant Speed Climbs/Descents/ Leveloffs.

G. Magnetic Compass Turns.

H. Effect of Changes in Airspeed.

I. False Sensations in Flight.

MAXIMUM TIME ALLOWED FOR TEST: FIVE HOURS

GENERAL INSTRUCTIONS

READ CAREFULLY

1. This book contains 550 questions beginning with number 1001. You are required to answer 100 QUESTIONS ONLY.

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

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

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

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

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

7. The MINIMUM passing grade is 70 percent.

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.

AIRMAN WRITTEN TEST APPLICATION

PRIVACY ACT STATEMENT

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

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

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

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

INSTRUCTIONS TO APPLICANT:

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

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

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

* DO NOT TEAR SHEETS APART.

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

INSTRUCTIONS TO FAA PERSONNEL:

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

SAMPLE ANSWER SHEET

DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

AIRMAN WRITTEN TEST APPLICATION

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

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

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

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

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

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

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

Graduation date | NAME OF SCHOOL | CITY AND STATE

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

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

Applicant's identity established by:

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

CARD B: CERTIFICATED SCHOOL NUMBER | MATCH TIP DATE BY SECTION 1 2 3 | ID

FIELD OFFICE DESIGNATION

SIGNATURE of FAA Representative

INSTRUCTIONS FOR MARKING THE ANSWER SHEET. Completely darken only one circle for each question. DO NOT USE (X) OR (✓). Use black lead pencil furnished by examiner. To make corrections, 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 ①②③④	23 ①②③④	45 ①②③④	67 ①②③④	89 ①②③④	111 ①②③④	133 ①②③④
2 ①②③④	24 ①②③④	46 ①②③④	68 ①②③④	90 ①②③④	112 ①②③④	134 ①②③④
3 ①②③④	25 ①②③④	47 ①②③④	69 ①②③④	91 ①②③④	113 ①②③④	135 ①②③④
4 ①②③④	26 ①②③④	48 ①②③④	70 ①②③④	92 ①②③④	114 ①②③④	136 ①②③④
5 ①②③④	27 ①②③④	49 ①②③④	71 ①②③④	93 ①②③④	115 ①②③④	137 ①②③④
6 ①②③④	28 ①②③④	50 ①②③④	72 ①②③④	94 ①②③④	116 ①②③④	138 ①②③④
7 ①②③④	29 ①②③④	51 ①②③④	73 ①②③④	95 ①②③④	117 ①②③④	139 ①②③④
8 ①②③④	30 ①②③④	52 ①②③④	74 ①②③④	96 ①②③④	118 ①②③④	140 ①②③④
9 ①②③④	31 ①②③④	53 ①②③④	75 ①②③④	97 ①②③④	119 ①②③④	141 ①②③④
10 ①②③④	32 ①②③④	54 ①②③④	76 ①②③④	98 ①②③④	120 ①②③④	142 ①②③④
11 ①②③④	33 ①②③④	55 ①②③④	77 ①②③④	99 ①②③④	121 ①②③④	143 ①②③④
12 ①②③④	34 ①②③④	56 ①②③④	78 ①②③④	100 ①②③④	122 ①②③④	144 ①②③④
13 ①②③④	35 ①②③④	57 ①②③④	79 ①②③④	101 ①②③④	123 ①②③④	145 ①②③④
14 ①②③④	36 ①②③④	58 ①②③④	80 ①②③④	102 ①②③④	124 ①②③④	146 ①②③④
15 ①②③④	37 ①②③④	59 ①②③④	81 ①②③④	103 ①②③④	125 ①②③④	147 ①②③④
16 ①②③④	38 ①②③④	60 ①②③④	82 ①②③④	104 ①②③④	126 ①②③④	148 ①②③④
17 ①②③④	39 ①②③④	61 ①②③④	83 ①②③④	105 ①②③④	127 ①②③④	149 ①②③④
18 ①②③④	40 ①②③④	62 ①②③④	84 ①②③④	106 ①②③④	128 ①②③④	150 ①②③④
19 ①②③④	41 ①②③④	63 ①②③④	85 ①②③④	107 ①②③④	129 ①②③④	
20 ①②③④	42 ①②③④	64 ①②③④	86 ①②③④	108 ①②③④	130 ①②③④	
21 ①②③④	43 ①②③④	65 ①②③④	87 ①②③④	109 ①②③④	131 ①②③④	
22 ①②③④	44 ①②③④	66 ①②③④	88 ①②③④	110 ①②③④	132 ①②③④	

DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

AGI-1A

USE ONLY WITH AGI QUESTION BOOK NO. 1*

TITLE	TEST NO.
GROUND INSTRUCTOR TEST ADVANCED	664806

NAME _____

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	1001	26	1111	51	1267	76	1388
2	1009	27	1114	52	1275	77	1393
3	1012	28	1118	53	1277	78	1403
4	1015	29	1126	54	1282	79	1407
5	1018	30	1130	55	1284	80	1412
6	1024	31	1139	56	1288	81	1425
7	1027	32	1145	57	1294	82	1429
8	1034	33	1149	58	1299	83	1438
9	1035	34	1154	59	1304	84	1451
10	1038	35	1159	60	1308	85	1463
11	1046	36	1172	61	1312	86	1466
12	1048	37	1180	62	1317	87	1478
13	1051	38	1189	63	1321	88	1482
14	1055	39	1195	64	1323	89	1484
15	1060	40	1201	65	1332	90	1489
16	1064	41	1206	66	1336	91	1495
17	1068	42	1212	67	1338	92	1510
18	1072	43	1219	68	1342	93	1516
19	1077	44	1239	69	1349	94	1520
20	1082	45	1241	70	1354	95	1529
21	1084	46	1247	71	1364	96	1532
22	1088	47	1250	72	1367	97	1534
23	1094	48	1254	73	1370	98	1537
24	1099	49	1257	74	1378	99	1542
25	1101	50	1265	75	1384	100	1545

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S A M P L E

ADVANCED

GROUND INSTRUCTOR

WRITTEN TEST

001. Control Areas within the contiguous U.S. extend upward from either 700 feet or 1,200 feet above the surface to but not including

1- 18,000 feet MSL.
2- 24,000 feet MSL.
3- the base of the Continental Control Area.
4- 3,000 feet MSL.

002. Unless specified otherwise, Federal airways extend from

1- 700 feet above the surface upward to the Continental Control Area and are 10 nautical miles wide.
2- 1,200 feet above the surface upward to 18,000 feet MSL and are 8 nautical miles wide.
3- the surface upward to 18,000 feet MSL and are 4 nautical miles wide.
4- 1,200 feet above the surface upward to 14,500 feet MSL and are 16 nautical miles wide.

003. As used in aviation, what does "flight visibility" mean?

1- The prevailing horizontal visibility as reported by the United States National Weather Service or an accredited observer.
2- The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.
3- The average visibility in all directions as seen from the cockpit of an aircraft in flight.
4- The average slant range distance that the pilot can see from the cockpit of an aircraft in flight.

004. Regulations which refer to "commercial operators" relate to that person who

1- is a required crewmember aboard an airline transport aircraft.
2- for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier.
3- acts as pilot in command of an air carrier aircraft.
4- is the owner of a scheduled airline.

005. Regulations which refer to the "operational control" of a flight are in relation to

1- exercising the privileges of pilot in command of an aircraft.
2- performing the specific duties of any required crewmember.
3- acting as the sole manipulator of the aircraft's controls.
4- exercising authority over initiating, conducting, or terminating a flight.

006. Regulations which refer to "operator" relate to that person who

1- causes the aircraft to be used or authorizes its use.
2- is a required crewmember aboard the aircraft.
3- acts as pilot in command of the aircraft.
4- is the sole manipulator of the aircraft controls.

007. "Ceiling" as used in aviation weather reports is the height above the earth's surface of the

1- highest layer of clouds located above the reporting station.
2- lowest layer of clouds or obscuration phenomena located above the reporting station.
3- highest layer of clouds that is reported as "overcast" and not classified as "thin" or "partial."
4- lowest layer of clouds or obscuration phenomena that is reported as "broken," "overcast," or "obscuration" and not classifed as "thin" or "partial."

008. Specific requirements pertinent to operating in an Airport Traffic Area apply only at an airport where

1- a Terminal Control Area is established.
2- a Control Zone is in effect.
3- an approach control facility is available.
4- a control tower is in operation.

009. Rules governing Airport Traffic Areas apply when flying into all

1- airports with operating control towers.
2- control zones.
3- airports with operating Flight Service Stations.
4- airports.

010. Airport Traffic Areas are in effect at all airports where

1- a Flight Service Station is in operation.
2- a control tower is in operation.
3- the airport is located within the lateral limits of controlled airspace.
4- a control zone is in effect.

011. An Airport Traffic Area extends upward to, but not including

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

012. When the control tower at an airport is in operation, what designated airspace associated with that airport is in effect?

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

013. Unless otherwise designated, Airport Traffic Areas extend upward to, but do not include

1- 3,000 feet above sea level.
2- 2,000 feet above the elevation of the airport.
3- 3,000 feet above the elevation of the airport.
4- the base of the Continental Control Area.

014. What designated airspace associated with an airport becomes inactive when the control tower at that airport is not in operation?

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

015. Which statement is true regarding Control Areas?

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

016. Which statement is true regarding control zones?

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

017. A control zone may include one or more airports and is normally a circular area with a radius of

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

018. One of the major differences between Control Zones and Control Areas is that all Control Zones

1- always begin at 700 feet AGL while Control Areas always begin at 1,200 feet above the surface.
2- are located around tower-controlled airports only.
3- have higher basic VFR weather minimums than Control Areas.
4- begin at the surface, while all Control Areas begin at an altitude of 700 feet or higher above the surface.

019. Within the contiguous U.S., the vertical limit of Control Zones extends from the surface upward to

1- but not including 10,000 feet MSL.
2- the base of the Continental Control Area.
3- infinity.
4- but not including 3,000 feet AGL.

020. With certain exceptions, the Continental Control Area extends upward from

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

021. Which statement is true concerning the requirements for flight within a Group I Terminal Control Area?

1- At least a Commercial Pilot Certificate is required.
2- Automatic altitude alerting system is required.
3- 4096 radar beacon transponder and automatic altitude reporting equipment are required.
4- Distance measuring equipment is required.

022. Special VFR weather minimums apply to operations within what type airspace?

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

023. The pilot in command is required to hold a category and class rating appropriate to the aircraft being flown, in which of the following?

1- All flights.
2- Flights for compensation or hire.
3- All solo flights.
4- Flight tests given by the Federal Aviation Administration.

024. Unless otherwise authorized, a pilot in command is required to possess a type rating for that aircraft when operating

1- a lighter-than-air category aircraft.
2- any military surplus aircraft.
3- an airplane in air commerce between the United States and other countries.
4- a turbojet powered airplane.

025. Which statement concerning Terminal Control Areas (TCAs) is true?

1- No person may operate an aircraft in either a Group I or a Group II TCA unless prior authorization from ATC has been received.
2- Flight under Visual Flight Rules is not permitted in Group I TCAs.
3- Flight plans are required for flight operations in Group II TCAs.
4- TCAs start at ground level and extend upward to 10,000 feet MSL.

026. Which of the following is permitted if a pilot has a commmercial pilot certificate, airplane category, with only a multiengine land class, and DC-3 type rating?

1- Operating any multiengine airplane, regardless of weight.
2- Carrying passengers for hire in a light multiengine land airplane.
3- Carrying passengers not for hire in a single-engine airplane.
4- Operating any large airplane for hire.

027. Unless otherwise authorized, a pilot in command is required to possess a type rating when operating

1- any airplane or helicopter having a gross weight in excess of 12,500 pounds.
2- any aircraft with a gross weight in excess of 6,000 pounds.
3- any multiengine airplane with a gross weight in excess of 6,000 pounds.
4- any aircraft that requires more than one pilot.

028. Suppose a First-Class Medical Certificate was issued to the pilot on November 18, 1980. Match the last date on which this medical certificate is valid for these operations.

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

a. May 18, 1981.
b. May 31, 1981.
c. November 18, 1981.
d. November 30, 1981.
e. December 31, 1981.
f. November 30, 1982.
g. December 31, 1980.

The correct matchings are

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

029. What is the earliest date a Second-Class Medical Certificate could have been issued to exercise the privileges of a Commercial Pilot Certificate on December 11, 1981?

1- November 31, 1980.
2- December 11, 1980.
3- December 1, 1980.
4- December 31, 1980.

030. A Second-Class Medical Certificate which was issued on March 18, 1980, permits a commercial pilot to exercise which of the following privileges?

1- Commercial pilot privileges until, but not after March 31, 1981.
2- Private pilot privileges until, but not after March 18, 1981.
3- Private pilot privileges until, but not after April 30, 1981.
4- Commercial pilot privileges until, but not after March 18, 1982.

031. A commercial pilot who carries passengers for hire at night is required to hold

1- an airplane instrument rating.
2- a type rating for the airplane being flown.
3- a Commercial Pilot Certificate with a gold seal.
4- a First-Class Medical Certificate.

032. Which of the following are considered aircraft "class ratings"?

1- Standard; restricted; experimental; limited.
2- Transport; normal; utility; acrobatic.
3- Airplane; rotorcraft; glider; lighter-than-air.
4- Single-engine land; multiengine land; single-engine sea; multiengine sea.

033. Appropriate and current pilot and medical certificates must be in one's personal possession

1- only when carrying passengers while acting as pilot in command.
2- only when acting as pilot in command during flight operations involving interstate commerce.
3- at all times while acting in any capacity as a required pilot flight crewmember.
4- only when acting as pilot in command for compensation or hire.

034. According to FARs, a Second-Class Medical Certificate issued January 18 of this year will

1- be issued without a specific expiration date if there are no limitations that would affect the safe operation of an aircraft.
2- expire January 31 of next year for commercial pilot privileges, but may be used for private pilot privileges until January 31, two years hence.
3- expire for commercial pilot privileges January 31, two years hence.
4- expire January 18 of next year.

035. For recently certificated commercial pilots to carry passengers for hire on a VFR flight at night in a multiengine land airplane within a radius of 25 NM from the departure airport, they are required to hold

1- airplane multiengine land ratings.
2- airplane single-engine land ratings.
3- airplane multiengine land and either airplane or helicopter pilot instrument ratings.
4- airplane multiengine land and airplane instrument ratings.

036. If a pilot receives a biennial flight review on September 3, 1980, and an instrument rating on March 28, 1981, the next biennial flight review for this pilot would be due

1- September 30, 1982.
2- March 28, 1983.
3- March 31, 1982.
4- September 3, 1981.

037. Which statement is true regarding Commercial Pilot Certificates?

1- They expire if recency of experience requirements are not met.
2- They expire after a duration of 12 months.
3- They expire after a duration of 24 months.
4- There is no expiration date on these certificates.

038. Examples of the term "Category" as used with respect to certification, and privileges and limitations of airmen, include

1- transport; normal; utility; acrobatic; restricted.
2- airplane; rotorcraft; glider; lighter-than-air.
3- DC-8 and DC-9; Lear Jet; Jet Commander 1121.
4- single-engine; multiengine; land; water; helicopter.

039. In regard to the expiration of Commercial Pilot Certificates, which statement is true?

1- They expire after a duration of 24 months unless the pilot receives a biennial flight review.
2- They expire when recency of experience requirements are not met.
3- They are issued without a specific expiration date.
4- They expire after a duration of 12 months unless the pilot meets the recency of experience requirements.

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

1- logged at least 200 hours of flight time.
2- at least 100 hours of pilot in command time.
3- an instrument pilot rating, if the flights extend beyond a 25-mile radius.
4- special authorization from FAA.

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

1- 60 days after the date of the move.
2- 90 days after the date of the move.
3- 120 days after the date of the move.
4- 30 days after the date of the move.

042. Which statement is true concerning a commercial or private pilot who holds a Second-Class Medical Certificate which was issued May 17, 1980?

1- A certificated commercial pilot is permitted to exercise commercial pilot privileges until April 30, 1982.
2- A certificated commercial pilot may exercise commercial pilot privileges until June 1, 1981, and private pilot privileges until June 1, 1982.
3- A certificated private pilot is permitted to exercise private pilot privileges only until the end of April 30, 1981.
4- A certificated private pilot is permitted to exercise private pilot privileges until May 1, 1981, and student pilot privileges until May 1, 1982.

043. A person may not act as a crewmember of an aircraft if alcoholic beverages have been consumed by that person within the preceding

1- 12 hours.
2- 24 hours.
3- 36 hours.
4- 8 hours.

044. To act as pilot in command of an aircraft that is type-certificated for more than one required pilot crewmember, a pilot must be type rated for that specific type aircraft and have satisfactorily completed a proficiency or flight check in that type aircraft, or an approved simulator, within the preceding

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

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

1- at least a Private Pilot Certificate with a glider rating and made and logged at least three flights as pilot or observer in a glider being towed by an airplane.
2- a logbook record of having made at least three flights as sole manipulator of the controls of a glider being towed by an airplane.
3- at least a Commecial Pilot Certificate with a glider rating.
4- a logbook endorsement for receipt of ground and flight instruction in gliders and familiarity with techniques and procedures for glider towing.

046. What recent flight experience must be met before a commercial airplane pilot may fly solo in an airplane?

1- Accomplish three takeoffs and landings within the preceding 90 days in any aircraft.
2- Satisfactorily accomplish a flight review in any aircraft for which rated, within the preceding 24 months.
3- Satisfactorily accomplish a flight review within the preceding 24 months, but this review must be in an airplane.
4- Accomplish three takeoffs and landings within the preceding 90 days in an airplane.

047. The maximum period of time that a satisfactorily completed FLIGHT REVIEW is valid is

1- one year.
2- two years.
3- three years.
4- six months.

048. The preflight action required by regulations relative to alternatives available if the planned flight cannot be completed is applicable to

1- any flight conducted for hire or compensation.
2- any flight not in the vicinity of an airport.
3- all IFR and night VFR flights.
4- IFR flights only.

049. Which statement is true regarding civil aircraft airworthiness?

1- If an unairworthy mechanical or structural condition exists, that aircraft can be flown only in solo flight.
2- The pilot in command is responsible for determining that the aircraft is in condition for safe flight.
3- The commercial operator is responsible for determining that the aircraft is in condition for safe flight.
4- An FAA certificated mechanic is responsible for determining that the aircraft is in condition for safe flight.

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

1- a type rating if the airplane is of the multiengine class.
2- a First-Class Medical Certificate.
3- an airplane instrument pilot rating.
4- a Third-Class Medical Certificate that was issued within the preceding 12 calendar months.

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

1- Carrying passengers in airplanes is prohibited at night.
2- Carrying passengers for hire at night and on cross-country flights of more than 50 NM in airplanes is prohibited.
3- Flying at night and on cross-country flights in airplanes is prohibited.
4- Carrying passengers on a cross-country flight in airplanes is prohibited.

052. In addition to other preflight action for a VFR flight away from the vicinity of the departure airport, regulations require the pilot in command to

1- check each fuel tank visually to ensure that it is full.
2- check the accuracy of the omni-navigation equipment and the emergency locator transmitter.
3- determine runway lengths of airports of intended use and the airplane's takeoff and landing distance data.
4- file a flight plan.

053. What limitation is imposed on a newly certificated commercial airplane pilot if that person does not hold an instrument pilot rating?

1- The carrying of passengers or property for hire on cross-country flights at night is limited to a radius of 50 NM.
2- The carrying of passengers for hire on cross-country flights is limited to 50 NM and the carrying of passengers for hire at night is prohibited.
3- The carrying of passengers for hire on cross-country flights is limited to 50 NM for night flights, but not limited for day flights.
4- That person is limited to private pilot privileges.

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

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

055. A pilot holding a commercial certificate must show, by a reliable record, the logging of only

1- pilot in command flight time.
2- the flight time necessary to meet the recent experience requirements.
3- flight time with passengers aboard the aircraft.
4- the additional flight instruction time received.

056. Suppose a pilot had a flight review on May 4, 1980, and received a Commercial Pilot Certificate on January 17, 1981. When is the next flight review normally due?

1- January 17, 1983.
2- May 4, 1982.
3- May 4, 1983.
4- January 17, 1982.

057. Which of the following types of landings are required to meet the recency of experience requirements for a VFR night flight carrying passengers in a single-engine nosewheel-type airplane?

1- Three full stops at night in any single-engine airplane.
2- Three full stops during daytime and three full stops at night in any single-engine nosewheel-type airplane.
3- Three touch-and-go's during daytime in single-engine or multiengine airplanes and three full stops in any nosewheel-type airplane.
4- Three full stops during daytime in any nosewheel-type airplane and three full stops at night in either a single-engine or multiengine airplane.

058. Prior to flying an airplane solo, a pilot who holds a Commercial Pilot Certificate must meet which of the following requirements?

1- Hold a Second-Class Medical Certificate issued within the preceding 12 months.
2- Satisfactorily completed a flight review or proficiency check within the preceding 24 months.
3- Accomplish three takeoffs and landings within the preceding 90 days.
4- Hold an instrument rating.

059. To serve as second in command of "large" airplanes a person must hold at least

1- a Commercial Pilot Certificate with the appropriate category, class, and type ratings.
2- a Commercial Pilot Certificate, an appropriate instrument rating, and be type certificated in the airplane.
3- an Airline Transport Pilot Certificate with the appropriate category and type ratings.
4- a Private Pilot Certificate with appropriate category and class ratings.

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

1- Received flight instruction in an airplane that has more than 200 horsepower.
2- Pass a flight test in such an airplane.
3- Hold a 200-horsepower class rating.
4- Make three solo takeoffs and landings in such an airplane.

061. If a pressurized airplane is not equipped with a quick-donning type oxygen mask, one pilot at the controls must wear and use an oxygen mask when operating above which Flight Level?

1- 250.
2- 300.
3- 350.
4- 180.

062. A pilot may log flight time as second in command during what portion of a flight?

1- All flight time while acting as second in command of aircraft on which more than one pilot is required.
2- Only that flight time during which the second in command is the sole manipulator of the aircraft's controls.
3- One-half of the total flight time while acting as second in command regardless of aircraft crew requirements.
4- All flight time when performing second in command duties in any aircraft.

063. If an unpressurized aircraft is operated at 15,500 feet MSL for 1 hour 30 minutes, who is required to use supplemental oxygen while at that altitude?

1- The flight crew during the entire time.
2- The pilot at the controls of the aircraft, but only for 30 minutes.
3- The pilot in command of the aircraft, but only for 1 hour.
4- All occupants, but only for the time exceeding 30 minutes.

064. If you plan to fly an unpresssurized airplane at 13,500 feet MSL for 1 hour 30 minutes, what minimum supply of supplemental oxygen is required by regulations?

1- 30-minute supply for all occupants.
2- 1-hour supply for the required minimum flight crew.
3- 1-hour 30-minute supply for all occupants.
4- 20-minute supply for the required minimum flight crew.

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

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

066. Which of the following is permitted in a "normal" category airplane?

1- Any maneuver requiring an abrupt change in attitude.
2- Any maneuver except acrobatics or spins.
3- All acrobatic maneuvers.
4- Mild acrobatics, including spins.

067. Regarding certificates and documents, no person may operate an aircraft unless it has within it

1- an Airworthiness Certificate, and aircraft and engine logbooks.
2- an Airworthiness Certificate, Registration Certificate, and Operating limitations.
3- a Registration Certificate, aircraft and engine logbooks, and Owner's Handbook.
4- a Registration Certificate and Owner's Handbook.

068. Airworthiness Directives for general aviation aircraft are published as

1- amendments to FARs.
2- nonregulatory directives.
3- supplements to the Advisory Circular System.
4- Notices to Airmen.

069. Airworthiness Directives for general aviation aircraft must be complied with in the same manner as

1- Federal Aviation Regulations.
2- Advisory Circulars.
3- nonregulatory directives.
4- Notices to Airmen.

070. A "utility" category airplane is one in which the pilot is permitted to perform

1- any maneuver except acrobatics or spins.
2- any maneuver that requires an abrupt change in attitude.
3- mild acrobatics, including spins.
4- all types of acrobatics.

071. An altitude alerting system or device is required to be installed in the aircraft when operating which of the following?

1- All turbojet airplanes.
2- All large airplanes.
3- All transport type aircraft.
4- All airplanes under IFR.

072. When are non-rechargable batteries of an Emergency Locator Transmitter (ELT) required to be replaced?

1- Every 24 months.
2- When 50% of their useful life expires or they were in use for 1 hour.
3- At the time of each 100-hour or annual inspection.
4- Annually.

073. Unless authorized, a "Restricted" category civil aircraft should not be operated over

1- large bodies of water.
2- designated mountainous areas.
3- any aircarrier airport.
4- densely populated areas.

074. Unless authorized, a "Restricted" category civil aircraft should not be operated within

1- congested airways.
2- Control Areas.
3- transition areas.
4- Control Zones.

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

1- Limited category aircraft.
2- Utility category aircraft.
3- Restricted, Limited, and Utility category aircraft.
4- Restricted category aircraft.

076. The carriage of passengers for hire by a commercial pilot is

1- not authorized in Utility category aircraft.
2- not authorized in Limited category aircraft.
3- authorized in Restricted category aircraft.
4- authorized in Experimental category aircraft.

077. What equipment is required if an aircraft is operated for hire on a day VFR flight conducted over water and beyond power-off gliding distance from shore?

1- A sensitive altimeter adjustable for barometric pressure.
2- An approved system of dispensing at least two different colors of water dye.
3- An approved radar altimeter.
4- Approved flotation gear readily available to each occupant, and at least one pyrotechnic signaling device.

078. Which is required equipment for powered aircraft during VFR night flights?

1- Gyroscopic direction indicator.
2- Anticollision light system.
3- Gyroscopic pitch and bank indicator.
4- Appropriate radio navigational equipment.

079. The required minimum flight crew must use supplemental oxygen at all times at cabin pressure altitudes above which altitude?

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

080. In addition to that required for unpressurized aircraft, at least a 10-minute supply of supplemental oxygen must be available for each occupant of a pressurized aircraft when operating above which Flight Level?

1- 190.
2- 200.
3- 250.
4- 180.

081. Formation flight while carrying passengers for hire is

1- not authorized, except when operating outside of controlled airspace.
2- authorized, if previous arrangements have been made with the other pilot/pilots.
3- authorized if the passengers are so informed prior to the flight.
4- not authorized under any circumstances.

082. What is the maximum distance from an airport that an airplane engaged in training operations may be operated without an Emergency Locator Transmitter?

1- 25 miles.
2- 50 miles.
3- 75 miles.
4- 10 miles.

083. If on a night flight the pilot of airplane A observes only the green wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

1- Airplane B; it is to the right of airplane A.
2- Airplane A; it is to the right of airplane B.
3- Airplane A; it is to the left of airplane B.
4- Airplane B, it is to the left of airplane A.

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

1- 12 months.
2- 16 months.
3- 24 months.
4- 9 months.

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

1- Formation flights are not permitted within controlled airspace.
2- Parachutes are required to be worn during formation flights.
3- Formation flights are prohibited when carrying passengers for hire.
4- Formation flights must be performed above 1,500 feet AGL.

086. Unless coordinated with ATC, operational testing of Emergency Locator Transmitters should be made only within the

1- last 5 minutes before any hour.
2- last 10 minutes before any hour.
3- first 10 minutes before any one-half hour.
4- first 5 minutes after any hour.

087. If on a night flight the pilot of airplane A observes only the red wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

1- Airplane B; it is to the left of airplane A.
2- Airplane A; it is to the left of airplane B.
3- Airplane A; it is to the right of airplane B.
4- Airplane B; it is to the right of airplane A.

088. May an airplane be operated in formation flight while passengers are carried for hire?

1- Yes, if operating outside controlled airspace.
2- Yes, if the passengers approve.
3- Yes, provided it is pre-arranged between the pilots.
4- No, this is not authorized.

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

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

090. Unless otherwise authorized or required by ATC, the maximum indicated airspeed at which a reciprocating engine equipped aircraft should be flown within an Airport Traffic Area is

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

091. What is the maximum indicated airspeed allowed in a VFR corridor designated through a Terminal Control Area?

1- 180 knots.
2- 200 knots.
3- 230 knots.
4- 156 knots.

092. When flying beneath the lateral limits of a Terminal Control Area, the maximum indicated airspeed authorized is

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

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

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

094. Unless otherwise authorized or required by ATC, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL?

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

095. You are flying an airplane at 5,500 feet while on a heading of 300°. You see an airplane headed west and converging from your right. According to Regulations, which pilot should give way and why?

1- You should give way, since the airplane on your right has the right-of-way.
2- The pilot of the other airplane should give way, since you are to its left and you have the right-of-way.
3- The pilot of the other aircraft should give way, since it is not flying at a proper VFR altitude.
4- Each pilot should alter course to the right, since safety requires constant vigilance of all pilots.

096. If airplane A is overtaking airplane B, which airplane has the right-of-way?

1- Airplane B, and it should expect to be passed on the right.
2- Airplane A, and it should alter course to the right to pass.
3- Airplane A, and it should alter course to the left to pass.
4- Airplane B, and it should expect to be passed on the left.

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

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

098. All aircraft (except gliders) are required to be equipped with operable Mode A 4096 transponders with automatic pressure altitude reporting capability when operating in

1- all airspace above 10,000 feet MSL.
2- controlled airspace above 10,000 feet MSL.
3- all airspace above 12,000 feet MSL that is not in the Continental Control Area.
4- controlled airspace above 12,500 feet MSL.

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

1- Approval from ATC to tow the glider in a Control Zone.
2- A certificate of waiver issued by the Administrator.
3- A Special Purpose Airworthiness Certificate issued by the controlling General Aviation District Office.
4- A glider rating on the pilot in command's pilot certificate.

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

1- A record of training in towing for the pilot in command.
2- A safety link at each end of the towline which has a breaking strength not less than 80% of the aircraft's gross weight.
3- A certificate of waiver issued by the Administrator.
4- Approval from ATC to operate in a control area.

101. Portable electronic devices which may cause interference with the navigation or communication system may not be operated on any aircraft while being flown under IFR

1- along federal airways.
2- by a commercial operator.
3- at altitudes above 14,500 feet MSL.
4- within the United States.

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

1- Seatbelts must be fastened about passengers during takeoff and landing only, while required flight crewmembers' seatbelts must be fastened during the entire flight.
2- Seatbelts must be fastened about passengers and required crewmembers during takeoff and landing only.
3- Seatbelts must be fastened about passengers during takeoff and landing only, while each required crewmember's seatbelt must be fastened at all times while occupying an assigned station.
4- All persons on board must have their seatbelts fastened during the entire flight.

103. One may not act as pilot in command of an aircraft while carrying passengers who are obviously under the influence of intoxicating liquors or drugs unless

1- these passengers are medical patients under proper care.
2- liquors or drugs are not to be served aboard the aircraft.
3- these passengers remain seated with the seatbelts fastened.
4- it is decided the safety of the flight would not be affected.

104. To comply with regulations, required flight crewmembers' seatbelts must be fastened

1- only during takeoff and landing when passengers are aboard the aircraft.
2- at all times while the aircraft is being operated in clouds.
3- only during takeoff and landing.
4- while the crewmembers are at their stations.

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

1- 18,000 feet MSL.
2- 24,000 feet AGL.
3- 29,000 feet MSL.
4- 10,000 feet AGL.

106. To determine cruising flight levels the minimum altitude at which a sensitive altimeter should be set to 29.92" Hg is

1- 12,500 feet MSL.
2- 18,000 feet MSL.
3- 22,500 feet MSL.
4- 10,000 feet MSL.

107. If an altimeter setting is not available at a departure airport, the sensitive altimeter should be set to indicate

1- the elevation of the departure airport.
2- the elevation of the departure airport corrected to mean sea level.
3- pressure altitude corrected for non-standard temperature.
4- the standard pressure 29.92" Hg.

108. The minimum safe altitude which applies anywhere is

1- an altitude which permits a safe emergency landing in the event of a power failure.
2- 500 feet above the surface, except over open water or sparsely populated areas.
3- 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.
4- 500 feet above the surface.

109. What is the minimum safe altitude above the highest obstacle that must be maintained over congested areas?

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

110. Suppose while on the final approach for landing, an alternating green and red light followed by a flashing red light is received from the control tower. Under these circumstances the pilot should

1- discontinue the approach, fly the same traffic pattern and approach again, and land.
2- abandon the approach, realizing the airport is unsafe for landing.
3- abandon the approach, circle the airport to the right, and expect a flashing white light when the airport is safe for landing.
4- land and clear the runway in use as safely and quickly as possible.

111. A flashing green light from the control tower to an aircraft in flight means

1- continue, because this light signal is not applicable to aircraft in flight.
2- circle the airport to the left and reenter the traffic pattern.
3- return for a landing, and expect a steady green light at the proper time.
4- continue, but exercise extreme caution.

112. If a flashing red light from the tower is received while holding on a runway for takeoff, the pilot should

1- take off immediately.
2- taxi clear of the runway.
3- return to the starting point on the ramp.
4- hold that position.

113. A flashing red light from the control tower during a landing approach means

1- give way to other aircraft in the traffic pattern.
2- the airport is unsafe; do not land.
3- exercise extreme caution while landing.
4- give way to faster aircraft; circle until cleared.

114. Unless otherwise authorized, all airplanes being operated within a Group I Terminal Control Area are required to be equipped with an operable

1- 4096 radar beacon transponder with automatic altitude reporting capability.
2- ADF receiver and VOR receiver.
3- DME receiver and an Emergency Locator Transmitter.
4- ILS receiver and marker beacon receiver.

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

1- Solo student pilots are not authorized to take off or land at airports that are located within Group I TCAs.
2- When operating within Group II TCAs, VOR receivers are not required.
3- Flight plans are rquired to be filed prior to operating within Group II TCAs.
4- Flight under Visual Flight Rules is not authorized within Group I TCAs.

116. What is the correct departure procedure at a noncontrolled airport?

1- The FAA approved departure procedure for that airport.
2- Depart in the same manner as at other airports.
3- Make all left turns, except a 45° right turn on the first crosswind leg.
4- Departure in any direction consistent with safety, after crossing the airport boundary.

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

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

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

1- When passing over these areas, aircraft are required to be at least 4,000 feet above the surface.
2- These areas should be avoided unless landing or taking off from airports within the areas, or unless otherwise authorized by Air Traffic Control.
3- Airport Traffic Areas are depicted on Sectional Aeronautical Charts by a broken line circle.
4- To operate within these areas, the pilot must possess at least a Private Pilot Certificate.

119. What type of speed at the planned cruise altitude should be entered on a flight plan?

1- Estimated groundspeed.
2- Calibrated airspeed.
3- True airspeed.
4- Indicated airspeed.

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

1- both airports, as well as to fly through the area.
2- both airports, but not required to fly through the area.
3- the tower-controlled airport only, but not required to fly through the area.
4- the tower-controlled airport only, as well as to fly through the area.

121. When entering an airport traffic area, what is the minimum altitude at which a turbine-powered or large aircraft may be flown until further descent is required for a safe landing?

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

122. What is the minimum basic VFR flight visibility for all flights at or above 10,000 feet MSL except when less than 1,200 feet AGL?

1- 3 miles.
2- 3 miles during daylight hours and 5 miles during official night hours.
3- 5 miles.
4- 1 mile in uncontrolled airspace, 3 miles in controlled airspace.

123. To operate an airplane VFR outside controlled airspace at an altitude of more than 1,200 feet AGL but less than 10,000 feet MSL, regulations require a flight visibility of no less than

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

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

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

125. What is the minimum distance from clouds that must be maintained when operating an aircraft outside controlled airspace at an altitude above 1,200 feet AGL but less than 10,000 feet MSL?

1- 1,000 feet above or 1,000 feet below and 1 mile horizontally.
2- 1,000 feet above or 500 feet below and 2,000 feet horizontally.
3- Clear of clouds.
4- 500 feet above or 1,000 feet below and 2,000 feet horizontally.

126. The minimum flight visibility for VFR flight increases from 3 to 5 miles at and above an altitude of

1- 10,000 feet MSL.
2- 14,500 feet MSL.
3- 18,000 feet MSL.
4- 1,200 feet AGL.

127. Regarding the operation of an airplane within a Group I Terminal Control Area, which of the following is true?

1- The airplane must be equipped with an operable VOR receiver, two-way communications radio, and a radar beacon transponder.
2- The pilot in command must hold an instrument pilot rating, and be prepared to be vectored through clouds if necessary.
3- The airplane must be certificated for flight under Instrument Flight Rules.
4- The pilot in command must hold at least a Commercial Pilot Certificate.

128. Flight within a Positive Control Area must be conducted under

1- VFR if the aircraft is equipped with a 4096 radar beacon transponder with automatic altitude reporting capability.
2- IFR only, and at a specific flight level assigned by ATC.
3- VFR or IFR, depending upon pilot qualifications and recent experience.
4- VFR, except when the weather is less than the required basic VFR minimums.

129. A disaster area within which a "Temporary Flight Restriction" is in effect can be determined by referring to

1- Airman's Information Manual, Part I.
2- Notices to Airmen.
3- AIRMETS.
4- Federal Aviation Regulations, Part 91.

130. Which is true for flight within Terminal Control Areas (TCAs)?

1- VFR operations are not authorized within Group I TCAs.
2- Operable transponders are required when operating within all TCAs.
3- Takeoffs and landings at airports within Group I TCAs are not authorized unless the pilot holds at least a Private Pilot Certificate.
4- All pilots operating within TCAs are required to file a flight plan.

131. Suppose an aircraft is being flown before sunrise and official sunrise is 0718. When are the aircraft's position lights required to be lighted?

1- They must remain lighted until 0748 then may be turned off.
2- They must remain lighted until 0613 then may be turned off.
3- They must remain lighted until 0718 then may be turned off.
4- They must remain lighted until 0648 then may be turned off.

132. Suppose after declaring an emergency with ATC and being given priority over other air traffic, a landing is made without incident. In this case

1- the pilot shall under all circumstances, submit a detailed report of that emergency to the chief of the ATC facility involved.
2- a detailed report must be submitted to the nearest General Aviation District or Regional Office of the FAA within 7 days.
3- the pilot must personally report to the chief of the facility involved to explain the reason for the emergency.
4- the pilot shall, if requested by ATC, submit a detailed report of that emergency within 48 hours to the chief of that ATC facility.

133. Suppose a pilot operating VFR while under radar control is assigned a vector and an altitude by ATC. The pilot should

1- deviate from the assigned altitude to avoid entering clouds, but should maintain the assigned heading.
2- deviate from the assigned heading to avoid entering clouds, but should maintain the assigned altitude.
3- not enter clouds, and should advise ATC that VFR conditions cannot be maintained.
4- maintain the assigned heading and altitude until a change is received from ATC even if clouds will be entered.

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

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

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

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

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

The correct matching is

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

136. What is the minimum allowable flight visibility for acrobatic flight?

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

137. What is the minimum allowable altitude for acrobatic flight?

1- 1,500 feet AGL.
2- 2,000 feet MSL.
3- 3,000 feet AGL.
4- 1,000 feet MSL.

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

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

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

1- 500 feet beneath clouds, and the ground visibility must be at least 1 mile.
2- Clear of clouds, and the flight visibility must be at least 1 mile.
3- 500 feet beneath clouds, and the flight and ground visibility must be at least 3-5 miles. (Marginal VFR).
4- Clear of clouds, and the ground visibility must be at least 2 miles.

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

1- The flight visibility must be at least 3 miles.
2- The flight must be able to remain at least 500 feet below the clouds.
3- The airplane must be equipped for IFR flight.
4- The pilot must hold at least a Commercial Pilot Certificate.

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

1- The ceiling within the Control Zone must be at least 500 feet.
2- The pilot must hold an instrument pilot rating and the airplane must be equipped for instrument flight.
3- The Control Zone must be specifically designated as a night Special VFR Control Zone.
4- The Control Zone must have an approach control facility.

142. A special VFR clearance requires that while in the control zone, you remain

1- at least 500 feet from clouds.
2- at least 1,000 feet from clouds.
3- at least 1,500 feet from clouds.
4- clear of clouds.

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

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

144. During which of these situations is prior authorization required from ATC to operate an airplane within a Control Zone?

1- When operating within the control zone in weather conditions that are classified as marginal VFR.
2- When operating within the control zone, regardless of weather conditions.
3- When surface weather conditions in the control zone are less than VFR minimums, even if operating above the clouds.
4- When operating within the control zone beneath a 1,000-foot ceiling.

145. Assuring compliance with an Airworthiness Directive is the responsibility of the

1- owner or operator of that aircraft.
2- National Transportation Safety Board.
3- FAA certificated mechanic.
4- pilot in command of that aircraft.

146. Automatic pressure altitude reporting equipment associated with a radar beacon transponder must be deactivated when

1- operating within an Airport Traffic Area.
2- directed by ATC.
3- operating VFR within a Control Zone.
4- operating VFR within Terminal Control Areas.

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

1- a visibility of at least 1 mile, regardless of the ceiling.
2- a ceiling of 1,000 feet or more, and a visibility of at least 3 miles.
3- such that the pilot can remain clear of clouds and have 1 mile visibility regardless of the ceiling.
4- a ceiling of 500 feet or more, and a visibility of at least 5 miles.

148. Which statement pertaining to Airworthiness Directives (ADs) is true?

1- Aircraft Maintenance personnel are responsible to see that all ADs are complied with.
2- ADs, when complied with chronologically, eliminate the need for maintenance records.
3- If the provisions of an AD have not been complied with, an aircraft cannot be considered to be in an airworthy condition.
4- ADs are nonregulatory in nature.

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

1- magnetic course being flown, beginning more than 3,000 feet above the surface.
2- true heading being flown, beginning at 3,000 feet above mean sea level.
3- magnetic heading being flown, beginning at 3,000 feet above mean sea level.
4- true course being flown, beginning at more than 3,000 feet above the surface.

150. If the 100-hour inspection for an aircraft which is used to carry persons for hire was exceeded by 8 hours, the next inspection is due within how many hours time in service?

1- 100 hours.
2- 102 hours.
3- 110 hours.
4- 92 hours.

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

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

152. Altitudes are referred to as flight levels starting from

1- 14,500 feet MSL.
2- 18,000 feet MSL.
3- 29,000 feet MSL.
4- 10,000 feet MSL.

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

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

154. Airworthiness Directives (ADs) issued for a given airplane, engine, or propeller are amendments to

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

155. The appropriate altitudes required by regulations relating to VFR level cruising flight begin above which altitude?

1- 3,000 feet MSL and are based on magnetic heading.
2- 3,000 feet MSL and are based on true heading.
3- 3,000 feet AGL, and are based on magnetic course.
4- 3,000 feet AGL, and are based on true course.

156. The altitudes to be maintained for VFR level cruising flight are required when

1- more than 3,000 feet above MSL, and are based on true heading.
2- at 3,000 feet or more AGL and are based on true course.
3- at 3,000 feet or more above MSL, and are based on magnetic heading.
4- more than 3,000 feet AGL, and are based on magnetic course.

157. Before passengers can be carried in an aircraft that has been altered in a manner that may have appreciably changed its flight characteristics, it must be flight tested by an appropriately rated pilot with at least a

1- commercial pilot certificate and an instrument rating.
2- private pilot certificate.
3- commercial pilot certificate and a mechanic's certificate.
4- commercial pilot certificate.

158. Frequent inspections should be made of the exhaust manifold heating system on aircraft so equipped to minimize the possibility of

1- a power loss due to back pressure in the exhaust system.
2- exhaust gases leaking into the cockpit.
3- a power loss due to leaking exhaust connections.
4- a cold-running engine due to the heat withdrawn by the heater.

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

1- An annual inspection may be substituted for a 100-hour inspection.
2- It is not permissible to substitute one inspection for another.
3- A 100-hour inspection may be substituted for an annual inspection.
4- An annual inspection is required even if a progressive inspection system has been approved.

160. Who is responsible for determining when maintenance is to be performed on an aircraft?

1- Pilot in command.
2- Maintenance personnel.
3- FAA certificated mechanic.
4- Owner or operator.

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

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

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

1- At the completion of each 100-hour or annual inspection of the aircraft.
2- When the engine has been overhauled or replaced.
3- When additional equipment has been installed in the aircraft.
4- Whenever repair or alteration may have changed the aircraft's flight or operating characteristics.

163. The validity of the Airworthiness Certificate is maintained by

1- performance of an annual and a 100-hour inspection prior to their expiration date.
2- applying for a new Airworthiness Certificate each year, prior to its expiration date.
3- an appropriate "return to service" statement in the aircraft maintenance records upon the completion of required inspections.
4- performance of an annual inspection.

164. After only 70 hours time in service, an annual inspection was completed on an aircraft which is operated for hire. The next 100-hour inspection will be due when the aircraft has flown an additional

1- 100 hours time in service.
2- 120 hours time in service.
3- 130 hours time in service.
4- 30 hours time in service.

165. Suppose an aircraft has 235 hours time in service when it receives a 100-hour inspection. If the inspection was 10 hours overdue, when is the next 100-hour inspection due?

1- At 345 hours time in service.
2- At 325 hours time in service.
3- At 315 hours time in service.
4- At 335 hours time in service.

166. Which of these operations is prohibited if the aircraft being used has not had a 100-hour inspection or annual inspection within the preceding 100 hours time in service?

1- Conducting any commercial operation.
2- Carrying passengers.
3- Giving flight instructions for hire.
4- Carrying property for hire.

167. What information from the aircraft's maintenance records may be discarded after the maintenance has been repeated or superseded by other maintenance?

1- The time since the last required overhaul.
2- The list of current major alterations to the aircraft.
3- The current status of applicable Airworthiness Directives.
4- The description of the maintenance performed.

168. The expiration date of an annual inspection can be determined from the date of the last inspection as entered in the

1- Repair and Alteration Form.
2- Aircraft Use and Inspection Report.
3- Airworthiness Certificate.
4- Aircraft and Engine Maintenance Records.

169. What information from the aircraft maintenance records must be retained for an indefinite period of time?

1- The description of work performed on the aircraft.
2- The signature of the person approving the aircraft for return to service after an inspection, alteration or repair.
3- The total time in service of the airframe.
4- The completion date of any work performed on the aircraft.

170. What information from the aircraft maintenance records must be transferred with the aircraft at the time it is sold?

1- The date of completion of all work which has been performed on the aircraft.
2- The current status of all applicable Airworthiness Directives.
3- The signature and certificate number of each person who has approved the aircraft for return to service after an inspection, alteration, or repair.
4- A description of all work performed on the aircraft.

171. Aircraft accident reporting rules are contained in

1- Federal Aviation Regulations, Part 61.
2- Federal Aviation Regulations, Part 91.
3- National Transportation Safety Board Regulation, Part 830.
4- Federal Aviation Regulations, Part 1.

172. Which of the following operations is governed by Federal Aviation Regulation, Part 135?

1- Operations that carry persons in air commerce for compensation or hire in small aircraft.
2- Nonstop sightseeing flights that begin and end at the same airport and do no exceed a 25-mile radius.
3- Student instruction, ferry flights, and aerial work operations such as chemical applications and pipeline patrol.
4- Air carrier operations and emergency mail service conducted under the Federal Aviation Act of 1958.

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

1- sightseeing flights within a 25-mile radius of the airport.
2- the transportation of mail conducted under a "star route" contract.
3- aerial photography or survey operations.
4- student instruction flights.

174. Part 135 of the Federal Aviation Regulations applies to which operation?

1- Aerial operations for compensation, such as aerial photography, pipeline patrol, rescue, and crop dusting.
2- Civil aircraft being ferried to a foreign country.
3- Flight instruction conducted by an FAA approved flight school.
4- Commercial operations other than air carrier in small aircraft.

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

1- 30 days.
2- 12 calendar months.
3- 24 calendar months.
4- 10 hours time in service.

176. A new maintenance record being used for a rebuilt aircraft engine must include previous

1- changes as required by Airworthiness Directives.
2- operating history of the engine.
3- operating hours of the engine.
4- annual inspections performed on the engine.

177. No person may use an ATC transponder in an airspace which requires a transponder, unless that transponder has passed an inspection within the preceding

1- 180 days.
2- 12 calendar months.
3- 24 calendar months.
4- 90 days.

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

1- It may be used when outside controlled airspace.
2- It may be used for VFR flight but not for IFR flight.
3- Its use is not permitted.
4- It may be used anywhere except in Terminal Control Areas.

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

1- When aircraft collide while in flight.
2- Damage to an aircraft's propeller while the aircraft is parked or taxiing on the surface.
3- The failure of an aircraft's generator/alternator while the aircraft is in flight.
4- An engine failure for any reason while the aircraft is in flight.

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

1- Flight control system malfunction or failure.
2- Damage to a landing gear.
3- A near midair collision.
4- An in-flight generator/alternator failure.

181. The nearest field office of the National Transportation Safety Board should be notified immediately when

1- damage limited to the wingtips of an aircraft occurs.
2- an overdue aircraft is thought to have been involved in an accident.
3- the pilot of an aircraft uses evasive action to avoid a midair collision with another aircraft.
4- damage to an aircraft's landing gear or wheels occur.

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

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

183. Part 135 regulations governing interstate air commerce apply to flights conducted

1- between locations in the same state through the airspace of another state.
2- between Mexico and the United States.
3- from one state into another state, excluding the District of Columbia.
4- only from one state into and terminating in another state.

184. To comply with regulations, which aircraft incident would require an immediate notification?

1- Engine failure for any reason during flight.
2- Any electrical fire occurring during flight.
3- Generator failure in flight which results in the loss of the electrical system.
4- Damage to the landing gear as a result of a hard landing.

185. Procedures regarding aircraft accident reports are found in

1- Federal Aviation Regulations, Part 61.
2- Federal Aviation Regulations, Part 91.
3- Federal Aviation Regulations, Part 135.
4- National Transportation Safety Board Regulation, Part 830.

186. When a runway on an airport is closed, how is it identified as being closed?

1- Red lights are placed at the approach end of the runway.
2- Yellow chevrons are painted on the runway beyond the threshold.
3- An "X" is painted on each end of the runway.
4- The letter "C" is painted in red after the runway number.

187. Which incident do Regulations require an immediate notification?

1- Damage to the landing gear as the result of a hard landing.
2- Any required flight crewmember being unable to perform flight duties because of illness.
3- Generator failure in flight which results in the loss of the electrical system.
4- Engine failure for any reason during flight.

188. Where can information be found concerning the reporting of an accident which has resulted in substantial damage to an aircraft?

1- In Federal Aviation Regulation, Part 61, and in Part I of the Airman's Information Manual.
2- In Federal Aviation Administration Compliance and Security Regulations.
3- In National Transportation Safety Board Regulation, Part 830, or the Airman's Information Manual.
4- In Federal Aviation Regulation, Part 91.

189. With regard to the operational status of a VORTAC, what is indicated if the coding identification is received approximately once every 30 seconds?

1- The VOR component is inoperative, the DME component only is operative.
2- Neither the VOR component nor the DME component is operating normally.
3- This facility uses voice identification and both VOR and DME components are operating normally.
4- The VOR component only is operative, the DME component is inoperative.

190. When landing at night on a runway equipped with in-runway lighting, the pilot sees a series of red lights in the centerline lighting, this indicates that

1- 3,000 feet of runway remain.
2- one-half of the runway remains.
3- there are no taxiway turnoffs until the end of the runway is reached.
4- 1,000 feet of runway remain.

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

1- That portion of the runway is not suitable for landing.
2- All landings and takeoffs on that runway must be made in the direction of the arrows.
3- That portion of the runway is the designated touchdown zone.
4- That runway is a precision instrument approach runway.

192. What restriction is represented by the operation of a rotating beacon during daylight hours in a control zone?

1- The tower is temporarily shut down.
2- There are unreported obstructions on the airport.
3- An ATC clearance is required for takeoffs and landings.
4- The airport is temporarily closed.

193. Operation of an airport rotating beacon during the hours of daylight would mean

1- right-hand traffic is in effect.
2- that takeoffs and landings only are authorized at the present time.
3- nothing to the pilot because these beacons operate continuously.
4- that weather in the control zone is below basic VFR weather minimums.

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

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

195. When making an approach to a runway equipped with a Visual Approach Slope Indicator (VASI), the VASI lights are observed to be red. Under these conditions, the pilot should

1- ignore these lights as they apply to IFR flights only.
2- level off momentarily to reach the glidepath.
3- continue the same rate of descent.
4- descend rapidly to reach the glidepath.

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

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

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

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

198. A pilot approaching to land an aircraft on a runway served by a Visual Approach Slope Indicator (VASI) at an airport with an operating control tower shall

1- not use the VASI unless a clearance for a VASI approach is received from the control tower.
2- use the VASI only when weather conditions are below basic VFR.
3- maintain an altitude at or above the glide slope until a lower altitude is necessary for a safe landing.
4- use the VASI only when executing an approved instrument approach procedure.

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

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

200. Airspace established as "Warning Areas" are located

1- along military low-altitude training routes.
2- in international airspace.
3- where hazardous terrain exists.
4- in the immediate vicinity of military bases.

201. Transition areas are designed for the purpose of

1- controlling all aircraft within 25 miles of an airport that lies within a control zone.
2- extending control zones laterally from 5 to 25 miles from the primary airport.
3- separating control zones from control areas.
4- containing IFR operations within controlled airspace during specific operations.

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

1- Distance information is obtained automatically when a VOR receiver is tuned to a VORTAC.
2- Distance information is the slant range distance in nautical miles.
3- Distance is the actual horizontal distance and may be in statute or nautical miles, depending on the airborne equipment.
4- Distance information is the actual horizontal distance in statute miles.

203. Regulations require that an aircraft pilot approaching to land on a runway served by a Visual Approach Slope Indicator (VASI) shall use the VASI

1- and stay at or above the glide slope until a lower altitude is necessary for a safe landing.
2- only when weather conditions are below basic VFR.
3- only when executing an approved instrument approach procedure.
4- only if a clearance for VASI approach is received from the control tower.

204. When on the proper glide slope of a standard 2-bar Visual Approach Slope Indicator (VASI) installation, the far lights should be

1- pink and the near lights should be white.
2- pink and the near lights should be pink.
3- white and the near lights should be red.
4- red and the near lights should be white.

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

1- DME operates on frequencies in the VHF spectrum.
2- Distance information received from DME is the actual horizontal distance from the station.
3- DME coded identification is transmitted once for each four times the VOR coded identification of a VORTAC is transmitted.
4- Aircraft must have TACAN equipment to obtain distance information from a VORTAC.

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

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

207. The absence of a sky condition/ceiling on an ATIS broadcast indicates a sky condition/ceiling of

1- 3,000 feet or above.
2- 4,000 feet or above.
3- 5,000 feet or above.
4- 1,000 feet or above.

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

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

209. Special authorization is required prior to conducting flights within which airspace during both VFR and IFR weather conditions?

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

210. Special authorization is not required for VFR flight within which airspace?

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

211. Special authorization is required prior to conducting VFR flights within which airspace?

1- Military Operations Areas.
2- Airport Advisory Areas.
3- Restricted Areas.
4- Alert Areas.

212. As standard operating practice, all inbound aircraft to an uncontrolled airport should continuously monitor the appropriate field facility frequency or frequency 122.9 MHz from which distance until landing?

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

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

1- traffic information and positive control of all aircraft within the Terminal Control Area (TCA).
2- traffic information and headings to fly to join the traffic pattern or to a position behind the preceding aircraft in the approach sequence.
3- traffic information and limited vectoring to VFR aircraft on a workload permitting basis.
4- separation between participating VFR aircraft and all IFR aircraft within the Terminal Radar Service Area (TRSA).

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

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

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

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

216. Radar-equipped FAA Air Traffic Control facilities can provide adequate radar assistance only to aircraft

1- identified by radar and capable of communicating with a radar facility.
2- within 50 NM of the radar site.
3- equipped for instrument flight and flown by an instrument-rated pilot.
4- equipped with at least a 64 code capability transponder.

217. When climbing or descending in VFR conditions between the surface and 12,500 feet MSL, unless otherwise advised by ATC, what transponder code should be used and how should the "ident" feature be used?

1- Code 1200, and the "ident" feature should be engaged.
2- Code 1400, and the "ident" feature should not be engaged.
3- Code 1400, and the "ident" feature should be engaged.
4- Code 1200, and "ident" feature should not be engaged.

218. What minimum aircraft equipmment is required to receive ATC radar advisory service?

1- Two-way communications radio.
2- Distance measuring equipment.
3- ATC transponder.
4- VOR or ADF receivers.

219. If Air Traffic Control instructs a pilot to "squawk VFR" when departing a Terminal Radar Service Area, under Visual Flight Rules, the pilot should

1- set transponder code to 1400, and engage "ident" feature.
2- set transponder code to 1200, but do not engage "ident" feature.
3- set transponder code to 1200, and engage "ident" feature.
4- set transponder code to 1400, but do not engage "ident" feature.

220. When a pilot accepts an ATC clearance to follow another aircraft to a landing, that pilot is responsible for maintaining

1- wake turbulence separation.
2- a minimum of 5 miles separation from all other aircraft in the traffic pattern.
3- a minimum of 2 minutes elapsed time before landing behind another aircraft.
4- a minimum of 2 miles separation from all other aircraft in the traffic pattern.

221. A cause of hypoxia other than reduced atmospheric pressure is

1- hyperventilation.
2- vertigo.
3- toxic substances in the blood.
4- high rates of descent.

222. When the hairs in the semi-circular canals of the inner ear are deflected, the pilot may experience

1- hypoxia.
2- hyperventilation.
3- discomfort or pain of the eardrum.
4- spatial disorientation or vertigo.

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

1- Tingling of the hands, legs, and feet.
2- Decreased breathing rate.
3- Increased vision acuity.
4- An increased sense of well-being.

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

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

225. Susceptibility to carbon monoxide poisoning increases as

1- altitude decreases.
2- air pressure increases.
3- humidity of the air decreases.
4- altitude increases.

226. An early symptom of carbon monoxide poisoning is

1- a dimming of one's vision.
2- an increased sense of well-being.
3- a feeling of sluggishness.
4- a ringing in the ears.

227. Breathing carbon monoxide results in

1- an increase in mental activity.
2- reduced ability to reason and make decisions.
3- increased muscular activity.
4- an increased sense of well-being.

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

1- traffic information and limited vectoring to VFR aircraft on a workload-permitting basis.
2- traffic information and positive control of all aircraft within the Terminal Control Area (TCA).
3- traffic information and headings to fly to join the traffic pattern or to a position in the approach sequence.
4- separation between participating VFR aircraft and all IFR aircraft within the Terminal Radar Service Area (TRSA).

229. The primary purpose of Aeronautical Advisory Stations (UNICOM) is to provide information to pilots pertaining to

1- Air Traffic Control.
2- takeoff and landing clearances.
3- radar assistance to VFR aircraft.
4- runway and wind conditions.

230. If prior to landing you desire to request ground transportation, the proper radio frequency to use would be one assigned to

1- Control Towers.
2- UNICOM.
3- Approach Control.
4- Flight Service Stations.

231. Large accumulations of carbon monoxide in the human body results in

1- loss of muscular power.
2- an increased sense of well-being.
3- being too warm.
4- tightness across the forehead.

232. Which statement is true regarding frequency assignments for UNICOM?

1- 122.8, 123.0, and 122.7 MHz are assigned to airports without an ATC tower or FSS.
2- 122.8 MHz is assigned to airports served by an FSS.
3- 122.95 MHz is assigned to uncontrolled airports.
4- 123.0 MHz is assigned only to airports served by a control tower.

233. When approaching a VOR which is being used for navigation on flights conducted under Visual Flight Rules, it is important to

1- pass the VOR on the right side of the radial to allow room for aircraft flying in the opposite direction on the same radial.
2- concentrate on the omni indicator and carefully make corrections so as to fly directly over the VOR.
3- exercise sustaining vigilance to avoid aircraft that may be converging on the VOR from other directions.
4- attempt to locate the VOR visually to insure that the station was actually passed when the TO-FROM indicator changed.

234. While operating in the traffic pattern of a controlled airport, pilots may adjust flight to achieve proper spacing without ATC approval by

1- executing shallow "S" turns.
2- climbing or descending at the pilot's discretion.
3- executing 180° turns with shallow banks.
4- executing 360° turns.

235. Rapid or extra deep breathing while using oxygen can cause a condition known as

1- aerosinusitis.
2- aerotitis.
3- hyperventilation.
4- hypoxia.

236. The shortage of oxygen in the human body results in which condition?

1- Aerosinusitis.
2- Aerotitis.
3- Hyperventilation.
4- Hypoxia.

237. Which physiological condition normally encountered during flight should a pilot be able to overcome through practice and experience?

1- Aerotitis.
2- Hypoxia.
3- Vertigo.
4- Aerosinusitis.

238. Which statement concerning hypoxia is true?

1- The body has a built-in alarm system to warn of the onset of hypoxia.
2- Heavy smokers may experience symptoms of hypoxia at lower altitudes than nonsmokers.
3- Closing the eyes for a short time may help to overcome the effects of hypoxia.
4- It is possible to predict exactly when and at what flight level hypoxia will occur.

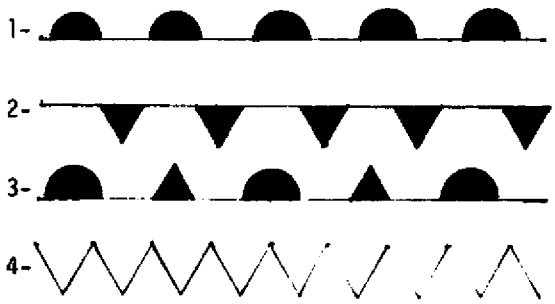
239. Which statement is true regarding the presence of alcohol within the human body?

1- An increase in altitude decreases the adverse effect of alcohol.
2- Judgment and decision-making abilities may be adversely affected by even small amounts of alcohol.
3- The human body metabolizes alcohol at a faster rate if bolstered with coffee.
4- A small amount of alcohol increases vision acuity.

240. Pilots using Air Traffic Control radar services when operating under VFR within a Stage III Terminal Radar Service Area (TRSA) are

1- expected to coordinate altitude change with ATC even if an altitude has not been assigned.
2- relieved of the responsibility to avoid flying into clouds if assigned an altitude.
3- allowed to fly just clear of clouds necessary to comply with ATC instructions.
4- required to maintain assigned vectors in all situations.

241. Which of the following symbols on a surface weather map represents a cold front?



242. In which areas is it permissible to operate an airplane under VFR, if that airplane is not equipped with a 4096 code transponder?

1- Continental Control Area.
2- Stage III Terminal Radar Service Areas (TRSAs).
3- Group II Terminal Control Areas (TCAs).
4- Group I Terminal Control Areas (TCAs).

243. By referring to surface weather maps, what can a person determine?

1- Temperature changes.
2- Current, most up-to-date weather data.
3- The ceilings at reporting stations.
4- Frontal positions.

244. The purpose of a Terminal Radar Service Area (TRSA) is to

1- adjust the flow of VFR traffic into the traffic pattern.
2- provide limited vectoring to VFR and IFR aircraft operating within this area.
3- provide Air Traffic Control separation between VFR aircraft operating within the area on a Special VFR Clearance.
4- provide Air Traffic Control separation between participating VFR aircraft and all IFR aircraft operating within this area.

245. Air Traffic Control authorization is not required prior to operating within the boundaries of a

1- Group I Terminal Control Area (TCA).
2- Group II Terminal Control Area (TCA).
3- Airport Traffic Area inside a TCA.
4- Stage III Terminal Radar Service Area (TRSA).

246. The most current information on communication and NAVAID frequencies of specific radio facilities are contained in the latest issue of the appropriate

1- Sectional Aeronautical Chart.
2- World Aeronautical Chart.
3- Low Altitude En Route Chart.
4- Terminal Area Chart.

247. The reason altimeters should be adjusted to the same altimeter setting for a specific area is

1- the elimination of a need to make in-flight calculations of true altitude.
2- to provide better vertical separation of aircraft.
3- the cancellation of altimeter error due to position of static source.
4- for more accurate terrain clearance in mountainous areas.

248. Which statement concerning hypoxia is true?

1- Tingling or warm sensations and sweating may be symptoms of hypoxia.
2- Hypoxia is caused by nitrogen bubbles in the joints and bloodstream.
3- Forcing oneself to concentrate on the flight instruments will help to overcome the effects of hypoxia.
4- It is possible to predict exactly when and at what flight level hypoxia will occur, and how it will manifest itself.

249. U.S. Low Level Significant Weather Prognostic charts are used to assist the pilot in

1- estimating the movement, development and decay of weather patterns which might occur within the following 12- and 24-hour periods.
2- determining the position of fronts and pressure systems during the preceding 6 hours.
3- determining the areas where ceilings are less than 1,000 feet and visibilities are less than 3 miles.
4- estimating the direction and speed of surface winds and the winds aloft for the following 6 hours.

250. A U.S. Low Level Significant Weather Prognostic chart provides which of the following?

1- The weather forecast to exist within a specific time in the future.
2- An analysis of weather conditions as observed by weather radar.
3- An interpretation of conditions existing in specific areas based on pilot reports.
4- A representation of weather conditions existing at the time of the observation.

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

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

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

1- Ceiling greater than 3,000 feet and/or visibility greater than 5 miles.
2- Ceiling between 5,000 and 7,000 feet and/or visibility greater than 5 miles.
3- Ceiling less than 1,000 feet and/or visibility less than 3 miles.
4- Ceiling between 1,000 feet and 3,000 feet and/or visibility between 3 and 5 miles.

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

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

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

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

255. Information on Surface Weather Maps that should be of greatest value to a pilot is the

1- direction and speed of surface winds and winds aloft.
2- locations of icing, turbulence, and thunderstorms.
3- pressure patterns and front locations.
4- amount, type, and height of clouds.

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

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

257. Which statement is true regarding Winds and Temperatures Aloft Forecast?

1- The temperatures showing neither + nor - should be considered + temperatures at all altitudes.
2- The windspeeds are given in miles per hour.
3- The temperatures are given in degrees Fahrenheit.
4- The wind directions are given in true directions.

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

1- Winds aloft forecasts.
2- Significant weather prognostic charts.
3- Constant pressure charts.
4- Stability charts.

259. When using a constant-pressure chart for planning a flight at 5,000 feet MSL, to which of the following should the pilot refer?

1- 500-millibar analysis chart.
2- 700-millibar analysis chart.
3- 850-millibar analysis chart.
4- 200-millibar analysis chart.

260. A pilot who wishes to determine the observed air temperature-dewpoint spread at FL180 should refer to which of the following?

1- U.S. High Level Significant Weather Prognostic chart.
2- Constant pressure analysis for 500 millibars.
3- Winds and temperature aloft forecast for 18,000 feet.
4- Stability charts for 18,000 feet.

261. To determine the freezing level and areas of probable icing aloft, you should refer to the

1- Radar Summary Chart.
2- Weather Depiction Chart.
3- Area Forecast.
4- Surface Analysis.

262. A U.S. Low Level Significant Weather Prognostic chart shows weather conditions

1- that exist at the time the chart was prepared.
2- for the past 12 to 24 hours.
3- as they are forecast to be 48 hours from the time the chart was prepared.
4- as they are forecast to be at the valid time of the chart.

263. A visibility entry does not appear in a Terminal Forecast when the visibility is expected to

1- be less than minimum for IFR operations.
2- meet the minimum required for VFR operations.
3- be unlimited.
4- be more than 6 miles.

264. What valuable information, as of map time, is provided by a Radar Summary Chart?

1- The intensity and intensity trend of precipitation.
2- The location of VFR and IFR weather.
3- The location of major fronts.
4- The observed winds aloft.

265. Radar Weather Reports are of special interest to pilots because they report

1- large areas of low ceilings and fog.
2- location of precipitation along with type, intensity, and trend.
3- location of broken to overcast clouds.
4- icing conditions.

266. Which statement is true concerning this Radar Weather Report for TUL?

TUL 1130 SPL LN 10TRWX/NC 196/100 220/200 310/240 345/80 C3140 MT 49 AT 290/40 D15.

1- The most intense cell is located 15 NM West-Northwest of the station.
2- Thunderstorm cells are moving from 310° at 40 knots.
3- There are four cells with tops at 10,000, 20,000, 24,000 and 8,000 feet.
4- The visibility is 10 miles in rain-showers.

267. Consider this Terminal Forecast excerpt:

```
OKC 120940
OKC 121010 C4 OVC 1L-F URBL 4 SCT C10 OVC
6H. 04Z VFR..
TUL 121010 C15 OVC. 15Z C12 OVC VR3L C5
OVC 1L-F. 04Z LIFR CIG 4F..
```

Select the true statement with respect to this excerpt.

1- The surface wind at both OKC and TUL is expected to be less than 10 knots during the first 12 hours of the forecast.
2- The valid period of this forecast is 12 hours.
3- The visibility at OKC after 04Z is expected to be 3 to 5 miles.
4- The categorical outlook for TUL implies that the wind is expected to be greater than 25 knots.

268. Terminal Forecasts are issued how many times a day and cover what period of time?

1- Three times daily and are valid for 24 hours with a 6-hour categorical outlook.
2- Four times daily and are valid for 8 hours with a 4-hour categorical outlook.
3- Six times daily and are valid for 12 hours with an additional 6-hour categorical outlook.
4- Two times daily and are valid for 24 hours with an additional 4-hour categorical outlook.

269. Which situation would most likely result in freezing precipitation?

1- Rain falling from air which has a temperature of 32° F. or less into air having a temperature of more than 32° F.
2- Rain falling from air which has a temperature of 0° C. or less into air having a temperature of 0° C. or more.
3- Rain which has a super-cooled temperature of 0° C. or less falling into air having a temperature of more than 0° C.
4- Rain falling from air which has a temperature of more than 32° F. into air having a temperature of 32° F. or less.

270. Select the true statement pertaining to Terminal Forecasts.

1- A forecast of prevailing visibility appears only if it is expected to be 3 miles or less.
2- Terminal Forecasts include specific information concerning cloud tops, icing, and turbulence.
3- If the speed of the surface wind is forecast to be less than 10 knots, the entire wind group is omitted.
4- Terminal Forecasts do not include surface wind forecast.

271. The conditions necessary for the formation of cumulonimbus clouds are a lifting action and

1- unstable air containing an excess of condensation nuclei.
2- unstable, moist air.
3- either stable or unstable air.
4- stable, moist air.

272. When conditionally unstable air with a high moisture content and a very warm surface temperature are forecast, what type of weather can be expected?

1- Strong updrafts and cumulonimbus clouds.
2- Smooth, cloudless skies.
3- Continuous heavy precipitation.
4- Fog and low stratus clouds.

273. Which condition is most likely to exist within a stable air mass?

1- Good visibility at the surface.
2- Moderate to severe turbulence in low levels.
3- Smoke, dust, haze, etc. concentrated in lower levels with resulting poor visibility.
4- Towering cumulus and cumulonimbus clouds.

274. To best determine weather conditions between weather reporting stations, the pilot should refer to

1- Pilot Reports.
2- Prognostic Charts.
3- Weather Maps.
4- Area Forecasts.

UA/OV OKC-AMA1630 FL080/TP C310/SK 085 BKN-OVC/RM LRG TSTM 95W OKC 15 WIDE

UA/OV AMA-GAG 1640 FL055/TP BE35/SK 070 BKN/RM LRG TSTM SE GAG.

UA/OV OKC-PNC 1645 FL075/TP BE58/SK 080 SCT-BKN/TP SUR TURBC SHORT DUR BL/LRG TSTM WOKC

275. One of the above reports indicates that a pilot reported

1- buildups to 3,500 feet east of OKC.
2- tops of the broken-overcast clouds at AMA are 8,500 feet.
3- a large thunderstorm is located 95 miles west of OKC.
4- a ceiling of 3,100 feet between OKC-AMA.

276. According to the above reports, a pilot reported

1- clear weather 95 miles west of OKC.
2- large thunderstorms between GAG and OKC.
3- a line of showers 15 miles wide located 95 miles west of OKC.
4- severe turbulence for short duration from OKC to PNC.

277. In an aviation weather report, which symbol designates a ceiling when used in connection with a cloud height?

1- -BKN
2- -X
3- M, E, W.
4- -OVC

278. Consider the following aviation weather report.

OKC-XM6 OVC 1 1/2 R-F 990/68/67/2908/ 990/RF2 R314

What does the item RF2 mean?

1- The horizontal visibility is 2 miles with rain and fog.
2- The vertical visibility is 200 feet in rain and fog.
3- The runway visibility range is 2,000 feet.
4- Two-tenths of the sky is obscured by rain and fog.

279. Suppose the remarks section of the hourly aviation weather report contains the following coded information.

RADAT 92050

What is the meaning of this information?

1- A pilot reported thunderstorms 92 DME miles distance on the 050 radial of the VORTAC.
2- Relative humidity was 92% and the freezing level (0° C.) was at 5,000 feet MSL.
3- Radar echoes with tops at 5,000 feet were observed on the 092 radial of the VORTAC.
4- Radar echoes were observed at a distance of 92 miles on a bearing of 050°.

280. Consider the following aviation weather report:

OKC SP W5X 1/2 R+F 180/63/61/2204/000/ RF3 R819 TWR VSBY 1/4

Which of the following is true regarding OKC weather?

1- At the time of the report rain had been occurring for 41 minutes.
2- The wind is calm.
3- Runway visibility is 1/4 mile.
4- Runway is flooded with 3 inches of water.

281. Transcribed weather broadcasts (TWEB) can be monitored by tuning the appropriate radio communications receiver to which frequencies?

1- VOR and NDB frequencies.
2- Airport communications frequencies.
3- FSS communications frequencies.
4- NDB frequencies only.

282. If a strong temperature inversion is encountered immediately after takeoff or during an approach to a landing, a potential hazard exists because of turbulence created by

1- strong surface winds.
2- strong convective winds.
3- cold air overriding calm, warm air.
4- wind shear.

283. Suppose an airport has an elevation of 4,000 feet. Assuming standard temperature and dewpoint lapse rates, if the temperature at this airport is 80° F. and the surface dewpoint temperature is 62° F., the base of the clouds formed by a lifting process would be located approximately

1- 6,000 feet MSL.
2- 8,000 feet MSL.
3- 10,000 feet MSL.
4- 4,000 feet MSL.

284. Suppose an airport has an elevation of 2,000 feet. Assuming standard temperature and dewpoint lapse rates, if the temperature at that airport is 92° F. and the surface dewpoint temperature is 72° F., the base of the clouds formed by a lifting process would be located at approximately

1- 4,500 feet MSL.
2- 5,500 feet MSL.
3- 6,500 feet MSL.
4- 3,500 feet MSL.

285. Suppose an airport has an elevation of 1,000 feet. Assuming standard temperature and dewpoint lapse rates, if the temperature at this airport is 70° F. and the dewpoint temperature is 52° F., the base of the clouds formed by a lifting process would be located at approximately

1- 5,000 feet MSL.
2- 6,000 feet MSL.
3- 7,000 feet MSL.
4- 4,000 feet MSL.

286. Surface wind direction is given relative to

1- magnetic north in written weather reports and forecasts.
2- true north in scheduled weather broadcasts for all stations except the broadcasting station.
3- true north when received from FSS Airport Advisories or from control tower instruction for takeoff and landing.
4- magnetic north, regardless of the means used to disseminate wind information.

287. Suppose an airport is at sea level. Assuming standard temperature and dewpoint lapse rates, if the temperature at this airport is 92° F. and the surface dewpoint temperature is 72° F., the base of the clouds formed by a lifting process would be located at approximately

1- 3,500 feet MSL.
2- 4,500 feet MSL.
3- 5,500 feet MSL.
4- 2,500 feet MSL.

288. Individual forecast for specific routes of flight can be obtained from which of the following weather services?

1- Area Forecasts.
2- In-flight Advisories.
3- Transcribed Weather Broadcasts (TWEB).
4- Terminal Forecasts.

289. Which statement is true regarding a cold front occlusion?

1- The air ahead of the warm front has the same temperature as the air behind the overtaking cold front.
2- The air between the warm front and cold front is colder than either the air ahead of the warm front or the air behind the overtaking cold front.
3- The air ahead of the warm front is colder than the air behind the overtaking cold front.
4- The air ahead of the warm front is warmer than the air behind the overtaking cold front.

290. Radiation fog is most likely to occur with which of the following conditions?

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 over a cold surface with an 8- to 10-knot wind causing mixing and condensation.
4- High humidity during the early evening, cool cloudless night with light winds, and favorable topography.

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

1- long-lasting heavy precipitation.
2- fog and drizzle.
3- smooth air.
4- showers and thunderstorms.

292. What causes radiation fog to form?

1- Moist, unstable air being cooled as it is forced up a sloping land surface.
2- The addition of moisture to a mass of cold air as it moves over a body of water.
3- The ground cooling the adjacent air to the dewpoint temperature during conditions of little or no wind, and clear skies.
4- Moist air being warmed by the ground over which it passes.

293. Which of the following is the cause of advection fog?

1- Saturation of cool air as the precipitation falling through it is evaporated.
2- Warm moist air moving over colder ground or water.
3- Moist stable air being cooled adiabatically as it flows up sloping terrain.
4- Terrestrial radiation cooling the ground which in turn cools the air in contact with it.

294. When the air temperature is within 4° of the dewpoint temperature and the spread is decreasing, it is likely that you would encounter

1- fog and low clouds.
2- icing conditions or freezing rain.
3- thundershowers or thunderstorms.
4- clear cool weather.

295. Which of the following types of clouds would indicate areas of convective turbulence?

1- Towering cumulus clouds.
2- Cirrus clouds.
3- Standing lenticular altocumulus clouds.
4- Nimbostratus clouds.

296. Which statement is true regarding air temperature and dewpoint temperature spread?

1- The temperature spread decreases as the relative humidity decreases.
2- The temperature spread increases as the relative humidity increases.
3- Temperature and dewpoint spread are not related to relative humidity.
4- The temperature spread decreases as the relative humidity increases.

297. In the Northern Hemisphere, which of the following is a true statement with regard to the flow of air within a low-pressure system?

1- Air flows inward, downward, and clockwise.
2- Air flows outward, upward, and clockwise.
3- Air flows outward, downward, and counterclockwise.
4- Air flows inward, upward, and counterclockwise.

298. In the Northern Hemisphere, what causes the wind to be deflected to the right?

1- Centrifugal force.
2- Coriolis force.
3- Surface friction.
4- The pressure gradient force.

299. Which statement is true regarding high- or low-pressure systems?

1- A high-pressure area or ridge is an area of rising air.
2- A low-pressure area or trough is an area of descending air.
3- Both high- and low-pressure areas are characterized by descending air.
4- A high-pressure area or ridge is an area of descending air.

300. If the air temperature is 22° C. at an elevation of 3,500 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 9,786 feet MSL.
2- 11,000 feet MSL.
3- 14,500 feet MSL.
4- 6,286 feet MSL.

301. At about what average rate do temperature lapse rates converge in a convective current with unsaturated air?

1- 2.0° C. per 1,000 feet.
2- 2.5° C. per 1,000 feet.
3- 3.0° C. per 1,000 feet.
4- 5/9° C. per 1,000 feet.

302. If the air temperature is 10° C. at an elevation of 2,000 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

1- 4,857 feet MSL.
2- 5,000 feet MSL.
3- 7,000 feet MSL.
4- 2,857 feet MSL.

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

1- fast moving warm front.
2- slow moving cold front that is underrunning warm, moist, and stable air.
3- squall lines.
4- slow-moving warm front.

304. What are the standard atmosphere temperature and pressure values for sea level?

1- 15° C. and 29.92 inches of mercury.
2- 59° C. and 760.0 millibars.
3- 0° F. and 29.92 millibars.
4- 0° C. and 1013.2 inches of mercury.

305. Which of the following is considered to be the most hazardous condition associated with thunderstorms?

1- Lightning.
2- Static electricity.
3- Wind shear and turbulence.
4- St. Elmo's Fire.

306. The factor which determines whether the type of cloudiness associated with a front will be predominantly stratiform or cumuliform is the

1- pressure of the air behind the front.
2- degree of stability of the air being lifted.
3- relative humidity of the air behind the front.
4- dewpoint of the air being lifted.

307. Which statement is true relating to the blue and magenta colors used to depict airports on Sectional Aeronautical Charts?

1- Airports having air-to-ground communications are shown in blue; airports with no means of communication are shown in magenta.
2- Airports having runways capable of handling large aircraft are shown in blue; all others in magenta.
3- Airports having Airport Traffic Areas are shown in blue; all others in magenta.
4- Airports having concrete runways are shown in blue; all others in magenta.

308. When turbulence causes changes in altitude and/or attitude but aircraft control remains positive, that turbulence should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

309. When unsecured objects are tossed about the cockpit or cabin due to turbulence, that turbulence should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

310. Turbulence that causes a pilot to feel a slight strain against the seatbelt or shoulder straps should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

311. Turbulence that causes a pilot to feel definite strains against the seatbelt or shoulder straps should be reported as

1- light.
2- moderate.
3- severe.
4- very light.

312. To take advantage of favorable winds on an extended flight from west to east in the Northern Hemisphere, a pilot should plan the course so as to fly

1- north of both low- and high-pressure areas.
2- south of low-pressure areas and north of high-pressure areas.
3- south of both low- and high-pressure areas.
4- north of low-pressure areas and south of high-pressure areas.

313. To take advantage of favorable winds on an extended flight from east to west in the Northern Hemisphere, a pilot should plan the course so as to fly

1- south of low-pressure areas and north of high-pressure areas.
2- south of both low- and high-pressure areas.
3- north of both low- and high-pressure areas.
4- north of the low-pressure areas and south of high-pressure areas.

314. Which statement is true with regard to the general circulation of air associated with a high-pressure area in the Northern Hemisphere?

1- Air flows outward, downward, and clockwise.
2- Air flows inward, downward, and counterclockwise.
3- Air flows inward, upward and clockwise.
4- Air flows outward, upward, and counterclockwise.

315. If an aircraft travels 4 nautical miles in 1 minute, what is the groundspeed?

1- 220 knots.
2- 230 knots.
3- 240 knots.
4- 210 knots.

316. If an aircraft travels 5 nautical miles in 2 minutes, what is the groundspeed?

1- 90 knots.
2- 150 knots.
3- 180 knots.
4- 80 knots.

317. How far will an aircraft travel in 3-1/2 minutes if its groundspeed is 165 knots?

1- 9.6 NM.
2- 12.8 NM.
3- 28.2 NM.
4- 1.3 NM.

318. Five statute miles is equal to how many nautical miles?

1- 8.75 NM.
2- 5.75 NM.
3- 4.35 NM.
4- 11.25 NM.

319. One nautical mile is equal to how many statute miles?

1- 1.15 SM.
2- 1.75 SM.
3- 2.15 SM.
4- 0.87 SM.

320. How many nautical miles are equivalent to 375 statute miles?

1- 350 NM.
2- 400 NM.
3- 432 NM.
4- 325 NM.

321. When determining the true course in an easterly or westerly direction on a Sectional Aeronautical Chart, the course measurement should be taken at a meridian near the midpoint of the course because

1- the isogonic lines are not parallel.
2- the lines of latitude are drawn in an arc.
3- the angular measurement changes between points due to convergence of the lines of longitude.
4- the magnetic North Pole from which direction is measured, is not located at the geographic North Pole.

322. To determine the horizontal limits and the base of control areas within the boundaries of the U.S.A., pilots should refer to

1- a World Aeronautical Chart.
2- an En Route Low Altitude Chart.
3- an En Route High Altitude Chart.
4- a Sectional Aeronautical Chart.

323. How is a Control Zone depicted on Sectional Aeronautical Charts?

1- A blue dashed line encircling the airport.
2- The letters CT in the airport data box.
3- A magenta colored band surrounding the airport.
4- A blue airport symbol.

324. Which of the following statements is true in regard to the application of magnetic variation in solving navigation problems?

1- To convert from true course to magnetic heading, add easterly variation to the true course.
2- To convert from true course to magnetic course, subtract westerly variation from the true course.
3- To convert from magnetic course to magnetic heading, subtract westerly variation from the magnetic course.
4- To convert from true course to magnetic course, subtract easterly variation from the true course.

325. Consider the following:

Forecast wind . . . . . 310°/15 knots.
Pressure altitude . . . 8,000 feet.
Ambient temperature . . +05° C.
Indicated airspeed . . 210 knots.
Variation . . . . . 8° W.
True course . . . . . 198°

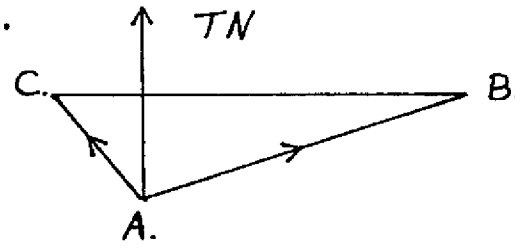
With these conditions, what would be the approximate magnetic heading and groundspeed?

1- 210° and 245 knots.
2- 186° and 215 knots.
3- 194° and 199 knots.
4- 200° and 235 knots.

326. If an aircraft travels 3 nautical miles in 45 seconds, what is the groundspeed?

1- 200 knots.
2- 225 knots.
3- 240 knots.
4- 400 knots.

327.



If the illustration above is used to explain the wind triangle, it would be true to state that

1- line A-B represents true course and groundspeed, and line C-B represents true heading and true airspeed.
2- line A-B represents magnetic heading and true airspeed, and line C-B represents magnetic course and indicated airspeed.
3- line A-B represents magnetic course and indicated airspeed, and line C-B represents true course and groundspeed.
4- line A-B represents true heading and true airspeed, and line C-B represents true course and groundspeed.

328. Consider the following:

Forecast wind . . . . . 210°/26 knots.
Pressure altitude . . . 11,000 feet.
Ambient temperature . . -10° C.
Indicated airspeed . . 140 knots.
Variation . . . . . 10° east.
True course . . . . . 150°

With these conditions, what would be the approximate magnetic heading and groundspeed?

1- 158° and 164 knots.
2- 132° and 178 knots.
3- 168° and 135 knots.
4- 148° and 149 knots.

329. If an aircraft travels 1 nautical mile in 53 seconds, what is the groundspeed?

1- 68 knots.
2- 113 knots.
3- 175 knots.
4- 26.5 knots.

330. If an aircraft travels 2 nautical miles in 50 seconds, what is the groundspeed?

1- 144 knots.
2- 163 knots.
3- 240 knots.
4- 125 knots.

331. If an aircraft travels 1 nautical mile in 40 seconds, what is the groundspeed?

1- 150 knots.
2- 160 knots.
3- 240 knots.
4- 90 knots.

332. Suppose at an altitude of 8,000 feet MSL the temperature is +10° C. If the calibrated airspeed is 155 knots, the true airspeed would be approximately

1- 140 knots.
2- 159 knots.
3- 178 knots.
4- 135 knots.

333. Suppose at an altitude of 9,500 feet MSL the temperature is -20° C. If the calibrated airspeed is 170 knots, the true airspeed would be approximately

1- 152 knots.
2- 190 knots.
3- 205 knots.
4- 141 knots.

334. Given:

Usable fuel at takeoff . . . . 36 gallons
Fuel consumption rate . . . . 12.4 GPH
Constant groundspeed of . . . 140 knots
Flight time since takeoff . . 48 minutes

Based on the above information, how much further can be flown on the fuel remaining?

1- 180 nautical miles.
2- 294 nautical miles.
3- 383 nautical miles.
4- 153 nautical miles.

335. Given:

Usable fuel at takeoff . . . . 40 gallons
Fuel consumption rate . . . . 13.3 GPH
Constant groundspeed of . . . 120 knots
Flight time since takeoff . . 1 hour and 20 min.

Based on the above information how much further can be flown on the fuel remaining?

1- 180 nautical miles.
2- 200 nautical miles.
3- 240 nautical miles.
4- 160 nautical miles.

336. On a cross-country flight, suppose Point A is crossed at 1500 hrs. and the plan is to reach Point B at 1530 hrs. Use the following information to determine the indicated airspeed required to reach Point B on schedule.

Distance between A & B . . 70 NM.
Forecast wind . . . . . 310°/15 knots.
Pressure altitude . . . . 8,000 feet.
Ambient temperature . . . -10° C.
True course . . . . . 270°

The required indicated airspeed would be approximately

1- 137 knots.
2- 152 knots.
3- 168 knots.
4- 126 knots.

337. Consider the conditions listed below:

Departure path . . . . . straight out.
Takeoff time . . . . . 1030 DST.
Winds during climb . . . . 180°/30 knots.
True course during climb . 160°
Airport elevation . . . . 1,500 feet.
True airspeed . . . . . 125 knots.
Rate of climb . . . . . 500 ft/min.

What would be the distance and time upon reaching 8,500 feet MSL?

1- 23 nautical miles and 1044 DST.
2- 25 nautical miles and 1047 DST.
3- 30 nautical miles and 1044 DST.
4- 20 nautical miles and 1047 DST.

338. On a cross-country flight, suppose Point C is crossed at 0900 hrs. and the plan is to reach Point D at 0925 hrs. Use the following information to determine the indicated airspeed required to reach Point D on schedule.

Distance between C & D . . 68 NM.
Forecast wind . . . . . 295°/25 knots.
Pressure altitude . . . . 7,000 feet.
Ambient temperature . . . +10° C.
True course . . . . . 175°

The required indicated airspeed would be approximately

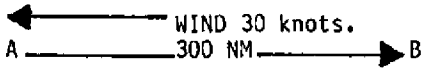
1- 144 knots.
2- 166 knots.
3- 172 knots.
4- 135 knots.

339. Assume a pilot plans to descend from 9,500 feet MSL so as to arrive at 2,500 feet MSL over a VORTAC. With a groundspeed of 175 MPH and a rate of descent of 700 feet per minute, at what distance from the VORTAC should the descent be started?

1- 29.2 statute miles.
2- 24.0 statute miles.
3- 17.5 statute miles.
4- 39.4 statute miles.

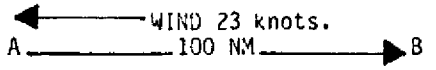
340. Assume it is planned to descend from 11,500 feet MSL so as to arrive at 7,000 feet MSL 5 statute miles from a VORTAC. With a groundspeed of 160 MPH and a rate of descent of 600 feet per minute, at what distance from the VORTAC should the descent be started?

1- 20 statute miles.
2- 25 statute miles.
3- 29 statute miles.
4- 18 statute miles.

341. 

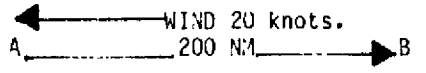
Suppose a nonstop round-trip flight from A to B is planned. If the true airspeed is 160 knots and the rate of fuel consumption is 13 GPH, how much fuel is required?

1- 30.5 gallons.
2- 51.5 gallons.
3- 60 gallons.
4- 20.5 gallons.

342. 

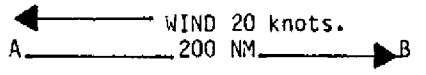
Suppose a nonstop round-trip flight from A to B is planned. If the true airspeed is 127 knots and the rate of fuel consumption is 9.7 GPH, how much fuel is required?

1- 15.9 gallons.
2- 13.4 gallons.
3- 9.4 gallons.
4- 18.3 gallons.

343. 

Suppose a nonstop round-trip flight is made between A and B. If the true airspeed is 100 knots, what is the average groundspeed for the entire flight?

1- 100 knots.
2- 104 knots.
3- 110 knots.
4- 96 knots.

344. 

Suppose a nonstop round-trip flight is made between A and B. If the true airspeed is 100 knots, what is the total time for the flight?

1- 4 hours.
2- 4 hours 10 minutes.
3- 4 hours 20 minutes.
4- 3 hours 50 minutes.

345. Suppose at an altitude of 6,000 feet MSL, the temperature is +5° C. If the calibrated airspeed is 210 knots, the true airspeed would be approximately

1- 230 knots.
2- 210 knots.
3- 196 knots.
4- 192 knots.

346. Suppose at an altitude of 13,000 feet MSL, the temperature is -15° C. If the calibrated airspeed is 174 knots, the true airspeed would be approximately

1- 170 knots.
2- 144 knots.
3- 136 knots.
4- 210 knots.

347. Suppose after 450 miles are flown from the departure point, the aircraft's position is 36 miles off course. If 150 miles remain to be flown, what total correction should be made to converge on the destination?

1- 18.1°
2- 6.0°
3- 43.2°
4- 40.1°

348. Suppose after 185 miles are flown from the departure point, the aircraft's position is 5 miles off course. If 75 miles remain to be flown, what total correction should be made to converge on the destination?

1- 3.8°
2- 5.3°
3- 34°
4- 15°

349. Assume a true heading of 052° results in a groundtrack of 056°, and a true airspeed of 145 knots results in a groundspeed of 168 knots. From this information, what is the approximate wind direction and wind speed?

1- 204° and 29 knots.
2- 258° and 25 knots.
3- 038° and 30 knots.
4- 079° and 23 knots.

350. Assume a true heading of 075° results in a ground track of 087°, and a true airspeed of 140 knots results in a groundspeed of 141 knots. From this information what is the approximate wind speed and wind direction?

1- 25 knots and 162°
2- 30 knots and 183°
3- 29 knots and 349°
4- 26 knots and 003°

351. Assume you plan to begin a descent from 8,500 feet MSL when 20 nautical miles from destination airport. If the groundspeed is 150 knots and you desire to be at 4,500 feet MSL when over the airport, the rate of descent should be

1- 500 feet per minute.
2- 600 feet per minute.
3- 700 feet per minute.
4- 400 feet per minute.

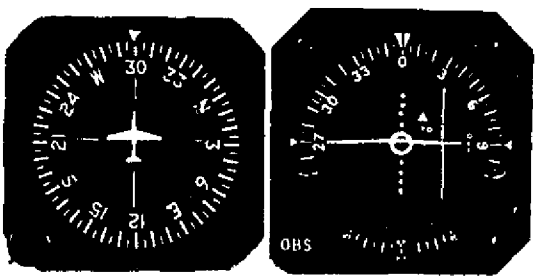
352. Assume a true heading of 118° results in a ground track of 122° and a true airspeed of 160 knots results in a groundspeed of 154 knots. From this information, the wind is from approximately

1- 73° at 12 knots.
2- 178° at 15 knots.
3- 63° at 15 knots.
4- 60° at 12 knots.

353. Assume you plan to descend from 10,000 feet MSL so as to arrive at 4,000 feet MSL 5 nautical miles from a VORTAC. With a groundspeed of 140 knots and a rate of descent of 900 feet per minute, at what distance from the VORTAC should the descent be started?

1- 10.5 nautical miles.
2- 20.5 nautical miles.
3- 3.9 nautical miles.
4- 6.6 nautical miles.

354.



If an aircraft had the instrument indications as shown above, then makes a 180° turn to the left and continues straight ahead, it will intercept the

1- 180 radial.
2- 270 radial.
3- 360 radial.
4- 090 radial.

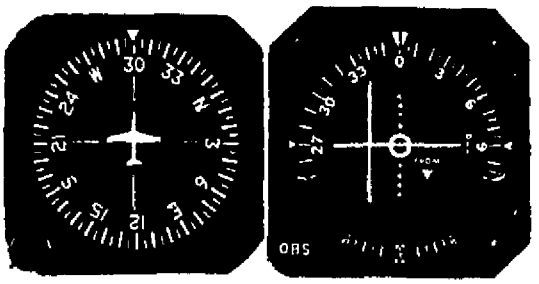
355. Suppose after 200 miles are flown from the departure point the aircraft's position is 9 miles off course. If 250 miles remain to be flown, what total correction should be made to converge on the destination?

1- 2.9°
2- 28.1°
3- 4.7°
4- 44.4°

356. Assume you plan to descend from 7,500 feet MSL so as to arrive at 1,000 feet MSL 6 nautical miles from a VORTAC. With a groundspeed of 156 knots and a rate of descent of 800 feet per minute, at what distance from the VORTAC should the descent be started?

1- 15 nautical miles.
2- 27 nautical miles.
3- 30.2 nautical miles.
4- 11.7 nautical miles.

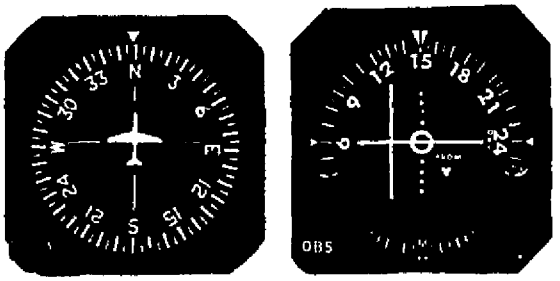
357.



Refer to the illustration above. What is the location of the aircraft in relation to the VORTAC?

1- Northeastly.
2- Southwestly.
3- Southeastly.
4- Northwestly.

358.



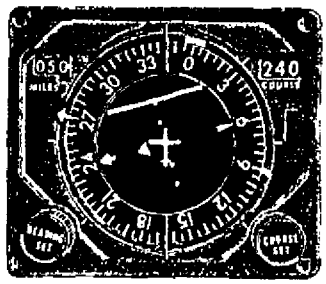
Refer to the illustration above. What is the location of the aircraft in relation to the VORTAC?

1- North-Northwestly.
2- South-Southeastly.
3- South-Southwestly.
4- North-Northeastly.

359. Suppose after 240 miles are flown from the departure point, the aircraft's position is 8 miles off course. If 75 miles remain to be flown, what <u>total</u> correction should be made to converge on the destination?

1- 23.3°
2- 6.0°
3- 44.7°
4- 8.1°

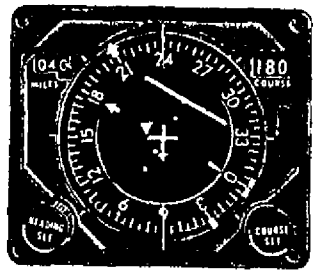
360.



Refer to the illustration above. If the present heading is maintained, what radial will the aircraft intercept at a 75° angle outbound?

1- 090 radial.
2- 240 radial.
3- 270 radial.
4- 060 radial.

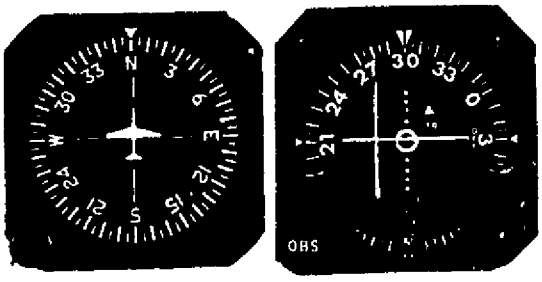
361.



Refer to the above illustration. If the heading is maintained, what radial will the aircraft intercept at a 60° angle inbound?

1- 180 radial.
2- 300 radial.
3- 360 radial.
4- 120 radial.

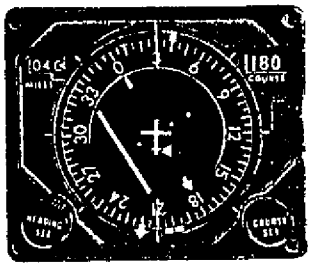
362.



If an aircraft had the instrument indications shown above, then makes a 180° turn and continues straight ahead, it will intercept which of the following radials?

1- 225 radial.
2- 315 radial.
3- 015 radial.
4- 135 radial.

363.



Refer to the illustration above. To intercept the 360 radial at a 60° angle inbound the aircraft should be turned

1- 90° left.
2- 90° right.
3- 150° left.
4- 30° right.

364. Suppose the ADF of an aircraft in flight is tuned to a Non-Directional Radiobeacon and the wing-tip bearing changes from 310° to 320° in 7 minutes elapsed time. Based on this information, the time en route to that station would be approximately

1- 8.5 minutes.
2- 1 hour and 25 minutes.
3- 42 minutes.
4- 7 minutes.

365. When a VOR test facility (VOT) is used to check the accuracy of a VOR receiver, the Course Deviation Indicator should be centered with the omnibearing and the TO-FROM indicator reading

1- 0° FROM or 180° TO, regardless of your position from the VOT.
2- 0° TO only if you are due south of the VOT.
3- 0° TO or 180° FROM, regardless of your position from the VOT.
4- 180° FROM only if you are due north of the VOT.

366. While maintaining a magnetic heading of 310° and a true airspeed of 165 knots, you cross the 040 radial of a VOR at 1710 and the 030 radial at 1719. The time and distance to this station are

1- 1 hour and 165 nautical miles.
2- 54 minutes and 148.5 nautical miles.
3- 42 minutes and 115 nautical miles.
4- 1 hour and 6 minutes and 183.3 nautical miles.

367. While maintaining a magnetic heading of 270° and a true airspeed of 175 knots, you cross the 180 radial of a VOR at 1010 and the 190 radial at 1016. What is the time and distance to this station?

1- 36 minutes and 105 nautical miles.
2- 1 hour and 175 nautical miles.
3- 42 minutes and 122 nautical miles.
4- 1 hr and 4 minutes and 291.6 nautical miles.

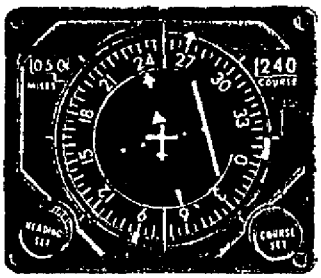
368. While maintaining a magnetic heading of 360° and a true airspeed of 130 knots, you cross the 090 radial of a VOR at 0900 and the 080 radial at 0908. What is the time and distance to this station?

1- 40 minutes and 91 nautical miles.
2- 42 minutes and 96 nautical miles.
3- 48 minutes and 104 nautical miles.
4- 38 minutes and 82 nautical miles.

369. While maintaining a magnetic heading of 180° and a true airspeed of 130 knots, the 270 radial of a VOR is crossed at 1237 and the 260 radial at 1242. The time and distance to this station are

1- 42 minutes and 91 nautical miles.
2- 44 minutes and 96 nautical miles.
3- 42 minutes and 104 nautical miles.
4- 30 minutes and 65 nautical miles.

370.



Which statement is true regarding the illustration above if the aircraft maintains the heading depicted?

1- The magnetic bearing to the station is 240°.
2- The aircraft will intercept the 060 radial at a 15° angle.
3- The aircraft is on a magnetic bearing of 060°.
4- The aircraft is on a magnetic heading of 240°.

371. For a given airfoil the angle of attack which results in a stall

1- is dependent on the load factor.
2- varies with the speed of airflow around the airfoil.
3- varies directly with the degree of bank.
4- remains constant regardless of bank, load factor, or airspeed.

372. The lift produced by an airfoil is the force produced

1- opposite to the relative wind.
2- parallel to the relative wind.
3- perpendicular to the relative wind.
4- halfway between the chord line and the relative wind.

373. The point on an airfoil through which the force known as lift is concentrated is called the

1- center of rotation.
2- center of pressure.
3- midpoint of the chord.
4- center of gravity.

374. Aerodynamically, propeller thrust is the result of

1- deflective forces on the curved side of the blade.
2- shape and angle of attack of the blade.
3- decreased pressure on the flat side of the blade and increased pressure on the curved side.
4- angle of incidence of the blade.

375. Aspect ratio of a wing is defined as the ratio of the

1- square of the chord to the wingspan.
2- wingspan to the mean aerodynamic chord.
3- wingspan to the main compression rib.
4- wingspan to the wing root.

376. What is the primary function of the rudder, while entering a turn from straight-and-level flight?

1- Overcome yaw caused by the raised aileron on the higher wing.
2- Overcome the yaw caused by the lowered aileron on the higher wing.
3- Overcome the yaw caused by the lowered aileron on the lower wing.
4- To turn the aircraft.

377. Suppose the ADF of an aircraft in flight is tuned to a Non-Directional Radiobeacon and the wing-tip bearing changes from 130° to 140° in 3 minutes elapsed time. Based on this information, the time en route to that station would be approximately

1- 18 minutes.
2- 20 minutes.
3- 30 minutes.
4- 9 minutes.

378. Name the four flight fundamentals involved in maneuvering an aircraft?

1- Straight-and-level flight, turns, climbs, and descents.
2- Takeoffs, slow flight, fast flight, and stalls.
3- Starting, taxiing, takeoff, and landing.
4- Aircraft power, pitch, bank, and trim.

379. When entering a turn, the primary function of the rudder is to

1- cause the aircraft to turn.
2- prevent the aircraft from rolling about the longitudinal axis.
3- allow the aircraft to pitch about its lateral axis.
4- control yawing about the vertical axis.

380. If the airspeed of an airplane is doubled while the angle of attack remains the same, the drag will

1- double.
2- decrease as airspeed increases.
3- be four times greater.
4- remain the same.

381. Which statement generally describes the relationship of the forces acting on an airplane that is climbing at a constant airspeed and at constant power?

1- Thrust is equal to drag and lift is greater than weight.
2- Thrust is equal to drag, and lift is equal to weight.
3- Thrust is greater than drag, and lift is equal to weight.
4- Thrust is greater than drag and lift is greater than weight.

382. The acute angle between the wing chord line and the direction of the relative wind is known as the

1- dihedral angle.
2- stalling angle.
3- angle of attack.
4- angle of incidence.

383. When the angle of attack of the wing is increased, the center of pressure of that airfoil will

1- move forward.
2- move erratically aft and forward.
3- remain unaffected.
4- move aft.

384. Assume an airplane is cruising at 100 MPH and is creating 1,000 pounds of drag. If the angle of attack remains the same but the airspeed is doubled, the total drag would increase to

1- 3,000 pounds.
2- 4,000 pounds.
3- 5,000 pounds.
4- 2,000 pounds.

385. The reason a light airplane tends to nose down during power reductions is that the

1- force of drag acts horizontally and above the thrust line.
2- center of pressure is located forward of the center of gravity.
3- center of gravity is located forward of the center of pressure.
4- thrust line acts horizontally and above the force of drag.

386. At a constant power setting, the rate of climb of an airplane is greater when the wings are level than when in a climbing turn because when level the

1- wing loading is greater.
2- relative airspeed is greater.
3- center of lift is nearer the trailing edge of the wing.
4- vertical lift component is greater.

387. The angle between the chord line of the wing and the longitudinal axis of the airplane is known as the angle of

1- relative wind.
2- incidence.
3- dihedral.
4- attack.

388. The angle between the chord line of an airfoil and the relative wind is known as the angle of

1- lift.
2- incidence.
3- longitudinal dihedral.
4- attack.

389. What is the rotation of an airplane about its longitudinal axis called and how is it controlled?

1- Yawing, and it is controlled with the ailerons.
2- Rolling, and it is controlled with the ailerons.
3- Pitching, and it is controlled with the elevator.
4- Yawing, and it is controlled with the rudder.

390. During flight, if a change is made in pitch attitude, an airplane will rotate about its

1- center of gravity.
2- center of lift.
3- chord midpoint.
4- center of pressure.

391. The three axes of an airplane intersect at the

1- center of pressure.
2- midpoint of the datum line.
3- midpoint of the mean chord.
4- center of gravity.

392. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is true?

1- Thrust always acts forward parallel to the relative wind and is greater than drag.
2- Lift always acts perpendicular to the longitudinal axis of the wing and is greater than weight.
3- Weight always acts vertically toward the center of the earth.
4- Drag always acts rearward parallel to relative wind and is less than thrust.

393. Which statement generally describes the relationship of the forces acting on an airplane while it is climbing at constant airspeed and constant rate?

1- Lift is greater than weight; thrust is greater than drag.
2- Lift is equal to weight; thrust is equal to drag.
3- Lift is equal to weight; thrust is greater than drag.
4- Lift is greater than weight; thrust is equal to drag.

394. Which statement generally describes the relationship of the forces acting on an airplane in a constant power and constant airspeed descent?

1- Thrust is equal to drag; lift is equal to weight.
2- Thrust is greater than drag; weight is greater than lift.
3- Thrust is greater than drag; lift is equal to weight.
4- Thrust is equal to drag; weight is greater than lift.

395. Lift on a wing is most properly defined as the

1- force produced perpendicular to the relative wind.
2- partial vacuum produced on top of the wing.
3- reduced pressure resulting from a smooth flow of air over a curved surface and acting perpendicular to the longitudinal axis.
4- differential pressure acting perpendicular to the chord of the wing.

396. What changes in airplane control must be made to maintain altitude while the airspeed is being decreased?

1- Increase the angle of attack to produce more lift than drag.
2- Decrease the angle of attack to compensate for the increasing drag.
3- Maintain a constant angle of attack until the desired airspeed is reached, then increase the angle of attack.
4- Increase the angle of attack to compensate for the decreasing lift.

397. Wing loading of an airplane is determined by a value which is the

1- ratio of the wing area to the horsepower of the engine.
2- gross weight of the airplane divided by the wing area.
3- gross weight of the airplane divided by the wing span.
4- total load the wing can carry.

398. The ratio between the total air load imposed on the wing and the gross weight of an airplane in flight is known as the

1- power loading.
2- aspect ratio.
3- yield load.
4- load factor.

399. It is unwise to operate an airplane in excess of its maximum certificated gross weight primarily because

1- of the significant increase it will cause in fuel consumption.
2- an overloaded airplane is excessively stable in flight.
3- excessive loads may be imposed upon some part of the aircraft's structure.
4- flight at weights in excess of maximum gross weights is not possible.

400. Flight operations approaching maximum speeds, such as V_{NE}, should be avoided because

1- control effectiveness is so greatly impaired that it renders the airplane uncontrollable.
2- of the possibility of inducing flutter or exceeding the design load factors.
3- excessive induced drag will cause structural failures.
4- the stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.

401. If, during takeoff, an airplane becomes airborne at less than the normal takeoff speed, this is probably because of

1- an error in the airspeed indicator.
2- excessive power applied to the engine.
3- ground effect.
4- a strong headwind.

402. The phenomenon of ground effect causes

1- the direction of the relative wind to change, thus producing a smaller angle of attack.
2- the wing to become less efficient, thus requiring a longer ground run for takeoff.
3- the induced drag to increase, thus reducing the groundspeed.
4- the angle of attack to increase, thus increasing the stall speed.

403. Even under conditions of high gross weight, high density altitude, and high temperature, it is possible for an airplane to become airborne at a speed below the stall speed. This is because of

1- an increase in downwash.
2- an increase in upwash.
3- an increase in downwash plus the decrease in upwash.
4- the phenomenon of ground effect.

404. Pilots operating at less than one wingspan length above the surface, such as on takeoff or just before touchdown during landing, can expect

1- a decrease in longitudinal stability.
2- high induced drag, at low airspeed.
3- an overall increase in parasite and induced drag.
4- the necessity for additional up elevator pressure.

405. The phenomenon of "ground effect" is most likely to be involved in which of the following situations?

1- Abruptly settling back to the surface immediately after becoming airborne.
2- Inability to climb once airborne.
3- The absence of normal cushioning on landings in high-wing airplanes.
4- Inability to become airborne even though the airspeed is sufficient for a normal takeoff.

406. How is an airplane's performance affected by frost on the wings?

1- Lift is increased; drag is decreased.
2- Lift is decreased; drag is increased.
3- Lift is increased; drag is increased.
4- Lift is decreased; drag is decreased.

407. Maximum range in a propeller driven airplane is achieved in a flight condition which produces the greatest proportion between

1- speed and power required.
2- flight hours and fuel flow per hour.
3- power required and fuel flow per hour.
4- fuel flow and power required.

408. The critical altitude of an aircraft engine is the maximum altitude at which

1- that engine will no longer create enough power for climb purposes.
2- a supercharger must be placed in high ratio to maintain sea level rated horsepower.
3- the engine rated horsepower is reduced to 75% of its sea level rated value.
4- that engine can develop its sea level rated horsepower.

409. Frost covering the upper surface of an airplane wing will usually cause

1- drag factors so large that sufficient speed cannot be obtained for takeoff.
2- the airplane to stall at an angle of attack that is higher than normal.
3- the airplane to stall at an angle of attack that is lower than normal.
4- no problems for pilots of light aircraft.

410. An accumulation of frost on an airplane wing will result in

1- a decrease in lift and drag.
2- a decrease in lift and an increase in drag.
3- an increase in lift and drag.
4- an increase in lift and a decrease in drag.

411. What is the rotation of an airplane about its lateral axis called, and how is it controlled?

1- Yawing, and is controlled with the ailerons.
2- Rolling, and is controlled with the ailerons.
3- Yawing, and is controlled with the rudder.
4- Pitching, and is controlled with the elevator.

412. During a change in bank, an airplane will rotate about its center of

1- gravity and lateral axis.
2- pressure and longitudinal axis.
3- gravity and longitudinal axis.
4- pressure and lateral axis.

413. During a change in pitch attitude, an aircraft will rotate around its center of

1- gravity and longitudinal axis.
2- pressure and longitudinal axis.
3- pressure and lateral axis.
4- gravity and lateral axis.

414. Which statement is true relating to the use of the rudder in conventional airplanes to compensate for the effects of torque?

1- If airspeed is increased (power constant), right rudder pressure must be added.
2- If power is reduced (airspeed constant), right rudder pressure must be added.
3- If power is increased (airspeed constant), left rudder pressure must be added.
4- If airspeed is decreased (power constant), right rudder pressure must be added.

415. "P factor", the force which produces a yawing effect during takeoffs, climbs at slow airspeeds, and certain other attitudes, is the result of the

1- clockwise rotation of the engine and propeller turning the airplane counterclockwise.
2- propeller blade descending on the right producing more thrust than the ascending blade on the left.
3- gyroscopic force applied to the rotating propeller blades acting 90° in advance of the point where force was applied.
4- spiral characteristic of the air forced rearward by the rotating propeller.

415. Assume an aircraft is indicating 140 knots into a 15-knot headwind. If a 180° turn is made which places the wind directly behind the aircraft, the indicated airspeed would

1- decrease 15 knots and the groundspeed would increase 15 knots.
2- be the same and the groundspeed would increase 15 knots.
3- be the same and the groundspeed would increase 30 knots.
4- increase 30 knots and the groundspeed would remain the same.

417. Assume an aircraft is in cruising flight with a 20-knot tailwind. If a 180° turn is made which places the wind directly on the nose of the aircraft, the indicated airspeed would

1- be the same and the groundspeed would decrease 40 knots.
2- decrease 40 knots and the groundspeed would remain the same.
3- increase 20 knots and the groundspeed would decrease 20 knots.
4- decrease 20 knots and the groundspeed would decrease 20 knots.

418. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

1- equal to atmospheric pressure.
2- greater than atmospheric pressure.
3- greater than the pressure below the wing.
4- less than atmospheric pressure.

419. During flight with zero angle of attack, the pressure below the wing would be

1- equal to atmospheric pressure.
2- greater than atmospheric pressure.
3- less than the pressure along the upper surface of the wing.
4- less than atmospheric pressure.

420. The tendency of an airplane to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as

1- maneuverability.
2- stability.
3- balance.
4- controllability.

421. Which statement is true regarding the use of flaps during turns?

1- The addition of flaps increases the stall speed.
2- The addition of flaps decreases the stall speed.
3- In any given degree of bank, the addition of flaps has no effect on stall speed.
4- Using a constant flap setting and varying the bank has no effect on stall speed.

422. The tendency of an airplane to develop forces that further remove the airplane from its original position, when disturbed from a condition of steady flight, is known as

1- neutral static stability.
2- static instability.
3- positive static stability.
4- dynamic instability.

423. The additional load imposed on the wings of an airplane during a level coordinated turn in smooth air is dependent on the

1- true airspeed.
2- angle of bank.
3- rate of turn.
4- density altitude.

424. In a constant altitude coordinated turn, the load factor imposed on an airplane is the result of

1- rate of turn and airspeed.
2- angle of attack and airspeed.
3- centrifugal force and gravity.
4- wind and density altitude.

425. Load factor is the actual weight supported by the wings of an airplane at any given moment

1- divided by the total weight of the airplane.
2- multiplied by the total weight of the airplane.
3- subtracted from the total weight of the airplane.
4- added to the total weight of the airplane.

426. The angle of attack at which an airplane wing stalls will

1- change with an increase in gross weight.
2- remain the same regardless of gross weight.
3- decrease if the center of gravity is moved aft.
4- increase if the center of gravity is moved forward.

427. An airplane in a steep banked turn stalls at a higher airspeed than it does with the wings level, because the

1- total lift has decreased.
2- total lift has increased.
3- critical angle of attack is reached at a higher airspeed.
4- critical angle of attack has decreased.

428. The primary function of flaps is to

1- provide a steeper gliding angle.
2- increase control effectiveness at slow speeds.
3- permit a safer takeoff over high obstructions.
4- increase lateral stability.

429. Lowering flaps during a landing approach

1- eliminates floating.
2- permits approaches at a higher indicated airspeed.
3- decreases the angle of descent without increasing airspeed.
4- increases the angle of descent without increasing airspeed.

430. The use of flaps will produce

1- decreased lift and decreased drag.
2- increased lift and increased drag.
3- increased lift and decreased drag.
4- decreased lift and increased drag.

431. In addition to the added safety factor, dual-ignition systems also provide

1- better heat control of the engine.
2- shorter engine warmup periods.
3- improved engine performance.
4- easier starting.

432. An airplane certificated in the utility category means that the airplane could be operated in which maneuvers?

1- Any maneuver except acrobatics or spins.
2- Mild acrobatics, including spins.
3- All maneuvers, including acrobatics.
4- Any maneuver requiring an abrupt attitude change.

433. An increase in carburetor air temperature while operating at the same altitude with the same RPM and manifold pressure, will produce

1- more engine horsepower.
2- less engine horsepower.
3- variable or fluctuating engine horsepower.
4- the same engine horsepower.

434. When operating a supercharged engine, the use of carburetor heat should be regulated by reference to the

1- degree of roughness at which the engine is operating.
2- cylinder air temperature gauge.
3- manifold pressure or RPM indicator.
4- carburetor air or mixture temperature gauge.

435. If the ground wire between the magneto and the ignition switch becomes disconnected, the most noticeable result will be that the engine

1- will not operate on the right magneto.
2- cannot be shut down by turning the switch to the "off" position.
3- cannot be started with the switch to the "on" position.
4- will not operate on the left magneto.

436. In an airplane equipped with a manifold pressure gauge, a tachometer, a cylinder head temperature gauge, and an exhaust gas temperature indicator, the first indication of induction icing will be noted by a decrease in engine

1- RPM.
2- manifold pressure.
3- exhaust gas temperature.
4- cylinder head temperature.

437. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is

1- heavily loaded.
2- operating at high airspeeds.
3- using high power settings.
4- developing lift.

438. The loss of aircraft control, which may occur if a light airplane is flown into the wake of a large airplane, is caused principally by

1- the tornado-like vortices produced by the wingtips of the large airplane.
2- high speed sound waves similar to those produced by sonic "booms."
3- meteorological factors which create wind shear.
4- turbulence created by the propellers or jet engine exhaust of the large airplane.

439. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

1- decrease in manifold pressure.
2- rough running engine followed by an increase in manifold pressure.
3- decrease in engine RPM.
4- rough running engine followed by loss of RPM.

440. The installation of oil cooler covers, which have not been recommended by the airplane manufacturer, must be approved by

1- the owner or operator of the airplane.
2- an airplane-engine mechanic.
3- the National Transportation Safety Board.
4- the Federal Aviation Administration.

441. The amount of water absorbed in aviation fuels will

1- decrease as the temperature of the fuel increases.
2- increase as the temperature of the fuel increases.
3- increase as the temperature of the fuel decreases.
4- remain the same regardless of temperature changes.

442. The use of fuel with too low an octane rating may cause

1- a cooling effect on the cylinders.
2- detonation.
3- higher manifold pressure.
4- a prompt preignition reaction.

443. Which statement is true regarding the operation of a typical unsupercharged aircraft engine?

1- Operating with an excessively lean mixture for an extended period of time usually results in "fouled" spark plugs.
2- Most unsupercharged engines are capable of producing 100% of their rated power at or above 5,000 feet.
3- In general, rich mixtures must be used with caution when operating at high power settings.
4- Detonation often cannot be recognized from the cockpit through sound or engine roughness.

444. Which statement is true regarding the operation of an airplane engine during cold weather?

1- Overpriming the engine could result in poor compression and hard starting.
2- Engine parts expand, making it difficult to crank the engine.
3- Prolonged idling causes the spark plug electrodes to become saturated with congealed oil and results in shorting out the spark plugs.
4- Preheating an engine should be done only in an emergency.

445. If it is necessary to use a substitute gasoline in an airplane in lieu of that recommended, it should be remembered that

1- automotive gasolines should not be used, even if the octane is equivalent or better than that of the aviation gasoline recommended.
2- automotive gasolines can be used if the octane is equivalent to that of the aviation gasoline recommended.
3- automotive gasolines are recommended but only for short periods of time.
4- aircraft engines are certificated for operation with either automotive or aviation fuels.

446. The best procedure to use when attempting to start an overprimed engine is to

1- continue to use the starter until the engine fires.
2- follow the manufacturer's instructions.
3- hand crank the engine with the throttle full open and the aircraft brakes set.
4- boost the battery with an auxiliary power unit.

447. When full throttle is used on an unsupercharged engine with the mixture control in the full-rich position, the pilot should realize that the engine is being

1- subjected to damage caused by preignition.
2- provided additional fuel in the cylinders for cooling.
3- provided additional air in the cylinders for cooling.
4- subjected to damage caused by detonation.

448. What pilot action should be taken when using fuel with a higher lead content than that recommended?

1- Avoid manifold pressures in excess of 25" Hg.
2- Operate the engine with an RPM that is lower than the manifold pressure.
3- Operate the engine with a leaner than normal mixture.
4- avoid extremely lean mixture operations.

449. The main purpose of the mixture control is to

1- increase oxygen supplied to the engine.
2- decrease air supplied to the engine.
3- adjust the fuel flow to obtain the proper air/fuel ratio.
4- decrease oxygen supplied to the engine.

450. A clogged oil breather line in a reciprocating engine will cause

1- a lean fuel mixture.
2- a low cylinder head temperature.
3- fuel starvation.
4- excessive oil consumption.

451. If fuel/air mixture adjustments are not made during operation at high altitudes, engine performance will be affected because of

1- a constant volume of air and an increase in the amount of fuel metered by the carburetor.
2- a decrease in the weight of air while approximately the same amount of fuel enters the carburetor.
3- a decrease in the amount of fuel and a decrease in the volume of air entering the carburetor.
4- an increase in the amount of fuel and a decrease in the volume of air entering the carburetor.

452. Which statement is true regarding preheating an airplane during cold weather operations?

1- The cockpit, as well as the engine, should be preheated.
2- The cockpit area should not be preheated with portable heaters.
3- Hot air should be blown directly at the engine through the air intakes.
4- The possibility of fire is rare during preheating.

453. The crankcase breather lines of an aircraft's engine should receive special attention during preflight in cold weather because they are susceptible to being clogged by

1- congealed oil from the crankcase.
2- ice in the breather line.
3- freezing rain or snow.
4- sediment from the crankcase.

454. Assume that prior to starting an engine the manifold pressure gauge indicates 29" Hg. The reason for this is that the

1- throttle is in the full-open position.
2- throttle is closed, trapping high pressure in the manifold.
3- pressure in the manifold is the same as atmospheric pressure.
4- gauge is stuck at the full-power position.

455. One of the advantages of fuel injection systems over carburetor systems is

1- easier restarting of an engine that quits because of fuel starvation.
2- a reduction in the probability of evaporative icing.
3- elimination of vapor locks during ground operations.
4- less difficulty in starting a hot engine.

456. One advantage of fuel injection systems over carburetor systems is

1- better fuel distribution to the cylinders.
2- easier hot-engine starting.
3- easier in-flight restarting.
4- less difficulty with hot weather vapor locks during ground operations.

457. The most effective technique to use for detecting other aircraft at night is to

1- avoid staring directly at the point where another aircraft is suspected to be flying.
2- avoid scanning the region below the horizon so as to avoid the effect of ground lights on the eyes.
3- stare directly at the point where another aircraft is suspected to be flying.
4- turn the head and sweep the eyes rapidly over the entire visible region.

458. Which statement is true relating to the factors which affect fuel consumption?

1- Wind, as well as engine manifold pressure and RPM, is a factor in determining the rate of fuel consumption.
2- Various combinations of engine manifold pressure and RPM can produce a given rate of fuel consumption at different altitudes.
3- The rate of fuel consumption is constant for different altitudes if engine manifold pressure and RPM are held constant.
4- Only one combination of engine manifold pressure and RPM can produce a given rate of fuel consumption at different altitudes.

459. When receiving radar vectors, if an airplane is approaching on a collision course from your left, what action should you take, if any?

1- Expect the other pilot to give way as required by regulations.
2- Take whatever action necessary to avoid a collision.
3- Maintain the assigned heading or altitude unless deviation is approved by ATC.
4- Wait until ATC issues a new heading or altitude that will ensure adequate separation.

460. As a precaution to avoid midair collisions during VFR climbs or descents along federal airways, pilots are encouraged to fly

1- along the centerline of the airway.
2- to the left side of the centerline of the airway.
3- at least 4 nautical miles on either side of the centerline of the airway.
4- to the right side of the centerline of the airway.

461. What precautions should be used with respect to oxygen systems?

1- An approved flame dispenser with shield should be used when checking the oxygen system for leaks.
2- Assure that medical oxygen has been used to replenish oxygen containers.
3- Do not use grease covered hands, rags or tools near oxygen equipment.
4- Prohibit smoking while in an aircraft equipped with an oxygen system.

462. The absolute ceiling of an airplane is the highest altitude to which that airplane can climb and

1- maintain a rate of climb of at least 50 fpm.
2- maintain a rate of climb of at least 100 fpm.
3- maintain a rate of climb of at least 200 fpm.
4- maintain level flight.

463. The service ceiling of an airplane is the altitude beyond which

1- a rate of climb of at least 100 fpm cannot be maintained.
2- level flight cannot be maintained.
3- an airspeed of at least 100 knots cannot be maintained.
4- the airplane is no longer maneuverable.

464. The power combination that is most likely to result in excessive cylinder pressures is a relatively

1- high manifold pressure with a high engine RPM.
2- low manifold pressure with a low engine RPM.
3- low manifold pressure with a high engine RPM.
4- high manifold pressure with a low engine RPM.

465. As altitude increases, the indicated airspeed at which a given airplane stalls in a particular configuration will

1- decrease as the true airspeed increases.
2- remain the same as at low altitude.
3- increase because the air density becomes less.
4- decrease as the true airspeed decreases.

466. Which of the following has the most significant effect on the indicated airspeed at which an airplane stalls?

1- Flight altitude.
2- Atmospheric temperature.
3- Atmospheric pressure.
4- Airplane attitude.

467. Which statement is true relating to the factors which produce stalls?

1- The stalling angle of attack is independent of the speed of airflow over the wings.
2- The stalling angle of attack depends upon the speed of the airflow over the wings.
3- The critical angle of attack is a function of the degree of bank.
4- An accelerated stall will always produce a spin.

468. An airplane in a steep-banked turn stalls at a higher airspeed than it does with the wings level because in the turn the

1- total lift has decreased.
2- effective thrust has decreased.
3- critical angle of attack has decreased.
4- critical angle of attack is reached at a higher airspeed.

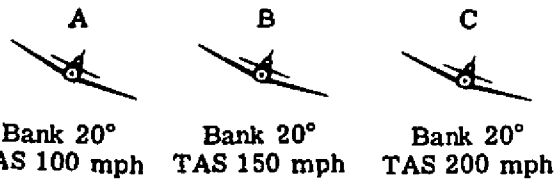
469. The angle of attack at which an airplane stalls

1- is dependent upon the speed of the airflow over the wings.
2- will occur at smaller angles of attack flying downwind than when flying upwind.
3- will remain constant regardless of gross weight.
4- is a function of speed and density altitude.

470. In airplanes all stalls are caused by

1- misuse of the elevators.
2- exceeding the critical angle of attack.
3- exceeding the critical angle of pitch.
4- a loss of airspeed.

471. Note the angle of bank and airspeed of the airplanes illustrated and compare the turn rates and radii.



Which statement is true?

1- "A" has the fastest turn rate and "C" has the greatest turn radius.
2- "A" has the slowest turn rate and "C" has the smallest turn radius.
3- All airplanes are turning at the same rate, but "C" has the greatest turn radius.
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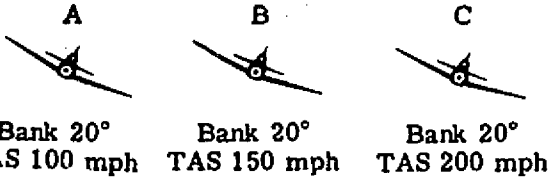

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TAKE-OFF DATA

TAKE-OFF DISTANCE WITH 20° FLAPS FROM HARD-SURFACED RUNWAY

GROSS WEIGHT LBS.	IAS AT 50 FT. MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F		AT 2500 FEET & 50°F		AT 5000 FT. & 41°F		AT 7500 FT. & 33°F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE
2200	55	0	345	680	405	770	480	885	580	1060
		15	205	460	245	525	295	615	365	725
		30	100	275	120	320	155	380	195	460
2600	60	0	500	915	585	1045	705	1230	855	1470
		15	310	635	370	735	455	870	560	1055
		30	165	395	200	465	255	565	325	695
3000	64	0	695	1210	820	1405	990	1675	1205	2045
		15	450	855	535	1005	660	1215	815	1505
		30	250	555	310	665	390	820	500	1030

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

472. Refer to the above chart.

Given: Weight . . . . . 2,200 lbs.
Temperature . . . . 109° F.
Pressure Altitude . 1,666 feet.
Headwind . . . . . 15 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 604 feet.
2- 740 feet.
3- 1,006 feet.
4- 503 feet.

473. Refer to the above chart.

Given: Weight . . . . . 2,400 lbs.
Temperature . . . . 75° F.
Pressure Altitude . 2,500 feet.
Headwind . . . . . 15 MPH

Find the ground run required for takeoff under the given conditions.

1- 283 feet.
2- 308 feet.
3- 338 feet.
4- 258 feet.

474. Refer to the above chart.

Given: Weight . . . . . 2,600 lbs.
Temperature . . . . 84° F.
Pressure Altitude . Sea level
Headwind . . . . . 15 MPH

Find the ground run required for takeoff under the given conditions.

1- 500 feet.
2- 635 feet.
3- 698 feet.
4- 341 feet.

475. Refer to the above chart.

Given: Weight . . . . . 2,500 lbs.
Temperature . . . . 109° F.
Pressure Altitude . 1,000 feet
Headwind . . . . . 15 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 628 feet.
2- 683 feet.
3- 753 feet.
4- 591 feet.

476. Refer to the above chart.

Given: Weight . . . . . 2,900 lbs.
Temperature . . . . 25° F.
Pressure Altitude . 3,000 feet
Headwind . . . . . 5 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 1,277 feet.
2- 1,045 feet.
3- 1,522 feet.
4- 1,235 feet.

477. Refer to the above chart.

Given: Weight . . . . . 2,400 lbs.
Temperature . . . . 84° F.
Pressure Altitude . Sea level
Headwind . . . . . 20 MPH

Find the takeoff distance required to clear a 50-foot obstacle.

1- 653 feet.
2- 812 feet.
3- 893 feet.
4- 524 feet.

SEA LEVEL **HORSEPOWER SETTING - IO-520-B** 2000 FEET

MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH	FUEL FLOW GPH	MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
23.2	-	-	-20	75	214	92	15.3	23.0	-	-
21.1	22.8	-		65	185	80	13.35	20.8	22.5	-
18.8	20.2	22.0		55	157	69	11.5	18.6	20.0	21.7
16.6	17.7	19.1		45	128	58	9.7	16.4	17.5	18.9
23.7	-	-	0	75	214	92	15.3	23.4	-	-
21.4	23.1	-		65	185	80	13.35	21.2	22.9	-
19.1	20.5	22.4		55	157	69	11.5	18.9	20.3	22.1
16.8	18.0	19.5		45	128	58	9.7	16.7	17.8	19.2
24.0	-	-	+20	75	214	92	15.3	23.7	-	-
21.7	23.5	-		65	185	80	13.35	21.5	23.2	-
19.4	20.9	22.7		55	157	69	11.5	19.2	20.6	22.5
17.0	18.2	19.8		45	128	58	9.7	16.8	18.0	19.5
24.4	-	-	+40	75	214	92	15.3	24.1	-	-
22.1	23.9	-		65	185	80	13.35	21.8	23.6	-
19.7	21.2	23.1		55	157	69	11.5	19.5	20.9	22.8
17.2	18.5	20.1		45	128	58	9.7	17.1	18.3	19.8
24.8	-	-	+60	75	214	92	15.3	24.5	-	-
22.4	24.2	-		65	185	80	13.35	22.2	24.0	-
20.0	21.5	23.5		55	157	69	11.5	19.8	21.3	23.2
17.5	18.8	20.4		45	128	58	9.7	17.3	18.6	20.1
25.2	-	-	+80	75	214	92	15.3	24.9	-	-
22.8	24.7	-		65	185	80	13.35	22.5	24.4	-
20.2	21.8	23.8		55	157	69	11.5	20.1	21.6	23.5
17.7	19.0	20.6		45	128	58	9.7	17.5	18.8	20.4
25.5	-	-	+100	75	214	92	15.3	25.2	-	-
23.0	-	-		65	185	80	13.35	22.8	24.7	-
20.5	22.1	-		55	157	69	11.5	20.2	21.9	23.8
17.9	19.2	20.9		45	128	58	9.7	17.7	19.0	20.7

478. Refer to the above chart and the conditions given below. What is the manifold pressure?

Given: OAT . . . . . +10° F.
Altitude . . . . 2,000 ft.
Fuel flow . . . . 12.43 GPH
RPM 2,500

1- 21.5" Hg.
2- 23.4" Hg.
3- 23.7" Hg.
4- 20.2" Hg.

479. Refer to the above chart and the conditions given below. What is the manifold pressure?

Given: OAT . . . . . 100° F.
Altitude . . . . 2,000 ft.
Fuel Flow . . . . 12.43 GPH
RPM 2,300

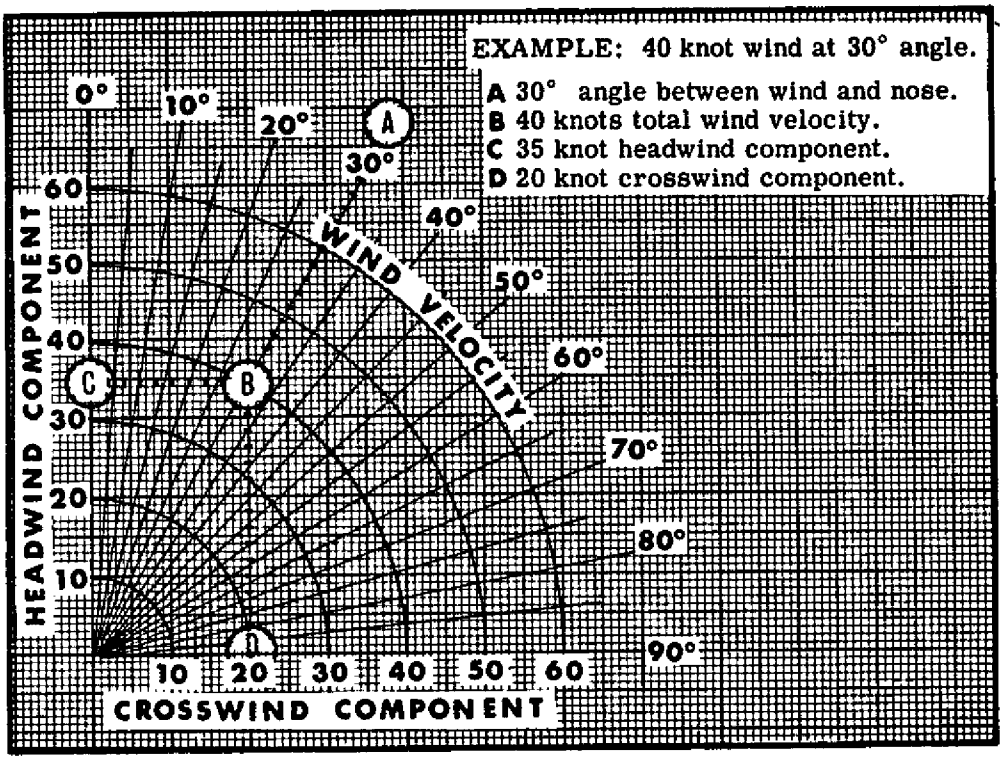
1- 23.3" Hg.
2- 24.7" Hg.
3- 25.2" Hg.
4- 21.9" Hg.

480. Refer to the above chart. With an OAT of +80° F., what is the maximum attainable manifold pressure at sea level with the engine operating at 2,500 RPM with a fuel pressure of 80 pounds per hour?

1- 22.2" Hg.
2- 22.5" Hg.
3- 22.8" Hg.
4- 21.7" Hg.

481. Refer to the above chart. With an OAT of +20° F., what is the maximum attainable manifold pressure at an altitude of 1,000 feet with the engine operating at 2,500 RPM with a fuel flow of 11.5 gallons per hour?

1- 19.3" Hg.
2- 18.65" Hg.
3- 18.5" Hg.
4- 22.7" Hg.



482. Refer to the above chart, and assume Runway 27 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 V_{SO}, if V_{SO} of the airplane is 65 knots?

1- 320° at 15 knots.
2- 220° at 20 knots.
3- 240° at 25 knots.
4- 350° at 10 knots.

483. Refer to the above chart. Suppose the airplane being flown has crosswind capability in direct crosswinds up to 13 knots. Which of these wind conditions would exceed the airplane's crosswind capability?

1- A crosswind of 20 knots at a 30° angle.
2- A crosswind of 50 knots at a 15° angle.
3- A crosswind of 25 knots at a 50° angle.
4- A crosswind of 30 knots at a 25° angle.

484. Refer to the above chart, and assume Runway 22 is being used for landing. Which surface wind listed below would exceed the crosswind component of 0.2 V_{SO}, if V_{SO} of the airplane is 55 knots?

1- 200° at 30 knots.
2- 260° at 15 knots.
3- 270° at 15 knots.
4- 190° at 20 knots.

485. Refer to the above chart. Suppose the airplane being flown has a crosswind capability in direct crosswinds up to 12 knots. Which of these crosswind conditions would exceed the airplane's crosswind capability?

1- A crosswind of 15 knots at a 30° angle.
2- A crosswind of 20 knots at a 40° angle.
3- A crosswind of 15 knots at a 45° angle.
4- A crosswind of 10 knots at a 90° angle.

4000 FEET — **HORSEPOWER SETTING · IO-520-B** — 6000 FEET

MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH		MP AT 2500 RPM	MP AT 2300 RPM	MP AT 2100 RPM
22.6	-	-	-20	75	214	92	15.3	22.2	-	-
20.5	22.2	-		65	185	80	13.35	20.2	21.7	-
18.3	19.7	21.4		55	157	69	11.5	18.0	19.4	21.0
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486. Refer to the above chart. With an OAT of -10° F., what is the maximum attainable manifold pressure at 2,300 RPM at 4,000 feet?

1- 22.35" Hg.
2- 22.5" Hg.
3- 23.0" Hg.
4- 22.2" Hg.

487. Refer to the above chart. With an OAT of +60° F., what is the maximum attainable manifold pressure at 2,100 RPM at an altitude of 5,000 feet?

1- 23.7" Hg.
2- 23.95" Hg.
3- 24.2" Hg.
4- 23.2" Hg.

488. Refer to the above chart. With an OAT of +90° F., what is the maximum attainable manifold pressure at 2,500 RPM at an altitude of 6,000 feet?

1- 23.0" Hg.
2- 24.65" Hg.
3- 24.8" Hg.
4- 22.0" Hg.

489. Refer to the above chart. With an OAT of +30° F., what is the maximum attainable manifold pressure at 2,300 RPM at an altitude of 6,000 feet?

1- 22.4" Hg.
2- 22.6" Hg.
3- 23.15" Hg.
4- 22.8" Hg.

CONDITIONS:
Flaps 30°
Power Off
Maximum Braking
Paved, Level, Dry Runway
Zero Wind

LANDING DISTANCE

NOTES:

1. Decrease distances 10% for each 10 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2.5 knots.
2. For operation on a dry, grass runway, increase distances by 40% of the "ground roll" figure.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
3800	71	S.L.	725	1440	750	1480	780	1520	805	1560	830	1600
		1000	750	1480	780	1520	805	1560	835	1605	860	1645
		2000	780	1525	810	1565	835	1605	865	1650	895	1695
		3000	810	1565	840	1610	870	1660	900	1705	930	1750
		4000	840	1615	870	1660	900	1705	930	1750	965	1800
		5000	870	1660	905	1710	935	1755	965	1805	1000	1855
		6000	905	1710	940	1765	970	1810	1005	1860	1035	1910
		7000	940	1765	975	1815	1010	1870	1045	1920	1075	1970
		8000	975	1815	1010	1870	1050	1930	1085	1980	1120	2035

490. Refer to the above chart to determine the landing distance when the conditions are as given below.

Given:
Weight . . . . . 3,800 lbs.
Pressure Altitude . . 3,000 feet
Temperature . . . . . 0° C.
Tailwind . . . . . 5 knots
Runway, dry grass . . 3,000 feet

The landing distance over a 50-foot obstruction at the threshold would be approximately

1- 1,878 feet.
2- 2,202 feet.
3- 2,629 feet.
4- 1,576 feet.

491. Refer to the above chart to determine the landing ground-roll distance when the conditions are as given below.

Given:
Weight . . . . . 3,800 lbs.
Pressure Altitude . . Sea level
Temperature . . . . . 40° C.
Headwind . . . . . 10 knots
Runway, dry grass . . 3,400 feet

The ground-roll distance would be approximately

1- 1,079 feet.
2- 1,245 feet.
3- 2,080 feet.
4- 913 feet.

492. Refer to the above chart to determine the landing distance with these conditions:

Weight . . . . . 3,800 lbs.
Pressure Altitude . . 5,000 feet
Temperature . . . . . 30° C.
Headwind . . . . . 10 knots

The ground-roll distance would be approximately

1- 1,625 feet.
2- 965 feet.
3- 869 feet.
4- 1,805 feet.

493. Refer to the above chart to determine landing distance with these conditions:

Weight . . . . . 3,800 lbs.
Pressure Altitude . . 4,000 feet
Temperature . . . . . 20° C.
Headwind . . . . . 20 knots

The distance required for a landing over a 50-foot obstruction at the threshold is

1- 1,364 feet.
2- 1,535 feet.
3- 1,705 feet.
4- 720 feet.

AIRSPEED CORRECTION TABLE

Flaps 0°		Flaps 15°*		Flaps 45°**	
IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH
60	64	70	79	70	76
100	102	80	88	80	84
120	122	90	94	90	93
140	141	100	103	100	102
160	161	110	112	110	111
180	181	120	121	120	120
200	201	130	131	130	129
220	221	140	141	140	138
240	242	150	151		
		160	161		

* Maximum Flap Speed 160 MPH ** Maximum Flap Speed 140 MPH

STALL SPEED CHART

MPH - CAS

4990 POUNDS GROSS WEIGHT

CONFIGURATION	ANGLE OF BANK			
	0°	20°	40°	60°
Gear and Flaps Up	64	67	97	119
Gear Down and Flaps 15°	60	63	92	113
Gear Down and Flaps 45°	76	79	87	106

494. Refer to the above charts. What would be the approximate indicated stall speed during a 40° bank with the gear down and flaps set at 15°?

1- 88 MPH.
2- 90 MPH.
3- 92 MPH.
4- 80 MPH.

495. Refer to the above charts. What would be the approximate indicated stalling speed if the angle of bank is 20° and the gear and flaps are up?

1- 83 MPH.
2- 87 MPH.
3- 102 MPH.
4- 70 MPH.

496. Refer to the above charts. What would be the approximate indicated stalling speed during a 20° bank with the gear down and the flaps set at 45°?

1- 74 MPH.
2- 70 MPH.
3- 83 MPH.
4- 72 MPH.

497. Refer to the above charts. If the bank angle is 60°, the gear is down, and the flaps are set at 45°, what would be the indicated stall speed?

1- 93 MPH.
2- 106 MPH.
3- 110 MPH.
4- 84 MPH.

498. Refer to the above charts. What would be the approximate indicated stalling speed if the angle of bank is 0° with the gear down and the flaps set at 15°?

1- 80 MPH.
2- 84 MPH.
3- 88 MPH.
4- 71 MPH.

499. What is calibrated airspeed?

1- Indicated airspeed corrected for outside air temperature.
2- Indicated airspeed corrected for instrument and installation error.
3- Indicated airspeed corrected for pressure altitude.
4- Indicated airspeed corrected for density altitude.

USEFUL LOAD WEIGHTS AND MOMENTS

FUEL					
LEADING EDGE TANKS ARM 75					
Gallons	Weight	Moment	Gallons	Weight	Moment
5	30	23	45	270	203
10	60	45	49	294	221
15	90	68	55	330	248
20	120	90	60	360	270
25	150	113	65	390	293
30	180	135	70	420	315
35	210	158	75	450	338
40	240	180	80	480	360

OCCUPANTS				
Front Seats ARM 85		Rear Seats		
			Fwd. Position ARM 121	Aft Position ARM 136
Weight	Moment	Weight	Moment	Moment
120	102	120	145	163
130	111	130	157	177
140	119	140	169	190
150	128	150	182	204
160	136	160	194	218
170	145	170	206	231
180	153	180	218	245
190	162	190	230	258
200	170	200	242	273

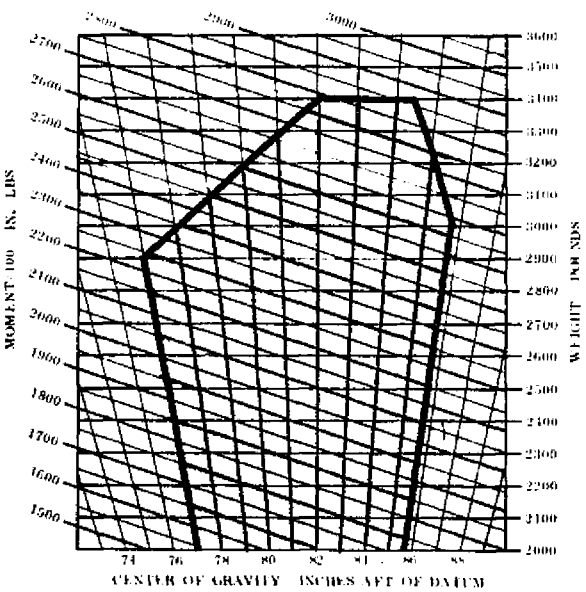
OIL ARM 25		
Quarts	Weight	Moment
12	23	6

BAGGAGE ARM 150	
Weight	Moment
10	15
20	30
30	45
40	60
50	75
60	90
70	105
80	120
90	135
100	150
110	165
120	180
130	195
140	210
150	225
160	240
170	255
180	270
190	285
200	300
210	315
220	330
230	345
240	360
250	375
260	390
270	405

EMPTY WEIGHT DATA		
OIL NOT INCLUDED	Empty Weight (Lbs.)	Empty Weight Moment (/100)
Certificated Weight	2110	1652

NOTE: All moments are equal to $\frac{\text{weight X arm}}{100}$

GROSS WEIGHT MOMENT LIMITS



DO NOT MARK ON CHART

500. During a turn, if the angle of bank is increased and at the same time the airspeed is decreased, a pilot can expect the radius of turn to

1- decrease and the rate of turn to decrease.
2- increase and the rate of turn to decrease.
3- decrease and the rate of turn to increase.
4- increase and the rate of turn to increase.

501. Use the loading data on page 81. What would be the maximum allowable inches aft of datum center of gravity moment if the airplane was loaded to 3,400 pounds gross weight?

1- 82.0 inches.
2- 84.5 inches.
3- 85.8 inches.
4- 77.0 inches.

502. Refer to the loading data on page 81 and assume an airplane is loaded as follows:

Front seat - 1st person . . . 170 lbs.
2nd person . . . 130 lbs.

Rear seat aft position -
1st person . . . 120 lbs.
2nd person . . . 190 lbs.

Baggage . . . . . 150 lbs.
Oil . . . . . Full
Fuel - leading edge tanks . . Full

From the data given, it can be determined that the airplane is loaded

1- over allowable gross weight; CG located outside forward limits.
2- under allowable gross weight; CG located within aft limits.
3- over allowable gross weight; CG located within forward limits.
4- under allowable gross weight; CG located outside aft limits.

503. If all index units are positive when computing weight and balance the location of the datum would be at the

1- centerline of the nosewheel or tailwheel depending on the type airplane.
2- centerline of the main wheels.
3- trailing edge of the wings.
4- nose, or out in front of the airplane.

504. If the landing gear on an airplane moves forward during retraction, the

1- total moments will remain the same.
2- total moments will increase.
3- total moments will decrease.
4- center of gravity will remain the same.

505. Consider the following:

Airplane weight . . . . . 9,500 lbs.
Center of gravity
location . . . . . Station 90.0
Aft center of gravity
limit . . . . . Station 90.5

How much weight could be added at Station 120 without exceeding the aft center of gravity limit?

1- 61.0 lbs.
2- 110.5 lbs.
3- 161.0 lbs.
4- 30.0 lbs.

506. Consider the following:

Aircraft weight . . . . . 5,000 lbs.
Center of gravity . . . . . Station 80.0
Aft center of gravity
limit . . . . . Station 80.5

What is the maximum weight that could be added at Station 150.0 without exceeding the aft center of gravity limit?

1- 69.5 lbs.
2- 70.0 lbs.
3- 160.5 lbs.
4- 35.9 lbs.

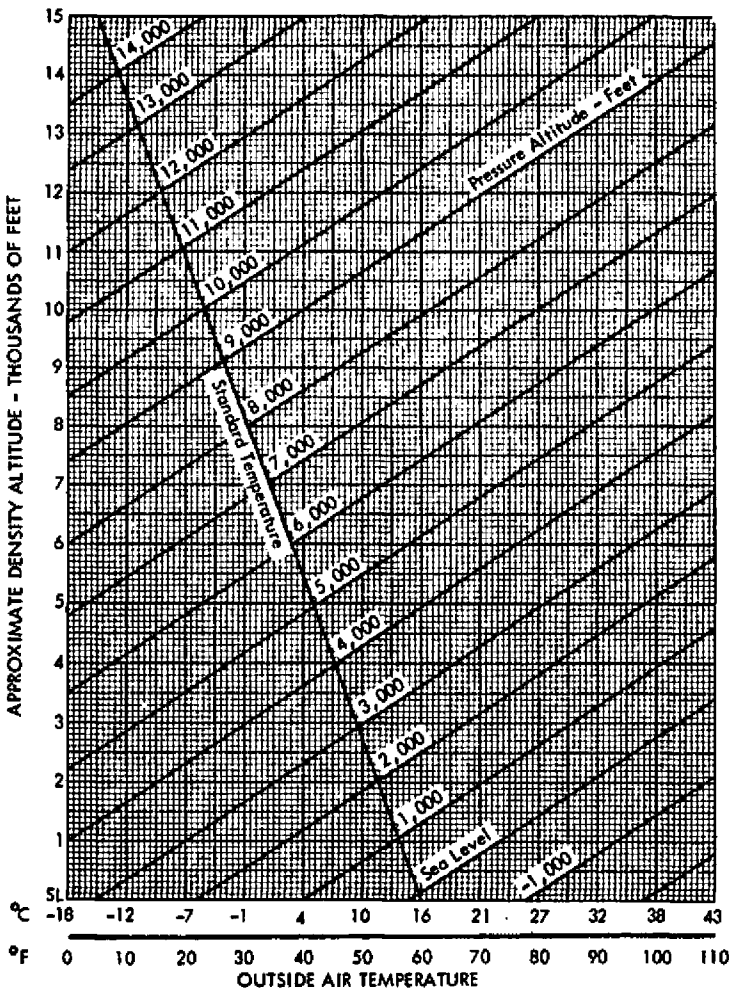
507. Consider the following:

Aircraft weight . . . . . 8,300 lbs.
Center of gravity . . . . . Station 90.0
Aft center of gravity
limit . . . . . Station 90.5

How much weight could be added at Station 160 without exceeding the aft center of gravity limit?

1- 16.5 lbs.
2- 59.7 lbs.
3- 69.5 lbs.
4- 13.9 lbs.

DENSITY ALTITUDE CHART



Altimeter Setting (In. Hg.)	*Pressure Altitude Conversion Factor*
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

508. Refer to the above chart. If, during takeoff at an airport having an elevation of 2,223 feet, a temperature of 95° F., and an altimeter setting of 28.90, the airplane would perform as though it were at

1- 3,200 feet MSL.
2- 4,700 feet MSL.
3- 6,064 feet MSL.
4- 2,223 feet MSL.

509. Refer to the above chart. If the ambient temperature and altimeter setting are 60° F. and 30.40, respectively, at an airport having a field elevation of 2,000 feet, the density altitude at that airport would be approximately

1- 1,200 feet.
2- 1,560 feet.
3- 1,900 feet.
4- 440 feet.

510. Refer to the above chart. When the altimeter setting is 29.30 and the temperature is 80° F. at an elevation of 5,000 feet, the density altitude is approximately

1- 3,580 feet.
2- 5,600 feet.
3- 8,000 feet.
4- 580 feet.

511. Refer to the above chart. Wher the altimeter setting is 29.80 and the temperature is 90° F. at an elevation of 2,000 feet, the density altitude is approximately

1- 110 feet.
2- 2,110 feet.
3- 4,500 feet.
4- sea level.

512. Consider the following:

Airplane weight . . . . . 6,400 lbs.
Center of gravity
location . . . . . Station 80.0
Aft center of gravity
limit . . . . . Station 80.5

How much weight could be added to Station 150.0 without exceeding the aft center of gravity limit?

1- 46.0 lbs.
2- 69.5 lbs.
3- 70.0 lbs.
4- 5.0 lbs.

513. During a level turn, increasing the airspeed while maintaining a constant load factor would result in

1- a decrease in the radius of turn.
2- an increase in the radius of turn.
3- an increase in centrifugal force.
4- the same radius of turn.

514. Which statement is true relating to the effect of low-level wind shear on airplane performance?

1- A headwind which shears to a tailwind causes the airplane to pitch up.
2- A tailwind which shears to a headwind causes an initial decrease in airspeed.
3- A tailwind which shears to a headwind causes the airplane to pitch down.
4- A headwind which shears to a tailwind causes an initial decrease in airspeed.

515. Suppose while flying in a steady wind of 30 knots, the airplane is turned from a direct headwind to a direct tailwind. The indicated airspeed would

1- remain the same but the groundspeed would increase 60 knots.
2- decrease 30 knots and the groundspeed would increase 30 knots.
3- increase 60 knots and the groundspeed would increase 30 knots.
4- increase 30 knots and the groundspeed would increase 30 knots.

516. Which statement concerning airplane speed symbols is true?

1- V_X means the best rate-of-climb speed.
2- V_{FE} means the maximum flap extended speed.
3- V_{LE} means the maximum landing safety speed.
4- V_{SO} means the power-on stalling speed with the gear and flaps retracted.

517. Which of the following airspeed symbols means "never-exceed" speed?

1- V_{NE}
2- V_{NO}
3- V_A
4- V_{SO}

518. Whenever climbing or descending through an inversion or wind-shear zone, the pilot should be alert for which of the following changes in airplane performance?

1- A sudden surge of thrust.
2- A sudden decrease in power.
3- A fast rate of climb and a slow rate of descent.
4- A sudden loss of airspeed.

519. Which of the following airspeeds is identified by color coding on an airspeed indicator?

1- The maximum gear operating or extended speed.
2- The maximum structural cruising speed.
3- The stalling speed for all altitudes and configurations.
4- The design maneuvering speed.

520. In regard to the climb angle, the airplane will climb at

1- a steeper angle when flying downwind than when flying into the wind.
2- a shallower angle when flying downwind than when flying into the wind.
3- the same angle whether flying downwind or upwind.
4- a lesser rate when flying downwind than when flying into the wind.

521. How will an increase in weight (loading) affect the performance of an airplane?

1- The glide ratio will decrease.
2- The power setting required to produce a specific airspeed will change.
3- The indicated stalling speed will decrease.
4- The lift/drag ratio will change.

522. For each 1,000-foot increase in altitude, the true airspeed increases approximately what percent of the indicated airspeed?

1- 3.5%
2- 5%
3- 10%
4- 2%

523. Which of the following procedures could be used to determine density altitude while on the ground?

1- Set the altimeter to field elevation and then by means of a density altitude chart apply temperature to the indicated altitude.
2- Set the altimeter to 29.92" Hg and then by means of a computer apply temperature to the indicated altitude.
3- Set the altimeter to the reported altimeter setting and then by means of a density altitude chart apply temperature to the indicated altitude.
4- Set the altimeter to the current altimeter setting and then apply the standard temperature lapse rate to the indicated altitude.

524. The indicated stalling speed of an airplane is most affected by

1- changes in air density.
2- variations in flight altitude.
3- variations in airplane loading.
4- changes in air temperature.

525. What is the primary reason for computing density altitude?

1- To determine aircraft performance.
2- To establish flight levels (FLs) above 18,000 feet MSL.
3- To ensure safe cruising altitude over mountainous terrain.
4- To determine pressure altitude.

526. Operation in excess of an airplane's V_{NE} should be avoided because

1- flutter or excessive load factors could be induced.
2- the stalling speed would increase to the point that normal maneuvers could not be performed without stalling.
3- control effectiveness would be impaired to the point that the airplane would be uncontrollable.
4- excessive induced drag could cause structural failure.

527. The stalling speed of an airplane will be highest when the airplane is loaded with a

1- low gross weight and forward center of gravity.
2- low gross weight and aft center of gravity.
3- high gross weight and forward center of gravity.
4- high gross weight and aft center of gravity.

528. Which statement is true regarding takeoff performance with high-density altitude conditions?

1- The acceleration rate will increase since the lighter air creates less drag.
2- A shorter distance is required to accelerate to lift-off speed due to the reduced drag of lighter air.
3- A higher than normal indicated airspeed is required to produce sufficient lift since the air is less dense.
4- The acceleration rate is slower because the engine and propeller efficiency is reduced.

529. The reported altimeter setting of a given station is the

1- station's barometric pressure converted to mean sea level pressure.
2- station's pressure altitude adjusted for existing temperatures.
3- actual barometric pressure measured at sea level.
4- actual barometric pressure measured at that station.

530. If an airplane is loaded with the center of gravity aft of the rearward limit, that airplane will tend to become

1- unstable about its longitudinal axis.
2- sluggish in aileron control.
3- sluggish in rudder control.
4- unstable about its lateral axis.

531. The different colored radials and arcs on an airspeed indicator represent

1- equivalent airspeeds.
2- true airspeeds.
3- calibrated airspeeds.
4- indicated airspeeds.

532. Acceleration error will be displayed on the attitude indicator by a false

1- bank to the right.
2- nose-low indication.
3- nose-high indication.
4- bank to the left.

533. The center of gravity of an airplane is computed along the

1- vertical axis.
2- longitudinal axis.
3- horizontal axis.
4- lateral axis.

534. Deceleration error will be displayed on the attitude indicator by a false

1- bank to the right.
2- nose-low indication.
3- nose-high indication.
4- bank to the left.

535. The center of gravity of an airplane can be determined by which of the following methods?

1- Multiplying total weight by total moments.
2- Dividing total arms by total moments.
3- Dividing total moments by total weight.
4- Multiplying total arms by total weight.

536. In a coordinated turn the displacement of the turn needle

1- increases as the angle of bank increases and the airspeed decreases.
2- increases as the angle of bank decreases and the airspeed increases.
3- remains constant for a 30° bank regardless of the airspeed.
4- indicates the angle of bank.

537. Refer to the chart on page 87.

Given: Associated conditions on the chart.
Standard altitude . . . 6,200 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

1- 95 MPH.
2- 110 MPH.
3- 115 MPH.
4- 93 MPH.

538. Refer to the chart on page 87.

Given: Associated conditions on the chart.
Standard altitude . . . 3,600 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

1- 94 MPH.
2- 113 MPH.
3- 115 MPH.
4- 93 MPH.

539. What is the primary advantage of a constant-speed propeller?

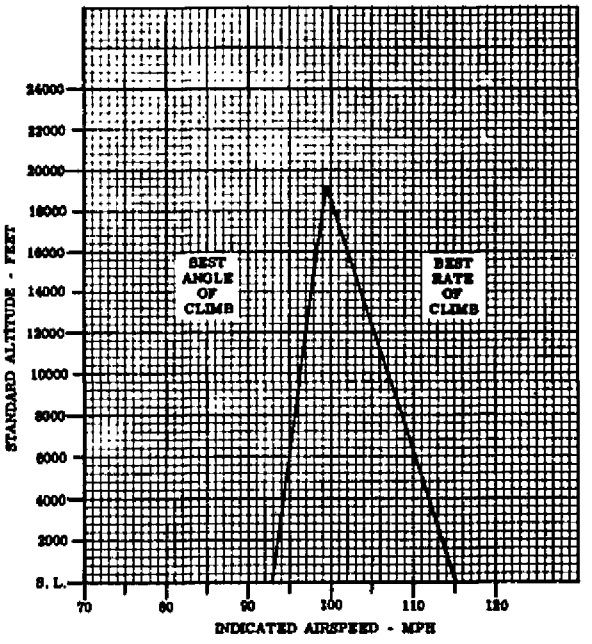
1- To obtain a pitch setting that is suitable for each flight situation and power setting.
2- To maintain a specific engine speed.
3- To control the power output developed by the engine.
4- To obtain and maintain a selected pitch angle of the blades regardless of the flight situation or power setting.

MAXIMUM CLIMB

CLIMB SPEED

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
WEIGHT	3400 POUNDS
GEAR	UP
FLAPS	UP



540. Refer to the chart above.

Given: Associated conditions on the chart.
Standard altitude . . . 6,000 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 95 MPH.
2- 110 MPH.
3- 115 MPH.
4- 93 MPH.

541. Refer to the chart above.

Given: Associated conditions on the chart.
Standard altitude . . . 3,000 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 94 MPH.
2- 113 MPH.
3- 115 MPH.
4- 93 MPH.

CLIMB SPEEDS

Cruising Climb Speed—Normal rate of power, full throttle with Gear and Flaps Up . . . . . 130 mph

At 5000 ft. Altitude	GEAR & FLAP UP	GEAR DOWN	GEAR & FLAP DOWN
Best rate of climb speed	102 mph	86 mph	67 mph
Best angle of climb speed	84 mph	75 mph	64 mph

STALL SPEEDS

CONFIGURATION	ANGLE OF BANK 0°	20°	40°	60°
Gear and Flaps Up Power Off	71.0 mph	73.2 mph	81.1 mph	100.4 mph
Gear and Flaps Up Power On	63.0 mph	65.0 mph	72.0 mph	89.2 mph
Gear and Flaps Down Power Off	60.0 mph	61.9 mph	68.6 mph	84.9 mph
Gear and Flaps Down Power On	54.0 mph	55.7 mph	61.7 mph	76.5 mph

542. Refer to the illustration above. If "V_Y" is maintained during a 20° angle of bank turn with the gear and flaps retracted, how much margin of safety will there be above stalling speed?

1- 19.0 MPH.
2- 28.8 MPH.
3- 37.0 MPH.
4- 10.8 MPH.

543. Refer to the illustration above. If "V_X" is maintained during a straight climb with gear and flaps down, how much margin of safety will there be above stalling speed?

1- 10 MPH.
2- 15 MPH.
3- 20 MPH.
4- 5 MPH.

544. Refer to the illustration above and determine the airspeed that is recommended by FAA when none is specified by the airplane manufacturer for short-field approach. The proper approach speed is

1- 64-68 MPH.
2- 70-74 MPH.
3- 78-84 MPH.
4- 55-59 MPH.

545. If the pitot head were clogged or iced over and the power and pitch were held constant, the indicated airspeed would

1- increase as altitude is decreased.
2- increase as altitude is increased.
3- decrease as altitude is increased.
4- be unaffected by altitude changes.

546. Which statement is true about magnetic deviation of a magnetic compass?

1- Deviation is the same for all aircraft on various headings.
2- Deviation is different in a given aircraft in different localities.
3- Deviation is different on various headings of a given aircraft.
4- Deviation is the same for all aircraft in the same locality.

547. The pressure altitude at a given location is indicated by the altimeter after it is set to

1- 29.92.
2- the density altitude.
3- field elevation.
4- the current altimeter setting.

548. Generally, when severe turbulence is encountered, the airspeed should be reduced to or slightly below the design maneuvering speed, because at that speed the

1- margin of safety above stall speed is increased.
2- airplane will stall before an excessive load factor occurs.
3- angle of the relative wind resulting from vertical gusts will be less and thus prevent a stall.
4- effectiveness of the controls is increased.

549. Which instrument would be affected by excessively low pressure in the airplane's vacuum system?

1- Pressure altimeter.
2- Airspeed indicator.
3- Vertical speed indicator.
4- Heading indicator.

550. Deviation error of the magnetic compass is caused by

1- magnetic dip.
2- acceleration and deceleration.
3- certain metals and electrical systems within the airplane.
4- the difference in location of true north and magnetic north.

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