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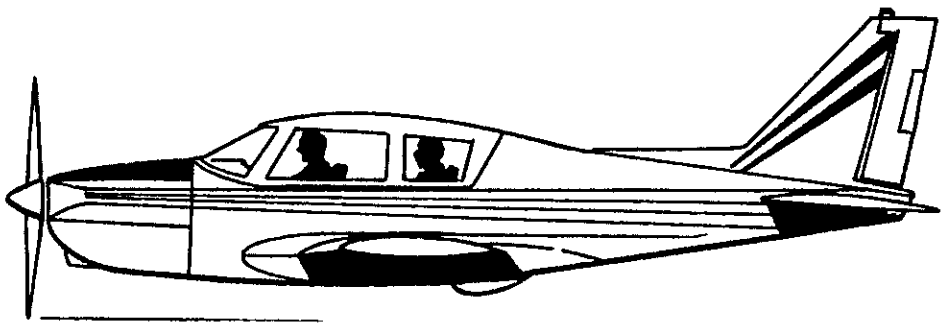
AC 61-71A

COMMERCIAL PILOT AIRPLANE Written Test Guide



1977

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

COMMERCIAL PILOT

AIRPLANE

WRITTEN TEST GUIDE

REVISED
1977

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service

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PREFACE

This guide has been developed by Flight Standards National Field Office to assist applicants in preparing for the Commercial Pilot-Airplane Written Test. This guide supersedes AC 61-71, Commercial Pilot-Airplane Written Test Guide, dated 1974.

This guide outlines the aeronautical knowledge requirements for a commercial pilot, informs the applicant of source material that can be used to acquire this knowledge, and includes the test items and illustrations used in the FAA Commercial Pilot-Airplane Written Test.

All test items pertaining to the Federal Aviation Regulations are based on those regulations which were in effect at the time of printing.

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

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COMMERCIAL PILOT AIRPLANE WRITTEN TEST GUIDE

INTRODUCTION

This guide is offered as an aid to assist persons in obtaining the necessary knowledge to pass the written test. There is NO quick and easy way to obtain the background of experience, knowledge, and skill that the present-day professional pilot must possess. In the many areas where technological change is the rule rather than the exception, there can be no substitute for diligent study to develop competence and remain current.

The intent of this guide is to define and narrow the field of study to the knowledge requisite to the Commercial Pilot Certificate. Thus, the applicant is more able to direct an effective study plan. The applicant is reminded, however, THAT FULL KNOWLEDGE OF ALL TOPICS MENTIONED IN THE STUDY OUTLINE—NOT JUST A MASTERY OF THE TEST ITEMS—SHOULD BE USED AS THE BASIS FOR DETERMINING THAT ONE IS PROPERLY PREPARED TO TAKE A WRITTEN TEST.

NEED FOR THE WRITTEN TEST

Technological advances and refinement have made the modern airplane versatile, reliable, and efficient, thereby expanding the phases of air commerce in which the commercial pilot may become involved. Consequently, situations are often encountered involving rapidly changing conditions which demand full knowledge of the airplane and the environment in which it will be operated.

The increased use of more advanced and refined aircraft by the general aviation segment has outmoded the practice of testing for memory alone. Of course, knowledge is still necessary but it must be related to skill. Therefore, written examinations today require the ability to use knowledge in practical situations as well as in answering questions based on theoretical problems.

TYPE OF TEST QUESTIONS

The written test contains "objective, multiple-choice" type test items that can be answered by a single response selected from the four presented. This type of test has several advantages, two of which are (1) *objective scoring*, eliminating any element of subjective judgment when determining the grade, and (2) *rapid scoring*, making it possible for the applicant to receive the grade quickly.

TAKING THE WRITTEN TEST

At present there are 60 items on the commercial written test. The maximum time allowed for completion is 4 hours. While it may be possible to complete the test in less time, it may increase the probability of mistakes.

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

1. Each statement means exactly what it says. Do not look for hidden meanings. The statement does not concern exceptions to the rule; it refers to the general rule.
2. Always read the statement or question first—before looking at the answers. Be sure to read the entire item carefully. Avoid "skimming" and hasty assumptions as this may lead to an erroneous approach to the problem or failure to consider vital words.
3. Only *one* of the alternate answers given is completely correct. The others may be the result of incorrect computation, misconceptions of rules and principles, or erroneous or incomplete analysis of the problem. Be sure to consider and understand all factors.
4. Each test item is independent of other test items. The correct response to one item is not based on the correct response to a previous test question, although occasionally the same factors may be used.

5. Applicants are encouraged to skip items which they cannot readily answer. You can return to the items you skipped after completing those which you can readily answer. This procedure will enable you to make maximum use of the time available, and may mean the difference between a passing or failing score.
6. In solving problems, select the answer closest to your solution. If you have solved the problem correctly, your solution will be nearest to the correct answer.

ELIGIBILITY FOR TAKING THE TEST

The prerequisites for taking the initial written test are prescribed in FAR Part 61.35. The requirements for retaking the test in the event of failure are prescribed in FAR Part 61.49. When arriving for the written test, you should be prepared to present to the person administering the test proof of your eligibility to take it, as well as documentary evidence of your identity. Normally, you will not be permitted to begin the test unless there is maximum allowable time available for taking the test.

§ 61.33 Tests: general procedure.

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

§ 61.35 Written test: prerequisites and passing grades.

(a) An applicant for a written test must—

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

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

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

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

This section does not apply to the written test for an airline transport pilot certificate or a rating associated with that certificate.

§ 61.37 Written tests: cheating or other unauthorized conduct.

(a) Except as authorized by the Administrator, no person may—

(1) Copy, or intentionally remove, a written test under this Part;

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

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

(4) Take any part of that test in behalf of another person;

(5) Use any material or aid during the period that test is being given; or

(6) Intentionally cause, assist, or participate in any act prohibited by this paragraph.

(b) No person whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefor, under this chapter for a period of one year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

§ 61.39 Prerequisites for flight tests.

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

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

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

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

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

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

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

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

(iii) Is applying for an airline transport pilot certificate or an additional aircraft rating on that certificate.

(b) Notwithstanding subparagraph (1) of paragraph (a) of this section, an applicant for an airline transport pilot certificate or an additional aircraft rating on that certificate who has been, since passing the written examination, continuously employed as a pilot, or as a pilot assigned to flight engineer duties by, and is participating in an approved pilot training program of a U.S. air carrier or commercial operator, or who is rated as a pilot by, and is participating in a pilot training program of a U.S. scheduled military air transportation service, may take the flight test for that certificate or rating.

§ 61.49 Retesting after failure.

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

Subpart E—Commercial Pilots

§ 61.121 Applicability.

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

§ 61.123 Eligibility requirements: general

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

(a) Be at least 18 years of age;

(b) Be able to speak, read, and understand English, or have an operating limitation on his pilot certificate as is necessary for safety;

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

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

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

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

§ 61.125 Aeronautical knowledge.

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

(a) *Airplanes.*

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

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

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

STUDY OUTLINE

The study outline which follows is the framework for basic aeronautical knowledge that the prospective commercial pilot should know. Each question on the FAA written test can be directly related to one or more of the topics contained in this outline. This subject matter is based on operationally realistic airman activity and encompasses the requirements specified in FAR 61.125.

A. Federal Aviation Regulations, Part 1.

Have a knowledge of:

1. General definitions
2. Abbreviations and symbols

B. Federal Aviation Regulations, Part 61.

Have a knowledge of:

1. Required certificates/ratings
2. Certificates and ratings issued
3. Carriage of narcotic drugs
4. Duration of pilot certificates
5. Duration of medical certificates
6. General limitations
7. Pilot logbooks
8. Operations during medical deficiency
9. Second-in-command qualifications
10. Recent experience: pilot in command
11. Pilot-in-command proficiency check
12. Commercial pilot privileges/limitations

C. Federal Aviation Regulations, Part 91.

Have a knowledge of:

1. Responsibility of pilot in command
2. Preflight action
3. Flight crewmembers at stations
4. Careless or reckless operation
5. Liquor and drugs
6. Dropping objects
7. Fastening of safety belts
8. Parachutes and parachuting
9. ATC transponder equipment
10. Civil aircraft: certificates required
11. Aircraft airworthiness
12. Aircraft operating limitations/markings
13. Supplemental oxygen
14. Instrument and equipment requirements
15. Limited/restricted aircraft limitations
16. Emergency locator transmitters
17. Reports on aircraft identification and activity
18. Operating near other aircraft
19. Right-of-way rules
20. Aircraft speeds
21. Acrobatic flight
22. Aircraft lights
23. ATC light signals
24. Compliance — ATC clearances/instructions
25. Minimum safe altitude; general
26. Altimeter settings
27. Operation—in vicinity of airports, and at airports with or without towers
28. Flight in terminal control areas
29. Basic VFR weather minimums
30. Special VFR weather minimums
31. Maintenance required
32. Carrying persons after repairs or alterations
33. Inspections
34. Altimeter system tests and inspections
35. Progressive inspections
36. Maintenance records
37. Transfer of maintenance records
38. Rebuilt engine maintenance records
39. ATC transponder tests and inspections

D. Federal Aviation Regulations, Part 135.

Have a knowledge of:

1. Applicability
2. Operating rules
3. Crewmembers qualification
4. Aircraft and equipment

E. National Transportation Safety Board, Part 830.

Have a knowledge of:

1. Applicability
2. Definitions
3. Immediate notification and information

4. Preserving wreckage/mail/cargo/records
5. Reports/statements to be filed

F. FAA Advisory Circulars.

Have a knowledge of:

1. Series 00—General
2. Series 20—Aircraft
3. Series 60—Airmen
4. Series 70—Airspace
5. Series 90—Air Traffic Control and General Operations
6. Series 120—Air Carrier and Commercial Operators
7. Series 150—Airports
8. Series 170—Air Navigation Facilities

G. Airman's Information Manual, Part 1.

Have a knowledge of:

1. Glossary of aeronautical terms
2. Airport lighting/marking aids
3. Visual approach slope indicators
4. Controlled/uncontrolled areas
5. Special use airspace
6. Radar traffic information service
7. Stage I, II, III terminal radar service
8. Traffic/wind indicators
9. ADIZ and designated mountainous areas
10. Medical facts for pilots—hypoxia/hyperventilation/alcohol/carbon monoxide
11. Good operating practices
12. Wingtip vortices

H. Aerodynamics and Principles of Flight.

Have a knowledge of:

1. Laws of motion
2. Functions of the flight controls
3. Principles of airfoils
4. Wing planform—
   (a) Area/span/chord
   (b) Aspect ratio/taper/sweepback
   (c) Effect of planform on stall patterns
5. Forces acting on the aircraft
6. Flight controls/axes of the aircraft
7. Lift/drag during turns
8. Lift versus angle of attack
9. Lift/thrust versus air density
10. Types of flaps, spoilers, divebrakes
11. Effect of flaps on lift/drag/trim
12. Effect of ice/snow/frost on airfoils
13. Power versus climb/descent/level flight
14. Gyroscopic precession
15. Types and effect of drag—induced/parasite/profile
16. Ground effect
17. Loads/load factors
18. Stability—static and dynamic/longitudinal/lateral/directional
19. Stalls/spins
20. Relative wind/angle of attack
21. Effect of wind during turns
22. Torque effect—P factor

I. Aircraft/Engine Operation—General.

Have a knowledge of:

1. Fuel injection/carburetor principles
2. Reciprocating engine principles
3. Preflight/postflight safety practices
4. Use of mixture/throttle/propeller control
5. Use of proper fuel grade/type
6. Fuel system operation
7. Engine starting/shutdown
8. Detonation cause/effect
9. Fuel contamination prevention/elimination
10. Emergency—engine/systems/equipment/fire
11. Carburetor icing cause/detection/elimination
12. Wake turbulence causes/precautions
13. Proper loading of the aircraft
14. Interpreting engine instruments
15. Ignition or electrical system/units
16. Recovery from critical flight situations
17. Effect of carburetor heat on mixture
18. Aircraft operating limitations
19. Manifold pressure versus RPM
20. High altitude operations/pressurization
21. Use of oxygen and oxygen equipment
22. Mid-air collision avoidance precautions

J. Aircraft/Engine Performance—General.

Have a knowledge of:

1. Takeoff charts
2. Rate-of-climb charts
3. Maximum safe crosswind charts
4. Use of Denalt Computer
5. Landing charts
6. Stall speed charts
7. Airspeed measurement — TAS/IAS/CAS/EAS
8. Airspeed correction charts
9. Computing density/pressure/altitudes

10. Effect of density altitude on performance
11. Effect of weight/balance on performance
12. Critical performance speeds—"V Speeds"
13. Effect of wind on aircraft performance
14. Bank/speed versus rate/radius of turn
15. Stall speed versus altitude or attitude
16. Stall speed versus indicated/true airspeed
17. Obstacle clearance takeoff/landing
18. Best angle-/rate-of-climb
19. Computation of gross weight/useful load
20. Computation of center-of-gravity
21. Weight addition or removal
22. Balance, stability, and center-of-gravity
23. Effect of adverse balance
24. Shifting of loose cargo
25. Management of weight and balance control
26. Weight shifting

K. Flight Instruments and Systems.

Have a knowledge of:

1. Attitude indicator operation/errors
2. Heading indicator operation/errors
3. Turn indicator/coordinator
4. Altimeter operation/errors
5. Vertical speed indicator operation/errors
6. Airspeed indicator operation/errors
7. Vacuum systems/instruments
8. Pitot-static systems/instruments
9. Magnetic compass operation/errors
10. Altimeter setting procedures/significance
11. Pressure altitude—significance/obtaining
12. Gyroscopic principles

L. Airplane Operation.

Have a knowledge of:

1. Normal/crosswind takeoffs/landings
2. Maximum performance takeoffs/landings
3. Emergency landings
4. Maneuvering speed
5. Taxiing in strong surface winds
6. Flaps operation/systems
7. Landing gear operation/systems
8. Controllable pitch propellers—operation/systems
9. Supercharged engine operation

RECOMMENDED STUDY MATERIALS

The prospective commercial pilot will find the following list of publications useful in preparing for the written test. In addition, there are many excellent commercial training aids available and other instructional materials which may be helpful.

Airman's Information Manual (AIM). This publication presents, in four parts, information necessary for the planning and conduct of flights in the U.S. National Airspace System. Besides providing frequently updated airport and navaid data, the AIM includes instructional and procedural information and is designed for use in the cockpit.

Each part is available on a separate annual subscription to better serve the needs of the individual pilot:

Part 1. *Basic Flight Manual and ATC Procedures.* Issued semiannually.

Part 2. *Airport Directory.* Issued semiannually.

Part 3. *Operational Data and Notices to Airmen.* Issued every 56 days, supplemented by Part 3A (Notices to Airmen) issued every 14 days.

Part 4. *Graphic Notices and Supplemental Data.* Issued quarterly.

HANDBOOKS AND TECHNICAL MANUALS

Pilot's Handbook of Aeronautical Knowledge. AC 61-23A. This handbook contains essential, authoritative information used in training and guiding applicants for private pilot certification, flight instructors, and flying school staffs.

Flight Training Handbook. AC 61-21. This text deals with certain basic flight information such as load factor principles, weight and balance, and related aerodynamic aspects of flight, as well as principles of safe flight. Thus it serves primarily as a text for student pilots, for pilots improving their qualifications, or preparing for additional ratings.

Pilot's Weight and Balance Handbook. AC 91-23. This handbook provides an easily understood text on aircraft weight and balance for pilots who need to appreciate the importance of weight and balance control for safety of flight. The text progresses from an explanation of basic fundamentals to the complete application of weight and balance principles in large aircraft operation.

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, U.S. Government Printing Office, Washington, D.C. 20402.

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

A check or money order made payable to the Superintendent of Documents should be included with each order. Submit orders for single-sales and subscription Parts on different order forms. No COD orders are accepted.

National Transportation Safety Board, Part 830. This publication deals with procedures required in dealing with accidents and lost or overdue aircraft in the United States, its territories, and possessions. To obtain this publication, send request to:

> National Transportation Safety Board
> Attn: Publications Branch
> Washington, D.C. 20594

VFR and IFR Exam-O-Grams. Brief, timely, and graphic articles developed and published on a continuing basis. They are nondirective in nature and are issued as an information service, particularly to individuals interested in airman written tests. They relate to concepts, practices, and procedures critical to aviation safety and assist in giving safety-oriented information to airman applicants and practicing airmen. Exam-O-Grams are available free of charge but are limited to a single set of VFR and/or IFR Exam-O-Grams per request. Requests for placement on the mailing list should be addressed to:

> DOT-FAA
> Aeronautical Center
> Flight Standards National Field Office
> Examinations Branch, AFS-590
> P.O. Box 25082
> Oklahoma City, Oklahoma 73125

How to Obtain GPO Publications

Requests for FAA publications sold through the Superintendent of Documents should be submitted on an order form, if possible, and mailed to:

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

In order to aid the processing of your order, the following suggestions are offered:

1. Place orders for subscription items and single-sales items on separate requests.
2. Provide the exact title of the publication, the Advisory Circular number, and the stock number, if known.
3. A check or money order—not cash—payable to Superintendent of Documents in the correct amount should accompany your order.
4. Enclose a self-addressed mailing label if you don't have an order blank.

AIRMAN WRITTEN TEST APPLICATION

PRIVACY ACT STATEMENT

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

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

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

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

INSTRUCTIONS TO APPLICANT:

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

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

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

- DO NOT TEAR SHEETS APART.

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

INSTRUCTIONS TO FAA PERSONNEL:

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

DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION

AIRMAN WRITTEN TEST APPLICATION

DATE OF TEST (MONTH / DAY / YEAR)	TITLE OF TEST	TEST NO.
02 / 12 / 77	COMMERCIAL PILOT - AIRPLANE	254615

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

NAME (LAST, FIRST, MIDDLE)	DOE JOHN R
DATE OF BIRTH (MONTH / DAY / YEAR)	1 / 17 / 26
MAILING ADDRESS — NO. AND STREET, APT. #, P.O. BOX, OR RURAL ROUTE	1530 SOUTH 12TH STREET
CITY, TOWN OR POST OFFICE, AND STATE	ANYTOWN AMERICA
ZIP CODE	73069
DESCRIPTION — HEIGHT / WEIGHT / HAIR / EYES	69 / 158 / Br / Br
BIRTHPLACE (City and State, or foreign country)	
CITIZENSHIP	USA
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 John R Doe

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

CARD A					CARD B		
CATEGORY	TEST NUMBER	TAKE NO.	SECTIONS 1 2 3 4 5 6 7	EXPIRATION MONTH DAY YEAR	CERTIFICATED SCHOOL NUMBER	MECH EXP DATE BY SECTION 1 2 3	ID

Applicant's identity established by:

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.

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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	

Sample

AC FORM 8080-3 (12-76) (0052-00-37-2006)

DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

TITLE	SELECTION NO.
COMMERCIAL PILOT — AIRPLANE	254601

NAME John R. Doe

NOTE: MARKING ON THIS SHEET IS PERMITTED.

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9 . . .	282	29 . . .	483	49 . . .	683
10 . . .	292	30 . . .	493	50 . . .	696
11 . . .	304	31 . . .	503	51 . . .	703
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15 . . .	344	35 . . .	544	55 . . .	742
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18 . . .	374	38 . . .	566	58 . . .	771
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20 . . .	392	40 . . .	590	60 . . .	796

Sample

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

1- Flight plans are required for flight operations in Group II TCAs.

2- TCAs start at ground level and extend upward to, but not including, the base of Positive Control Areas.

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

4- No person may operate an aircraft in either a Group I or a Group II TCA unless prior authorization from ATC has been received.

002. Regulations which refer to "commercial operator" relate to that person who

1- is a required crewmember aboard an airline transport aircraft.

2- is the owner of a scheduled airline.

3- acts as pilot in command of an air carrier aircraft.

4- engages in flight for compensation or hire.

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

1- acting as the sole manipulator of the aircraft controls.

2- the specific duties of any required crewmember.

3- exercising authority over initiating, conducting, or terminating a flight.

4- exercising the privileges of pilot in command of an aircraft.

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

1- the airport is located within the lateral limits of controlled airspace.

2- a control tower is in operation.

3- a Flight Service Station is in operation.

4- a control zone is in effect.

005. An Airport Traffic Area extends upward to, but does not include,

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

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

1- airports.

2- control zones.

3- airports with an operating control tower.

4- airports with an operating Flight Service Station.

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

1- acts as pilot in command of the aircraft.

2- is a required crewmember aboard the aircraft.

3- is the sole manipulator of the aircraft controls.

4- causes the aircraft to be used or authorizes its use.

008. According to FARs, a Second-Class Medical Certificate issued January 18, 1976,

1- is issued without a specific expiration date if there are no limitations that would affect the safe operation of an aircraft.

2- will expire January 18, 1977.

3- will expire January 31, 1977, for commercial pilot privileges, but may be used for private pilot privileges until January 31, 1978.

4- will expire, for commercial pilot privileges, January 31, 1978.

009. Which statement is true regarding Commercial Pilot Certificates?

1- There is no expiration date on these certificates.

2- They expire if recency of experience requirements are not met.

3- They expire after a duration of 24 months.

4- They expire after a duration of 12 months.

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

1- single-engine; multiengine; land; water; helicopter.

2- transport; normal; utility; acrobatic; restricted.

3- DC-8 and DC-9; Lear Jet; and Jet Commander 1121.

4- airplane; rotorcraft; glider; and lighter-than-air.

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

1- On a DVFR flight plan.

2- In the Positive Control Area.

3- On an international flight.

4- Flight in the Continental Control Area.

012. To carry passengers for hire on a VFR trip at night in a single-engine airplane, and to remain within a radius of 25 NM from the departure airport, the pilot in command would be required to possess at least a

1- Commercial Pilot Certificate with airplane single-engine land rating.

2- Private Pilot Certificate with airplane single-engine land and instrument ratings.

3- Commercial Pilot Certificate with airplane single-engine land and instrument ratings.

4- Private Pilot Certificate with airplane single-engine land rating.

013. An appropriate and current pilot and medical certificate must be in one's personal possession

1- only when acting as pilot in command during flight operations involving interstate commerce.

2- only when carrying passengers while acting as pilot in command.

3- only when acting as pilot in command for compensation or hire.

4- at all times while acting in any capacity as a required crewmember.

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

1- a type rating for the airplane to be flown.

2- a First-Class Medical Certificate.

3- an instrument rating.

4- a Commercial Pilot Certificate with a gold seal.

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

1- Automatic direction finding equipment is required.

2- A radar beacon transponder is required.

3- At least a Commercial Pilot Certificate is required.

4- Distance measuring equipment is required.

016. If recency of experience requirements for night flight are not met, and official sunset is 1806, the latest time which passengers can be carried is

1- 1806.
2- 1906.
3- 1706.
4- 1836.

017. A pilot exercising the privileges of a Commercial Certificate must show, by a reliable record, the logging of what flight time?

1- All additional flight time.

2- All flight time flown with passengers aboard the aircraft.

3- Only the flight time necessary to meet the recent experience requirements.

4- Only the additional flight instruction time received.

018. What portion of a flight may a pilot log as second in command?

1- All flight time while acting as second in command, regardless of aircraft crew requirement.

2- All flight time while acting as second in command in aircraft requiring more than one pilot.

3- Only that flight time during which the second in command is the sole manipulator of the controls.

4- One-half of the total flight time while serving as second in command on aircraft requiring more than one pilot.

019. If a pilot has only a "multiengine land" rating on a Commercial Certificate and carries passengers in a single-engine airplane, this pilot would be operating in

1- violation of FARs, unless the pilot has made at least three takeoffs and three landings within the past 90 days.

2- accordance with FARs, since the pilot is rated in a more complex aircraft and is not carrying passengers for hire.

3- violation of FARs.

4- accordance with FARs, provided the pilot receives a checkout flight in the aircraft with a certificated instructor.

020. Which of the following is permitted if a pilot has a Commercial Certificate, airplane, with only a multiengine land class, and DC-3 type rating?

1- Carrying passengers for hire in a light twin-engine airplane.

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

3- Operating any multiengine airplane, regardless of weight.

4- Operating any large airplane for hire.

021. If a Second-Class Medical Certificate was issued to a commercial pilot 13 months ago, during the next 11 months, this pilot may

1- act as pilot in command and carry passengers or property, but not for compensation or hire.

2- act as pilot in command for compensation or hire and carry passengers or property for compensation or hire.

3- not act as pilot in command nor carry passengers or property.

4- act as pilot in command for compensation or hire, but may not carry passengers or property for compensation or hire.

022. Assume that a Second-Class Medical Certificate was issued on December 5, 1976. For operations not exercising the privileges of a Commercial Pilot Certificate, this medical certificate will be valid through the end of

1- December 5, 1978.
2- December 5, 1977.
3- December 31, 1978.
4- December 31, 1977.

023. If a Second-Class Medical Certificate was issued July 24, 1976, this certificate

1- must be renewed by midnight July 23, 1977, to carry passengers for hire after July 24, 1977.

2- permits commercial pilot privileges only until midnight July 23, 1977.

3- permits private pilot privileges only, beyond midnight of the last day of July 1977.

4- permits private pilot privileges only beyond midnight July 24, 1977.

024. Determining that an aircraft is in condition for safe flight is the sole responsibility of the

1- owner of that aircraft.
2- operator who leases that aircraft.
3- mechanic who services that aircraft.
4- pilot in command of that aircraft.

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

1- deviate from FARs to the extent required to meet the emergency, but must submit a written report to the Administrator within 24 hours.
2- not deviate from FARs unless prior to the deviation approval is granted by the Administrator.
3- deviate from FARs to the extent required to meet that emergency.
4- not deviate from FARs unless permission is obtained from Air Traffic Control.

026. Pilots who change their permanent mailing address and fail to notify the Airman Certification Branch of the FAA of this change are entitled to exercise the privileges of their pilot certificate for a period of

1- 30 days.
2- 60 days.
3- 90 days.
4- 180 days.

027. To act as pilot in command of an aircraft, one must have satisfactorily (1) accomplished a flight review or (2) completed a pilot proficiency check within the preceding

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

028. Unless the takeoffs and landings have been made to meet the recency of experience requirement, a commercial pilot may not

1- perform any duties as a crewmember.
2- fly for compensation or hire.
3- act as pilot in command.
4- carry passengers.

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

1- three takeoffs and three landings to a full stop in the same category and class of aircraft to be used.
2- three touch-and-go landings in the same category and class of aircraft to be used.
3- three takeoffs and three landings, either full stop or touch-and-go, but must be accompanied by a certificated flight instructor who meets the recent experience for night flight.
4- three takeoffs and three landings to a full stop in the same category but not necessarily in the same class of aircraft to be used.

030. Prior to carrying passengers at night, the pilot in command must have accomplished the required takeoffs and landings in

1- an aircraft that is equipped for instrument flight.
2- the same category and class of aircraft to be used.
3- the specific aircraft to be used.
4- any category aircraft.

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

1- Commercial Pilot Certificate with the appropriate category and class ratings.
2- Private Pilot Certificate with the appropriate category, class, and type ratings.
3- Commercial Pilot Certificate with the appropriate category, class, and type ratings.
4- Private Pilot Certificate with the appropriate category, and class ratings.

032. Prior to takeoff, passengers should be notified to fasten their seatbelts. This is

1- mandatory for air taxi operators and airlines only.
2- mandatory prior to takeoffs but not landings.
3- mandatory prior to all takeoffs and landings.
4- a good operating practice, although not mandatory.

033. When must a required flight crewmember's seatbelt be fastened?

1- During takeoffs and landings only.
2- During the entire flight if the aircraft is being used for hire.
3- During the entire flight while at the assigned station.
4- During takeoffs and landings only if passengers are being carried for hire.

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

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

035. Portable electronic devices which may cause interference with the navigation or communication system may not be operated on aircraft being flown

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

036. In addition to other preflight action, the regulations require the pilot in command to

1- file a flight plan.
2- check the accuracy of the omninavigation equipment.
3- check each fuel tank visually to ensure that it is always full.
4- determine runway lengths at airports of intended use.

037. 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- An FAA certificated mechanic is responsible for determining that the aircraft is in condition for safe flight.
4- The commercial operator is responsible for determining that the aircraft is in condition for safe flight.

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

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

1- 8 hours.
2- 12 hours.
3- 24 hours.
4- 48 hours.

040. Nonrechargeable batteries used in emergency locator transmitters must be replaced before what percent of their useful life has expired?

1- 25%.
2- 50%.
3- 75%.
4- 90%.

041. Airworthiness Directives for general aviation aircraft are published as

1- supplements to the Advisory Circular System.

2- Notices to Airmen.

3- amendments to FARs.

4- nonregulatory directives.

042. What is the maximum cumulative time an emergency locator transmitter can be operated before the nonrechargeable batteries must be replaced?

1- 30 minutes.
2- 45 minutes.
3- 1 hour.
4- 2 hours.

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

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

044. The expiration date for batteries used in emergency locator transmitters can be found on the

1- instrument panel.
2- radio station license.
3- outside of the transmitter.
4- Airworthiness Certificate.

045. Unless coordinated with ATC, operational testing of emergency locator transmitters should be made only within the

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

046. If the operational category of an airplane is listed as "utility," it would mean that this airplane could be operated in which of the following maneuvers?

1- Any maneuver except acrobatics or spins.

2- All types of acrobatics.

3- Any maneuver that requires an abrupt change in attitude.

4- Mild acrobatics, including spins.

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

1- displayed at the cabin or cockpit entrance so that it is legible to passengers or crewmembers.

2- included in the approved logbooks for that aircraft.

3- filed with the other required certificates or documents within the aircraft.

4- filed in the operator's office from which the airplane is dispatched.

048. Which document should show compliance wtih an applicable Airworthiness Directive?

1- The aircraft maintenance records.

2- The aircraft Airworthiness Certificate.

3- A log maintained separately from other aircraft records.

4- The aircraft Registration Certificate.

049. What documents or records must be aboard an aircraft during flight?

1- Operating limitations, and an aircraft Use and Inspection Report.

2- Operating limitations; a Registration Certificate; and an appropriate, current, and properly displayed Airworthiness Certificate.

3- Repair and alteration forms, and a Registration Certificate.

4- Aircraft and engine logbooks, and a Registration Certificate.

050. At which of these cabin pressure altitudes may a pilot operate an aircraft in excess of 30 minutes without supplemental oxygen?

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

051. 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.

052. 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- 180.
2- 250.
3- 190.
4- 200.

053. When operating a pressurized aircraft above Flight Level 350, and it becomes necessary for one of the required pilots to leave the station, the remaining pilot at the controls shall

1- use the oxygen mask until the other pilot returns to the station.

2- require all remaining crewmembers to use oxygen masks until the other pilot returns.

3- assure that a quick-donning oxygen mask is available that can be sealed on the face within 5 seconds.

4- reduce the cabin pressure altitude to 14,000 feet MSL and maintain this cabin pressure altitude until the other pilot returns.

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

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

055. Unless each occupant is provided with supplemental oxygen, no person may operate an aircraft above a cabin pressure altitude of

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

056. If the operational category of an airplane is listed as "normal," it would mean that this airplane could be operated in which of the following maneuvers?

1- All types of acrobatics.

2- Any maneuver requiring an abrupt change in attitude.

3- Mild acrobatics, including spins.

4- Any maneuver except acrobatics or spins.

057. The maximum cumulative time that an emergency locator transmitter may be operated before the rechargeable battery must be recharged is

1- 1 hour.
2- 2 hours.
3- 30 minutes.
4- 45 minutes.

058. Rechargeable batteries used in emergency locator transmitters must be recharged before what percent of the useful life of their charge has been depleted?

1- 25%.
2- 50%.
3- 75%.
4- 90%.

059. Which statement is true relating to Airworthiness Directives (ADs)?

1- ADs are nonregulatory in nature.

2- Noncompliance with ADs renders an airplane unairworthy.

3- Compliance with ADs is the responsibility of maintenance personnel.

4- When ADs are complied with, airplane maintenance records may be discontinued.

060. Unless authorized, a "restricted category" civil aircraft should not be operated over

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

061. Unless authorized, a "restricted category" civil aircraft should not be operated within

1- transition areas.
2- control areas.
3- congested airways.
4- control zones.

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

1- authorized in experimental category aircraft.
2- not authorized in utility category aircraft.
3- authorized in restricted category aircraft.
4- not authorized in limited category aircraft.

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

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

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

1- A landing light if the flight is for hire.
2- Two-way radio communications system.
3- Lights for all flight and engine instruments.
4- Sensitive altimeter adjustable for barometric pressure.

065. Supplemental oxygen must be used by the required minimum flight crew for that time exceeding 30 minutes while at cabin pressure altitudes above

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

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

1- An approved system of dispensing at least two different colors of water dye.
2- A sensitive altimeter adjustable for barometric pressure.
3- Approved flotation gear readily available to each occupant, and at least one pyrotechnic signaling device.
4- Approved flotation gear readily available to each occupant only if the aircraft is flown beyond 50 NM from shore.

067. When conducting VFR operations at night for hire, the aircraft must be equipped with at least

1- a sensitive altimeter.
2- one landing light.
3- an attitude indicator.
4- a flashing strobe on the vertical fin.

068. Approved flotation gear, readily available to each occupant, is required on each airplane if it is being flown

1- over water, but only when beyond 50 NM from shore.
2- for hire over water beyond power-off gliding distance from shore.
3- for hire over water, regardless of the distance flown from shore.
4- over water beyond power-off gliding distance from shore.

069. Assume a pilot flying a single-engine airplane observes a multiengine airplane approaching on a collision course from the left. Which pilot should give way and why?

1- The pilot of the multiengine airplane should give way; the single-engine airplane is to the right.

2- The pilot of the single-engine airplane should give way; the single-engine airplane is more maneuverable.

3- Each pilot should alter course to the right; safety requires constant vigilance.

4- The pilot of the single-engine airplane should give way; the other airplane is to the left.

070. 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 A; it is to the right of airplane B.

2- Airplane B; it is to the left of airplane A.

3- Airplane A; it is to the left of airplane B.

4- Airplane B; it is to the right of airplane A.

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

1- Airplane A, and it should alter course to the right to pass.

2- Airplane B, and it should expect to be passed on the right.

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.

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

1- 156 knots.
2- 200 knots.
3- 230 knots.
4- 250 knots.

073. In addition to other general aviation operations, an operable emergency locator transmitter must be attached to airplanes being used in

1- commercial operations flown over designated mountainous areas only.

2- commercial operations which are governed by Part 135.

3- agricultural aircraft operations.

4- training flights that remain within a 20-mile radius of the airport.

074. Formation flight while carrying passengers is

1- authorized if the passengers are so informed prior to the flight.

2- not authorized, except when operating outside of controlled airspace.

3- not authorized under any circumstances.

4- authorized, if previous arrangements have been made with the other pilot/pilots.

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

1- No, this is not authorized.

2- Yes, if the passengers approve.

3- Yes, provided arrangements have been made with the other pilot/pilots.

4- Yes, if operating outside controlled airspace.

076. 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 B; it is to the left of airplane A.

4- Airplane A; it is to the left of airplane B.

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

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

087. While in flight, a flashing green light from the control tower means

1- return for a landing, and expect a steady green light at the proper time.
2- return for a landing, and expect an alternating red and green light at the proper time.
3- continue, because this light signal is not applicable to aircraft in flight.
4- continue, but exercise caution.

088. 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- land and clear the runway in use as safely and quickly as possible.
2- abandon the approach, fly the same traffic pattern again, and land.
3- abandon the approach, realizing the airport is unsafe for landing.
4- abandon the approach and reenter the traffic pattern using right-hand turns.

089. A pilot given landing priority by ATC after declaring an emergency in flight is

1- required to make a written report of the emergency to the nearest General Aviation District Office.
2- required, if requested by ATC, to submit a detailed report of the emergency to the chief of that ATC facility within 48 hours.
3- not required to submit a report of the emergency, unless requested by the Administrator of the FAA.
4- not required to submit a written report unless there was damage to the aircraft.

090. No person may operate an aircraft at night unless lighted position lights are displayed during the period

1- from 1 hour after sunset until 1 hour before sunrise.
2- from 1 hour before sunset until 1 hour after sunrise.
3- in which the visibility falls below VFR minimums.
4- from sunset to sunrise.

091. Assume that a pilot who has been instructed to maintain VFR conditions is assigned a vector and an altitude by ATC. This pilot should

1- maintain both the assigned heading and altitude, and should enter the clouds, if instrument rated.
2- not enter the clouds, and should advise ATC the VFR conditions cannot be maintained.
3- deviate from the assigned altitude to avoid entering clouds, but should maintain the assigned heading.
4- deviate from the assigned heading to avoid entering the clouds, but should maintain the assigned altitude.

092. Assume that a pilot operating VFR is assigned a vector and an altitude by ATC. The pilot should

1- not enter clouds, and should advise ATC that VFR conditions cannot be maintained.
2- enter clouds if instrument rated.
3- enter clouds if the sky condition is observed as scattered.
4- not enter clouds, but should deviate so as to maintain VFR conditions; advising ATC is not necessary.

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

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

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

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

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

096. If an airport without a control tower is located within an Airport Traffic Area, ATC authorization is required for landing at

1- the tower-controlled airport only, and for flight through the area.
2- both airports and for flight through the area.
3- both airports but not for flight through the area.
4- the tower-controlled airport only, but not for flight through the area.

097. The minimum altitude at which a sensitive altimeter should be set to 29.92" Hg is

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

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

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

099. The minimum safe altitude which applies anywhere is

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

100. If the final approach path crosses over a powerline which is 200 feet in height, what is the minimum altitude to be maintained above this powerline during an approach for a landing?

1- Any altitude that assures adequate clearance.
2- 500 feet above the powerline.
3- 1,000 feet above the powerline.
4- 2,000 feet above the powerline.

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

102. When flying below 18,000 feet in an aircraft having no radios, cruising altitude must be maintained by reference to an altimeter adjusted to

1- an altimeter setting of 29.92" Hg.
2- zero altitude prior to departure.
3- the elevation of any airport within 100 NM.
4- the elevation of the departure airport.

103. 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.

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

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

105. 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- 1 mile in uncontrolled airspace, 3 miles in controlled airspace.

2- 3 miles during daylight hours, and 5 miles during hours of darkness.

3- 3 miles.

4- 5 miles.

106. To operate an airplane VFR <u>outside controlled airspace</u> at an altitude of more <u>than 1,200 feet</u> AGL but less than 10,000 feet MSL, the minimum flight visibility is

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

107. What is the minimum flight visibility and proximity to cloud requirements for VFR flight, at 6,500 feet MSL, in a Control Area?

1- 1,000 feet over or 500 feet under; 3 miles visibility.

2- 1,000 feet under or 500 feet over; 3 miles visibility.

3- 1,000 feet over or 500 feet under; 1 mile visibility.

4- 1,000 feet under or 500 feet over; 1 mile visibility.

108. Operations within an Airport Traffic Area require ATC authorization for landing at

1- any airport within the area and for flight through the area.

2- any airport within this area, but not for flight through the area.

3- a tower-controlled airport only, but not for flight through the area.

4- a tower-controlled airport only and for flight through the area.

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

1- Departure in any direction consistent with safety, after crossing the airport boundary.

2- Make all left turns, except a 45° right turn on the first crosswind leg.

3- Depart as prearranged with other pilots using the airport.

4- The FAA approved departure procedure for that airport.

110. If an airport without a control tower is located within the Airport Traffic Area of an airport which has an operating control tower, ATC authorization is required for landing at

1- both airports and for flight through the area.

2- the tower-controlled airport only, and for flight through the area.

3- both airports but not for flight through the area.

4- the tower-controlled airport only but not for flight through the area.

111. Flight within a Positive Control Area should be conducted under

1- VFR except when weather is less than the required basic VFR minimums.

2- IFR only and at a specific flight level assigned by ATC.

3- VFR or IFR if the aircraft is equipped with radar beacon transponder.

4- VFR or IFR depending upon pilot qualifications and recent experience.

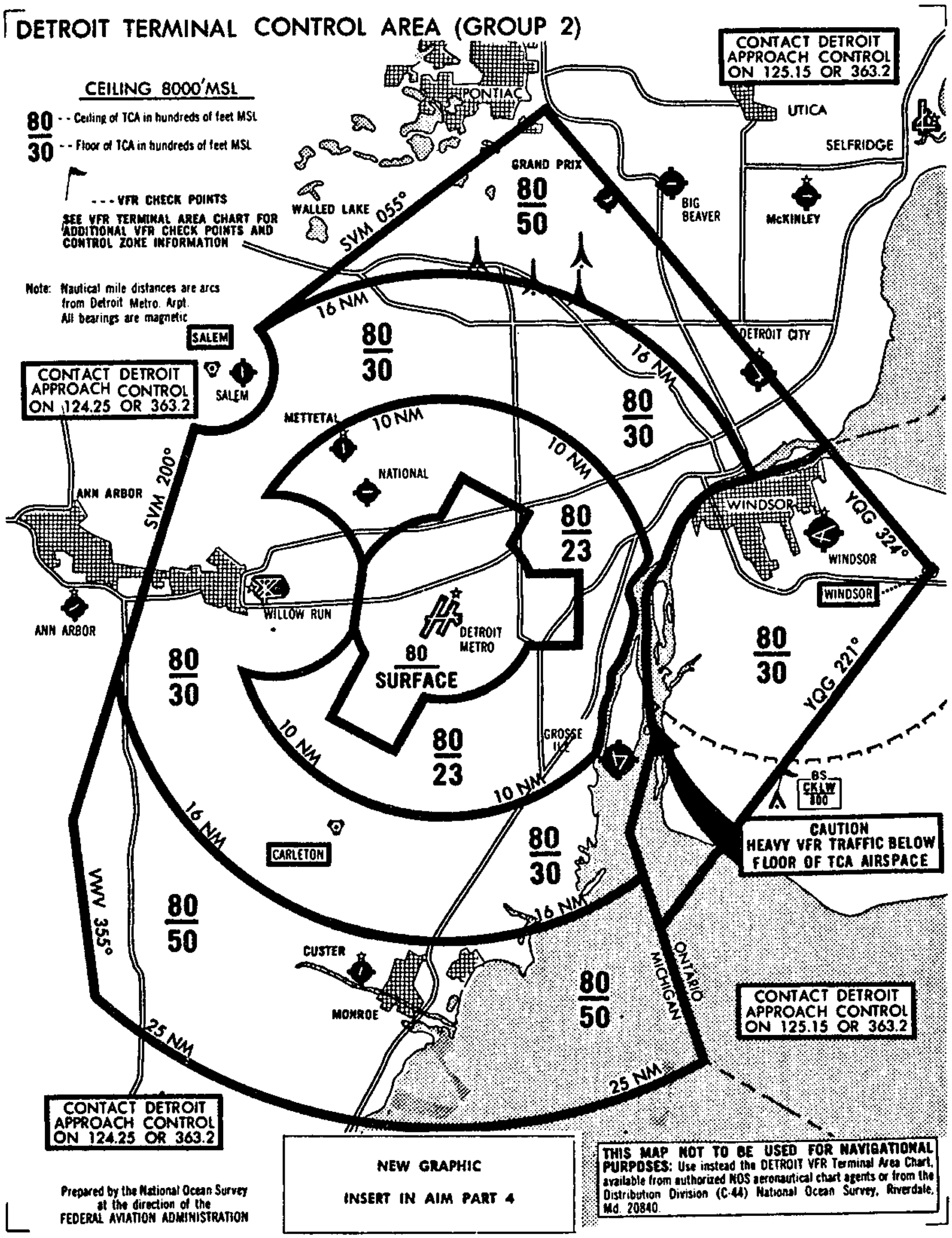

DETROIT TERMINAL CONTROL AREA (GROUP 2)
CEILING 8000'MSL
80 - - Ceiling of TCA in hundreds of feet MSL
30 - - Floor of TCA in hundreds of feet MSL
- - - VFR CHECK POINTS
SEE VFR TERMINAL AREA CHART FOR ADDITIONAL VFR CHECK POINTS AND CONTROL ZONE INFORMATION
Note: Nautical mile distances are arcs from Detroit Metro. Arpt. All bearings are magnetic
CONTACT DETROIT APPROACH CONTROL ON 125.15 OR 363.2
CONTACT DETROIT APPROACH CONTROL ON 124.25 OR 363.2
CAUTION HEAVY VFR TRAFFIC BELOW FLOOR OF TCA AIRSPACE
CONTACT DETROIT APPROACH CONTROL ON 125.15 OR 363.2
CONTACT DETROIT APPROACH CONTROL ON 124.25 OR 363.2
PONTIAC
UTICA
SELFRIDGE
GRAND PRIX
BIG BEAVER
McKINLEY
WALLED LAKE
SVM 055°
SALEM
DETROIT CITY
METTETAL
NATIONAL
ANN ARBOR
SVM 200°
WINDSOR
YQG 324°
YQG 221°
WILLOW RUN
DETROIT METRO
80 SURFACE
GROSSE ILE
CKLW
CARLETON
VWV 355°
CUSTER
MONROE
ONTARIO
MICHIGAN
10 NM
16 NM
25 NM
THIS MAP NOT TO BE USED FOR NAVIGATIONAL PURPOSES: Use instead the DETROIT VFR Terminal Area Chart, available from authorized NOS aeronautical chart agents or from the Distribution Division (C-44) National Ocean Survey, Riverdale, Md. 20840.
NEW GRAPHIC
INSERT IN AIM PART 4
Prepared by the National Ocean Survey at the direction of the FEDERAL AVIATION ADMINISTRATION

Figure 1

112. Which statement is true regarding VFR departures from airports within a Terminal Control Area such as the Detroit Metro Airport depicted by Figure 1?

1- Pilots should advise the Control Tower of the intended altitude and departure route.

2- Pilots should advise ATIS of the intended altitude and departure route.

3- Pilots should advise the ground controller of the intended altitude and departure route.

4- Pilots are required to request the route and altitude of the intended departure through filing a VFR flight plan.

113. ATC radar headings and altitude assignments when operating VFR within a Terminal Control Area, such as depicted by Figure 1, authorize the pilot to fly

1- within the TCA provided basic VFR separation from clouds can be maintained.

2- closer than 500 feet below the clouds.

3- in visibility conditions that are less than 3 miles.

4- into clouds within the TCA.

114. Refer to Figure 1. To remain below the Terminal Control Area when departing VFR northbound from National Airport (located northwest of Detroit Metro), a pilot must fly below what altitude?

1- 2,300 feet AGL until reaching a point which is 10 NM from National Airport.

2- 2,300 feet MSL until reaching a point which is 10 NM from Detroit Metro Airport.

3- 3,000 feet MSL until reaching a point which is 16 NM from Detroit Metro Airport.

4- 8,000 feet AGL until reaching a point which is 16 NM from Detroit Metro Airport.

115. The maximum indicated airspeed at which flight can be made into a Terminal Control Area such as depicted by Figure 1, is

1- 250 knots.
2- 230 knots.
3- 200 knots.
4- 156 knots.

116. Refer to Figure 1. Select the lowest appropriate altitude to fly VFR over the Detroit TCA from the southwest to the northeast and remain above this TCA.

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

117. The maximum indicated airspeed for flight within an airport traffic area located within a Terminal Control Area such as Detroit Metro, Figure 1, is

1- 250 knots.
2- 230 knots.
3- 200 knots.
4- 156 knots.

118. The maximum indicated airspeed at which flight can be made beneath the lateral limits of a Terminal Control Area such as depicted by Figure 1 is

1- 250 knots.
2- 230 knots.
3- 200 knots.
4- 156 knots.

119. Which statement is true regarding ATC authorization for VFR flights through Terminal Control Areas such as depicted by Figure 1?

1- ATC authorization is mandatory only when weather conditions are less than VFR minimums.

2- ATC authorization is encouraged but is not mandatory.

3- ATC authorization is mandatory.

4- ATC authorization is not mandatory if the control zones are avoided.

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

1- FAA maintenance inspector.

2- pilot in command.

3- National Transportation Safety Board.

4- owner or operator.

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

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

4- Maintenance personnel.

122. Automatic pressure altitude reporting equipment must be deactivated when

1- directed by ATC.

2- VFR within Terminal Control Areas.

3- VFR within a Control Zone.

4- operating within an Airport Traffic Area.

123. 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 above MSL, and are based on magnetic heading.

3- at 3,000 feet or more AGL, and are based on true course.

4- more than 3,000 feet AGL, and are based on magnetic course.

124. The appropriate altitudes required by regulations relating to VFR level cruising flight begin above

1- 3,000 feet MSL, and are based on true heading.

2- 3,000 feet AGL, and are based on magnetic course.

3- 3,000 feet MSL, and are based on magnetic heading.

4- 3,000 feet AGL, and are based on true course.

125. Altitudes are referred to as flight levels starting from

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

126. A special VFR clearance to enter a control zone requires that while in the control zone the pilot remain

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

127. At some airports located within control zones where ground visibility is not reported, takeoffs and landings of airplanes under special VFR are

1- not subject to visibility requirements.

2- authorized by ATC if the flight visibility is at least 1 mile.

3- authorized only if the ground visibility is observed to be at least 3 miles.

4- not authorized.

128. No person may operate an airplane in a control zone under a special VFR clearance at night unless that person

1- meets the applicable requirements for instrument flight and the airplane is equipped as required for instrument flight.

2- uses the runway which is served by an operating Visual Approach Slope Indicator.

3- holds at least a commercial pilot certificate and an instrument rating.

4- enters the Airport Traffic Area at or above 1,500 feet AGL and maintains that altitude until descending for a landing.

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

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

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

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

2- The total time in service of the airframe.

3- The completion date of any work performed on the aircraft.

4- The description of work performed on the aircraft.

131. The validity of the Airworthiness Certificate is maintained by

1- an appropriate "return to service" statement in the aircraft maintenance records upon the completion of required inspections.

2- applying for a new Airworthiness Certificate each year, prior to its expiration date.

3- performance of an annual and a 100-hour inspection prior to their expiration date.

4- performance of an annual inspection.

132. After only 80 hours' time in service, an annual inspection was completed on an airplane which is operated for hire. The next 100-hour inspection will be due within

1- 20 hours' time in service.
2- 80 hours' time in service.
3- 100 hours' time in service.
4- 120 hours' time in service.

133. After 110 hours' time in service, a 100-hour inspection was completed on an airplane that is used for hire. The next 100-hour inspection will be due within

1- 10 hours' time in service.
2- 90 hours' time in service.
3- 100 hours' time in service.
4- 110 hours' time in service.

134. If an aircraft's operation in flight was substantially affected by an alteration or repair, the aircraft documents must show that it was test flown and approved for return to service by an appropriately rated pilot prior to being operated

1- away from the vicinity of the airport.

2- with passengers aboard.

3- for compensation or hire.

4- by any private pilot.

135. Who is primarily responsible for maintaining an aircraft in an airworthy condition?

1- Owner only.

2- Pilot in command.

3- Operator or owner of the aircraft.

4- Mechanic who signs the maintenance records.

136. Before passengers can be carried in an aircraft that has been altered in a manner that may have appreciably changed its flight characteristics, a test flight is required by at least an appropriately rated

1- commercial pilot with an instrument rating.

2- private pilot.

3- commercial pilot.

4- commercial pilot with a mechanic's certificate.

137. Frequent inspections should be made of aircraft exhaust manifold type heating systems to minimize the possibility of

1- a power loss due to leaking exhaust connections.

2- a cold-running engine due to the heat withdrawn by the heater.

3- a power loss due to back pressure in the exhaust system.

4- exhaust gases leaking into the cockpit.

138. Part 135, Federal Aviation Regulations, governing air taxi operators and commercial operators of small aircraft, applies to which operation?

1- Carrying weekend skiers for hire to another state.

2- A pipeline patrol flown by a commercial pilot hired by the company which owns both the pipeline and airplane.

3- Student instruction for hire at an approved school.

4- Aerial work including crop dusting and spraying.

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

1- Airworthiness Certificate.

2- Repair and Alteration Form.

3- Aircraft and Engine Maintenance Records.

4- Aircraft Use and Inspection Report.

140. Part 135, Federal Aviation Regulations, Air Taxi Operators and Commercial Operators of Small Aircraft, <u>does not</u> apply to

1- the carrying of property only for compensation or hire.

2- pipeline or powerline patrol operations.

3- transportation of mail under a "star route" contract.

4- the carrying of persons or property for compensation or hire in air commerce.

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

1- changes as required by Airworthiness Directives.

2- annual inspections performed on the engine.

3- operating hours of the engine.

4- operating history of the engine.

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

3- The signature and certificate number of each person who has approved the aircraft for return to service.

4- The current status of all applicable Airworthiness Directives.

143. After January 1, 1976, 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- 24 calendar months.
2- 30 calendar months.
3- 36 calendar months.
4- 48 calendar months.

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

1- The list of current major alterations to the aircraft.

2- The description of the maintenance performed.

3- The time since the last required overhaul.

4- The current status of applicable Airworthiness Directives.

145. Which statement is true regarding the keeping of preventive maintenance records for an aircraft?

1- There is no requirement to retain these records unless the aircraft is used for hire.

2- These records are required to be kept in a bound logbook.

3- There is no requirement to retain these records.

4- These records are required to be kept in some form for at least 24 calendar months.

146. Airplane accident reporting rules are contained in

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

147. When should notification of an accident be made, if the accident resulted in substantial damage to the airplane?

   1- Immediately.
   2- Only when requested.
   3- Within 10 days.
   4- Within 30 days.

148. Procedures regarding aircraft accident reports are found in

   1- NTSB regulation, Part 830.
   2- FAR Part 91, General Operating and Flight Rules.
   3- FAR Part 99, Security Control of Air Traffic.
   4- FAR Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft.

149. Information concerning the reporting of an accident which has resulted in substantial damage to an airplane can be found in

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

150. Regulations governing interstate air commerce apply to flights conducted

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

151. Assume an airplane departs an airport in one state, navigates through the airspace of another state, and lands in the state of original departure. If this airplane weighs less than 12,500 lbs., and is carrying passengers for hire, what regulation would govern this flight?

   1- Air Taxi Operators and Commercial Operators of Small Aircraft, Part 135.
   2- Only General Operating and Flight Rules, Part 91, applying to small aircraft.
   3- Only Certification: Pilots and Flight Instructors, Part 61; and General Operating Flight Rules, Part 91, applying to small aircraft.
   4- Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft, Part 121.

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

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

153. Military airports are distinguishable from civil airports by light beacons which alternately flash dual peaked (two quick)

1- green flashes between each white flash.

2- white flashes between each green flash.

3- yellow flashes between each white flash.

4- green flashes only.

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

1- right-hand traffic is in effect.

2- nothing to the pilot because these beacons operate continuously.

3- that takeoffs and landings only are authorized at the present time.

4- that weather in the control zone is below basic VFR weather minimums.

155. National Transportation Safety Board regulation requires an immediate notification as a result of which incident?

1- Any required flight crewmember being unable to perform flight duties because of illness.

2- Violent evasive action to avoid a midair collision.

3- Damage to the landing gear as a result of a hard landing.

4- Generator failure in flight which results in the loss of the electrical system.

156. Notification to the NTSB is required whenever there has been any damage

1- caused by collision with another aircraft on the ground.

2- to an engine caused by engine failure in flight.

3- which adversely affects structural strength or flight characteristics.

4- which requires repairs to landing gear or flaps.

157. Assume that during flight a fire, which was extinguished, burned the insulation from a transceiver wire. What action is required by regulations?

1- An immediate landing at the most practical airport, and an immediate notification filed with the nearest FAA field office.

2- No notification or report is required.

3- An immediate notification by the operator of the aircraft to the nearest National Transportation Safety Board field office.

4- A notification only if requested by the National Transportation Safety Board.

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

1- Violent evasive action to avoid a midair collision.

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.

159. Assume while taxiing for takeoff a small fire burned the insulation from a transceiver wire. What action would be required to comply with NTSB regulations?

1- An immediate report must be filed with the nearest FAA field office.

2- No notification or report is required.

3- An immediate notification by the operator of the aircraft to the nearest NTSB field office.

4- A notification only if requested by the NTSB.

160. A transition area designated in conjunction with an airport having prescribed instrument approaches has vertical limits from

1- 700 feet AGL to the overlying control area.

2- the surface to 700 feet AGL.

3- the surface to 1,200 feet AGL.

4- 1,200 feet AGL to the overlying control area.

161. Transition areas are designated for the purpose of

1- controlling all aircraft within 25 miles of an airport that lies within a control zone.

2- containing IFR operations within controlled airspace during specific operations.

3- separating control zones from the control areas.

4- extending control zones laterally from 5 to 25 miles from the primary airport.

162. While making an approach to a runway that has a VASI installation, all of the VASI lights are observed to be red. Under these conditions, the pilot should

1- continue the same rate of descent.

2- level off momentarily to reach the glidepath.

3- descend rapidly to reach the glidepath.

4- ignore these lights as they apply to IFR flights only.

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

1- only when weather conditions are below basic VFR.

2- only when executing an approved instrument approach procedure.

3- only if a clearance for VASI approach is received from the control tower.

4- and stay at or above the glide slope until a lower altitude is necessary for a safe landing.

164. Assume a pilot turns on final approach to a runway served by a Visual Approach Slope Indicator (VASI). The descent should be initiated

1- at any point in the traffic pattern where at least two of the light bars are visible to the pilot.

2- at any point in the approach where a red, red, indication is visible to the pilot.

3- only after a clearance is received from ATC for a VASI approach.

4- only after the aircraft is visually aligned with the runway.

165. When on the proper glide slope of a standard 2-bar VASI installation, the downwind lights should be

1- pink and the upwind lights should be white.

2- red and the upwind lights should be white.

3- pink and the upwind lights should be pink.

4- white and the upwind lights should be red.

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

1- use the VASI only when weather conditions are below basic VFR.

2- use the VASI only when executing an approved instrument approach procedure.

3- not use the VASI unless a clearance for a VASI approach is received from the control tower.

4- maintain an altitude at or above the glide slope until a lower altitude is necessary for a safe landing.

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

1- A traffic clearance is required for takeoffs and landings.

2- The tower is temporarily shut down.

3- There are obstructions on the airport.

4- The airport is temporarily closed.

168. 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.

169. What minimum aircraft equipment is required to receive ATC radar advisory service?

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

170. 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 1400, and the "ident" feature should not be engaged.

2- Code 1200, and the "ident" feature should be engaged.

3- Code 1200, and the "ident" feature should not be engaged.

4- Code 1400, and the "ident" feature should be engaged.

171. 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, but not engage "ident" feature.

2- set transponder code to 1200, and engage "ident" feature.

3- set transponder code to 1400, and engage "ident" feature.

4- set transponder code to 1200, but do not engage "ident" feature.

172. During normal VFR cruising flight at 12,500 feet MSL, unless otherwise advised by ATC, the transponder should be set to which code?

1- 0400.
2- 1000.
3- 1200.
4- 1400.

173. During normal VFR cruising flight at 9,500 feet MSL, unless otherwise advised by ATC, the transponder should be set to which code?

1- 0400.
2- 1200.
3- 1400.
4- 2200.

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

1- within 50 NM of the radar site.

2- equipped for instrument flight and flown by an instrument-rated pilot.

3- identified by radar and capable of communicating with a radar facility.

4- equipped with at least a 64 code capability transponder.

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

1- a minimum of 2 miles separation from all other aircraft in the traffic pattern.

2- a minimum of 2 minutes' elapsed time before landing behind another aircraft.

3- a minimum of 5 miles separation from all other aircraft in the traffic pattern.

4- wake turbulence separation.

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

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

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

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

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

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

179. 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.

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

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

181. When in the vicinity of a VOR which is being used for navigation on VFR flights, it is important to

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

182. Another cause of hypoxia other than reduced atmospheric pressure is

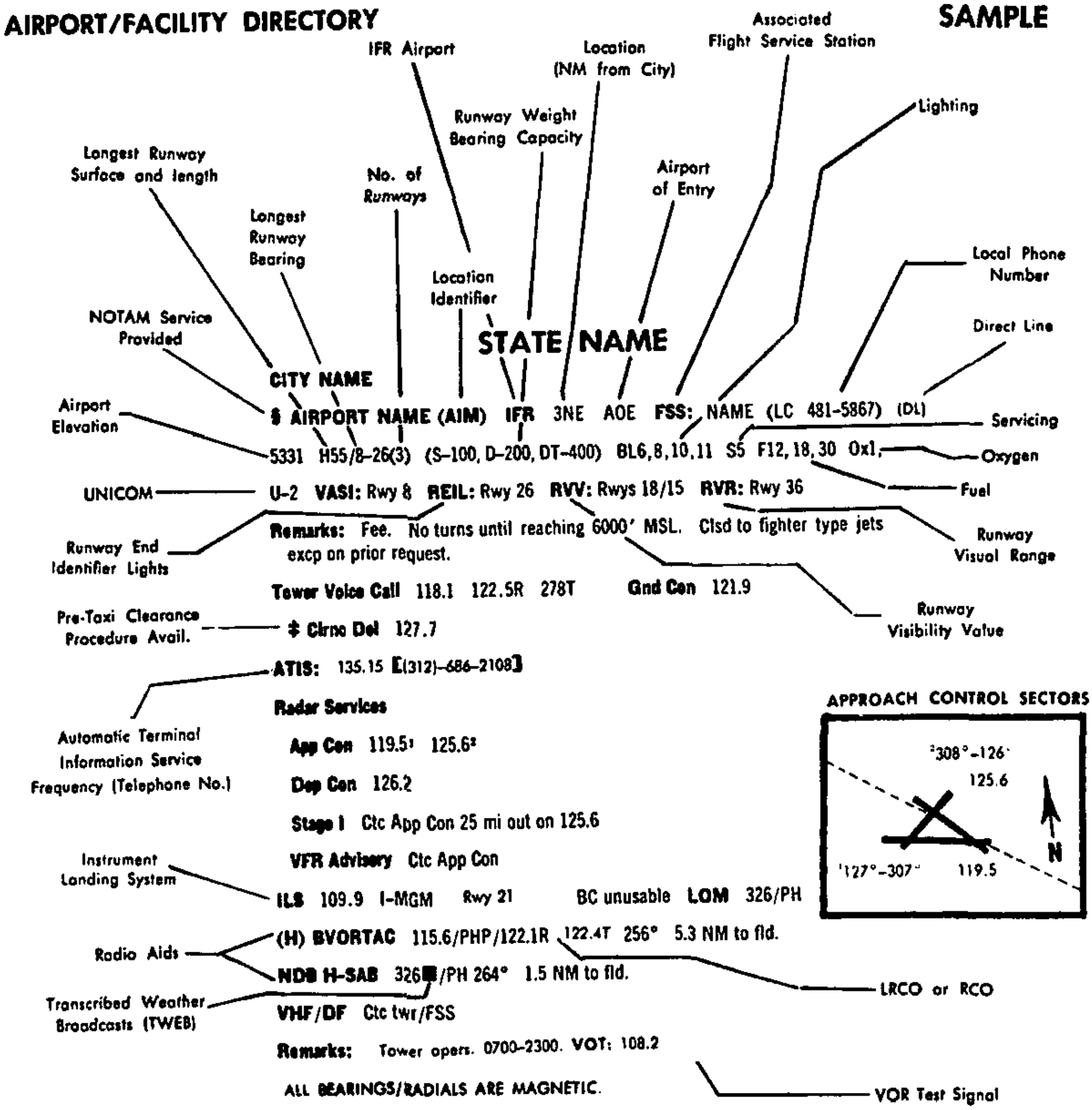
1- vertigo.
2- hyperventilation.
3- toxic substances in the blood.
4- high rates of descent.

183. Which statement concerning hypoxia is true?

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

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

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



ATLANTA

‡ THE WILLIAM B HARTSFIELD ATLANTA INTL (ATL) *IFR* LRA 8S **FSS:** ATLANTA
1026 H100/8-26(4) (S-120, D-200, DT-360) BL6,7A,8,10,13,14,15 S5 F18,30 Ox1,2,3,4 U2 **VASI:** Rwy 27R **RVR-1:** Rwy 27, 33 **RVR-2:** Rwys 8, 26 **RVR-3:** Rwys 9R, 27L

Remarks: Fee. Cert.-FAR 139, CFR Index E.

Atlanta Tower 119.1 119.5 **Gnd Con** 121.9 121.75
‡ Clrnc Del 121.65
ATIS: 123.7 arr 111.0 dep
Radar Services:
Atlanta App Con 126.9 127.25 (270–089°) 118.1 127.9 (090–269°)
Atlanta Dep Con 125.7 (270–089°) 125.0 (090–269°)
TCA Group I: See NOS TCA chart
ILS 109.9 I-ATL Rwy 8 BC unusable **LOM:** 375/AT
108.7 I-BRU Rwy 26 **LOM:** 266■/BR
108.9 I-FUN Rwy 9R
108.5 I-FSQ Rwy 27L
ATLANTA (H) BVORTAC 115.6/ATL/122.1R 016° 8.1NM to fld.
NDB H-SAB■ 270° 4.7NM to fld (see Bruce)
Remarks: Rwy 26 LOM is Bruce NDB■. Rwy 26 LOC I-BRU BC unusable beyond 15NM. **VOT:** 111.0.

‡ BIRMINGHAM MUNI (BHM) *IFR* 5NE LRA **FSS:** BIRMINGHAM on fld
643 H100/5-23(2) (S-175, D-205, DT-350) BL6,8,10 S5 F12,18,30 Ox2 U2 **VASI:** Rwy 5, 23 **RVR-1:** Rwy 5. **RVV:** Rwy 5
Remarks: Rwy 23 thr dsplcd 1770′, only acft with S-60, D-100, DT-150 GWT or less on portion of rwy 23 NE of dsplcd thr. A-gear lctd 1000′ from rwy 5 thr and 600′ from rwy 23 thr, cable aprxly 3 inches above surface. Cert.-Far 139, CFR Index C.
Birmingham Tower 118.7 **Gnd Con** 121.7
‡ Clrnc Del 120.9
ATIS: 119.4
Radar Services:
Birmingham App Con 119.9 (050–230°), 124.5 (231–049°)
Birmingham Dep Con 124.9
TRSA: See graphic in AIM Part 4
ILS 110.3 I-BHM Rwy 5 **LOM:** 224■/BH
Birmingham (H) BVORTAC 114.4/BHM 126° 9.5NM to Fld.
NDB H-SAB■ 052° 4.5 to fld. (see McLendon).
Remarks: Rwy 5 BC unusable beyond 10 NM. Rwy 5 LOM is McLendon NDB. **VOT:** 110.0

Figure 2

185. Refer to Figure 2. Which is true regarding VFR departures from the Birmingham Mun. Airport?

1- Radio communication with Birmingham Departure Control is encouraged but not mandatory.
2- Radio communication with Birmingham clearance delivery must be made prior to departure.
3- The initial radio communication when departing Birmingham Mun. Airport must be made with the Birmingham Control Tower.
4- Radio communication with Birmingham Departure Control is mandatory.

186. Refer to Figure 2. Which is true regarding VFR arrivals to the Birmingham Mun. Airport?

1- Radio communication with Birmingham Approach Control is mandatory.
2- Radio communication with Birmingham ATIS is mandatory prior to landing.
3- The initial radio communication must be made with the Birmingham FSS.
4- Radio communication with Birmingham Approach Control is encouraged but not mandatory.

187. Refer to Figure 2. Which is true regarding VFR departures from the Atlanta Intl. Airport?

1- The initial radio communication when departing Atlanta Intl. Airport ramp must be made with the Atlanta Control Tower.
2- Radio communication with Atlanta Departure Control is encouraged but not mandatory.
3- Radio communication with Atlanta Departure Control is mandatory.
4- Radio communication with Atlanta ATIS is mandatory prior to takeoff.

188. Refer to Figure 2. Which is true regarding VFR arrivals to the Alanta Intl. Airport?

1- Radio communication with Atlanta ATIS is mandatory prior to landing.
2- Radio communication with Atlanta Approach Control is mandatory.
3- Radio communication with Atlanta Approach Control is encouraged but not mandatory.
4- The initial radio communication must be made with Atlanta Control Tower.

189. Refer to Figure 2. VFR arrivals to Birmingham Mun. Airport from the north should contact Birmingham Approach Control on frequency

1- 118.7 MHz.
2- 119.9 MHz.
3- 124.5 MHz.
4- 124.9 MHz.

190. Refer to Figure 2. VFR arrivals to Birmingham Mun. Airport from the south should contact Birmingham Approach Control on frequency

1- 118.7 MHz.
2- 119.9 MHz.
3- 124.5 MHz.
4- 124.9 MHz.

191. Refer to Figure 2. VFR arrivals to Atlanta Intl. Airport from the southwest should contact Atlanta Approach Control on frequency

1- 118.1 or 127.9 MHz.
2- 119.1 or 119.5 MHz.
3- 125.7 MHz.
4- 126.9 or 127.25 MHz.

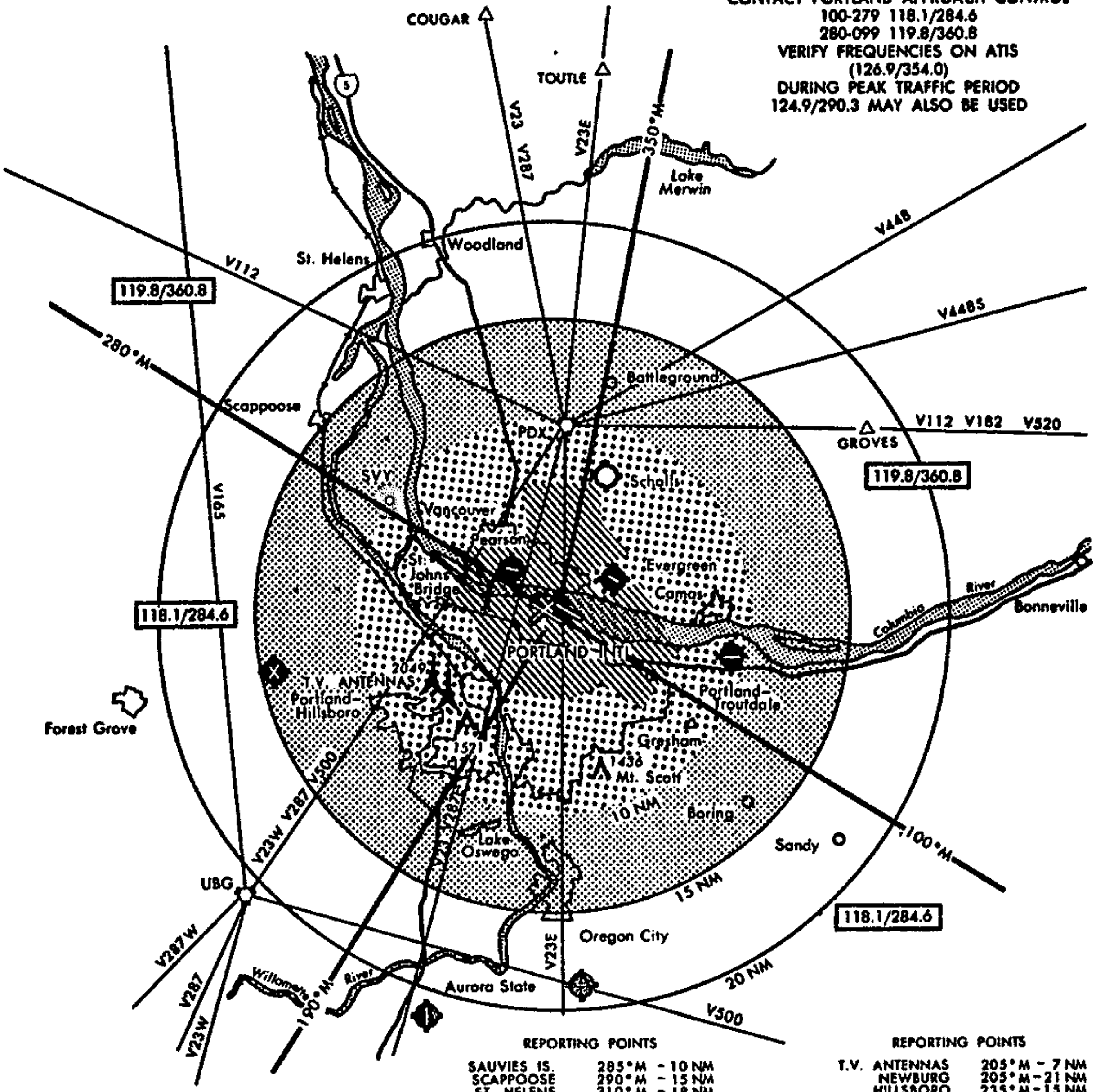
192. Refer to Figure 2. VFR arrivals to Atlanta Intl. Airport from the northeast should contact Atlanta Approach Control on frequency

1- 125.7 MHz.
2- 118.1 or 127.9 MHz.
3- 119.1 or 119.5 MHz.
4- 126.9 or 127.25 MHz.

PORTLAND INTERNATIONAL AIRPORT PORTLAND, OREGON

FIELD ELEV. 26' MSL

CONTACT PORTLAND APPROACH CONTROL
100-279 118.1/284.6
280-099 119.8/360.8
VERIFY FREQUENCIES ON ATIS
(126.9/354.0)
DURING PEAK TRAFFIC PERIOD
124.9/290.3 MAY ALSO BE USED



REPORTING POINTS

SAUVIES IS.	285°M - 10 NM
SCAPPOOSE	290°M - 15 NM
ST. HELENS	310°M - 18 NM
WOODLAND	322°M - 20 NM
COUGAR	332°M - 30 NM
TOUTLE	344°M - 28 NM
SCHOLLS	003°M - 7 NM
GROVES	037°M - 18 NM
BONNEVILLE	063°M - 28 NM
CAMAS	072°M - 9 NM
TROUTDALE	084°M - 9 NM
BATTLEGROUND	355°M - 12 NM
LAKE MERWIN	355°M - 24 NM

REPORTING POINTS

T.V. ANTENNAS	205°M - 7 NM
NEWBURG	205°M - 21 NM
HILLSBORO	235°M - 15 NM
FOREST GROVE	235°M - 22 NM
ST JOHNS BRIDGE	240°M - 7 NM
GRESHAM	108°M - 9 NM
SANDY	108°M - 19 NM
BORING	113°M - 14 NM
MT SCOTT	140°M - 9 NM
OREGON CITY	155°M - 15 NM
LAKE OSWEGO	175°M - 11 NM
AURORA	175°M - 22 NM

LEGEND

- SURFACE TO 8000' MSL
- 2000 TO 8000' MSL
- 3000 TO 8000' MSL

Prepared by the National Ocean Survey at the direction of the FEDERAL AVIATION ADMINISTRATION

Figure 3

193. The purpose of a Terminal Radar Service Area such as depicted by Figure 3, is to

1- adjust the flow of VFR traffic into the traffic pattern.

2- provide limited vectoring to IFR and VFR aircraft operating within this area.

3- provide ATC separation between VFR aircraft and weather conditions that are below VFR minimums.

4- provide ATC separation between participating VFR aircraft and all IFR aircraft operating within this area.

194. ATC authorization for VFR flight into a Terminal Radar Service Area such as the one depicted by Figure 3 is

1- mandatory for flights landing at the primary airport (Portland Intl.) but not for flights through the area.

2- mandatory.

3- encouraged but not mandatory.

4- mandatory for arrivals but not departure.

195. Refer to Figure 3. If inbound to Portland Intl. Airport from the south along V23E, radio communication with Portland Approach Control should be made on frequency

1- 118.1 MHz.
2- 119.8 MHz.
3- 123.0 MHz.
4- 126.9 MHz.

196. Refer to Figure 3. If inbound to Portland Intl. Airport from the north along V23E, radio communication with Portland Approach should be made on frequency

1- 118.1 MHz.
2- 119.8 MHz.
3- 122.5 MHz.
4- 126.9 MHz.

197. Refer to Figure 3. The floor of the Terminal Radar Service Area over Portland-Hillsboro Airport (located west of Portland Intl. Airport) is

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

198. ATC radar service provided in a Terminal Radar Service Area such as depicted by Figure 3, is the same as that provided in a

1- Control Zone.
2- Stage III Service Area.
3- Stage II Service Area.
4- Stage I Service Area.

199. Refer to Figure 3. If inbound to the Portland Intl. Airport from the east, along the Columbia River, at an altitude of 4,500 feet MSL, the Terminal Radar Service Area would first be entered at a point

1- 5 NM from Portland Intl.
2- 10 NM from Portland Intl.
3- 15 NM from Portland Intl.
4- 20 NM from Portland Intl.

200. The maximum indicated airspeed for recipricating engine aircraft within an Airport Traffic Area located within a Terminal Radar Service Area such as depicted by Figure 3, is

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

201. The maximum indicated airspeed for flight within a Terminal Radar Service Area such as depicted by Figure 3, and outside the Airport Traffic Area, is

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

202. 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- vertical lift component is greater.

2- center of lift is nearer the trailing edge of the wing.

3- wing loading is greater.

4- relative airspeed is greater.

203. The primary function of the rudder, while entering a turn from straight-and-level flight, is to

1- overcome the yaw caused by the lowered aileron on the higher wing.

2- overcome the yaw caused by the lowered aileron on the lower wing.

3- overcome the yaw caused by the raised aileron on the higher wing.

4- make the airplane turn.

204. Maneuvering the airplane is generally divided into four flight fundamentals which are

1- starting, taxiing, takeoff, and landing.

2- airplane power, pitch, bank, and trim.

3- takeoff, normal flight, slow flight, and stalls.

4- straight-and-level flight, turns, climbs, and descents.

205. The most important function of a rudder during coordinated flight is to

1- prevent skids.

2- make the airplane turn.

3- help overcome the effects of torque as well as the effects of adverse yaw.

4- overcome the yaw caused by the aileron rising as the wing is lowered.

206. When entering a turn, the primary function of the rudder is to

1- cause the airplane to turn.

2- control yawing about the vertical axis.

3- allow the airplane to pitch about its lateral axis.

4- prevent the airplane from rolling about the longitudinal axis.

207. What is the most important function of a rudder during coordinated flight?

1- The rudder prevents skids.

2- The rudder turns the airplane.

3- Properly applied, the rudder helps to overcome the effects of torque and adverse yaw.

4- Applying rudder overcomes the asymmetrical thrust of the propeller as a turn is initiated.

208. Using rudder to maintain altitude during a steep turn is

1- inappropriate.

2- necessary in airplanes producing a high asymmetrical propeller thrust ("P" factor).

3- necessary if the nose drops in the turn since use of elevators will tighten the turn and aggravate the situation.

4- proper if bank angle exceeds 50° since it is at approximately this angle of bank that the functions of the elevator and rudder tend to reverse.

209. To produce the desired effect, trim tabs must be adjusted

1- in such a direction as to remain flush with the primary control surfaces they affect.

2- in the same direction as the primary control surfaces they affect.

3- in the opposite direction to the primary control surfaces they affect.

4- depending upon the design of the trim tab controls.

210. If the airspeed of an airplane is doubled while the angle of attack remains the same the drag will

1- decrease as the airspeed increases.
2- double.
3- be four times greater.
4- remain the same.

211. Which statement best describes the relationship of the forces acting on that airplane in a constant power and constant airspeed descent?

1- Thrust is greater than drag; lift is equal to weight.

2- Thrust is equal to drag; lift is equal to weight.

3- Thrust is greater than drag; weight is greater than lift.

4- Thrust is equal to drag; weight is greater than lift.

212. 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 be increased to

1- 1,000 pounds.
2- 2,000 pounds.
3- 3,000 pounds.
4- 4,000 pounds.

213. 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- attack.
3- incidence.
4- dihedral.

214. The angle between the chord line of an airfoil and the relative wind is known as the angle of

1- lift.
2- attack.
3- incidence.
4- longitudinal dihedral.

215. For a given airfoil the angle of attack which results in a stall

1- remains constant regardless of bank, load factor, or airspeed.

2- varies directly with the degree of bank.

3- is dependent on the load factor.

4- varies with the speed of airflow around the airfoil.

216. When the angle of attack of the wing is increased, the center of pressure of that airfoil will

1- remain unaffected.
2- move forward.
3- move aft.
4- move erratically.

217. The point on an airfoil through which lift acts is the

1- midpoint of the chord.
2- center of pressure.
3- center of rotation.
4- center of gravity.

218. Aerodynamically, propeller thrust is the result of the

1- deflective forces on the curved side of the blade.

2- angle of incidence of the blade.

3- decreased pressure on the flat side of the blade and increased pressure on the curved side.

4- shape and angle of attack of the blade.

219. Air deflections produced by a rotating propeller cause dynamic pressure on the engine side of the propeller to be greater than atmospheric pressure, thus generating

1- torque.
2- horsepower.
3- drag.
4- thrust.

220. During flight, if a change is made in pitch attitude, an airplane will rotate about its

   1- center of gravity.
   2- chord midpoint.
   3- center of lift.
   4- center of pressure.

221. Rotation about the longitudinal axis is known as

   1- pitching, and is controlled with the elevator.

   2- rolling, and is controlled with the ailerons.

   3- yawing, and is controlled with the ailerons.

   4- yawing, and is controlled with the rudder.

222. The reason a light general aviation 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.

223. What changes in airplane control must be made to maintain altitude while the airspeed is being decreased?

   1- Decrease the angle of attack to compensate for the increase in drag.

   2- Increase angle of attack to produce more lift than weight.

   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.

224. Lift on a wing is most properly defined as the

   1- differential pressure acting perpendicular to the chord of the wing.

   2- force produced perpendicular to the relative wind.

   3- reduced pressure resulting from a smooth flow of air over a curved surface and acting perpendicular to the mean surface.

   4- partial vacuum produced on top of the wing.

225. The force of lift is considered to act through one point in the airfoil section of a wing. This point is called the

   1- center of rotation.
   2- midpoint of the chord.
   3- center of pressure.
   4- center of gravity.

226. Which statement best describes the relationship of the forces acting on an airplane when it is climbing at constant airspeed and constant rate?

   1- Lift is greater than weight, and thrust is equal to drag.

   2- Lift is greater than weight, and thrust is greater than drag.

   3- Lift is equal to weight, and thrust is greater than drag.

   4- Lift is equal to weight, and thrust is equal to drag.

227. Which statement best 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 equal to weight.

   2- Thrust is greater than drag, and lift is equal to weight.

   3- Thrust is equal to drag, and lift is greater than weight.

   4- Thrust is greater than drag, and lift is greater than weight.

228. Maximum range in a propeller driven airplane is achieved in a flight condition which produces the greatest proportion between

1- flight hours and fuel flow.
2- speed and power required.
3- flight hours and power available.
4- fuel flow and power required.

229. Frost covering the upper surface of an airplane wing will usually cause

1- the airplane to stall at an angle of attack that is higher than normal.

2- drag factors so large that sufficient speed cannot be obtained for takeoff.

3- no problems for pilots of light aircraft.

4- the airplane to stall at an angle of attack that is lower than normal.

230. An accumulation of frost on the airplane wings will result in

1- an increase in lift and drag.

2- a decrease in lift and an increase in drag.

3- an increase in lift and a decrease in drag.

4- a decrease in lift and drag.

231. During a change in bank, an airplane will rotate around its center of

1- pressure and longitudinal axis.
2- gravity and lateral axis.
3- pressure and lateral axis.
4- gravity and longitudinal axis.

232. During a change in pitch attitude, an airplane will rotate around its center of

1- pressure and longitudinal axis.
2- gravity and lateral axis.
3- pressure and lateral axis.
4- gravity and longitudinal axis.

233. How is an airplane's performance affected by frost on the wings?

1- Lift is increased; drag is increased.

2- Lift is decreased; drag is increased.

3- Lift is increased; drag is decreased.

4- Lift is decreased; drag is decreased.

234. Rotation about the lateral axis is known as

1- pitching, and is controlled with the elevator.

2- rolling, and is controlled with the ailerons.

3- yawing, and is controlled with the ailerons.

4- yawing, and is controlled with the rudder.

235. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is correct?

1- Weight always acts vertically toward the center of the earth.

2- Lift always acts perpendicular to the longitudinal axis of the wing and is greater than weight.

3- Thrust always acts forward parallel to the relative wind and is greater than drag.

4- Drag always acts rearward parallel to relative wind and is less than thrust.

236. The three axes of an airplane intersect at the

1- midpoint of the datum line.
2- center of pressure.
3- center of gravity.
4- midpoint of the mean chord.

237. The phenomenon of "ground effect" is most likely to be involved in which of the following situations?

1- The absence of normal cushioning on landings in high-wing airplanes.

2- Abruptly settling back to the surface immediately after becoming airborne.

3- Inability to climb once airborne.

4- Inability to become airborne even though the airspeed is sufficient for a normal takeoff.

238. Operations approaching maximum speeds, such as Vne, should be avoided because

1- excessive induced drag will cause structural failures.

2- the stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.

3- control effectiveness is so greatly impaired that it renders the airplane uncontrollable.

4- of the possibility of inducing flutter or exceeding the design load factors.

239. The phenomenon of ground effect causes

1- the angle of attack to increase, thus increasing the stall speed.

2- induced drag to increase, thus reducing the groundspeed.

3- the direction of the relative wind to change, thus producing a smaller angle of attack.

4- the wing to become less efficient, thus requiring a longer ground run for takeoff.

240. If, during takeoff, an airplane becomes airborne at less than the normal takeoff speed, this is probably because of

1- excessive power applied to the engine.

2- an error in the airspeed indicator.

3- a strong headwind.

4- ground effect.

241. A constant rate of climb in an airplane is determined by

1- excessive airspeed.
2- excessive engine power.
3- the airplane weight.
4- windspeed.

242. It is unwise to operate an airplane in excess of its maximum certificated gross weight primarily because

1- an overloaded airplane is excessively stable in flight.

2- excessive loads may be imposed upon some part of the structure.

3- of the significant increase it will cause in fuel consumption.

4- flight at weights in excess of maximum gross weights is not possible.

243. 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- an overall increase in parasite and induced drag.

3- high induced drag, at low airspeed.

4- the necessity for additional up elevator pressure to counteract nose heaviness.

244. 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 upwash.

2- an increase in downwash.

3- an increase in downwash plus the decrease in upwash.

4- the phenomenon of ground effect.

245. Load factor is the actual weight supported by the wings at any given moment

1- subtracted from the total weight of the airplane.

2- added to the total weight of the airplane.

3- multiplied by the total weight of the airplane.

4- divided by the total weight of the airplane.

246. Wing loading of an airplane is determined by a value which is the

1- gross weight divided by the span.

2- ratio of the wing area to the horsepower.

3- total load the wing will carry.

4- gross weight of the airplane divided by the wing area.

247. Assume that an airplane is certificated with a maximum gross weight of 2,500 lbs. and a load factor of 3.8. If this airplane were loaded to a gross weight of 2,650 lbs. and flown in turbulence creating a 3.8 load factor, what airload would be imposed upon its structure?

1- 1,280 lbs. above maximum permissible, and this airplane should not be flown at this gross weight.

2- 150 lbs. above maximum permissible, and this airplane should not be flown at this gross weight.

3- 570 lbs. above maximum permissible, and this airplane should not be flown at this gross weight.

4- 2,650 lbs. and this airplane should not be flown at this gross weight.

248. The additional load imposed on the wings of an airplane during a level coordinated turn in smooth air is dependent on the

1- rate of turn.
2- density altitude.
3- true airspeed.
4- angle of bank.

249. In a constant altitude coordinated turn, the load factor imposed on an airplane is the result of

1- centrifugal force and gravity.
2- angle of attack and airspeed.
3- rate of turn and airspeed.
4- wind and density altitude.

250. What is one reason for avoiding operations at or above red line speeds?

1- Excessive induced drag will cause possible structural failures.

2- The lifting capacity of the wing is so great that the load factor can easily be exceeded.

3- The stalling speed is increased to the point that maneuvers cannot be performed without resulting in a stall.

4- Control effectiveness is so greatly impaired that it renders the airplane uncontrollable.

251. For a given angle of bank, the load factor imposed on both the airplane and pilot in a coordinated constant-altitude turn

1- is constant.

2- is directly related to the airplane's gross weight.

3- increases at a very slow rate beyond 45° of bank.

4- varies with the rate of turn.

252. Why is it unwise to operate an airplane in excess of the maximum certificated gross weight?

1- Fuel consumption may be significantly increased.

2- Flight in excess of certificated weights is not possible.

3- An overloaded airplane is excessively stable in flight.

4- Certain structural limitations may be exceeded.

253. In a certificated airplane, uncontrollable spins are most likely to develop from normal spins if the

1- rudders and ailerons are cross controlled.

2- gross weight is exceeded.

3- most rearward CG position is exceeded.

4- minimum allowable load is exceeded.

254. For a given airfoil the angle of attack which results in a stall

1- remains constant regardless of bank, load factor, or airspeed.

2- varies directly with the degree of bank.

3- is dependent on the load factor.

4- varies with the speed of airflow around the airfoil.

255. 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.

256. An airplane in a steep-banked turn stalls at a higher airspeed than it does with the wings level, because the

1- critical angle of attack has decreased.

2- critical angle of attack is reached at a higher airspeed.

3- total lift has decreased.

4- total lift has increased.

257. 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- balance.
2- stability.
3- maneuverability.
4- controllability.

258. Turbulent air can cause an increase in stalling speed when there is

1- a decrease in angle of attack.
2- a sudden decrease in load factor.
3- an abrupt increase in true airspeed.
4- an abrupt change in relative wind.

259. 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- dynamic instability.
3- static instability.
4- positive static stability.

260. As a general rule, airplanes tend to become more stable with

1- forward loading.
2- light loads.
3- flaps extended.
4- aft loading.

261. The degree of airplane wing loading during a level coordinated turn in smooth air depends upon the

1- density altitude.
2- rate of turn.
3- angle of bank.
4- true airspeed.

262. Which is the best technique for minimizing the wing load factor when flying in severe turbulence?

1- Control altitude with power, airspeed with elevator, and accept variations of bank.

2- Control airspeed with power, maintain wings level, and accept variations of altitude.

3- Set power and trim to obtain an airspeed at or below maneuvering speed, maintain wings level, and accept variations of airspeed and altitude.

4- Control airspeed as closely as possible with elevator and power, and accept variations of bank and altitude.

263. Which statement is true regarding airspeed control, degree of bank, and use of flaps during slow speed, low altitude maneuvering?

1- The airspeed should be increased if the bank is steepened and flaps are retracted.

2- The airspeed should be increased if the bank is steepened and flaps are lowered.

3- The airspeed should be constant, regardless of the degree of bank or flap setting.

4- The airspeed should be constant during an increase in bank, regardless of flap setting.

264. The maximum allowable airspeed with flaps extended is lower than cruising speed because

1- they are used only when preparing to land.

2- the additional lift and drag created would overload the wing structure at higher speeds.

3- the flaps will retract automatically at higher speeds.

4- too much drag is induced.

265. Lowering the flaps during a landing approach

1- permits approaches at a higher indicated airspeed.

2- eliminates floating.

3- decreases the angle of descent without increasing power.

4- increases the angle of descent without increasing airspeed.

266. The use of flaps will produce

1- increased lift and decreased drag.
2- increased lift and increased drag.
3- decreased lift and increased drag.
4- decreased lift and decreased drag.

267. Why is the maximum allowable airspeed with flaps extended (Vfe) lower than cruising airspeed?

1- They are used only when preparing to land.

2- The additional lift and drag created would overload the wing structure at higher speeds.

3- The flaps will retract automatically at higher speeds.

4- Too much drag is induced.

268. Which statement is true regarding the use of flaps during turns?

1- The addition of flaps decreases the stall speed.

2- The addition of flaps increases 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.

269. Why can turbulent air cause an increase in stalling speed?

1- The true airspeed is abruptly increased.

2- The load factor is suddenly decreased.

3- The angle of attack is decreased.

4- The angle of attack is increased.

270. Indicated stall speed is affected by

1- angle of attack, weight, and air density.

2- weight, load factor, and power.

3- weight, density altitude, power, and turbulence.

4- load factor, angle of attack, and power.

271. Which statement is true relating to the use of the rudder in conventional airplanes to compensate for the effects of torque?

1- If power is increased (airspeed constant), left rudder pressure must be added.

2- If airspeed is increased (power constant), right rudder pressure must be added.

3- If power is reduced (airspeed constant), right rudder pressure must be added.

4- If airspeed is decreased (power constant), right rudder pressure must be added.

272. A downwind turn near the ground may be hazardous because

1- there may be insufficient space to maneuver in event of engine failure.

2- the nose drops in a turn.

3- altitude is always lost in a turn.

4- during the turn the airspeed is reduced by the speed of the wind and if the wind is strong enough will reduce the airspeed to the stalling point.

273. If you are cruising into a 15 MPH headwind and turn 180° so the wind is from directly behind the airplane, the indicated airspeed would

1- increase 30 MPH and the groundspeed would remain the same.

2- decrease 15 MPH and the groundspeed would increase 15 MPH.

3- be the same and the groundspeed would increase 15 MPH.

4- be the same and the groundspeed would increase 30 MPH.

274. During flight with zero angle of attack, the pressure below the wing would be

1- less than the pressure along the upper surface of the wing.

2- greater than atmospheric pressure.

3- equal to atmospheric pressure.

4- less than atmospheric pressure.

275. Assume an airplane is in cruising flight with a 25 MPH tailwind. If a 180° turn is made which places the wind directly on the nose of the airplane, the indicated airspeed would

1- increase 25 MPH and the groundspeed would decrease 25 MPH.

2- decrease 25 MPH and the groundspeed would decrease 25 MPH.

3- be the same and the groundspeed would decrease 50 MPH.

4- decrease 50 MPH and the groundspeed would remain the same.

276. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

1- greater than the pressure below the wing.

2- greater than atmospheric pressure.

3- equal to atmospheric pressure.

4- less than atmospheric pressure.

277. Which statement is true relative to changing angle of attack?

1- A decrease in angle of attack will increase impact pressure below the wing, and decrease drag.

2- An increase in angle of attack will decrease impact pressure below the wing, and increase drag.

3- An increase in angle of attack will increase impact pressure below the wing, and increase drag.

4- An increase in angle of attack will increase impact pressure below the wing, and decrease drag.

278. The primary function of flaps is to

1- increase lateral stability.

2- permit a safer takeoff over high obstructions.

3- increase control effectiveness at slow speeds.

4- provide a steeper gliding angle.

279. A clogged oil breather line on a reciprocating engine will cause

1- excessive oil consumption.
2- fuel starvation.
3- a low cylinder head temperature.
4- a lean mixture.

280. One of the disadvantages of fuel injection systems compared with carburetor systems is

1- difficulty in starting a hot engine.
2- uneven fuel distribution to the cylinders.
3- slower throttle response.
4- poor control of fuel/air mixture.

281. One advantage of fuel injection systems over carburetor systems is

1- easier starts when the engine is hot.
2- faster throttle response.
3- easier in-flight restarting should it become necessary.
4- less difficulty with vapor locks during ground operations.

282. One of the disadvantages of fuel injection systems compared with carburetor systems is

1- uneven fuel distribution to the cylinders.
2- slower throttle response.
3- poor control of fuel/air mixture.
4- vapor locks during ground operations on hot days.

283. One advantage of fuel injection systems over carburetor systems is

1- easier starts when the engine is hot.
2- less difficulty with vapor locks during ground operations.
3- easier in-flight restarting should it become necessary.
4- easier cold weather starts.

284. One of the advantages of fuel injection systems over carburetor systems is

1- elimination of vapor locks during ground operations.
2- a reduction in the probability of evaporative icing.
3- easier restarting of an engine that quits because of fuel starvation.
4- less difficulty in starting a hot engine.

285. One advantage of fuel injection systems over carburetor systems is

1- easier in-flight restarting.
2- easier hot-engine starting.
3- less difficulty with hot weather vapor locks during ground operations.
4- better fuel distribution to the cylinders.

286. Assume that after takeoff a turn is made to a downwind heading. In regard to the climb, the airplane will climb at

1- a steeper angle into the wind than downwind.
2- the same angle upwind or downwind.
3- a steeper angle downwind than into the wind.
4- a greater rate into the wind than downwind.

287. "P factor," the force which produces a yawing effect on 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 force was applied.
4- spiral characteristic of the air forced rearward by the rotating propeller.

288. 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 possibility of fire is rare during preheating.

3- The cockpit area should not be preheated with portable heaters.

4- Hot air should be blown directly at the engine through the air intakes.

289. During preflight in cold weather, crankcase breather lines should receive special attention because they are susceptible to being clogged by

1- moisture from the outside air which has frozen.

2- congealed oil from the crankcase.

3- ice in the breather line.

4- sediment in the crankcase.

290. To check all cylinders for compression on a 6-cylinder, 4-cycle reciprocating engine, it would be necessary to rotate the crankshaft

1- one revolution.
2- two revolutions.
3- four revolutions.
4- six revolutions.

291. In standard atmosphere at sea level, an engine developing full power produces a manifold pressure (MP) of 27" Hg and 2600 RPM. What approximate MP and RPM should this engine produce in a standard atmosphere at 4,000 feet MSL under full power?

1- 23" Hg and 2600 RPM.
2- 25" Hg and 2600 RPM.
3- 27" Hg and 2200 RPM.
4- 31" Hg and 3000 RPM.

292. If, under standard atmospheric conditions at sea level, an engine using full power produces a manifold pressure of 29" Hg and 2700 RPM, what manifold pressure and RPM should this engine be expected to produce at 3,000 feet MSL using full power under standard atmospheric conditions?

1- 21" Hg and 2400 RPM.
2- 26" Hg and 2700 RPM.
3- 29" Hg and 2400 RPM.
4- 32" Hg and 3000 RPM.

293. Assume that prior to starting an engine the manifold pressure gauge indicates 29" Hg. The reason for this is that the

1- pressure in the manifold is the same as atmospheric pressure.

2- throttle is closed, trapping high pressure in the manifold.

3- throttle is in the full open position.

4- gauge is stuck at the full power position.

294. One difference between float-type carburetion and fuel injection is that in the latter system

1- the throttle controls the flow of air while fuel flow remains constant.

2- fuel is distributed to the cylinders more evenly.

3- vapor lock is less likely to occur.

4- power response is slower.

295. One of the disadvantages of fuel injector systems compared with carburetor systems is

1- uneven fuel distribution to the cylinders.

2- slower throttle response.

3- poor control of fuel/air mixture.

4- problems associated with restarting an engine that quits because of fuel starvation.

296. During takeoff, when maximum power and thrust are required, the constant-speed propeller should be set to a propeller blade angle which

1- will produce a large angle of attack with respect to its relative wind.

2- is high and will produce a low RPM.

3- will produce a small angle of attack with respect to its relative wind.

4- will produce a low slipstream velocity.

297. When operating an airplane with a constant-speed propeller, which procedure places the least stress on cylinder components?

1- Whether power settings are being increased or decreased, RPM is adjusted before manifold pressure.

2- When power settings are being increased, increase manifold pressure before RPM.

3- When power settings are being decreased, reduce manifold pressure before RPM.

4- When power settings are being decreased, reduce RPM before manifold pressure.

298. When establishing a climb, the proper sequence of engine control adjustment is to increase

1- mixture, followed by RPM and then manifold pressure.

2- manifold pressure and mixture but not the RPM.

3- manifold pressure followed by RPM, then mixture.

4- RPM, mixture, and then manifold pressure.

299. The main purpose of the mixture control is to

1- adjust the fuel flow to obtain the proper air/fuel ratio.

2- decrease the air supplied to the engine.

3- increase the oxygen supplied to the engine.

4- decrease oxygen supplied to the engine.

300. If fuel/air mixture adjustments are not made during operation at high altitudes, engine performance will be affected because of

1- an increase in the amount of fuel and a decrease in the volume of air entering 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- a constant volume of air and an increase in the amount of fuel metered by the carburetor.

301. To establish a climb after takeoff in an airplane equipped with a constant-speed propeller, the output of the engine is reduced to climb power by decreasing manifold pressure and

1- increasing RPM by decreasing propeller blade angle.

2- decreasing RPM by decreasing propeller blade angle.

3- increasing RPM by increasing propeller blade angle.

4- decreasing RPM by increasing propeller blade angle.

302. Unless adjusted, the fuel air mixture becomes richer with an increase in altitude because the amount of fuel

1- remains constant while the weight of air decreases.

2- remains constant while the volume of air decreases.

3- increases while the volume of air decreases.

4- increases while the volume of air remains constant.

303. To properly purge water from the fuel system of an airplane equipped with fuel tank sumps and a fuel strainer quick drain, it is necessary to drain fuel from the

1- lowest point in the fuel system only.

2- fuel strainer drain and the fuel tank sumps.

3- fuel tank sump drains only.

4- fuel strainer drain only.

304. The use of too low an octane fuel may cause

1- detonation.
2- higher manifold pressure.
3- a cooling effect on cylinders.
4- a prompt preignition reaction.

305. When operating an airplane equipped with a constant-speed propeller, and while maintaining a constant manifold pressure, the tendency of the engine to detonate will

1- decrease, with a decrease in RPM.
2- increase as the mixture is enriched.
3- increase, with a decrease in RPM.
4- decrease, with an increase in the temperature of the fuel/air mixture.

306. 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- Detonation often cannot be recognized from the cockpit through sound or engine roughness.
4- In general, rich mixtures must be used with caution when operating at high power settings.

307. The best procedure to use when attempting to start an overprimed engine is to

1- follow the manufacturer's instructions.
2- handcrank the engine with the throttle open and the aircraft brakes set.
3- continue to use the starter until the engine fires.
4- boost the battery with an auxiliary power unit.

308. When full throttle is used on an unsupercharged engine with the mixture control full rich, the pilot should realize that the engine is being

1- subjected to damage resulting from detonation.
2- provided additional fuel in the cylinders for cooling.
3- provided additional air in the cylinders for cooling.
4- subjected to damage from preignition.

309. If is is necessary to use a substitute gasoline in an airplane in lieu of that recommended, it should be remembered that

1- automotive gasolines are recommended, but only for short periods of time.
2- automotive gasolines should not be used, even if the octane is equivalent or better than that of the aviation gasoline recommended.
3- automotive gasolines can be used if the octane is equivalent to that of the aviation gasoline recommended.
4- aircraft engines are certificated for operation with either automotive or aviation fuels.

310. What pilot action should be taken when using fuel with a higher lead content than that recommended?

1- Operate the engine with an RPM that is lower than the manifold pressure.
2- Operate the engine with a leaner than normal mixture.
3- Avoid extremely lean mixture operation.
4- Avoid manifold pressures in excess of 25" Hg.

311. Failure to adjust the mixture properly after leveling off at altitude will

1- permit the same weight of air to enter the carburetor.
2- cause higher cylinder head temperature.
3- allow the same fuel flow as at lower altitudes.
4- reduce the fuel/air ratio in the carburetor.

312. Which statement is true regarding induction system icing?

   1- Induction system icing affects only engines equipped with carburetors.

   2- Fuel ice is usually formed in the induction system of fuel injection engines.

   3- Impact ice affects both fuel injection engines and engines equipped with carburetors.

   4- Throttle ice is usually formed in the induction system of fuel injection engines.

313. Which statement is true regarding the use of carburetor heat or alternate air during flight?

   1- It is preferable to use carburetor heat or alternate air as a prevention, rather than as a deicer.

   2- Full carburetor heat should be continuously used when the temperature is below 32° F.

   3- Partial heat should be used in airplanes that are not equipped with some instrumentation to determine the effect of the heat.

   4- Partial carburetor heat should be used when the temperature is below 32° F.

314. 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

   1- exhaust gas temperature.
   2- manifold pressure.
   3- RPM.
   4- cylinder head temperature.

315. When operating higher output engines, especially those with superchargers, the use of carburetor heat should be regulated by reference to the

   1- degree of roughness at which the engine is operating.

   2- manifold pressure or RPM indicator.

   3- cylinder head temperature gauge.

   4- carburetor air or mixture temperature gauge.

316. 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- the Federal Aviation Administration.

   3- the National Transportation Safety Board.

   4- an engine mechanic.

317. 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.

318. Detonation during a climb can be corrected by reducing the

   1- airspeed.
   2- propeller RPM.
   3- fuel-to-air ratio.
   4- manifold pressure.

319. Which statement is true regarding airplane engine starts during cold weather operations?

   1- Prolonged idling causes the spark plug electrodes to become saturated with congealed oil and results in shorting out the plugs.

   2- Overpriming could result in poor compression and hard starting.

   3- Engine parts expand, making it difficult to crank the engine.

   4- Preheating an engine should be done only in an emergency.

320. What effect would a light crosswind have on the wingtip vortices generated by a large airplane that had just taken off?

1- The upwind vortex would tend to remain on the runway longer than the downwind vortex.

2- A light crosswind would rapidly dissipate the strength of both vortices.

3- The downwind vortex would tend to remain on the runway longer than the upwind vortex.

4- Both vortices would move downwind at a greater rate than if the surface wind was directly down the landing runway.

321. In which sections of the carburetor would icing most likely occur?

1- Accelerator pump and main metering jet.

2- Float chamber and fuel inlet screen.

3- Venturi and on the throttle valve.

4- Main air bleed and main discharge nozzle.

322. The low temperature that causes carburetor ice in an engine equipped with a float-type carburetor is normally the result of the

1- compression of air at the carburetor venturi.

2- low volatility of the fuel.

3- vaporization of fuel and expansion of air in the carburetor.

4- freezing temperature of the air entering the carburetor.

323. In an aircraft equipped with a float-type carburetor and a constant-speed propeller, carburetor icing would probably first be detected by

1- a drop in engine RPM.

2- detonation.

3- a drop in manifold pressure and engine RPM.

4- a drop in manifold pressure.

324. In an airplane equipped with a constant-speed propeller and a manifold pressure (MP) gauge, the presence of carburetor ice can be verified by applying carburetor heat and noting an immediate

1- decrease in MP and then a gradual increase in MP.

2- increase in MP and then a gradual decrease in MP.

3- increase in MP and then a gradual increase in MP.

4- decrease in MP with no further change in MP.

325. Which conditions should alert a pilot to the possibility of induction icing?

1- A temperature between 32° F. and 50° F. with a relative humidity less than 50%.

2- A temperature between 0° F. and 32° F. with a relative humidity between 30% and 50%.

3- A temperature between 32° F. and 70° F. with a relative humidity greater than 50%.

4- Any temperature below freezing with a relative humidity less than 50%.

326. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

1- rough running engine followed by an increase in manifold pressure.

2- decrease in manifold pressure.

3- decrease in revolutions per minute.

4- rough running engine followed by loss of RPM.

327. Which statement is true regarding throttle ice in engine induction systems?

1- Throttle ice occurs only in combination with impact ice.

2- Throttle ice affects both fuel injection engines and engines equipped with carburetors.

3- Throttle ice is usually formed in induction systems when the throttle is closed.

4- Throttle ice is formed at cruise power settings.

328. The probable reason an engine continues to run after the ignition switch has been turned off is

1- faulty magneto timing.
2- burned out magneto breaker points.
3- a broken magneto ground wire.
4- a cracked intake manifold.

329. In addition to an added safety factor, dual ignition systems also provide

1- better combustion.
2- uniform engine heating.
3- shorter engine warmup periods.
4- less engine vibrations.

330. In addition to the added safety factor, dual ignition systems also provide

1- shorter engine warmup periods.
2- improved engine performance.
3- better heat control of the engine.
4- easier starting.

331. Choose the correct statement regarding wake turbulence.

1- Vortices tend to remain level for a period of time.

2- Vortex generation begins with the initiation of the takeoff roll.

3- The primary hazard is loss of control because of induced roll.

4- The greatest vortex strength is produced when the generating airplane is heavy, clean, and fast.

332. Which pilot action would be most appropriate for minimizing the hazards of wingtip vortices if cleared for takeoff behind a large jet?

1- Take off and climb at maximum speed to attain positive aircraft control in the event turbulence is encountered.

2- Taxi into position on the runway and hold until the vortices subside.

3- Maintain the ground run until past the point where the jet took off, and climb below the jet's flightpath.

4- Be airborne prior to reaching the point where the jet rotated, and climb above its flightpath.

333. Hazardous vortex turbulence that might be encountered behind large aircraft is created only when that aircraft is

1- developing lift.
2- heavily loaded.
3- operating at high airspeeds.
4- using high power settings.

334. The principal cause of hazardous conditions associated with the wake turbulence of large airplanes is the

1- laminar flow airfoil used on airplane designs.

2- propeller or jet "wash."

3- tornado-like vortices generated by the wingtips.

4- high speeds at which large airplanes operate.

335. The loss of aircraft control, which may occur if a light airplane is flown into the wake of a large airplane, is caused <u>principally</u> by

1- meteorological factors which create wind shear.

2- turbulence created by the propellers or jet exhaust of the large airplane.

3- high speed sound waves similar to those produced by sonic "booms."

4- the tornado-like vortices produced by the wingtips of the large airplane.

336. During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazards of wingtip vortices by

1- being airborne prior to reaching the jet's rotation point and climbing above its flightpath.

2- remaining below the jet's flightpath until able to turn clear of its wake.

3- maintaining extra speed on takeoff and climbout.

4- extending the takeoff roll and not rotating until well beyond the jet's rotation point.

MANIFOLD PRESSURE VS. RPM

NOTE: 1. THE LIMIT VALUES OF MANIFOLD PRESSURE APPLY FOR OUTSIDE AIR TEMPERATURES UP TO STANDARD DAY (ISA).
2. FOR OUTSIDE AIR TEMPERATURE ABOVE STANDARD DAY (ISA), THE LIMITS OF MANIFOLD PRESSURE MAY BE INCREASED, AS REQUIRED, UP TO A MAXIMUM OF 1.0 IN HG.

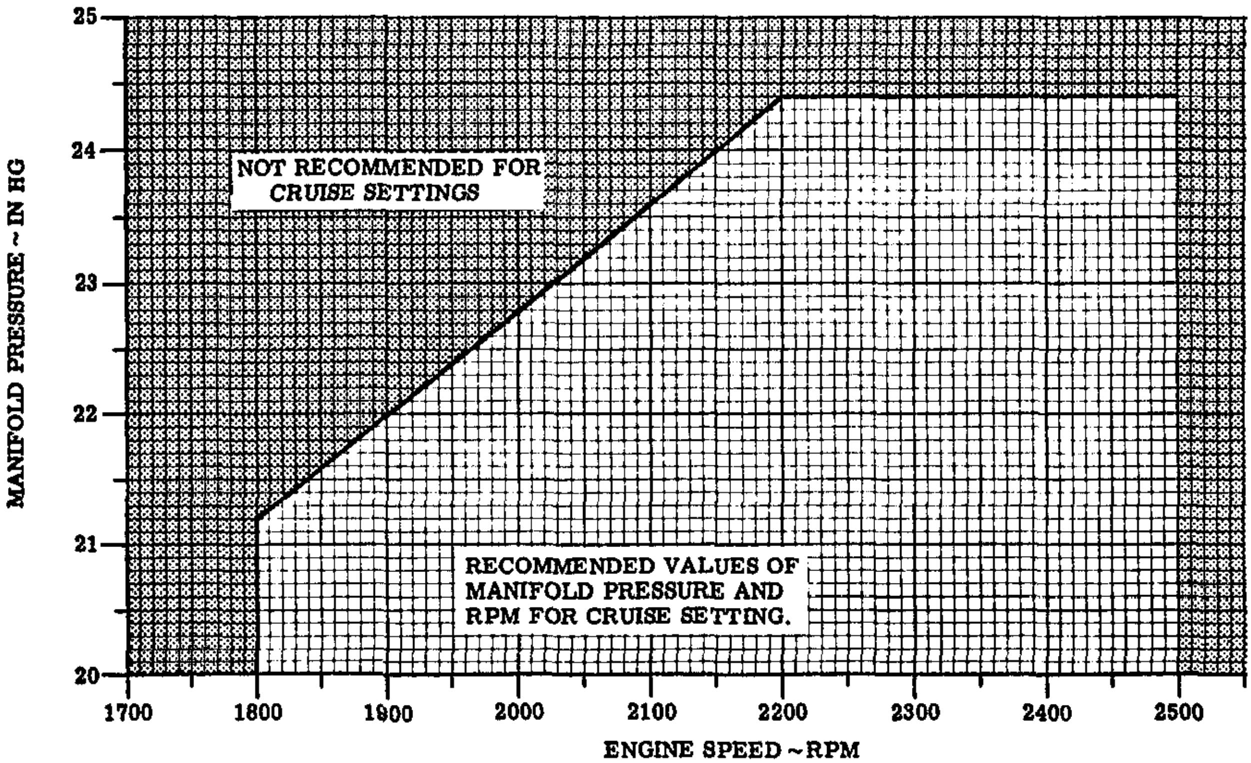


Figure 4

337. Refer to Fig. 4 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 24" Hg is

1- 2150 RPM to 2500 RPM.
2- 2000 RPM to 2500 RPM.
3- 1950 RPM to 2600 RPM.
4- 1900 RPM to 2600 RPM.

338. Refer to Fig. 4 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 23" Hg is

1- 2100 RPM to 2600 RPM.
2- 1900 RPM to 2600 RPM.
3- 2000 RPM to 2500 RPM.
4- 2025 RPM to 2500 RPM.

339. Refer to Fig. 4 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 22" Hg is

1- 2000 RPM to 2600 RPM.
2- 1700 RPM to 2500 RPM.
3- 1800 RPM to 2600 RPM.
4- 1900 RPM to 2500 RPM.

340. Refer to Fig. 4 above. The recommended range of engine speed (RPM) for cruise on a standard day with a manifold pressure of 21" Hg is

1- 1700 RPM to 2500 RPM.
2- 1800 RPM to 2500 RPM.
3- 1900 RPM to 2600 RPM.
4- 1950 RPM to 2600 RPM.

341. If the pitot static pressure tubes are broken inside a pressurized cabin during a high altitude flight, the altimeter would probably indicate

1- higher than actual flight altitude.
2- sea level.
3- a fluctuating altitude.
4- lower than actual flight altitude.

342. Which statement is true relating to the factors which affect fuel consumption?

1- The rate of fuel consumption is constant for different altitudes if manifold pressure and RPM are held constant.

2- Wind, as well as manifold pressure and RPM, is a factor in determining the rate of fuel consumption.

3- Various combinations of manifold pressure and RPM can produce a given rate of fuel consumption at different altitudes.

4- Only one combination of manifold pressure and RPM can produce a given rate of fuel consumption at different altitudes.

343. The power combination that is least likely to result in excessive cylinder pressures is a relatively

1- low manifold pressure with a low RPM.

2- low manifold pressure with a high RPM.

3- high manifold pressure with a low RPM.

4- high manifold pressure with a high RPM.

344. The power combination that is most likely to result in excessive cylinder pressures is a relatively

1- low manifold pressure with a high RPM.

2- high manifold pressure with a low RPM.

3- low manifold pressure with a low RPM.

4- high manifold pressure with a high RPM.

345. An airplane certificated in the utility category means that the airplane could be operated in which maneuvers?

1- All acrobatic maneuvers.

2- Mild acrobatics, including spins.

3- Any maneuver except acrobatics or spins.

4- Any maneuver requiring an abrupt attitude change.

346. An increase in carburetor air temperature while operating at the same altitude with the same RPM and MP, will produce

1- more horsepower.
2- less horsepower.
3- fluctuating horsepower.
4- the same horsepower.

347. If carburetor heat is used in such a manner as to provide too much heat at the carburetor intake, it will cause

1- the engine to idle too fast.

2- a decrease in fuel consumption.

3- a loss of RPM and a reduction of maximum power.

4- excessive cylinder head temperatures.

348. 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- carburetor air or mixture temperature gauge.

3- manifold pressure or RPM indicator.

4- cylinder air temperature gauge.

349. 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 left magneto.

2- cannot be started with the switch to the "on" position.

3- cannot be shut down by turning the switch to the "off" position.

4- will not operate on the right magneto.

350. Assuming that atmospheric pressure and temperature remain the same, a decrease in humidity will result in a

1- shorter takeoff distance; the air is less dense.

2- longer takeoff distance; the air is more dense.

3- shorter takeoff distance; the air is more dense.

4- longer takeoff distance; the air is less dense.

351. An increase in humidity in the atmosphere will tend to

1- increase the rate of climb.
2- decrease the takeoff distance.
3- increase the landing roll.
4- decrease the landing groundspeed.

352. If the atmospheric pressure and temperature remain the same, how would an increase in humidity affect takeoff performance?

1- Shorter takeoff distance; the air is less dense.

2- Longer takeoff distance; the air is more dense.

3- Longer takeoff distance; the air is less dense.

4- Shorter takeoff distance; the air is more dense.

353. The most effective technique to use for detecting other aircraft at night is to

1- avoid scanning the region below the horizon so as to avoid the effect of ground lights on the eyes.

2- stare directly at the point where another aircraft is suspected to be flying.

3- turn the head and sweep the eyes rapidly over the entire visible region.

4- avoid staring directly at the point where another aircraft is suspected to be flying.

354. As a precaution to avoid midair collisions during VFR climbs or descents along federal airways, pilots are encouraged to fly

1- to the right side of the centerline of the airway.

2- to the left side of the centerline of the airway.

3- along the centerline of the airway.

4- at least 4 NM on either side of the centerline forming the airway.

355. What precautions should be used with respect to oxygen systems?

1- Do not use grease covered hands, rags, or tools near oxygen equipment.

2- Assure that medical oxygen has been used to replenish oxygen containers.

3- An approved flame dispenser with shield should be used in checking the oxygen system for leaks.

4- Prohibit smoking while in an aircraft equipped with an oxygen system.

356. Assume an airplane is at 17,000 feet MSL, with the cabin pressure altitude at 7,000 feet. If the pitot static tube breaks at a point within the cockpit, the altimeter would indicate

1- 10,000 feet (7,000 feet plus 3,000 feet), which is the allowance for the differential pressure.

2- 17,000 feet.

3- the altitude above the terrain.

4- the cabin pressure altitude.

357. If decompression occurs in a pressurized airplane, a pilot should

1- make a rapid descent to an appropriate lower altitude.

2- start a slow descent to a lower altitude to minimize passenger discomfort.

3- contact ATC on 121.5 MHz for permission to descend.

4- instruct each passenger to force air into the middle ear.

358. The <u>indicated</u> stalling speed and true airspeed of an airplane at 5,000 ft. MSL, as compared to sea level, will normally be

1- the same as at sea level, but the true airspeed will be higher.

2- higher than at sea level, but the true airspeed will be the same.

3- the same as at sea level and the true airspeed will be the same.

4- higher than at sea level and the true airspeed will be higher.

359. What would occur if the density altitude is 5,000 ft. at an airport where the field elevation is 2,000 ft.?

1- Takeoff and landing performance would not be affected.

2- The altimeter would indicate 5,000 ft. when the airplane is on the ground.

3- Takeoff and landing performance would be the same as an airport with an elevation of 5,000 ft.

4- The indicated takeoff and landing airspeed should be higher than on a standard day.

360. Assume an approach speed of 1.3 to 1.4 times Vso when landing at an airport that is 6,500 ft. above sea level. If landing this airplane at a sea level airport, the approach speed should be

1- faster than at 6,500 ft.
2- the same as at 6,500 ft.
3- Vso with the flaps fully extended.
4- slower than at 6,500 ft.

361. Assume that an airplane is flying at a constant-power setting and at a constant-indicated altitude. If the outside air temperature increases, the true airspeed will

1- decrease; the true altitude will increase.

2- increase; the true altitude will decrease.

3- increase; the true altitude will increase.

4- decrease; the true altitude will decrease.

362. A high density altitude will always result in an increase in

1- equivalent airspeed.
2- true airspeed.
3- indicated airspeed.
4- calibrated airspeed.

363. Assume comparable conditions relative to temperature, wind, and airplane weight. The groundspeed at touchdown at high elevation airports will be

1- higher than at sea level.

2- lower than at sea level.

3- the same as at sea level.

4- either higher or lower than at sea level, depending on airspeed corrections applied.

364. If 80 MPH indicated airspeed has been used on final approach at an airport at sea level, the indicated airspeed on final approach to an airport where the field elevation is 4,800 ft. MSL should be

1- lower because the true airspeed is higher.

2- higher because the stalling speed is higher.

3- lower because the air density is lower.

4- the same as at sea level fields.

365. Assume a calm wind. During approach and landing at a high elevation airport and using the same indicated airspeed as that used at a sea level airport, the

1- groundspeed will be higher and the landing distance will be greater at the higher elevation airport.

2- groundspeed will be the same and the landing distance will be the same at each of the airports.

3- true airspeed will be the same and the landing distance will be the same at both airports.

4- true airspeed will be lower and the landing distance will be less at the higher elevation airport.

USEFUL LOAD WEIGHTS AND MOMENTS

OIL ARM 25		
Quarts	Weight	Moment
12	23	6

FUEL (3) 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

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	Empty Weight (Lbs.)	Empty Weight Moment (/100)
Certificated Weight	2110	1652

NOTE: All moments are equal to $\frac{\text{weight X arm}}{100}$

MAXIMUM CERTIFICATED

GROSS WEIGHT
3400 pounds

Figure 5

GROSS WEIGHT MOMENT LIMITS

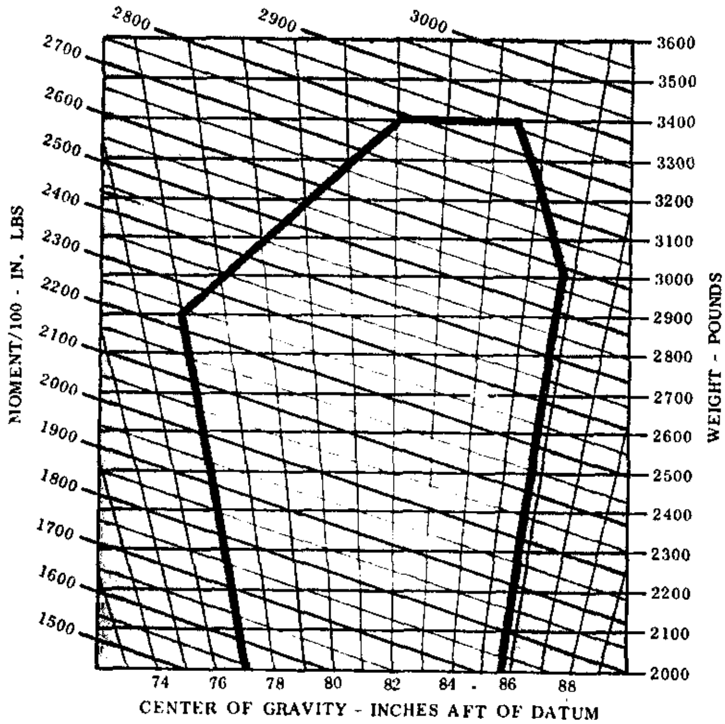


Figure 6

366. Refer to the loading data, Figs. 5 and 6, and assume that an airplane is loaded as follows:

Front	- 1st occupant ---	160 lbs.
	2nd occupant ---	156 lbs.
Rear seats (Aft position)	- 1st occupant ---	130 lbs.
	2nd occupant ---	147 lbs.
Baggage ---------------------		50 lbs.
Oil -------------------------		Full
Fuel - Leading edge tanks ---		75 gals.

From the data given, it can be determined that the airplane is loaded

1- 156 lbs. less than the maximum allowable gross weight with the CG located 84" aft of datum.

2- 163 lbs. less than the maximum allowable gross weight with the CG located 82" aft of datum.

3- 174 lbs. less than the maximum allowable gross weight with the CG located 84.1" aft of datum.

4- 174 lbs. less than the maximum allowable gross weight with the CG located outside the aft limits.

367. Refer to the loading data, Figs. 5 and 6, and assume an airplane is loaded as follows:

Front	- 1st occupant ---	150 lbs.
	2nd occupant ---	146 lbs.
Rear seats (Fwd position)	- 1st occupant ---	170 lbs.
	2nd occupant ---	175 lbs.
Baggage ---------------------		110 lbs.
Oil -------------------------		Full
Fuel - Leading edge tanks ---		75 gals.

From the data given, it can be determined that the airplane is loaded

1- 56 lbs. less than the maximum allowable gross weight with the CG located within the aft limits.

2- 66 lbs. less than the maximum allowable gross weight with the CG located outside the aft limits.

3- 66 lbs. less than the maximum allowable gross weight with the CG located 84.5" aft of the datum.

4- 76 lbs. less than the maximum allowable gross weight with the CG located 84.9" aft of the datum.

368. Assume an airplane is loaded as follows:

Weight "A" - 80 lbs. @ 200" aft of datum
Weight "B" - 160 lbs. @ 90" aft of datum
Weight "C" - 240 lbs. @ 60" aft of datum

According to this information only, the CG would be located at

1- 128" aft of datum.
2- 93.3" aft of datum.
3- 12.8" aft of datum.
4- 9.3" aft of datum.

369. Consider the following:

Aircraft weight ---- 7,650 lbs.
CG location -------- 79" aft of datum

What is the new CG location if 250 lbs. of baggage are added at 150" aft of datum?

1- 153.8" aft of datum.
2- 102.1" aft of datum.
3- 81.2" aft of datum.
4- 76.7" aft of datum.

370. GIVEN:

Aircraft weight ---- 2,800 lbs.
CG ----------------- 40" aft of datum

If 80 lbs. of weight are added at 80" aft of datum, the new CG will be

1- 42.5" aft of datum.
2- 37.6" aft of datum.
3- 38.9" aft of datum.
4- 41.1" aft of datum.

371. Consider the following:

Aircraft weight --------- 3,500 lbs.
CG location ------------- Station 70.0
CG aft limit ------------ Station 70.5

What is the maximum weight that could be added at Station 100.0 without exceeding the aft CG limit?

1- 59.3 lbs.
2- 35.0 lbs.
3- 29.5 lbs.
4- 20.6 lbs.

372. GIVEN:

Airplane weight --------- 3,700 lbs.
CG ---------------------- Station 77
Aft CG limit ------------ Station 79

What is the maximum weight that could be added at Station 150.0 without exceeding the aft CG limits?

1- 132.3 lbs.
2- 104.2 lbs.
3- 71.0 lbs.
4- 10.4 lbs.

373. Consider the following:

Aircraft weight ---- 5,750 lbs.
CG location -------- 77" aft of datum

What is the new CG location if 193 lbs. of baggage are added at 145" aft of datum?

1- 89.0" aft of datum.
2- 79.2" aft of datum.
3- 69.8" aft of datum.
4- 59.0" aft of datum.

374. GIVEN:

Airplane weight ---- 2,930 lbs.
CG location -------- Station 80.0

What is the new CG location if 70 lbs. of baggage are added at Station 117?

1- Station 88.0.
2- Station 80.8.
3- Station 117.0.
4- Station 197.0.

375. Consider the following:

Aircraft weight ---- 6,240 lbs.
CG location -------- 71" aft of datum

What is the new CG location if 210 lbs. of baggage are added at 140" aft of datum?

1- 211.0" aft of datum.
2- 140.0" aft of datum.
3- 83.2" aft of datum.
4- 73.2" aft of datum.

376. Consider the following:

Aircraft weight ---- 4,000 lbs.
CG location -------- Station 70.0
Aft CG limit ------- Station 70.5

How much weight could be added at Station 100.0 without exceeding the aft CG limit?

1- 170.5 lbs.
2- 143.4 lbs.
3- 137.9 lbs.
4- 67.7 lbs.

377. GIVEN:

Airplane weight ---- 5,000 lbs.
CG ----------------- Station 75.0
Aft CG limit ------- Station 75.5

How much weight could be added at Station 150.0 without exceeding the aft CG limit?

1- 150.0 lbs.
2- 74.5 lbs.
3- 72.3 lbs.
4- 33.5 lbs.

378. If the landing gear on an airplane moves forward during retraction, the

1- total moments will decrease.

2- total moments will remain the same.

3- total moments will increase.

4- center of gravity will remain the same.

379. The location of the center of gravity can always be found by

1- subtracting total weight from total moments.

2- subtracting total moments from total weight.

3- dividing total weight by total moments.

4- dividing total moments by total weight.

380. Consider the following:

Aircraft weight ---- 5,000 lbs.
CG location -------- Station 80.0
CG aft limit ------- Station 80.5

What is the maximum weight that could be added at Station 150.0 without exceeding the aft CG limit?

1- 160.5 lbs.
2- 70 lbs.
3- 69.5 lbs.
4- 35.9 lbs.

381. Assume an airplane is loaded as follows:

Weight "A" - 50 lbs. @ 200" aft of datum
Weight "B" - 150 lbs. @ 80" aft of datum
Weight "C" - 230 lbs. @ 30" aft of datum

According to this information only, the CG would be located at

1- 72.0" aft of datum.
2- 7.2" aft of datum.
3- 67.2" aft of datum.
4- 6.7" aft of datum.

382. Assume an airplane is loaded as follows:

Weight "A" - 200 lbs. @ 10" aft of datum
Weight "B" - 100 lbs. @ 100" aft of datum
Weight "C" - 50 lbs. @ 250" aft of datum

According to this information only, the CG would be located at

1- 157" aft of datum.
2- 85.7" aft of datum.
3- 70" aft of datum.
4- 68" aft of datum.

383. Suppose the nosewheel of an airplane moves rearward when retracting. Does this affect the CG?

1- No; the CG location would remain the same.

2- Yes; but the CG movement would be unpredictable.

3- Yes; the CG would move aft.

4- Yes; the CG would move forward.

384. Assume an airplane is loaded as follows:

Weight "A" - 200 lbs. @ 14" aft of datum
Weight "B" - 160 lbs. @ 80" aft of datum
Weight "C" - 125 lbs. @ 175" aft of datum

According to this information only, the CG would be located at

1- 89.6" aft of datum.
2- 77.2" aft of datum.
3- 55.5" aft of datum.
4- 13.9" aft of datum.

385. Assume an airplane is loaded as follows:

Weight "A" - 155 lbs. @ 13" aft of datum
Weight "B" - 205 lbs. @ 90" aft of datum
Weight "C" - 85 lbs. @ 160" aft of datum

According to this information only, the CG would be located at

1- 151.5" aft of datum.
2- 117.0" aft of datum.
3- 129.5" aft of datum.
4- 76.5" aft of datum.

386. Assume an airplane is loaded as follows:

Weight "A" - 180 lbs. @ 16" aft of datum
Weight "B" - 130 lbs. @ 70" aft of datum
Weight "C" - 75 lbs. @ 165" aft of datum

According to this information only, the CG would be located at

1- 96.6" aft of datum.
2- 93.7" aft of datum.
3- 63.2" aft of datum.
4- 24.1" aft of datum.

387. Solve the following weight problem:

Weight "A" - 130 lbs. @ 14" aft of datum
Weight "B" - 120 lbs. @ 85" aft of datum
Weight "C" - 55 lbs. @ 190" aft of datum

The CG would be located how far aft of datum?

1- .01".
2- 73.6".
3- 81.1".
4- 286.0".

WIND COMPONENTS

EXAMPLE:	
WIND SPEED	10 KNOTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	20^{o}
HEADWIND COMPONENT	9.5 KNOTS
CROSSWIND COMPONENT	3.5 KNOTS

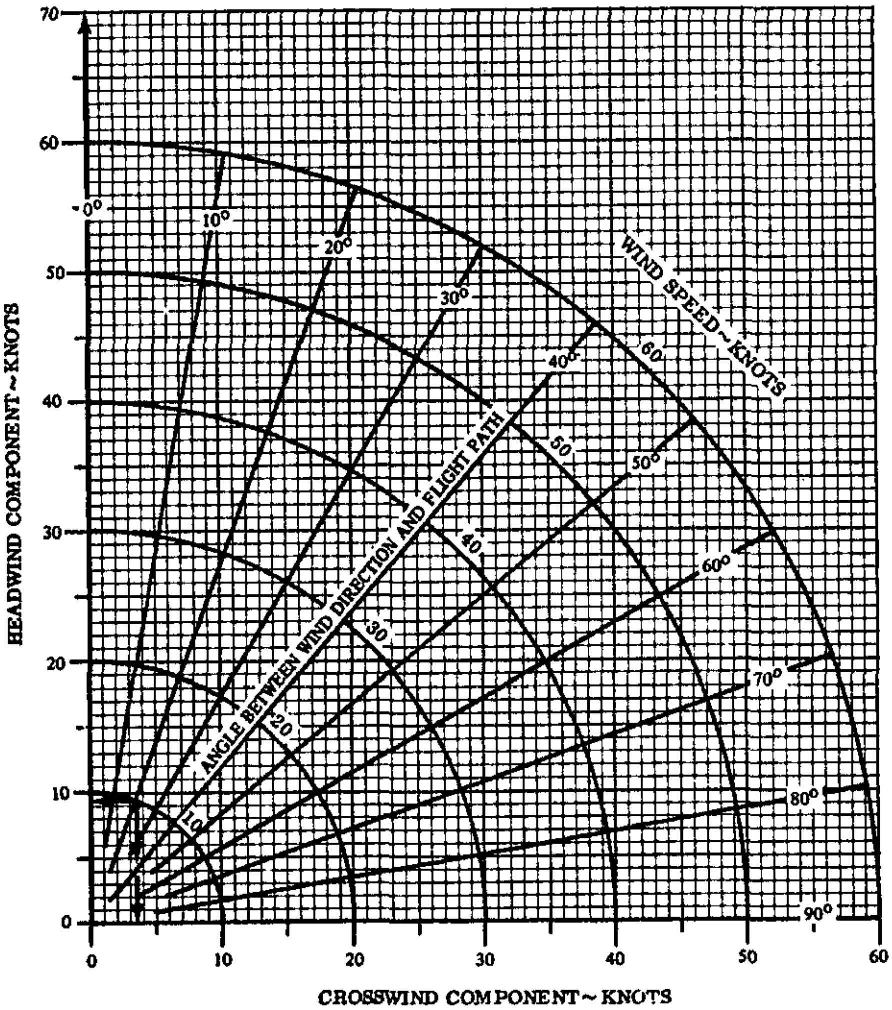


Figure 7

388. Assume the following conditions exist at an airport of intended landing:

Landing runway ------ 30
Wind ---------------- 020° @ 15 kts.

Using the chart in Fig. 7, a pilot can determine that the crosswind component is approximately

1- 22 knots.
2- 4 knots.
3- 15 knots.
4- 20 knots.

389. Assume the following conditions exist at an airport of intended landing:

Landing runway ------ 3
Wind ---------------- 060° @ 35 kts.

Using the chart in Fig. 7, a pilot can determine that the crosswind component is approximately

1- 22 knots.
2- 10 knots.
3- 12 knots.
4- 18 knots.

390. Assume the following conditions exist at an airport of intended landing:

Landing runway ------ 13
Wind ---------------- 140° @ 30 kts.

Using the chart in Fig. 7, a pilot can determine that the crosswind component is approximately

1- 18 knots.
2- 5 knots.
3- 10 knots.
4- 15 knots.

391. Assume the following conditions exist at an airport of intended landing:

Landing runway ------ 22
Wind ---------------- 260° @ 23 kts.

Using the chart in Fig. 7, a pilot can determine that the crosswind component is approximately

1- 25 knots.
2- 10 knots.
3- 15 knots.
4- 20 knots.

392. Assume a maximum demonstrated crosswind component equal to 0.2 Vso and the following conditions exist at an airport of intended landing:

Vso ----------------- 70 kts.
Landing runway ------- 35
Wind ---------------- 300° @ 20 kts.

Using the chart in Fig. 7, a pilot can determine that the

1- headwind component exceeds the crosswind component.

2- headwind component is excessive.

3- crosswind component is within safe limits.

4- maximum safe crosswind component is exceeded.

393. Assume a maximum demonstrated crosswind component equal to 0.2 Vso, and the following conditions exist at an airport of intended landing:

Vso ----------------- 60 kts.
Landing runway ------- 12
Wind ---------------- 150° @ 20 kts.

Using the chart in Fig. 7, a pilot can determine that the

1- crosswind component exceeds the headwind component.

2- headwind component is excessive.

3- crosswind component is within safe limits.

4- maximum safe crosswind component is exceeded.

394. Assume a maximum demonstrated crosswind component equal to 0.2 Vso, and the following conditions exist at an airport of intended landing:

Vso ---------------- 65 kts.
Landing runway ------ 17
Wind --------------- 200° @ 30 kts.

Using the chart in Fig. 7, a pilot can determine that the

1- crosswind component exceeds the headwind component.

2- maximum safe crosswind component is exceeded.

3- crosswind component is within safe limits.

4- headwind component is excessive.

NORMAL TAKE-OFF

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	UP
RUNWAY	PAVED, LEVEL, DRY SURFACE
TAKE-OFF SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 59% OF TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75°F
PRESSURE ALTITUDE	4000 FT
TAKE-OFF WEIGHT	3200 LBS
HEAD WIND	10 KNOTS
TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE	2190 FT
GROUND ROLL (59% OF 2190)	1292 FT
IAS TAKE-OFF SPEED	
LIFT-OFF	79 MPH
AT 50 FT	90 MPH

WEIGHT POUNDS	IAS TAKE-OFF SPEED (ASSUMES ZERO INSTR. ERROR)			
	LIFT-OFF		50 FEET	
	MPH	KNOTS	MPH	KNOTS
3400	81	70	92	80
3200	79	69	90	78
3000	76	66	87	76
2800	73	63	84	73
2600	70	61	80	70
2400	67	58	77	67

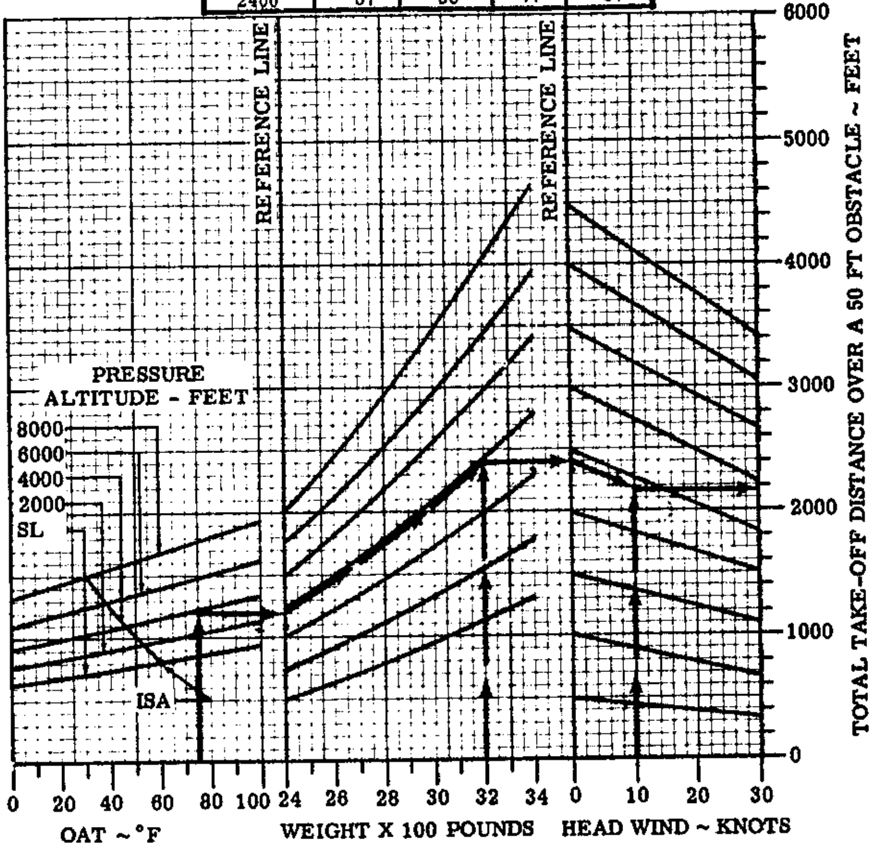


Figure 8

395. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 40° F.
Pressure altitude ----- 2,000 ft.
Weight ---------------- 3,200 lbs.
Headwind -------------- 20 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 1,810 ft.
2- 1,750 ft.
3- 1,690 ft.
4- 1,450 ft.

396. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 85° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 3,200 lbs.
Headwind -------------- 15 kts.

What is the approximate ground roll required for takeoff over a 50-foot obstacle?

1- 2,654 ft.
2- 2,172 ft.
3- 1,894 ft.
4- 1,563 ft.

397. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 45° F.
Pressure altitude ----- 8,000 ft.
Weight ---------------- 3,000 lbs.
Headwind -------------- 10 kts.

What weight reduction is necessary to take off over a 50-ft. obstacle in 2,000 ft.?

1- 450 lbs.
2- 400 lbs.
3- 350 lbs.
4- 250 lbs.

398. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 75° F.
Pressure altitude ----- 2,000 ft.
Weight ---------------- 2,800 lbs.
Headwind -------------- 25 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 1,150 ft.
2- 1,000 ft.
3- 850 ft.
4- 700 ft.

399. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 70° F.
Pressure altitude ----- 4,000 ft.
Weight ---------------- 3,400 lbs.
Headwind -------------- 15 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 2,900 ft.
2- 2,600 ft.
3- 2,400 ft.
4- 2,200 ft.

400. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 60° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 2,900 lbs.
Headwind -------------- 20 kts.

What weight reduction is necessary to take off over a 50-ft. obstacle in 1,500 ft.?

1- 500 lbs.
2- 400 lbs.
3- 300 lbs.
4- 200 lbs.

401. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 85° F.
Pressure altitude ----- 8,000 ft.
Weight ---------------- 3,100 lbs.
Headwind -------------- 10 kts.

What is the approximate ground roll required for takeoff over a 50-foot obstacle?

1- 3,100 ft.
2- 2,356 ft.
3- 1,829 ft.
4- 1,610 ft.

402. Use Fig. 8.

GIVEN: Associated Conditions - Fig. 8
Temperature ----------- 80° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 3,000 lbs.
Headwind -------------- 20 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 2,280 ft.
2- 2,190 ft.
3- 2,100 ft.
4- 2,060 ft.

OBSTACLE TAKE-OFF

ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER SET BEFORE BRAKE RELEASE
FLAPS	20°
RUNWAY	PAVED, LEVEL, DRY SURFACE
TAKE-OFF SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 73% OF TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75°F
PRESSURE ALTITUDE	4000 FT
TAKE-OFF WEIGHT	3100 LBS
HEAD WIND	20 KNOTS
TOTAL TAKE-OFF DISTANCE OVER A 50 FT OBSTACLE	1350 FT
GROUND ROLL (73% OF 1350)	986 FT
IAS TAKE-OFF SPEED	
LIFT-OFF	74 MPH
AT 50 FT	74 MPH

WEIGHT POUNDS	IAS TAKE-OFF SPEED (ASSUMES ZERO INSTR. ERROR)			
	LIFT-OFF		50 FEET	
	MPH	KNOTS	MPH	KNOTS
3400	77	67	77	67
3200	75	65	75	65
3000	72	63	72	63
2800	69	60	69	60
2600	66	57	66	57
2400	63	55	63	55

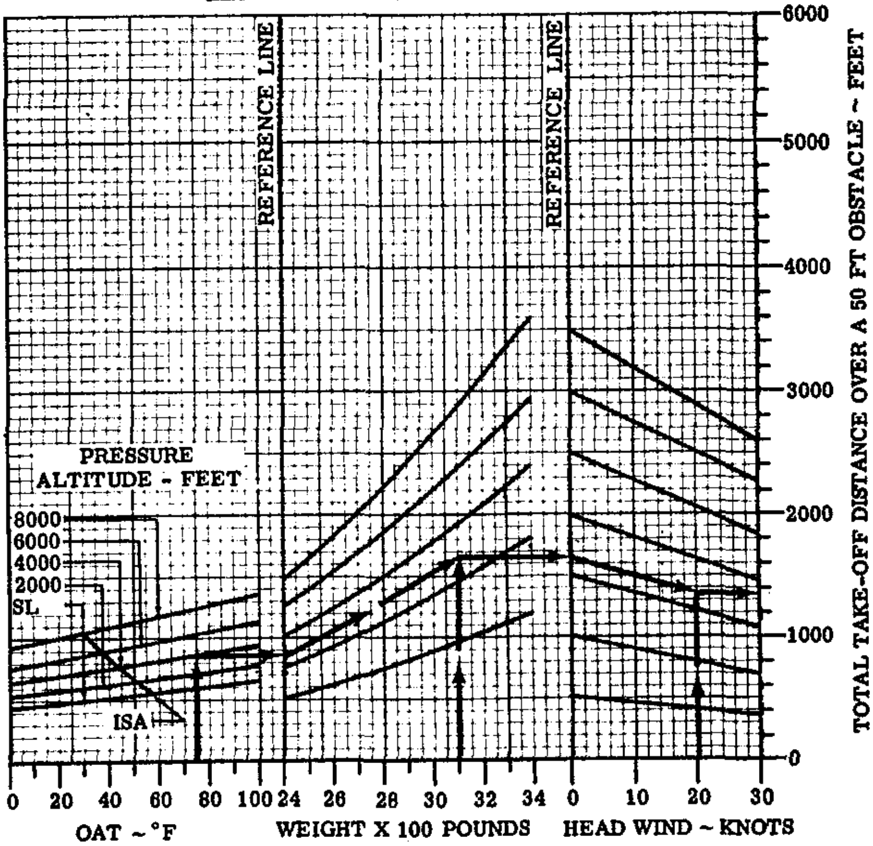


Figure 9

403. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 30° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 3,300 lbs.
Headwind -------------- 20 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 1,500 ft.
2- 1,400 ft.
3- 1,300 ft.
4- 1,200 ft.

404. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 20° F.
Pressure altitude ----- sea level
Weight ---------------- 3,400 lbs.
Headwind -------------- calm

What is the total takeoff distance over a 50-foot obstacle?

1- 1,200 ft.
2- 1,100 ft.
3- 1,000 ft.
4- 900 ft.

405. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 85° F.
Pressure altitude ----- 2,000 ft.
Weight ---------------- 2,800 lbs.
Headwind -------------- 10 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 1,100 ft.
2- 1,000 ft.
3- 900 ft.
4- 800 ft.

406. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 50° F.
Pressure altitude ----- sea level
Weight ---------------- 2,700 lbs.
Headwind -------------- calm

What is the total takeoff distance over a 50-foot obstacle?

1- 750 ft.
2- 650 ft.
3- 550 ft.
4- 450 ft.

407. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 95° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 3,400 lbs.
Headwind -------------- 10 kts.

What weight reduction is necessary to take off over a 50-foot obstacle in 2,000 ft.?

1- 500 lbs.
2- 400 lbs.
3- 300 lbs.
4- 200 lbs.

408. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 75° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 2,900 lbs.
Headwind -------------- 20 kts.

What weight reduction is necessary to take off over a 50-ft. obstacle in 1,000 ft.?

1- 400 lbs.
2- 300 lbs.
3- 200 lbs.
4- 100 lbs.

409. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 90° F.
Pressure altitude ----- 2,000 ft.
Weight ---------------- 3,300 lbs.
Headwind -------------- 10 kts.

What is the total takeoff distance over a 50-foot obstacle?

1- 1,350 ft.
2- 1,500 ft.
3- 1,650 ft.
4- 1,750 ft.

410. Use Fig. 9.

GIVEN: Associated Conditions - Fig. 9
Temperature ----------- 100° F.
Pressure altitude ----- 4,000 ft.
Weight ---------------- 3,200 lbs.
Headwind -------------- calm

What is the ground roll required for takeoff over a 50-foot obstacle?

1- 1,850 ft.
2- 1,540 ft.
3- 1,350 ft.
4- 1,180 ft.

MAXIMUM CLIMB

CLIMB SPEED

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
WEIGHT	3400 POUNDS
GEAR	UP
FLAPS	UP

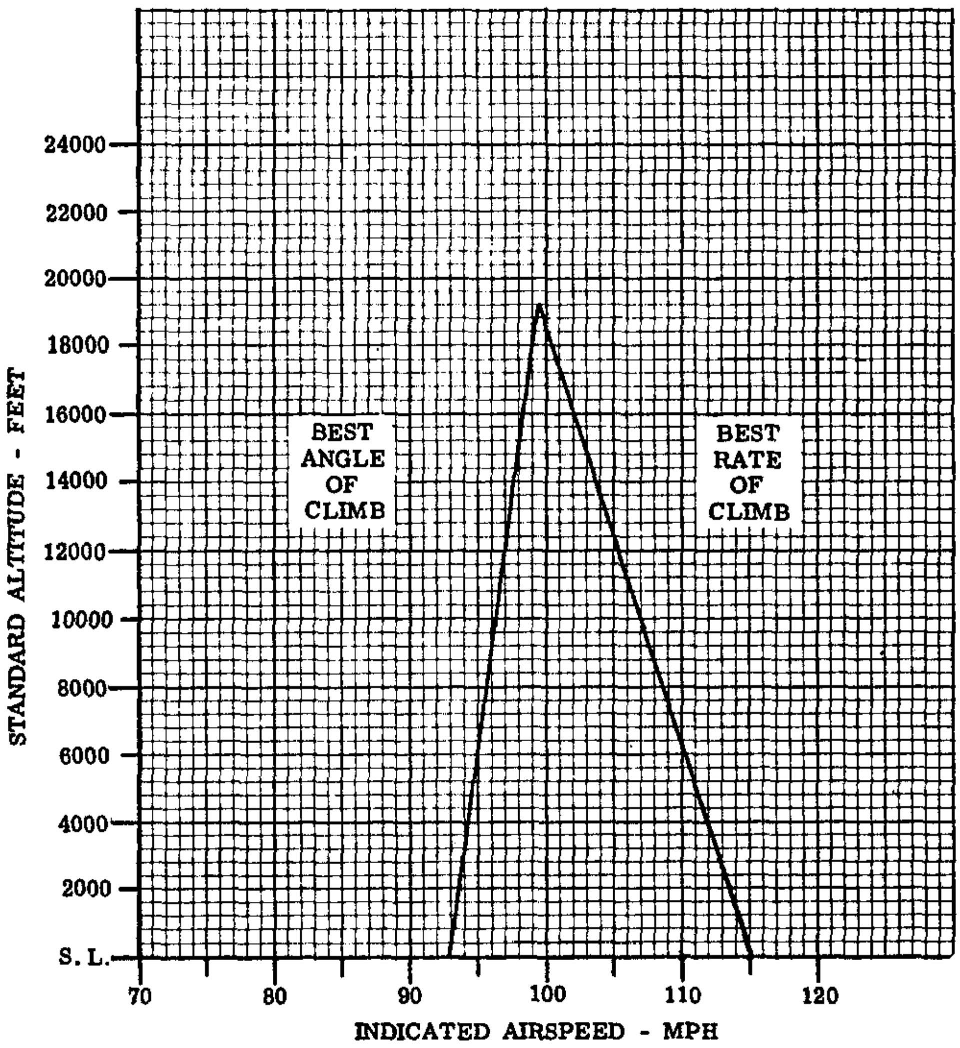


Figure 10

411. Use Fig. 10.

GIVEN: Associated conditions - Fig. 10
Standard altitude ----- 8,800 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

1- 95 MPH.
2- 96 MPH.
3- 106 MPH.
4- 108 MPH.

412. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 7,200 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

1- 110 MPH.
2- 109 MPH.
3- 95 MPH.
4- 94 MPH.

413. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 5,200 ft.

What indicated airspeed would result in the greatest increase in altitude in a unit of time?

1- 111 MPH.
2- 109 MPH.
3- 95 MPH.
4- 94 MPH.

414. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 6,000 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 113 MPH.
2- 112 MPH.
3- 95 MPH.
4- 93 MPH.

415. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 11,600 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 106 MPH.
2- 105 MPH.
3- 99 MPH.
4- 97 MPH.

416. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 3,200 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 113 MPH.
2- 112 MPH.
3- 94 MPH.
4- 92 MPH.

417. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 6,400 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 110 MPH.
2- 109 MPH.
3- 97 MPH.
4- 95 MPH.

418. Use Fig. 10.

GIVEN: Associated Conditions - Fig. 10
Standard altitude ----- 8,800 ft.

What indicated airspeed would result in the greatest increase in altitude for a given distance?

1- 110 MPH.
2- 108 MPH.
3- 96 MPH.
4- 94 MPH.

STALL SPEEDS (IAS)

ANGLE OF BANK

GROSS WEIGHT 3400 LBS.	LEVEL	20°	40°	60°
POWER	GEAR AND FLAPS UP			
ON	61 mph (53 kts)	63 mph (55 kts)	71 mph (61 kts)	86 mph (75 kts)
OFF	74 mph (64 kts)	76 mph (66 kts)	86 mph (74 kts)	105 mph (91 kts)
	GEAR AND FLAPS DOWN			
ON	50 mph (44 kts)	52 mph (45 kts)	58 mph (51 kts)	71 mph (62 kts)
OFF	63 mph (55 kts)	65 mph (57 kts)	73 mph (64 kts)	89 mph (78 kts)

Figure 11

419. Refer to the chart in Fig. 11. In a 20° bank, the power-on stall speed with gear and flaps down is approximately

1- 66 knots.
2- 57 knots.
3- 55 knots.
4- 45 knots.

420. Refer to the chart in Fig. 11. In a 40° bank, the power-on stall speed with gear and flaps up is approximately

1- 74 knots.
2- 71 knots.
3- 64 knots.
4- 61 knots.

421. According to the chart in Fig. 11, Vso in a 20° bank would be approximately

1- 66 knots.
2- 57 knots.
3- 55 knots.
4- 45 knots.

422. According to the chart in Fig. 11, Vso in a 40° bank would be approximately

1- 51 knots.
2- 61 knots.
3- 64 knots.
4- 74 knots.

423. According to the chart in Fig. 11, Vso in a 60° bank would be approximately

1- 91 knots.
2- 78 knots.
3- 75 knots.
4- 62 knots.

424. According to the chart in Fig. 11, Vso in a 40° bank would be approximately

1- 73 MPH.
2- 71 MPH.
3- 61 MPH.
4- 58 MPH.

425. According to the chart in Fig. 11, Vso in a 20° bank would be approximately

1- 76 MPH.
2- 65 MPH.
3- 55 MPH.
4- 45 MPH.

426. According to the chart in Fig. 11, Vso in a 60° bank would be approximately

1- 105 MPH.
2- 89 MPH.
3- 75 MPH.
4- 71 MPH.

427. In light airplanes, normal recovery from spins may become difficult if the

1- airspeed becomes too great.
2- CG is too far forward.
3- spin is entered too rapidly.
4- CG is too far rearward.

428. If an airplane is loaded to the rear of the CG range, that airplane will tend to become

1- unstable about its lateral axis.
2- sluggish in aileron control.
3- unstable about its longitudinal axis.
4- sluggish in rudder control.

429. The indicated stalling speed of an airplane is most affected by

1- changes in air temperature.
2- changes in air density.
3- variations in flight altitude.
4- variations in airplane loading.

430. If fuel/air mixture adjustments are not made during high altitude operation, engine performance will be affected because of

1- a decrease in the volume of air while there is an increase in the amount of fuel entering the carburetor.
2- a decrease in the weight of air while the same amount of fuel enters the carburetor.
3- a decrease in the weight of air and amount of fuel entering the carburetor.
4- a constant volume of air while there is an increase in the amount of fuel entering the carburetor.

431. The highest indicated airspeed will be obtained during level flight at a constant power setting when the outside air is

1- cold and dry.
2- warm and moist.
3- warm and dry.
4- cold and moist.

432. Suppose at sea level an unsupercharged engine with a constant-speed propeller develops 260 HP at 2625 RPM and 29" Hg. Which power settings would be expected at an airport where the elevation is 5,000 ft. above sea level?

1- Less than 2625 RPM and 29" Hg.
2- 2625 RPM and less than 29" Hg.
3- More than 2625 RPM and more than 29" Hg.
4- 2625 RPM and 29" Hg.

433. How does high density altitude affect the takeoff performance of an airplane?

1- Increased drag will require more power for acceleration.
2- Reduced engine and propeller efficiency will decrease acceleration.
3- Reduced drag will increase the rate of acceleration.
4- A higher indicated airspeed is required to produce necessary lift.

434. Suppose that on takeoff at sea level, full power with an unsupercharged engine will produce a manifold pressure of approximately 30" Hg. After climbing to 10,000 ft., without changing the position of the engine controls, the manifold pressure gauge would indicate approximately

1- 15" Hg.
2- 20" Hg.
3- 30" Hg.
4- 39" Hg.

435. Suppose that on takeoff at sea level, full power with an unsupercharged engine will produce a manifold pressure of approximately 27" Hg. After climbing to 5,000 ft., without changing the position of the engine controls, the manifold pressure gauge would indicate approximately

1- 30" Hg.
2- 27" Hg.
3- 22" Hg.
4- 20" Hg.

MAXIMUM CLIMB

RATE OF CLIMB

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
FLAPS	UP
GEAR	UP
AIRSPEED	BEST RATE-OF-CLIMB SPEED

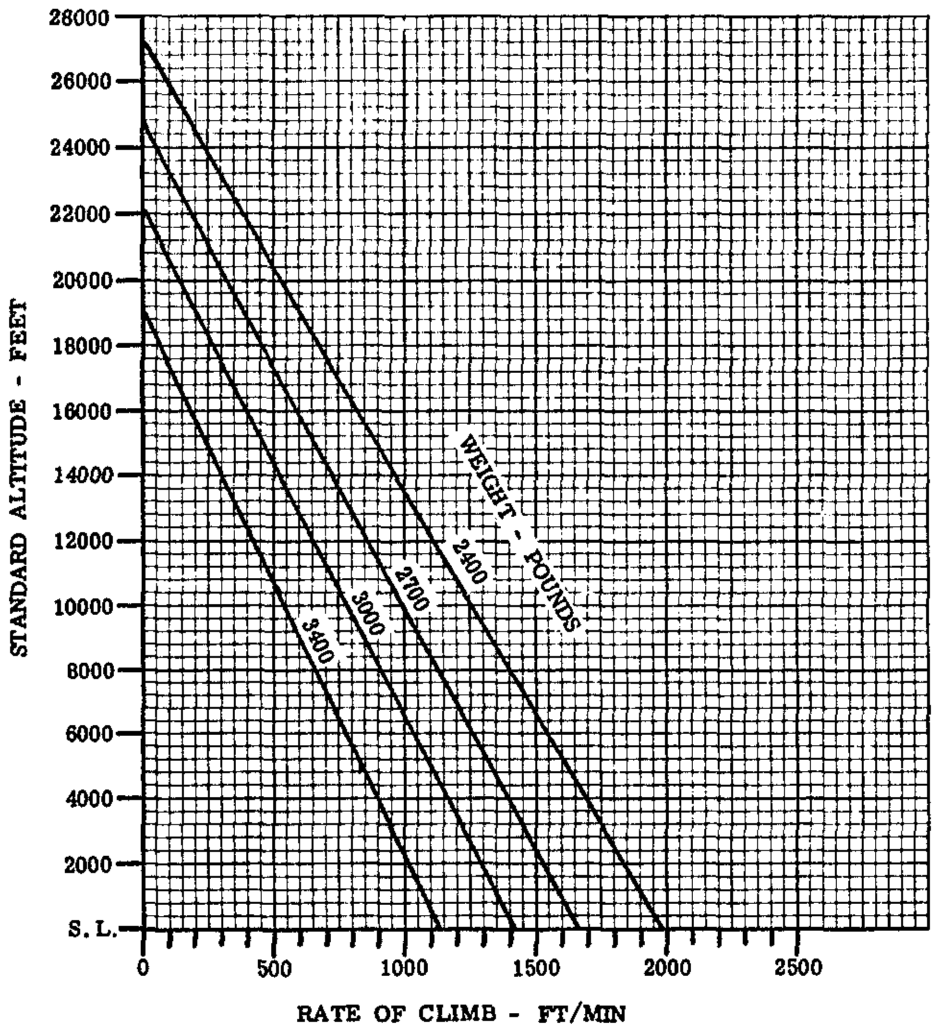


Figure 12

436. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 3,000 lbs.
Rate of climb --------- average

What is the approximate time required to climb from 2,000 ft. to 6,000 ft.?

1- 4 min. 20 sec.
2- 2 min. 05 sec.
3- 2 min. 30 sec.
4- 3 min. 20 sec.

437. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 3,400 lbs.
Rate of climb --------- average

What is the approximate time required to climb from 4,000 ft. to 10,000 ft.?

1- 9 min. 23 sec.
2- 7 min. 38 sec.
3- 7 min. 54 sec.
4- 8 min. 20 sec.

438. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 2,400 lbs.
Rate of climb --------- average

What is the approximate time required to climb from 3,000 ft. to 12,000 ft.?

1- 6 min. 15 sec.
2- 4 min. 40 sec.
3- 5 min. 10 sec.
4- 5 min. 38 sec.

439. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 2,700 lbs.
Rate of climb --------- average

What is the approximate time required to climb from 2,000 ft. to 10,000 ft.?

1- 6 min. 25 sec.
2- 5 min. 45 sec.
3- 5 min. 10 sec.
4- 4 min. 30 sec.

440. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 3,000 lbs.
Rate of climb --------- average

What is the approximate time required to climb from 4,000 ft. to 8,000 ft.?

1- 4 min. 30 sec.
2- 2 min. 50 sec.
3- 3 min. 20 sec.
4- 3 min. 50 sec.

441. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 3,400 lbs.
Rate of climb --------- average

What is the approximate time required to climb from 6,000 ft. to 12,000 ft.?

1- 14 min.
2- 12 min.
3- 10 min.
4- 8 min.

442. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 2,400 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

1- 26,600 ft.
2- 25,800 ft.
3- 25,400 ft.
4- 25,000 ft.

443. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 2,700 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

1- 24,000 ft.
2- 23,700 ft.
3- 23,300 ft.
4- 22,350 ft.

444. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 3,000 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

1- 21,200 ft.
2- 20,900 ft.
3- 20,600 ft.
4- 20,300 ft.

445. Use Fig. 12.

GIVEN: Associated Conditions - Fig. 12
Weight ---------------- 3,400 lbs.

At what altitude would the service ceiling (rate of climb 100'/min.) be reached?

1- 16,600 ft.
2- 17,800 ft.
3- 17,000 ft.
4- 17,400 ft.

MAXIMUM CLIMB

TIME TO CLIMB

ASSOCIATED CONDITIONS:

POWER	MAXIMUM CONTINUOUS
GEAR AND FLAPS	UP
TAKE-OFF WEIGHT	3400 POUNDS
AIRSPEED	BEST RATE-OF-CLIMB SPEED

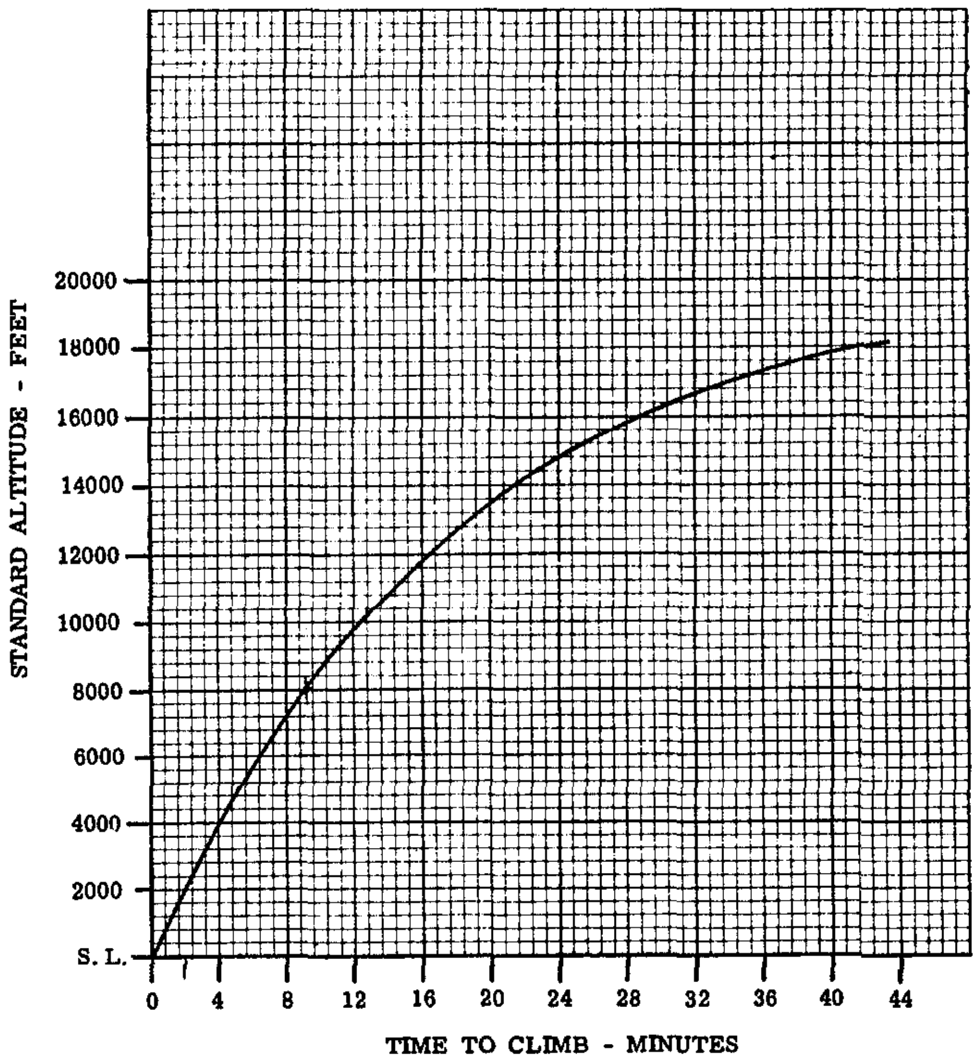


Figure 13

446. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Groundspeed ----------- 150 MPH

What is the approximate distance traveled when climbing from 4,000 ft. to 10,000 ft.

1- 25 miles.
2- 26 miles.
3- 21 miles.
4- 17 miles.

447. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Groundspeed ----------- 145 MPH

What is the approximate distance traveled when climbing from sea level to 8,000 ft.?

1- 25 miles.
2- 22 miles.
3- 21 miles.
4- 17 miles.

448. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Groundspeed ----------- 140 MPH

What is the approximate distance traveled when climbing from 3,000 ft. to 12,000 ft.?

1- 42 miles.
2- 37 miles.
3- 32 miles.
4- 27 miles.

449. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Groundspeed ----------- 135 MPH

What is the approximate distance traveled when climbing from 4,000 ft. to 14,000 ft.?

1- 48 miles.
2- 44 miles.
3- 42 miles.
4- 39 miles.

450. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Groundspeed ----------- 130 MPH

What is the approximate distance traveled when climbing from 2,000 ft. to 8,000 ft.?

1- 17 miles.
2- 15 miles.
3- 14 miles.
4- 13 miles.

451. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Groundspeed ----------- 120 MPH

What is the approximate distance traveled when climbing from sea level to 10,000 ft.?

1- 36 miles.
2- 33 miles.
3- 31 miles.
4- 25 miles.

452. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Fuel consumption ------ 14.5 GPH

What is the approximate fuel required to climb from 6,000 ft. to 14,000 ft.?

1- 5.0 gals.
2- 4.6 gals.
3- 3.7 gals.
4- 3.1 gals.

453. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Fuel consumption ------ 12 GPH

What is the approximate fuel required to climb from 4,000 ft. to 10,000 ft.?

1- 3.4 gals.
2- 2.9 gals.
3- 1.6 gals.
4- 1.0 gals.

454. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Fuel consumption ------ 15.0 GPH

What is the approximate fuel required to climb from 2,000 ft. to 14,000 ft.?

1- 5.5 gals.
2- 4.9 gals.
3- 4.3 gals.
4- 3.6 gals.

455. Use Fig. 13.

GIVEN: Associated Conditions - Fig. 13
Fuel consumption ------ 13.5 GPH

What is the approximate fuel required to climb from sea level to 12,000 ft.?

1- 4.00 gals.
2- 3.75 gals.
3- 3.25 gals.
4- 3.00 gals.

CRUISE OPERATION

WEIGHT 3400 LBS

NO.	% POWER	ENG SPEED RPM	BHP
1	45	2100	128
2	50	2100	142
3	55	2100	157
4	60	2200	171
5	65	2300	185
6	70	2400	200
7	75	2500	214

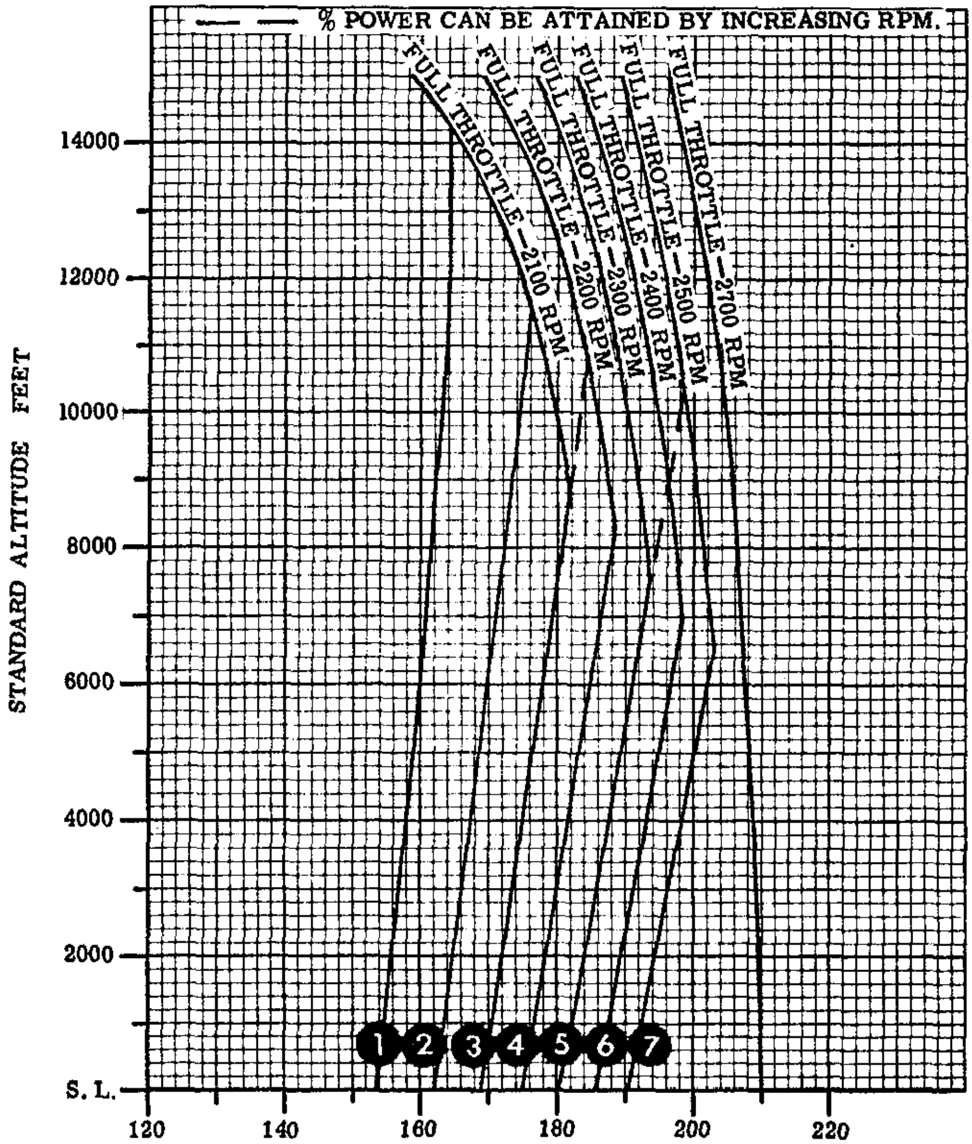


Figure 14

456. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 9,500 ft.
Power (full throttle) - 2100 RPM

Under the conditions given, what is the true airspeed?

1- 185 MPH.
2- 181 MPH.
3- 175 MPH.
4- 169 MPH.

457. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 8,500 ft.
Power (full throttle) - 2200 RPM

Under the conditions given, what is the true airspeed?

1- 190 MPH.
2- 188 MPH.
3- 178 MPH.
4- 175 MPH.

458. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 10,000 ft.
Power (full throttle) - 2500 RPM

Under the conditions given, what is the true airspeed?

1- 206 MPH.
2- 199 MPH.
3- 190 MPH.
4- 180 MPH.

459. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 9,000 ft.
Power (full throttle) - 2400 RPM

Under the conditions given, what is the true airspeed?

1- 198 MPH.
2- 196 MPH.
3- 186 MPH.
4- 180 MPH.

460. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 10,500 ft.
Power ----------------- 50%

Under the conditions given, what are the brake horsepower and true airspeed?

1- 175 BHP and 175 MPH.
2- 162 BHP and 175 MPH.
3- 142 BHP and 162 MPH.
4- 142 BHP and 175 MPH.

461. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 5,000 ft.
Power ----------------- 75%

Under the conditions given, what are the brake horsepower and true airspeed?

1- 200 BHP and 190 MPH.
2- 214 BHP and 200 MPH.
3- 200 BHP and 214 MPH.
4- 214 BHP and 190 MPH.

462. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 8,500 ft.
Power ----------------- 55%

Under the conditions given, what are the brake horsepower and true airspeed?

1- 157 BHP and 181 MPH.
2- 154 BHP and 172 MPH.
3- 157 BHP and 169 MPH.
4- 142 BHP and 181 MPH.

463. Use Fig. 14.

GIVEN: Weight ---------------- 3,400 lbs.
Standard altitude ----- 6,500 ft.
Power ----------------- 65%

Under the conditions given, what are the brake horsepower and true airspeed?

1- 192 BHP and 192 MPH.
2- 185 BHP and 192 MPH.
3- 185 BHP and 180 MPH.
4- 183 BHP and 180 MPH.

FUEL CONSUMPTION VS BRAKE HORSEPOWER

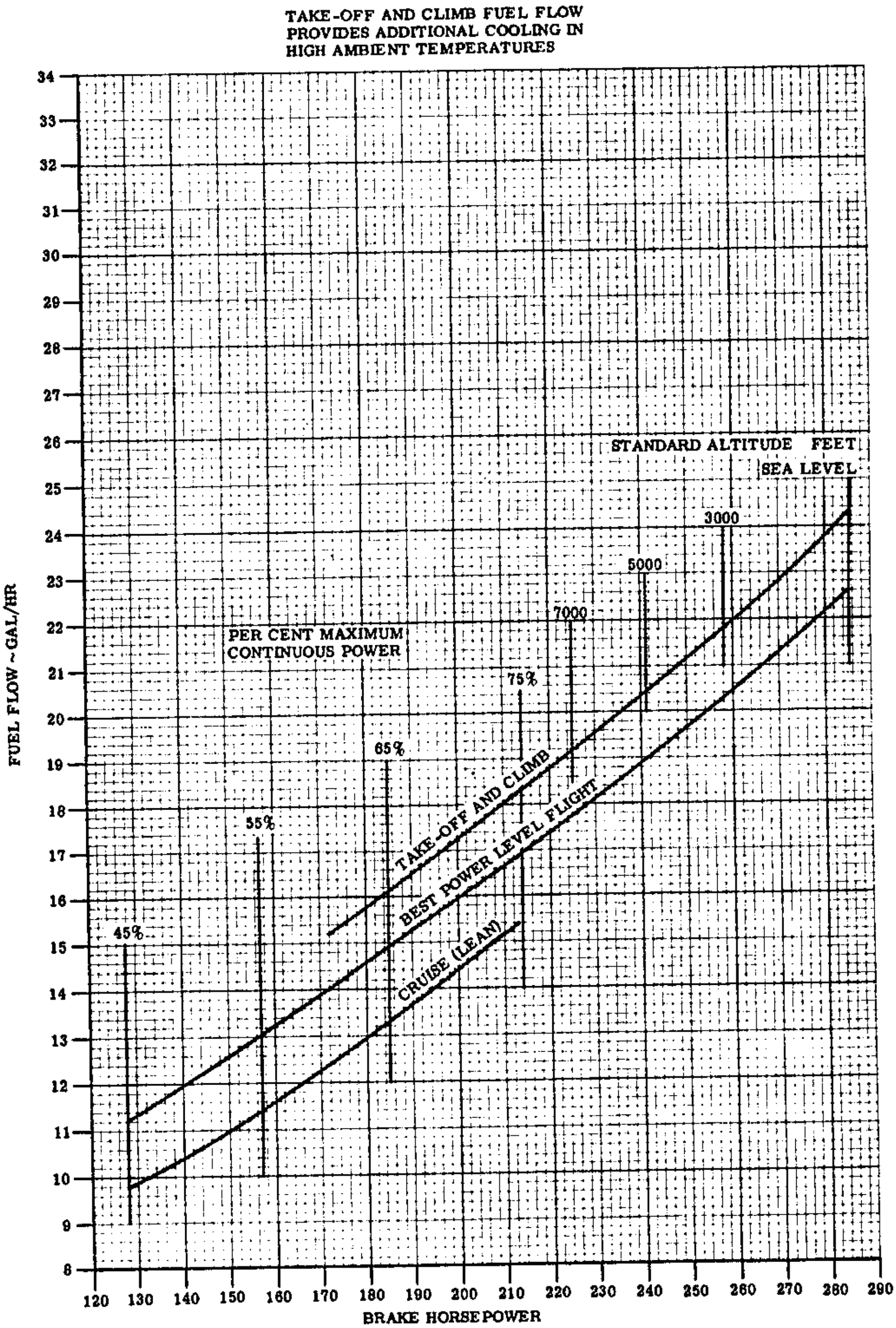


Figure 15

464. Use Fig. 15. What are the fuel flow and brake horsepower on takeoff from an airport located at 3,000 feet?

1- 22.0 gal./hr. and 259 HP.
2- 21.8 gal./hr. and 258 HP.
3- 21.8 gal./hr. and 259 HP.
4- 21.6 gal./hr. and 258 HP.

465. Use Fig. 15. What are the fuel flow and brake horsepower on takeoff from an airport at sea level?

1- 21.3 gal./hr. and 290 HP.
2- 22.4 gal./hr. and 290 HP.
3- 23.6 gal./hr. and 285 HP.
4- 24.3 gal./hr. and 285 HP.

466. Use Fig. 15.

GIVEN: Fuel quantity ---------- 47 gals.
Power - cruise (lean) -- 55%

Under the conditions given, approximately how much flight time would be available with a 45-minute reserve remaining?

1- 4 hrs. 6 min.
2- 3 hrs. 43 min.
3- 3 hrs. 22 min.
4- 3 hrs. 8 min.

467. Use Fig. 15.

GIVEN: Fuel quantity ---------- 65 gals.
Best power - level flt.- 55%

Under the conditions given, approximately how much flight time would be available with a 30-minute reserve remaining?

1- 5 hrs. 4 min.
2- 4 hrs. 30 min.
3- 4 hrs. 17 min.
4- 4 hrs. 6 min.

468. Use Fig. 15.

GIVEN: Fuel quantity ---------- 42 gals.
Best power - level flt.- 45%

Under the conditions given, approximately how much flight time would be available with a 30-minute reserve remaining?

1- 3 hrs. 54 min.
2- 3 hrs. 34 min.
3- 3 hrs. 14 min.
4- 3 hrs. 06 min.

469. Use Fig. 15.

GIVEN: Fuel quantity ---------- 36 gals.
Power - cruise (lean) -- 45%

Under the conditions given, approximately how much flight time would be available with a 20-minute reserve remaining?

1- 3 hrs. 40 min.
2- 3 hrs. 20 min.
3- 3 hrs. 00 min.
4- 2 hrs. 40 min.

470. Use Fig. 15. Approximately how much fuel would be consumed when climbing at 75% power for 7 minutes?

1- 2.6 gals.
2- 2.4 gals.
3- 2.1 gals.
4- 1.8 gals.

471. Use Fig. 15. Approximately how much fuel would be consumed when climbing at 65% power for 11 minutes?

1- 3.2 gals.
2- 2.9 gals.
3- 2.7 gals.
4- 2.5 gals.

472. Use Fig. 15.

GIVEN: Fuel quantity ---------- 54 gals.
Best power - level flt.- 65%

Under the conditions given, approximately how much flight time would be available with a 20-minute reserve remaining?

1- 3 hrs. 46 min.
2- 3 hrs. 37 min.
3- 3 hrs. 17 min.
4- 3 hrs. 6 min.

473. Use Fig. 15.

GIVEN: Fuel quantity ---------- 45 gals.
Power - cruise (lean) -- 65%

Under the conditions given, approximately how much flight time would be available with a 30-minute reserve remaining?

1- 3 hrs. 22 min.
2- 3 hrs. 15 min.
3- 3 hrs. 6 min.
4- 2 hrs. 52 min.

HORSEPOWER SETTING - IO-520-B

SEA LEVEL / 2000 FEET

SEA LEVEL MP AT 2500 RPM	SEA LEVEL MP AT 2300 RPM	SEA LEVEL MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH		2000 FEET MP AT 2500 RPM	2000 FEET MP AT 2300 RPM	2000 FEET 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

HORSEPOWER SETTING - IO-520-B

4000 FEET / 6000 FEET

4000 FEET MP AT 2500 RPM	4000 FEET MP AT 2300 RPM	4000 FEET MP AT 2100 RPM	OAT °F	% BHP	BHP	FUEL FLOW PPH/GPH		6000 FEET MP AT 2500 RPM	6000 FEET MP AT 2300 RPM	6000 FEET 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

Figure 16

474. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 2,000 feet
OAT ------------------- +80° F.
RPM ------------------- 2500
Manifold pressure ----- 24.9" Hg

What would be the approximate total flying time remaining if there was 100 lbs. of usable fuel available?

1- 1 hour 42 minutes.
2- 1 hour 24 minutes.
3- 1 hour 12 minutes.
4- 1 hour 05 minutes.

475. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 6,000 feet
OAT ------------------- +60° F.
RPM ------------------- 2300
Manifold pressure ----- 23.2" Hg

What would be the approximate total flying time remaining if there was 200 lbs. of usable fuel available?

1- 3 hours 24 minutes.
2- 2 hours 48 minutes.
3- 2 hours 30 minutes.
4- 2 hours 6 minutes.

476. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 4,000 feet
OAT ------------------- +80° F.
RPM ------------------- 2300
Manifold pressure ----- 24.0" Hg

What would be the approximate total flying time remaining if there was 350 lbs. of usable fuel available?

1- 5 hours 18 minutes.
2- 4 hours 52 minutes.
3- 4 hours 22 minutes.
4- 3 hours 48 minutes.

477. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 4,000 feet
OAT ------------------- +60° F.
RPM ------------------- 2500

What manifold pressure would be required to burn 15.3 gallons of fuel per hour?

1- 24.2" Hg.
2- 23.7" Hg.
3- 22.7" Hg.
4- 21.9" Hg.

478. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 6,000 feet
OAT ------------------- +20° F.
RPM ------------------- 2300

What manifold pressure would be required to burn 9.7 gallons of fuel per hour?

1- 18.8" Hg.
2- 18.5" Hg.
3- 17.5" Hg.
4- 16.4" Hg.

479. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 6,000 feet
OAT ------------------- +60° F.
RPM ------------------- 2300

What manifold pressure would be required to burn 11.5 gallons of fuel per hour?

1- 23.2" Hg.
2- 20.6" Hg.
3- 19.1" Hg.
4- 18.0" Hg.

480. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- sea level
OAT ------------------- +40° F.
RPM ------------------- 2500

What manifold pressure would be required to burn 11.5 gallons of fuel per hour?

1- 23.1" Hg.
2- 22.2" Hg.
3- 19.7" Hg.
4- 17.2" Hg.

481. Refer to Fig. 16 and assume the following conditions:

Altitude -------------- 2,000 feet
OAT ------------------- +20° F.
RPM ------------------- 2100

What manifold pressure would be required to burn 11.5 gallons of fuel per hour?

1- 22.5" Hg.
2- 20.6" Hg.
3- 19.5" Hg.
4- 19.2" Hg.

GLIDE DISTANCE

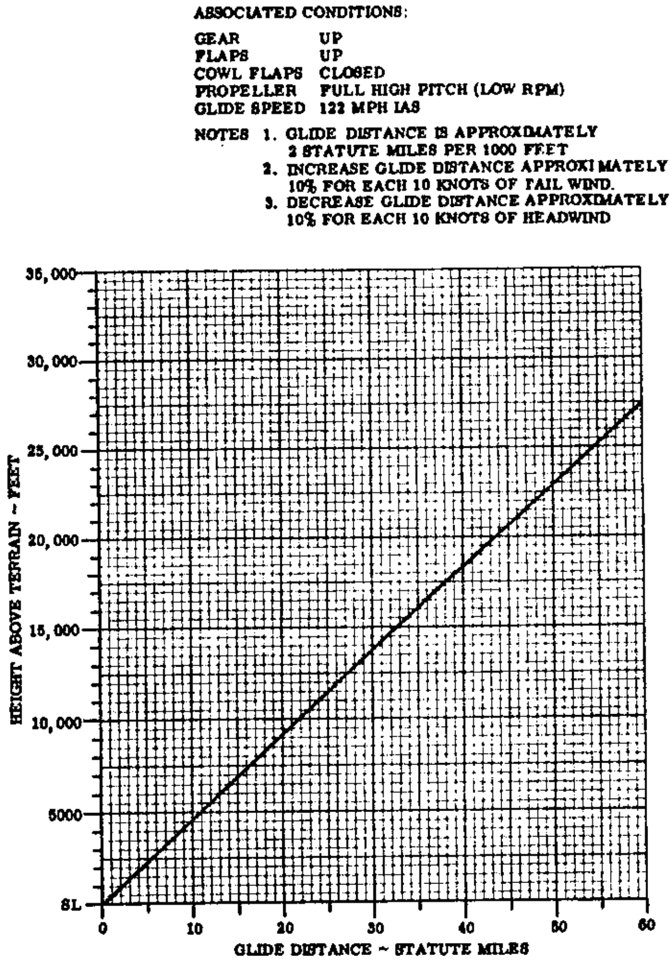


Figure 17

482. Refer to Fig. 17 above.

GIVEN: Associated Conditions - Fig. 17
Height above terrain -- 5,500 ft.
Tailwind -------------- 10 knots

What is the approximate glide distance?

1- 13 miles.
2- 12 miles.
3- 11 miles.
4- 10 miles.

483. Refer to Fig. 17 above.

GIVEN: Associated Conditions - Fig. 17
Height above terrain -- 10,500 ft.
Tailwind -------------- 20 knots

What is the approximate glide distance?

1- 28 miles.
2- 26 miles.
3- 24 miles.
4- 22 miles.

484. Refer to Fig. 17 above.

GIVEN: Associated Conditions - Fig. 17
Height above terrain -- 7,500 ft.
Headwind -------------- 30 knots

What is the approximate glide distance?

1- 16 miles.
2- 13 miles.
3- 11 miles.
4- 9 miles.

485. Refer to Fig. 17 above.

GIVEN: Associated Conditions - Fig. 17
Height above terrain -- 12,000 ft.
Headwind -------------- 20 knots

What is the approximate glide distance?

1- 26 miles.
2- 24 miles.
3- 23 miles.
4- 21 miles.

486. In the event severe turbulence is inadvertently encountered, the airplane should be flown at or below

1- maximum structural cruising speed.

2- any speed within the range of the green arc.

3- a speed equal to 1.2 times Vso.

4- maneuvering speed.

487. To attain maximum gliding distance after engine failure, the most efficient airspeed to use is the

1- speed within the green arc as depicted on the airspeed indicator.

2- speed just above stall.

3- maximum lift over drag (L/D) speed, considering gross weight.

4- maximum structural cruising speed.

488. Which marking is shown on the airspeed indicators of single-engine airplanes?

1- A red line showing Vne.
2- A yellow line showing Vso.
3- A blue line showing Vle.
4- A red line showing Vse.

489. How does increased weight affect the takeoff distance of an airplane?

1- Every airplane has the same acceleration factor under the same atmospheric conditions, but a higher airspeed is needed to produce the additional lift required.

2- Every airplane has the same acceleration factor with the same power output, but a higher airspeed is needed to overcome the increased ground effect.

3- The airplane will accelerate more slowly with the same power output and a higher airspeed is required to generate necessary lift for takeoff.

4- The airplane will accelerate more slowly with the same power output, but the same airspeed is required to generate necessary lift for takeoff.

490. Stall recovery becomes progressively more difficult if the center of gravity is located further

1- forward in light airplanes only.
2- aft in any airplane.
3- aft in light airplanes only.
4- forward in any airplane.

491. If the landing gear moves forward during gear retraction, the

1- center of gravity will remain the same.

2- total moments will remain the same.

3- total moments will decrease.

4- center of gravity will move aft.

492. As the center of gravity location is changed, recovery from stalls becomes progressively

1- less difficult as the CG moves rearward.

2- more difficult as the CG moves forward.

3- less difficult as the CG moves either forward or rearward.

4- more difficult as the CG moves rearward.

493. Which statement is true regarding the maximum distance attained over the ground in event of engine failure under a no-wind condition?

1- A decrease in airplane weight would require an increase in the maximum distance glide speed.

2- A decrease in airplane weight would require a decrease in the maximum distance glide speed.

3- A change in airplane weight would not require a change in the maximum distance glide speed.

4- The glide ratio for an airplane is a fixed value and does not change regardless of weight or speed.

NORMAL LANDING

ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 800 FT/MIN DESCENT ON APPROACH
FLAPS	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX. 53% OF TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	75° F.
PRESSURE ALTITUDE	4000 FT
LANDING WEIGHT	3200 LBS
HEAD WIND	10 KNOTS
TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE	1475 FT
GROUND ROLL (53% OF 1475)	782 FT
IAS APPROACH SPEED	87 MPH IAS

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	90	78
3200	87	76
3000	84	73
2800	81	70
2600	78	68
2400	75	65

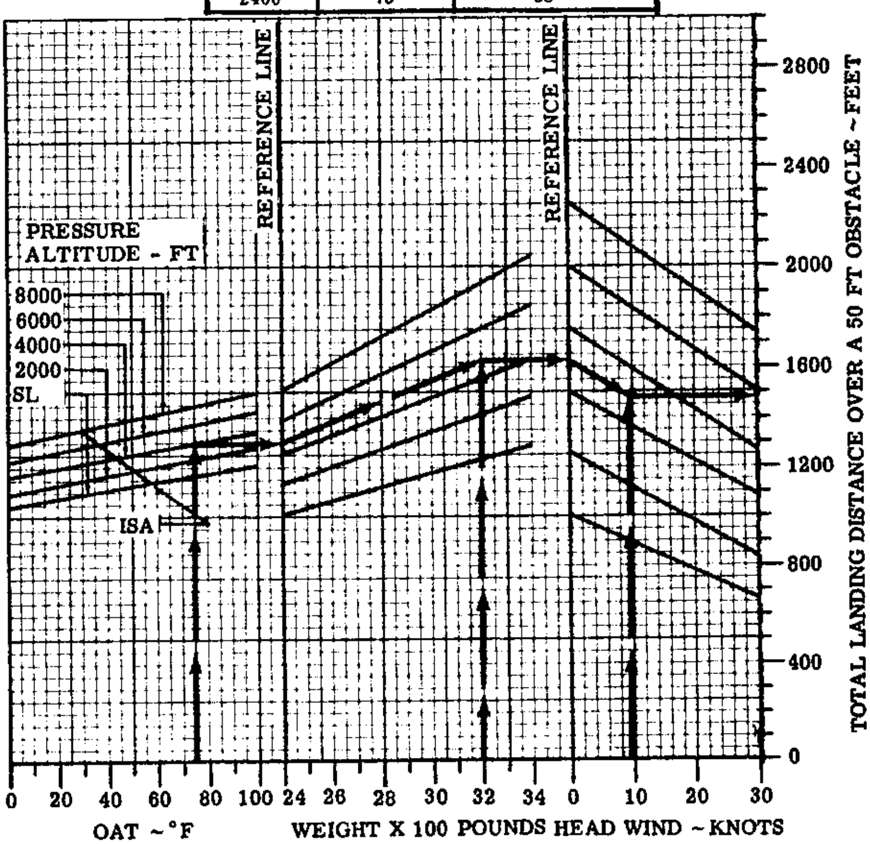


Figure 18

494. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 70° F.
Pressure altitude ----- sea level
Weight ---------------- 3,400 lbs.
Headwind -------------- 16 knots

Under the conditions given, determine the approximate ground roll.

1- 1,275 ft.
2- 883 ft.
3- 676 ft.
4- 542 ft.

495. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 80° F.
Pressure altitude ----- 4,000 ft.
Weight ---------------- 2,800 lbs.
Headwind -------------- 24 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,325 ft.
2- 1,250 ft.
3- 1,125 ft.
4- 1,000 ft.

496. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 50° F.
Pressure altitude ----- sea level
Weight ---------------- 3,000 lbs.
Headwind -------------- 20 knots

Under the conditions given, determine the approximate ground roll.

1- 1,050 ft.
2- 836 ft.
3- 557 ft.
4- 425 ft.

497. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 90° F.
Pressure altitude ----- 8,000 ft.
Weight ---------------- 3,400 lbs.
Headwind -------------- 6 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,900 ft.
2- 1,825 ft.
3- 1,750 ft.
4- 1,700 ft.

498. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 60° F.
Pressure altitude ----- 8,000 ft.
Weight ---------------- 3,200 lbs.
Headwind -------------- 18 knots

Under the conditions given, determine the approximate ground roll.

1- 1,500 ft.
2- 1,050 ft.
3- 795 ft.
4- 650 ft.

499. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 90° F.
Pressure altitude ----- 2,000 ft.
Weight ---------------- 3,400 lbs.
Headwind -------------- 10 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,725 ft.
2- 1,650 ft.
3- 1,575 ft.
4- 1,475 ft.

500. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 85° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 2,800 lbs.
Headwind -------------- 14 knots

Under the conditions given, determine the approximate ground roll.

1- 1,480 ft.
2- 1,280 ft.
3- 742 ft.
4- 634 ft.

501. Use Fig. 18.

GIVEN: Associated Conditions - Fig. 18
Temperature ----------- 50° F.
Pressure altitude ----- 4,000 ft.
Weight ---------------- 3,000 lbs.
Headwind -------------- 22 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,250 ft.
2- 1,175 ft.
3- 1,050 ft.
4- 975 ft.

OBSTACLE LANDING

ASSOCIATED CONDITIONS:

POWER	AS REQUIRED TO MAINTAIN 800 FT/MIN DESCENT ON APPROACH
FLAPS	DOWN
GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	IAS AS TABULATED
BRAKING	MAXIMUM

NOTE: GROUND ROLL IS APPROX. 55% OF TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT	70° F.
PRESSURE ALTITUDE	2000 FT
LANDING WEIGHT	3000 LBS
HEAD WIND	10 KNOTS
TOTAL LANDING DISTANCE OVER A 50 FT OBSTACLE	1000 FT
GROUND ROLL (55% OF 1000)	550 FT
IAS APPROACH SPEED	76 MPH

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	80	69
3200	78	68
3000	76	66
2800	73	63
2600	70	61
2400	67	58

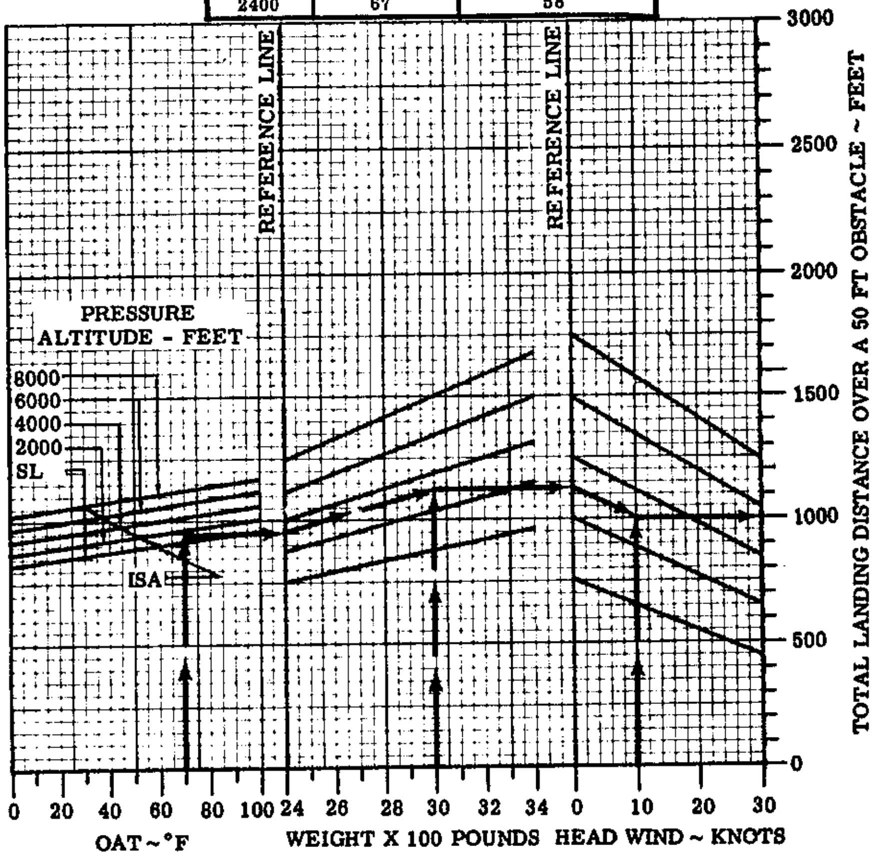


Figure 19

502. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 75° F.
Pressure altitude ----- 4,000 ft.
Weight ---------------- 3,300 lbs.
Headwind -------------- 12 knots

Under the conditions given, determine the approximate ground roll.

1- 633 ft.
2- 530 ft.
3- 464 ft.
4- 408 ft.

503. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 85° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 3,000 lbs.
Headwind -------------- 18 knots

What is the total landing distance over a 50-foot obstacle?

1- 1,180 ft.
2- 1,075 ft.
3- 975 ft.
4- 850 ft.

504. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 80° F.
Pressure altitude ----- 8,000 ft.
Weight ---------------- 2,900 lbs.
Headwind -------------- 24 knots

Under the conditions given, determine the approximate ground roll.

1- 650 ft.
2- 550 ft.
3- 450 ft.
4- 400 ft.

505. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 90° F.
Pressure altitude ----- 8,000 ft.
Weight ---------------- 3,400 lbs.
Headwind -------------- 30 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,300 ft.
2- 1,250 ft.
3- 1,175 ft.
4- 1,100 ft.

506. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 70° F.
Pressure altitude ----- 6,000 ft.
Weight ---------------- 3,300 lbs.
Headwind -------------- 28 knots

Under the conditions given, determine the approximate ground roll.

1- 1,000 ft.
2- 625 ft.
3- 550 ft.
4- 475 ft.

507. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 60° F.
Pressure altitude ----- 4,000 ft.
Weight ---------------- 3,200 lbs.
Headwind -------------- 20 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,125 ft.
2- 1,050 ft.
3- 975 ft.
4- 850 ft.

508. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 50° F.
Pressure altitude ----- 2,000 ft.
Weight ---------------- 3,100 lbs.
Headwind -------------- 16 knots

Under the conditions given, determine the approximate ground roll.

1- 950 ft.
2- 678 ft.
3- 523 ft.
4- 493 ft.

509. Use Fig. 19.

GIVEN: Associated Conditions - Fig. 19
Temperature ----------- 40° F.
Pressure altitude ----- sea level
Weight ---------------- 2,800 lbs.
Headwind -------------- 8 knots

What is the total landing distance over a 50-ft. obstacle?

1- 1,050 ft.
2- 950 ft.
3- 850 ft.
4- 750 ft.

510. Which airspeed would be the best to use to clear obstacles after takeoff?

1- Best rate-of-climb speed.
2- Best angle-of-climb speed.
3- Minimum safe climb speed.
4- Minimum controllable climb speed.

511. Which speed will provide the greatest gain in altitude over the shortest horizontal distance?

1- Minimum controllable speed in a climb configuration.
2- Minimum safe climb speed.
3- Best angle-of-climb speed.
4- Best rate-of-climb speed.

512. Which statement is true concerning airplane speed symbols?

1- Vfe means the speed for maximum stability.
2- Vle means the maximum safe landing speed.
3- Vy means the best angle-of-climb speed.
4- Vso means the stalling speed in the landing configuration.

513. Which statement is true concerning airplane speed symbols?

1- Vso; power-on stalling speed, gear and flaps retracted.
2- Vle; minimum landing safety speed.
3- Vy; best angle-of-climb speed.
4- Vx; best angle-of-climb speed.

514. Which statement concerning airplane speed symbols is correct?

1- Vso is the power-on stalling speed with the gear and flaps retracted.
2- Vfe is the maximum flap-extended speed.
3- Vno is the never-exceed speed.
4- Vy is the best angle-of-climb speed.

515. The symbol which means the stalling speed or the minimum steady flight speed in a specified configuration is

1- Va.
2- Vs.
3- Vsl.
4- Vso.

516. Which statement concerning airplane speed symbols is correct?

1- Vx is the best rate-of-climb speed.
2- Vle is the minimum landing safety speed.
3- Va is the design maneuvering speed.
4- Vso is the power-on stalling speed with the gear and flaps retracted.

517. The maximum speed at which an airplane may be safely stalled is the

1- power-off stalling speed with the gear and flaps in the landing position.
2- never-exceed speed.
3- maximum structural cruising speed.
4- maneuvering speed.

518. "Maximum structural cruising speed" is the maximum speed at which an airplane can be operated during

1- operations with gear extended.
2- abrupt maneuvers.
3- normal operations.
4- flight in smooth air.

519. Which airspeed listed below would a pilot be unable to identify by color-coding on the airspeed indicator?

1- The maneuvering speed.
2- The power-off stalling speed with the wing flaps and landing gear retracted.
3- The maximum structural cruising speed.
4- The never-exceed speed.

520. What determines the angle of attack at which an airplane stalls?

1- Relative wind.
2- Load factor.
3- True airspeed.
4- Airplane gross weight.

521. To increase the rate of turn and at the same time decrease the radius, a pilot should

1- shallow the bank and decrease airspeed.
2- steepen the bank and increase airspeed.
3- shallow the bank and increase airspeed.
4- steepen the bank and decrease airspeed.

522. If the airspeed was increased from 90 MPH to 135 MPH during a level 60° banked turn, the load factor would

1- remain the same but the radius of the turn would decrease.
2- increase due to additional centrifugal force.
3- decrease and the radius of turn would increase.
4- remain the same but the radius of turn would increase.

523. Increasing the airspeed while maintaining a constant load factor during a level, coordinated turn would result in

1- an increase in centrifugal force.
2- the same radius of turn.
3- a decrease in the radius of turn.
4- an increase in the radius of turn.

524. In coordinated flight for any specific bank, the faster the speed of the airplane the

1- smaller the radius and the slower the rate of turn.
2- greater the radius and the faster the rate of turn.
3- smaller the radius and the faster the rate of turn.
4- greater the radius and the slower the rate of turn.

525. Which statement is true, if during a level coordinated turn the load factor was kept constant?

1- An increase in airspeed would result in the same radius of turn.
2- An increase in airspeed results in a decrease in radius.
3- An increase in airspeed results in an increase in radius.
4- A decrease in airspeed results in an increase in radius.

526. Which statement is correct with respect to rate and radius of turn for an airplane flown in a coordinated turn at a constant altitude?

1- For any specific angle of bank and airspeed, the lighter the airplane the faster the rate and the smaller the radius of turn.
2- For a specific angle of bank and airspeed, the rate and radius of turn will not vary.
3- The faster the true airspeed, the faster the rate and larger the radius of turn regardless of the angle of bank.
4- To maintain a steady rate of turn, the angle of bank must be increased as the airspeed is decreased.

527. If, during a level turn, the rate of turn is kept constant, an increase in airspeed will result in a

1- need to increase angle of bank to maintain the same radius of turn.
2- need to decrease angle of bank to maintain the same radius of turn.
3- constant load factor regardless of changes in angle of bank.
4- decrease in centrifugal force.

528. The upper airspeed limit of the green arc on the airspeed indicator represents the maximum

1- structural cruising speed (Vno).
2- landing gear lowering speed (Vle).
3- design maneuvering speed (Va).
4- allowable speed for smooth-air operations (Vne).

529. In a coordinated turn the displacement of the turn needle

1- increases as angle of bank increases and airspeed decreases.

2- indicates the angle of bank.

3- remains constant for a 30° bank regardless of airspeed.

4- increases as angle of bank increases and airspeed increases.

530. Deceleration error will be displayed on the attitude indicator by a false

1- nose-high indication.
2- nose-low indication.
3- bank to the right.
4- bank to the left.

531. Acceleration error will be displayed on the attitude indicator by a false

1- bank to the right.
2- nose-high indication.
3- nose-low indication.
4- bank to the left.

532. Which of the following has the most significant effect on the <u>indicated airspeed</u> at which an airplane <u>stalls</u>?

1- Flight altitude.
2- Atmospheric pressure.
3- Atmospheric temperature.
4- Airplane attitude.

533. Which statement is true relating to the factors which produce stalls?

1- The stalling angle of attack depends upon the speed of the airflow over the wings.

2- The critical angle of attack is a function of the degree of bank.

3- To accelerate a stall will always produce a spin.

4- The stalling angle of attack is independent of the speed of airflow over the wings.

534. In airplanes all stalls are caused by

1- exceeding the critical angle of attack.

2- a loss of airspeed.

3- exceeding the critical angle of pitch.

4- misuse of the elevators.

535. 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- critical angle of attack has decreased.

2- critical angle of attack is reached at a higher airspeed.

3- total lift has decreased.

4- effective thrust has decreased.

536. During a turn, if the angle of bank is steepened and at the same time the airspeed is decreased, a pilot can expect the radius of turn to

1- increase and rate of turn to decrease.

2- increase and rate of turn to increase.

3- decrease and rate of turn to decrease.

4- decrease and rate of turn to increase.

537. The angle of attack at which an airplane stalls

1- will occur at smaller angles of attack flying downwind than when flying upwind.

2- is dependent upon the speed of the airflow over the wings.

3- is a function of speed and density altitude.

4- will remain constant regardless of gross weight.

538. Assume an altimeter is set to 29.84" Hg and the correct altimeter setting is 30.00" Hg. If under these conditions a landing is made at an airport where the field elevation is 772 feet, the altimeter would indicate approximately

1- 932 ft.
2- 160 ft.
3- 612 ft.
4- 772 ft.

539. On a warmer than standard day the pressure level where the altimeter will indicate 4,000 feet would be

1- higher than it would under standard conditions.
2- the same as it would under standard conditions.
3- the same as it would under colder than standard conditions.
4- lower than it would under standard conditions.

540. If a constant indicated altitude and altimeter setting are maintained and the temperature increases, what would be the effect on the true altitude and pressure altitude?

1- Both true altitude and pressure altitude decrease.
2- True altitude remains the same while pressure altitude increases.
3- Both true altitude and pressure altitude increase.
4- True altitude increases while pressure altitude remains the same.

541. If, without adjusting the altimeter setting, a flight is made from an area of high pressure into an area of lower pressure and a constant altitude is maintained, the altimeter would indicate

1- higher than the actual altitude above sea level.
2- lower than the actual altitude above sea level.
3- the actual altitude above sea level.
4- the actual altitude above ground level.

542. If, without adjusting the altimeter setting, a flight is made from an area of low temperature into an area of high temperature and a constant altitude is maintained, the actual altitude of the airplane would be

1- at a level below the standard datum plane.
2- at the same level as the altimeter indicates.
3- higher than the altimeter indicates.
4- lower than the altimeter indicates.

543. If, without adjusting the altimeter setting, a flight is made from an area of low pressure into an area of high pressure and a constant altitude is maintained, the altimeter would indicate

1- higher than the actual altitude above sea level.
2- the actual altitude above ground level.
3- the actual altitude above sea level.
4- lower than the actual altitude above sea level.

544. If, without adjusting the altimeter setting, a flight is made from an area of high temperature into an area of low temperature and a constant altitude is maintained, the actual altitude of the airplane would be

1- lower than the altimeter indicates.
2- at a level below the standard datum plane.
3- at the same level as the altimeter indicates.
4- higher than the altimeter indicates.

545. Precession errors in the attitude indicator are induced by

1- increasing load factors.
2- gravitational forces.
3- 360° turns.
4- skidding turns or when accelerating and decelerating.

546. Which airspeed would a pilot be unable to identify by the color coding of an airspeed indicator?

1- The maximum landing gear extended speed.

2- The maximum flap operating speed.

3- The never-exceed speed.

4- The maximum structural cruising speed.

547. The different colored radials and arcs on the airspeed indicator of a single-engine airplane represent

1- true airspeeds (TAS), which must be observed to avoid structural damage to the aircraft.

2- indicated airspeeds (IAS), which must be observed to avoid structural damage to the aircraft.

3- a means by which a pilot can easily recognize airspeeds which will produce stalls, best angle and best rate of climb, and maneuvering speed.

4- calibrated airspeeds (CAS), which must be observed to avoid possible structural damage to the aircraft.

548. What speed is indicated by the lowest airspeed limit of the white arc on the airspeed indicator?

1- The power-off stalling speed with the gear and flaps in the landing position.

2- The power-on stalling speed with flaps and landing gear retracted.

3- The maximum speed at which to lower full flaps.

4- The maximum speed for flying in turbulent air or for abrupt maneuvers.

549. If the ram air input to the pitot head of the pitot system becomes blocked, the indicated airspeed will generally

1- decrease as altitude is increased.
2- remain unchanged.
3- increase as altitude is increased.
4- drop to zero.

550. If, while on the ground, a sensitive altimeter is set to 29.92" Hg and the ambient pressure is 29.92" Hg, the altimeter will indicate

1- density altitude.
2- zero.
3- field elevation.
4- true altitude.

551. If the ram air input and the drain hole of the pitot system becomes blocked, trapping the pressure in the system, the indicated airspeed will generally

1- vary excessively during level flight when the actual airspeed is varied.

2- decrease during climbs.

3- not change during level flight, even when the actual airspeed is varied by large power changes.

4- increase during descents.

552. If a flight is made from an area of high pressure into an area of low pressure without adjusting the altimeter setting, the actual altitude of the airplane would be

1- at the same level as the altimeter indicates.

2- lower than the altimeter indicates.

3- higher than the altimeter indicates.

4- at a level below the standard datum plane.

553. Which statement is true regarding a sensitive altimeter?

1- The altimeter will assure safe terrain clearance if adjusted to the proper altimeter setting.

2- All aircraft flying at the same indicated altitude with identical altimeter settings will always be at the same true altitude.

3- If corrections are made for nonstandard temperature and pressure, the altimeter will give an accurate indication relative to terrain clearance.

4- The altimeter will indicate accurate altitude above terrain only when operating over flat terrain.

554. Deviation error of the magnetic compass is caused by

1- certain metals and electrical systems within the airplane.

2- the difference in location of true north and magnetic north.

3- acceleration and deceleration.

4- northerly turning error.

555. The compensating magnets of a magnetic compass should be adjusted

1- on not less than 90° increments.
2- with the radio equipment "off."
3- with the engine shut down.
4- with the engine running.

556. Pitot static system errors are generally the greatest in which range of airspeed?

1- Maneuvering speed.
2- High airspeed.
3- Low airspeed.
4- Cruising airspeed.

557. While in a shallow turn, the magnetic compass card

1- continues to rotate in a direction opposite to that of the turn.

2- continues to rotate in the same direction as the turn.

3- remains stationary in relation to the airplane throughout the turn.

4- remains stationary and the airplane rotates around the compass card.

558. What effect would using the alternate source of static pressure (which is vented inside of an unpressurized airplane) have on the airplane instrument indications?

1- The altimeter may indicate higher than the actual altitude being flown.

2- The airspeed indicator may indicate slower than the actual airspeed being flown.

3- The turn needle may become inoperative.

4- The vertical velocity indicator may indicate a continuous descent.

559. The location of the static vent which would provide the most accurate measurement of static pressure under variable flight conditions is one installed

1- in the pitot head which encounters relatively undisturbed air.

2- in the cockpit where it is not influenced by variable angle of attack.

3- on one side of the airplane and covered by a fine screen.

4- on each side of the airplane where the system will compensate for variation of airplane attitude.

560. One of the possible results of using the emergency alternate source of static pressure in an unpressurized airplane is that the

1- altimeter may indicate an altitude lower than the actual altitude being flown.

2- vertical velocity indicator may indicate a continuous descent.

3- altimeter may indicate an altitude higher than the actual altitude being flown.

4- airspeed indicator may indicate less than normal.

561. Which instrument would be affected by low pressure as indicated on the suction gauge?

1- Vertical velocity indicator.
2- Airspeed indicator.
3- Pressure altimeter.
4- Heading indicator.

562. The different colored radials and arcs on the airspeed indicators of single-engine airplanes represent

1- true airspeed (TAS).
2- indicated airspeed (IAS).
3- calibrated airspeed (CAS).
4- equivalent airspeed (EAS).

563. If the static pressure ports iced over while descending from altitude, the airspeed indicator would read

1- zero.
2- high.
3- low.
4- correctly.

564. What is the relationship of density altitude (DA) to pressure altitude (PA) under standard temperature and pressure conditions at any given altitude?

1- DA gradually becomes a lower figure at higher altitudes.

2- DA gradually becomes a higher figure at higher altitudes.

3- DA is equal to PA.

4- DA is never equal to PA at any altitude.

565. Assume an altimeter indicates an altitude of 2,500 feet MSL with an altimeter setting of 29.52" Hg. What is the approximate pressure altitude?

1- 2,900 ft.
2- 2,540 ft.
3- 2,400 ft.
4- 2,100 ft.

566. Assume an altimeter indicates 5,500 feet MSL with an altimeter setting of 30.15" Hg. What is the approximate pressure altitude?

1- 5,730 ft.
2- 5,270 ft.
3- 5,477 ft.
4- 5,523 ft.

567. Assume an altimeter indicates an altitude of 3,500 feet MSL with an altimeter setting of 29.42" Hg. What is the approximate pressure altitude?

1- 4,000 ft.
2- 3,550 ft.
3- 3,450 ft.
4- 3,000 ft.

568. Pilots adjust their altimeters to the same altimeter setting because this

1- eliminates altimeter error due to position of static source.

2- eliminates the need to make in-flight calculations of true altitude.

3- affords accurate terrain clearance in mountainous areas.

4- assures better vertical separation of aircraft.

569. In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the

1- west if a right turn is entered from a north heading.

2- east if a right turn is entered from a north heading.

3- east if a right turn is entered from a south heading.

4- south when the airplane is accelerated on a north heading.

570. The deviation error of a magnetic compass varies

1- the same for all airplanes on all headings.

2- on different headings.

3- according to the geographical location of the airplane.

4- as the airplane accelerates.

571. The deviation error of a magnetic compass varies according to the

1- airplane electrical systems in use.

2- headings being flown, and is the same for all airplanes.

3- geographic location of the airplane.

4- airspeed changes as the airplane accelerates.

572. To determine pressure altitude prior to takeoff, the altimeter should be set to

1- the density altitude corrected for nonstandard temperature.

2- the field elevation and the pressure reading in the altimeter setting window noted.

3- the current altimeter setting.

4- 29.92" Hg and the altimeter indication noted.

573. Under normal conditions, a good crosswind landing on a runway requires that, at the moment of touchdown, the

1- direction of motion of the airplane be parallel to the runway.

2- direction of motion of the airplane and its longitudinal axis be parallel to the runway.

3- upwind wheel should be braked lightly to control the shifting center of gravity.

4- longitudinal axis of the airplane be parallel to the direction of motion of the airplane.

574. Ground looping or loss of directional control after landing is more prevalent in tailwheel airplanes than in nosewheel airplanes because the

1- center of gravity shifts forward on landing in the tailwheel airplane.

2- tailwheel airplane has a greater rudder and vertical stabilizer surface.

3- center of gravity attempts to move in the same direction that the wheels are pointed in the tailwheel type airplane.

4- center of gravity is aft of the main landing gear in the tailwheel airplane.

575. During the takeoff and landing roll in a crosswind, most tailwheel type airplanes have a greater tendency to "weathervane" than nosewheel type airplanes because the tailwheel types generally have

1- a higher angle of attack on the upwind wing.

2- more surface exposed to the wind behind the main wheels.

3- a greater gyroscopic reaction to the engine rotation.

4- the center of gravity located forward of the main wheels.

576. What would be the result if the same indicated airspeed is used on final approach and landing at a high elevation airport as that used when landing at a sea level airport?

1- The true airspeed will be slower and the ground roll less at the high elevation airport than at the sea level airport.

2- The groundspeed will be faster and the ground roll greater at the high elevation airport than at the sea level airport.

3- The groundspeed and the ground roll will be the same at both the sea level airport and the high elevation airport.

4- The true airspeed and the ground roll will be the same at both the sea level airport and the high elevation airport.

577. Assume an altimeter indicates an altitude of 2,100 feet MSL with an altimeter setting of 30.12" Hg. What is the approximate pressure altitude?

1- 2,300 ft.
2- 1,900 ft.
3- 2,080 ft.
4- 2,180 ft.

578. Assume that an airplane is flying at a constant-power setting and at a constant-indicated altitude. As a result of an increase in the outside air temperature, the true airspeed will

1- increase and the true altitude will increase.

2- increase thd the true altitude will decrease.

3- decrease and the true altitude will decrease.

4- decrease and the true altitude will increase.

579. Which statement is true regarding airplane weight and maximum distance glide speed?

1- Glide distance for an airplane is a fixed value and does not change.

2- A change in airplane weight will not require a change in the maximum distance glide speed.

3- A decrease in airplane weight would require an increase in the maximum distance glide speed.

4- A decrease in airplane weight would require a decrease in maximum distance glide speed.

580. The correct airspeed during a power approach to a short-field landing may be verified by

1- the ability to land on a predetermined spot.

2- the ability to maintain a constant angle of descent.

3- little or no floating during the landing flare.

4- immediate response to control usage.

581. A pilot who continuously changes his visual focus from a distance that is too far to a point too close to the aircraft during landing practice, may tend to

1- fail to keep his airspeed at a constant value on the approach.

2- fly into the ground.

3- level off high.

4- overcontrol just prior to touchdown.

582. Which statement is true regarding takeoffs during cold weather?

1- Engine cowl flaps should be closed during all cold weather operations.

2- The engine develops less power during cold weather, and therefore requires a longer takeoff distance.

3- An engine might develop more than the rated power, even though the RPM and MP limits are not exceeded.

4- The use of carburetor heat during takeoff in cold weather is not advisable under any circumstances.

583. Unless the engine manufacturer has recommended the use of low lead gasoline, the use of this gasoline

1- should be avoided because of possible excessive engine wear.

2- is permissible and encouraged as a means to decrease air pollution.

3- should be limited because of its high power output.

4- is permissible only if the grade of fuel is the same as that recommended.

584. To minimize the side loads placed on the landing gear during touchdown the pilot should keep the

1- direction of motion of the airplane parallel to the runway.

2- downwind wing lowered sufficiently to eliminate the tendency for the airplane to drift.

3- longitudinal axis of the airplane parallel to the direction of its motion.

4- airplane headed sufficiently into the crosswind so that the direction of motion of the airplane is parallel to the runway.

585. With regard to the technique required for a crosswind correction on takeoff, a pilot should use

1- aileron pressure into the wind and initiate the lift-off at a normal airspeed in both tailwheel and nosewheel type airplanes.

2- rudder as required to maintain directional control, aileron pressure into the wind, and higher than normal lift-off airspeed in both conventional and nosewheel type airplanes.

3- right rudder pressure, aileron pressure into the wind, and higher than normal lift-off airspeed in both tricycle and conventional gear airplanes.

4- normal takeoff technique with a nosewheel type airplane, but use the technique described in response "2" when flying a tailwheel type airplane.

586. For takeoff, the blade angle of a controllable pitch propeller should be set at an angle which produces

1- equal pressure on each side of each blade.

2- a small angle of attack.

3- a large angle of attack.

4- high drag forces on that propeller.

587. During takeoff, when maximum power and thrust are required, the propeller blade angle of a constant-speed propeller should be set to an angle which will produce a

1- small angle of attack with respect to its relative wind.

2- large angle of attack with respect to its relative wind.

3- low slipstream velocity.

4- low RPM.

588. What is one function of wing flaps when lowered during a landing approach?

1- Flaps permit the airplane to approach at a higher indicated airspeed.

2- Flaps decrease the angle of the approach path.

3- Flaps increase airplane maneuverability.

4- Flaps increase the angle of descent without increasing the indicated airspeed.

589. The maximum speed at which an airplane may be stalled, without imposing structural damage is called the

1- design maneuvering speed.

2- maximum structural cruising speed.

3- never-exceed speed.

4- power-off stalling speed with the gear and flaps in the landing position.

590. Which will occur if full deflection of flight controls is applied when the airplane is flown at or below design maneuvering speed?

1- The airplane will not stall as rapidly, giving an increase in safety.

2- The airplane will stall before the load factor becomes excessive.

3- Vertical gusts will decrease the angle of attack, thus preventing stalls.

4- The effectiveness of the controls will be increased.

591. If severe turbulence is encountered, the airplane should be flown at

1- a speed equal to 1.2 times Vso.

2- any speed within the range of the green arc.

3- maximum structural cruising speed.

4- design maneuvering speed.

592. A downwind turn near the ground is hazardous because it places the pilot in

1- a position where turbulence created by surface friction causes aircraft to stall.

2- an unfavorable position if a forced landing becomes necessary.

3- a position where it is difficult to maintain a constant altitude.

4- a position where unintentional stalls occur because of decreased groundspeed as the turn progresses.

593. A pilot's most immediate and vital concern in the event of complete power failure after becoming airborne on takeoff, is

1- gaining altitude quickly.
2- turning back to the takeoff field.
3- landing directly into the wind.
4- maintaining a safe airspeed.

594. The indicated airspeed on the final approach to a landing should be faster than normal when

1- atmospheric conditions are below standard.

2- landing at airports above 5,000 feet MSL.

3- making a power approach.

4- turbulent conditions exist.

595. To develop maximum power and thrust, a constant-speed propeller should be set to a blade angle which will produce a

1- large angle of attack and low RPM.
2- small angle of attack and high RPM.
3- large angle of attack and high RPM.
4- small angle of attack and low RPM.

596. Which of the following procedures would minimize retractable landing gear accidents?

1- On all landings, use a moderate amount of power until the landing gear touches the surface.

2- After landing, park and shut down engine before activating any switches or levers.

3- Refrain from using brakes on landing roll.

4- Complete the landing roll and turn off the runway before activating any switches or levers.

597. Airplane metal propeller blade failure is usually caused by

1- warping of the blade after the blade was placed into service.

2- fatigue cracks that formed after the blade was placed into service.

3- material defects existing before the blade was put into service.

4- surface discontinuities existing before the blade was put into service.

598. If necessary to take off from a slushy runway, the freezing of landing gear mechanisms can be minimized by

1- retracting the gear immediately to prevent freezing.

2- delaying gear retraction.

3- increasing the airspeed to Vle before retraction.

4- recycling the gear.

599. Which of the following procedures would minimize the possibility of gear up landings?

1- Requesting the control tower to verify that the landing gear is down.

2- Committing prelanding procedures to memory.

3- Checking for a gear horn sound by closing the throttle while on final approach.

4- Completing a prelanding checklist.

600. While taxiing a light, high-wing airplane during strong quartering tailwinds, the aileron control (wheel or stick) should be positioned

1- toward the direction from which the wind is blowing.

2- neutral at all times.

3- opposite the direction from which the wind is blowing.

4- neutral, except when making turns into the wind.

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