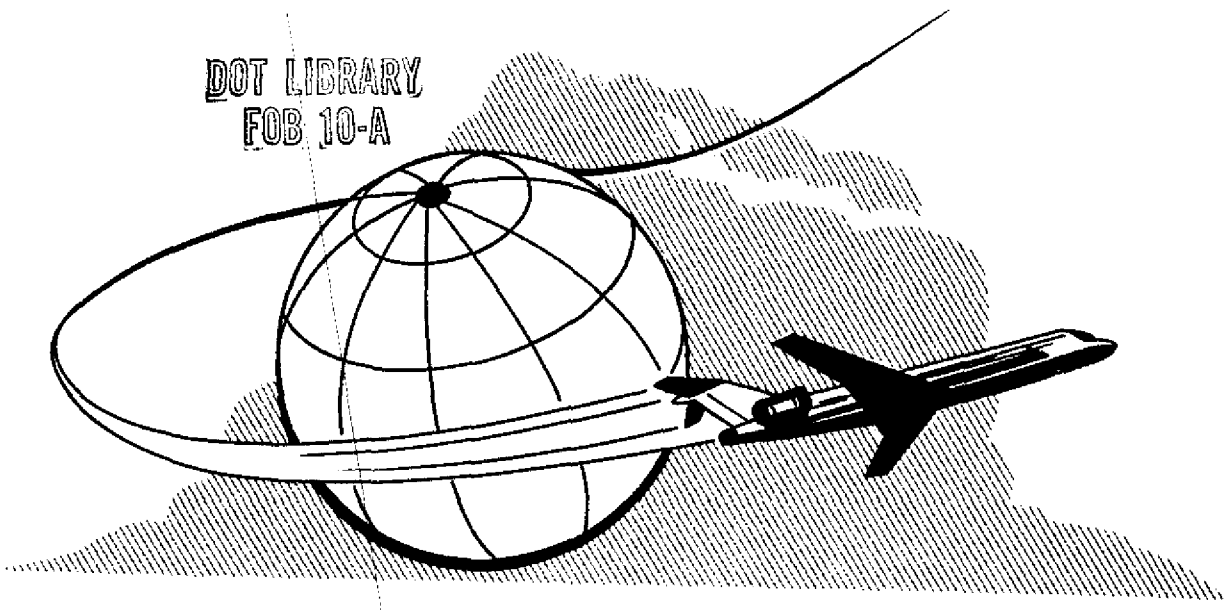
AC 61-18E

AIRLINE TRANSPORT PILOT - AIRPLANE



WRITTEN TEST GUIDE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIRLINE TRANSPORT PILOT (AIRPLANE) WRITTEN TEST GUIDE

REVISED 1977

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
FLIGHT STANDARDS SERVICE

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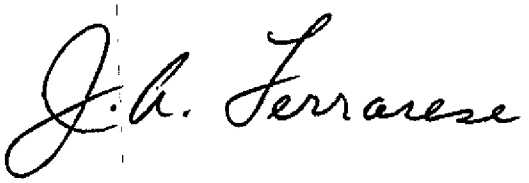
PREFACE

This written test guide was prepared by the Flight Standards Service of the Federal Aviation Administration to assist applicants who are preparing for the Airline Transport Pilot (Airplane) Written Test. It supersedes AC 61–18D, Airline Transport Pilot (Airplane) Written Test Guide, dated 1975.

This guide briefly explains the need for comprehensive instruction and describes the basic aeronautical knowledge and associated requirements for certification. Information on source material that may be used to acquire essential knowledge in the various subject areas is also included. Further, it provides the instructions for taking the official test as well as the questions representative of those from which the FAA makes selections in composing that test. The questions given in this guide are predicated on regulations, principles, and practices that were valid at the time of publication. Consequently, the questions in the official test, whenever updated, may vary somewhat from those contained in this guide.

The written test places major emphasis on requirements relating to airline operations. Pilots wishing to obtain the Airline Transport Pilot (Airplane) Certificate only for its advantage to them in their line of aviation activity must expect to be examined on the same basis as an applicant seeking the certificate for use as an airline pilot.

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



J. A. FERRARESE
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Flight Standards Service

CONTENTS

	Page
Preface	i
Contents	iii
Introduction	1
Eligibility Requirements for Certificate	1
The Written Test	3
Study Materials	4
Aeronautical Knowledge Covered by the Written Test	7

Appendix 1

Test Questions	1

Appendix 2

Legend—Instrument Approach Procedures (Charts)	121
Legend—Instrument Approach Procedures (Charts)	121
Legend—Approach Lighting Systems	122
Legend—SID and STAR Charts	123
Aircraft Approach Categories	124
Inoperative Components or Visual Aids Table	124
Legend—Enroute High Altitude Chart	125
Legend—Enroute High Altitude Chart	126
Legend—Enroute Low Altitude Chart	127
Legend—Enroute Low Altitude Chart	128
Relation of Temperature to ISA	129
Physiological Training	130
Definitions	131
Question Selection Sheet	133
Test Answer Sheet	134
Flight Time Analysis Worksheet	135
Order Blank	137

AIRLINE TRANSPORT PILOT (AIRPLANE) WRITTEN TEST GUIDE

INTRODUCTION

The Federal Aviation Administration has adopted the "question book" concept for use in determining an applicant's knowledge in the Airline Transport Pilot (Airplane) certification area.

At the testing center, the applicant is issued a question book containing over six hundred questions, an eighty-item question selection sheet which indicates the specific questions to be answered, and an Airman Written Test Application (AC Form 8080–3) which contains the answer sheet. The question book includes all the supplementary material required to answer the test questions. Supplementary material, such as a performance chart, will normally be found within one page of the question with which it is associated. Where this is not practicable, page reference numbers will be given. Chart legends and other pertinent reference materials are contained in the Appendix of the question book.

This guide includes questions which are representative of those in the question book. The Subject Matter Outline (SMO) reference code for each question appears directly below each question number. This SMO code, and the Subject Matter Outline which appears in the Appendix, will enable the applicant to readily identify the reference upon which each question is based. A sample 80-item question selection sheet is included in the Appendix, along with an example of the answer sheet used by the applicant for the official test.

It should be emphasized that a written test merely *samples* an applicant's knowledge in a particular area. The objective of Section 61.153 is to ensure that the applicant has the knowledge required for competent performance as an Airline Transport Pilot in airplanes. A careful study of *all* the questions contained in this guide along with the *associated reference material* will give the applicant this broad knowledge base.

ELIGIBILITY REQUIREMENTS FOR CERTIFICATE

The following excerpts from the Federal Aviation Regulations, Part 61, pertaining to eligibility, are given for the convenience of the applicant.

"§ 61.151 Eligibility requirements: general.

To be eligible for an airplane transport pilot certificate, a person must—

(a) Be at least 23 years of age;

(b) Be of good moral character;

(c) Be able to read, write, and understand the English language and speak it without accent or impediment of speech that would interfere with two-way conversation;

(d) Be a high school graduate, or its equivalent in the Administrator's opinion, based on the applicant's general experience and aeronautical experience, knowledge, and skill;

(e) Have a first-class medical certificate issued under Part 67 of this chapter within the 6 months before the date he applies; and

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

"§ 61.153 Airplane rating: aeronautical knowledge.

An applicant for an airline transport pilot certificate with an airplane rating must, after meeting the requirements of §§ 61.141 (except paragraph (a) thereof) and 61.145, pass a written test on—

(a) The sections of this Part relating to airline transport pilots and Part 121, subpart C of Part 65, and §§ 91.1 through 91.9 and subpart B of Part 91 of this chapter, and so much of Parts 21 and 25 of this chapter as relate to the operations of air carrier aircraft;

(b) The fundamentals of air navigation and use of formulas, instruments, and other navigational aids, both in aircraft and on the ground, that are necessary for navigating aircraft by instruments;

(c) The general system of weather collection and dissemination;

(d) Weather maps, weather forecasting, and weather sequence abbreviations, symbols, and nomenclature;

(e) Elementary meteorology, including knowledge of cyclones as associated with fronts;

(f) Cloud forms;

(g) National Weather Service Federal Meteorological Handbook No. 1, as amended;

(h) Weather conditions, including icing conditions and upper-air winds, that affect aeronautical activities;

(i) Air navigation facilities used on Federal airways, including rotating beacons, course lights, radio ranges, and radio marker beacons;

(j) Information from airplane weather observations and meteorological data reported from observations made by pilots on air carrier flights;

(k) The influence of terrain on meteorological conditions and developments, and their relation to air carrier flight operations;

(l) Radio communication procedure in aircraft operations; and

(m) Basic principles of loading and weight distribution and their effect on flight characteristics."

"§ 61.155 Airplane rating: aeronautical experience.

(a) An applicant for an airline transport pilot certificate with an airplane rating must hold a commercial pilot certificate or a foreign airline transport pilot or commercial pilot license without limitations, issued by a member state of ICAO, or he must be a pilot in an Armed Force of the United States whose military experience qualifies him for a commercial pilot certificate under § 61.31 of this Part.

(b) An applicant must have had—

(1) At least 250 hours of flight time as pilot in command of an airplane, or as copilot of an airplane performing the duties and functions of a pilot in command under the supervision of a pilot in command, or any combination thereof, at least 100 hours of which were cross-country time and 25 hours of which were night flight time; and

(2) At least 1500 hours of flight time as a pilot, including at least—

(i) 500 hours of cross-country flight time;

(ii) 100 hours of night flight time; and

(iii) 75 hours of actual or simulated instrument time, at least 50 hours of which were in actual flight.

Flight time used to meet the requirements of subparagraph (1) of this paragraph may also be used to meet the requirements of subparagraph (2) of this paragraph. Also, an applicant who has made at least 20 night takeoffs and landings to a full stop may substitute one additional night takeoff and landing to a full stop for each hour of night flight time required by subparagraph (2)(ii) of this paragraph. However, not more than 25 hours of night flight time may be credited in this manner.

(c) If an applicant with less than 150 hours of pilot-in-command time otherwise meets the requirements of paragraph (b)(1) of this section, his certificate will be endorsed "Holder does not meet the pilot-in-command flight experience requirements of ICAO", as prescribed by Article 39 of the "Convention on International Civil Aviation". Whenever he presents satisfactory written evidence that he has accumulated the 150 hours of pilot-in-command time, he is entitled to a new certificate without the endorsement.

(d) A commercial pilot may credit toward the 1500 hours total flight time requirement of subparagraph (b)(2) of this section the following flight time in operations conducted under Part 121 of this chapter:

(1) All second-in-command time acquired in airplanes required to have more than one pilot by their approved Aircraft Flight Manuals or airworthiness certificates; and

(2) Flight engineer time acquired in airplanes required to have a flight engineer by their approved Aircraft Flight Manuals, while participating at the same time in an approved pilot training program approved under Part 121 of this chapter.

However, the applicant may not credit under subparagraph (2) of this paragraph more than 1 hour for each 3 hours of flight engineer flight time so acquired, nor more than a total of 500 hours.

(e) If an applicant who credits second-in-command or flight engineer time under paragraph (d) of this section toward the 1500 hours total flight time requirement of subparagraph (b)(2) of this section—

(1) Does not have at least 1200 hours of flight time as a pilot including no more than 50 percent of his second-in-command time and none of his flight engineer time; but

(2) Otherwise meets the requirements of subparagraph (b)(2) of this section,

his certificate will be endorsed "Holder does not meet the pilot flight experience requirements of ICAO", as prescribed by Article 39 of the "Convention on International Civil Aviation." Whenever he presents satisfactory evidence that he has accumulated 1200 hours of flight time as a pilot including no more than 50 percent of his second-in-command time and none of his flight engineer time, he is entitled to a new certificate without the endorsement.

(f) Until July 22, 1970, an applicant for an airline transport pilot certificate (airplane rating) may meet the aeronautical experience requirements in effect either on, or before, November 22, 1969."

THE WRITTEN TEST

Questions and Scoring

The official test questions are of the multiple-choice type. Answers to questions listed on the question selection sheet should be marked on the answer sheet of the Airman Written Application (AC Form 8080–3). Directions should be read carefully before beginning the test. Incomplete or erroneous personal information entered on this form delays the scoring process.

The answer sheet is sent to the FAA Aeronautical Center in Oklahoma City where it is scored by a computer to indicate by code, the knowledge areas in which the applicant is found to be deficient. A written test Subject Matter Outline, which lists these knowledge areas by code, is enclosed with the Airman Written Test Report (AC 8080–2). The applicant must present this report for a flight test, or for retesting in the event of written test failure.

Taking the Test

The written test may be taken at FAA Flight Standards District Offices and other designated places. After completing the test, the applicant must surrender the question book, question selection sheet, answer sheet, and any papers used for computations or notations, to the proctor before leaving the test room.

When taking the test, the applicant should keep the following points in mind:

1. Answer each question in accordance with the latest regulations and procedures.
2. Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
3. After formulating an answer, determine which of the alternatives most nearly corresponds with that answer. The answer chosen should completely resolve the problem.
4. From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete or are derived from popular misconceptions.
5. If a certain question is difficult for you, it is best to proceed to other questions. After the less difficult questions have been answered, return to those which gave you difficulty. Be sure to indicate on the question selection sheet the questions to which you wish to return.
6. When solving a computer problem, select the answer nearest your solution. The problem has been checked with various types of computers; therefore, if you have solved it correctly, your answer will be closer to the correct answer than to any of the other choices.
7. Enter personal data in appropriate spaces on the test answer sheet in a complete and legible manner to aid in scoring. The test number is printed on the question selection sheet. It is *not the number* on the question book.

Retesting—FAR 61.49

Applicants who receive a failing grade, may apply for retesting by presenting their Airman Written Test Report, AC Form 8080–2—

(1) after 30 days from the date the applicant failed the test; or,

(2) in case of the first failure, the applicant may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that the instructor has given ground instruction to the applicant and finds the applicant competent to pass the test.

STUDY MATERIALS

Individuals preparing for the Airline Transport Pilot (Airplane) Written Test will find the following list of publications and materials helpful. Textbooks and other reference materials are available from many commercial publishers. It is the responsibility of each applicant to obtain appropriate study materials.

AIRMAN'S INFORMATION MANUAL (AIM) (SUP'T. Doc's.)

This publication presents, in five parts, information necessary for the planning and conduct of a flight in the National Airspace System. It is designed to be used in the cockpit for preflight and inflight operations by pilots and contains both instructional and procedural information. The subscription consists of:

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

Part 2—Airport Directory. Issued semiannually.

Part 3—Operational Data. Issued every 56 days.

Part 3A—Notices to Airmen. Issued every 14 days.

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

FEDERAL AVIATION REGULATIONS (FARs) (SUP'T. Doc's.)

Part 1, Definitions and Abbreviations

Part 61, Certification: Pilots and Flight Instructors

Part 65, Certification: Airmen Other than Flight Crewmembers

Part 91, General Operating and Flight Rules

Part 121, Certification and Operation: Air Carriers and Commercial Operators of Large Aircraft

ADVISORY CIRCULARS

00-6A—*Aviation Weather*

Provides an up-to-date and expanded text for pilots and other flight operations personnel whose interest in meteorology is primarily in its application to flying. (Sup't. Doc's.)

00-24—*Thunderstorms*

Contains information concerning flights in or near thunderstorms. (Free from FAA)

00-30—*Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence*

Brings to the attention of pilots and other interested personnel, the "Rule of Thumb" for avoiding or minimizing encounters with clear air turbulence (CAT). (Free from FAA)

00-45A—*Aviation Weather Services*

Supplements AC 00-6A, Aviation Weather, in that it explains the weather service in general and the use and interpretation of reports, forecasts, weather maps, and prognostic charts in detail. Is an excellent source of study for pilot certification examinations. (Sup't. Doc's.)

00-50—*Low Level Wind Shear*

Provides guidance for recognizing the meteorological situations that produce the phenomenon widely known as low level wind shear. (Free from FAA)

20-32B—*Carbon Monoxide (CO) Contamination in Aircraft—Detection and Prevention*

Provides information on the potential dangers of carbon monoxide contamination from faulty engine exhaust systems or cabin heaters of the exhaust gas heat exchanger type. (Free from FAA)

60-4—*Pilot's Spatial Disorientation*

Acquaints pilots flying under visual flight rules with the hazards of disorientation caused by the loss of reference with the natural horizon. (Free from FAA)

61-27B—*Instrument Flying Handbook*

Provides the pilot with basic information needed to acquire an FAA instrument rating. It is designed for the reader who holds at least a private pilot certificate and is knowledgeable in all areas covered in the "Pilot's Handbook of Aeronautical Knowledge." (Sup't. Doc's.)

61-77—*Airline Transport Pilot Airplane Practical Test Guide*

Designed to assist the applicant and his instructor in preparing for the Airline Transport Pilot Certificate with an Airplane Rating under FAR Part 61 (revised). (Sup't. Doc's.)

90-1A—*Civil Use of U.S. Government Produced Instrument Approach Charts*

Clarifies landing minimums requirements and revises instrument approach charts. (Free from FAA)

90-12B—*Severe Weather Avoidance*

Warns all pilots concerning flight in the vicinity of known or forecasted severe weather, severe turbulence and hail and advises them that air traffic control facilities, even though equipped with radar, might not always have the capability nor be in a position to provide assistance for circumnavigation of areas of severe weather. (Free from FAA)

90-14A—*Altitude-Temperature Effect on Aircraft Performance*

Introduces the Denalt Performance Computer and reemphasizes the hazardous effects density altitude can have on aircraft. (Free from FAA)

90-23D—*Wake Turbulence*

Alerts pilots to the hazards of aircraft trailing vortex wake turbulence and recommends related operational procedures. (Free from FAA)

90-54A—*Cruise Clearances*

Provides the aviation community guidance when operating under a "cruise" clearance. (Free from FAA)

90-60—*Weather Observation Reporting Obscured or Partially Obscured Sky Condition*

Provides pilots with information concerning weather conditions reported by weather observers as obscuration or partial obscuration. (Free from FAA)

90-62—*Flying DME Arcs*

Describes the procedures and techniques for intercepting DME arcs from radials, maintaining DME arcs, and intercepting radials and localizers from DME arcs. (Free from FAA)

90-64—*Automated Radar Terminal System (ARTS) III*

Advises the aviation community of the capabilities of the Automated Radar Terminal System and the associated services provided by ARTS III equipped air traffic control facilities. (Free from FAA)

91-6—*Water, Slush, and Snow on the Runway*

Provides background and guidelines concerning the operation of turbojet aircraft with water, slush, and/or snow on the runway. (Free from FAA)

91.11-1—*Guide to Drug Hazards in Aviation Medicine*

Lists all commonly used drugs by pharmacological effect on airmen with side effects and recommendations. (Sup't. Doc's.)

91-23—*Pilot's Weight and Balance 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. Progresses from an explanation of basic fundamentals to the complete application of weight and balance principles in large aircraft operations. (Sup't. Doc's.)

91-24—*Aircraft Hydroplaning or Aquaplaning on Wet Runways*

Provides information on the problem of aircraft tires hydroplaning on wet runways. (Free from FAA)

91-25A—*Loss of Visual Cues During Low Visibility Landings*

Provides information concerning the importance of maintaining adequate visual cues during the descent below MDA or DA. (Free from FAA)

91-43—*Unreliable Airspeed Indications*

Alerts pilots to the possibility of erroneous airspeed/Mach indications that may be caused by blocking or freezing of the pitot system and advises of corrective action that can be taken. (Free from FAA)

95-1—*Airway and Route Obstruction Clearance*

Advises all interested persons of the airspace areas within which obstruction clearance is considered in the establishment of Minimum En Route Instrument Altitudes (MEA's) for publication in FAR Part 95. (Free from FAA)

120–5—*High Altitude Operations in Areas of Turbulence*

Recommends procedures for use by jet pilots when penetrating areas of severe turbulence. (Free from FAA)

120–28A—*Criteria for Approval of Category IIIa Landing Weather Minima*

States an acceptable means, not the only means, for obtaining approval of Category IIIa minima and the installation approval of the associated airborne systems. (Free from FAA)

120–29—*Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators*

Sets forth criteria used by FAA in approving turbojet landing minima of less than 300–¾ or RVR 4,000 (Category I) and Category II minima for all aircraft. (Free from FAA)

121–12—*Wet or Slippery Runways*

Provides uniform guidelines in the application of the "wet runway" rule by certificate holders operating under FAR 121. (Free from FAA)

121–18—*Aviation Security—Carriage of Weapons and Escorted Persons*

Provides information and guidance for the implementation of amendments to FAR Part 121 regarding the carriage of weapons on aircraft and for the carriage of persons in the custody of law enforcement officers. (Free from FAA)

121.195(d)–1—*Alternate Operational Landing Distances for Wet Runways; Turbojet Powered Transport Category Airplanes*

Sets forth an acceptable means, but not the only means, by which the alternate provision of section 121.195(d) may be met. (Free from FAA)

AERONAUTICAL KNOWLEDGE COVERED BY THE WRITTEN TEST

FAR PART 1: DEFINITIONS AND ABBREVIATIONS

- A10 General definitions (1.1)
- A20 Abbreviations; symbols (1.2)

FAR PART 61: CERTIFICATION: PILOTS AND FLIGHT INSTRUCTORS

Subpart A — General

- B10 Requirements: certificates; ratings (61.3)
- Duration:
  - B11 CAT II pilot authorization (61.21)
  - B12 medical certificates (61.23)
- B13 Pilot logbooks: logging flight time (61.51)
- B14 Recent flight experience: pilot in command; instrument (61.57)

Subpart B — Aircraft Ratings and Special Certificates

- B20 Category II pilot authorization (61.67)

Subpart F — Airline Transport Pilots

- B30 Eligibility (61.151)
- B31 Airplane rating: aeronautical
  - knowledge (61.153)
  - experience (61.155)
  - skill (61.157)
- B32 Instruction in air transportation service (61.169)
- B33 General privileges; limitations (61.171)

FAR PART 65: CERTIFICATION: AIRMAN OTHER THAN FLIGHT CREWMEMBERS

Subpart C — Aircraft Dispatchers

- C10 Certificate required (65.51)
- C11 Eligibility requirement: general (65.53)
- C12 Knowledge requirements (65.55)
- C13 Experience requirements (65.57)
- C14 Skill requirements (65.59)

FAR PART 91: GENERAL OPERATING AND FLIGHT RULES

Subpart A — General

- D10 Pilot in command: responsibility; authority (91.3)
- D11 Preflight action (91.5)
- D12 Category II operation; general operating rules (91.6)
- D13 Flight crewmembers at stations (91.7)
- D14 Interference with crewmembers (91.8)
- D15 Fuel requirements: IFR conditions (91.23)
- D16 ATC transponder equipment (91.24)
- D17 VOR equipment check (IFR) (91.25)
- D18 Authorization: ferry flight; one engine inoperative (91.45)

Subpart B — Flight Rules

- D20 Aircraft speed (91.70)
- D21 ATC clearances; instructions (91.75)
- D22 ATC light signals (91.77)
- D23 Flight plan; information required (91.83)
- D24 Operations at airports: with operating control towers (91.87)
- D25 Operations at airports: without control towers (91.89)
- D26 Terminal Control Areas (91.90)
- D30 Weather minimums: basic VFR (91.105)
- D31 Weather minimums: special VFR (91.107)
- D32 VFR cruising altitudes; flight levels (91.109)
- D40 ATC clearance, flight plan required (IFR) (91.115)
- D41 Takeoff and landing (IFR): general (91.116)
- D42 Limitations on use of IAP (91.117)
- D43 Minimum altitudes (IFR) (91.119)
- D44 Cruising altitudes or flight levels (IFR) (91.121)
- D45 Radio communications (IFR) (91.125)
- D46 Two-way communications failure (IFR) (91.127)
- D47 Operation in controlled airspace (IFR) malfunction reports (91.129)

Appendix A — Category II Operations

- D50 Required instruments; equipment (App. A, 2)
- D51 Instruments; equipment approval (App. A, 3)
- D52 Maintenance program (App. A, 4)

FAR PART 121: DOMESTIC, FLAG, AND SUPPLEMENTAL AIR CARRIERS AND COMMERCIAL OPERATORS OF LARGE AIRCRAFT

Subpart I — Airplane Performance and Operating Limitations

- E10 Applicability (121.171)
- E11 Reciprocating engine powered-transport category: takeoff limitations—all engines operating (121.177)
- E12 Enroute limitations—one engine inoperative (121.179)
- E13 Landing limitations—destination (121.185)
- E14 Landing limitations—alternate airports (121.187)
- E15 Turbine engine powered-transport category: takeoff limitations (121.189)
- E16 Enroute limitations (one engine inoperative) (121.191)
- E17 Enroute limitations (two engines inoperative) (121.193)
- E18 Landing limitations; destination; alternate airports (121.195, .197)
- E19 Carriage of cargo-passenger compartment (121.285)
- E20 Demonstration of emergency evacuation procedures (121.291)

Subpart K — Instrument and Equipment Requirements

- E30 Flight; navigational equipment (121.305)
- E31 Emergency equipment (121.309)
- E32 Additional emergency equipment (121.310)
- E33 Seat and safety belts (121.311)
- Supplemental oxygen-reciprocating engine powered airplanes:
  - E34 unpressurized cabin (121.327)
  - E35 pressurized cabin (121.331)
- E36 Supplemental oxygen for sustenance: turbine engine powered airplanes (121.329)
- E37 Supplemental oxygen for emergency descent; first aid (121.333)
- E38 Emergency equipment for extended overwater operations (121.339)
- E39 Emergency flotation means (121.340)
- E40 Flight recorders (121.343)
- Radio equipment (VFR):
  - E41 routes navigated by pilotage (121.347)
  - E42 routes not navigated by pilotage; IFR over-the-top (121.349)
- E43 Airborne weather radar equipment requirements (121.357)
- E44 Cockpit voice recorders (121.359)
- E45 Ground proximity warning-glide slope deviation alerting system (121.360)

Subpart M — Airman and Crewmember Requirements

- F10 Composition of flight crew (121.385)
- F11 Flight attendants (121.391)

Subpart N — Training Program

- F20 Applicability and terms used (121.400)
- F21 Training program: general (121.401)
- F22 Crewmember emergency training (121.417)

Subpart O — Crewmember Qualifications

- F30 General (121.432)
- F31 Handling, carriage of dangerous articles (121.433a)
- F32 Operating experience (121.434)
- F33 Pilot qualification: certificates required (121.437)
- F34 Recent experience (121.439)
- F35 Line checks (121.440)
- F36 Proficiency checks (121.441)
- Pilot in command qualification-routes; airports:
  - F37 domestic; flag (121.443)
  - F38 supplemental; commercial (121.445)
- F39 Pilot route; airport qualifications for particular trips: domestic; flag (121.447)

Subpart P — Aircraft Dispatcher Qualifications and Duty Time Limitations: Domestic and Flag Air Carriers

- F40 Aircraft dispatcher qualifications (121.463)
- F41 Duty time limitations: domestic; flag (121.465)

Subpart Q — Flight Time Limitations: Domestic Air Carriers

- G10 All flight crewmembers (121.471)

Subpart R — Flight Time Limitations: Flag Air Carriers

- G20 One or two pilot crews (121.481)
- G21 Two pilots; one additional flight crewmember (121.483)
- G22 Three or more pilots; one additional flight crewmember (121.485)
- G23 Other commercial flying (121.489)

Subpart S — Flight Time Limitations: Supplemental Air Carriers and Commercial Operators

- G30 Pilots—airplanes (121.503)

G31 Two pilot crews—airplanes (121.505)
G32 Three pilot crews—airplanes (121.507)
G33 Four pilot crews—airplanes (121.509)
G34 All airmen—airplanes (121.515)
G35 Other commercial flying—airplanes (121.517)
G36 Crew of two pilots; one additional airman (121.521)
G37 Crew of three or more pilots, additional airmen (121.523)
G38 Pilots serving in more than one kind of flight crew (121.525)

Subpart T — Flight Operations

Responsibility for operational control:
H10 domestic (121.533)
H11 flag (121.535)
H12 supplemental; commercial (121.537)
H13 Aircraft security (121.538)
H14 Flight crewmembers at controls (121.543)
H15 Manipulation of controls (121.545)
H16 Admission to flight deck (121.547)
H17 Admission to pilot's compartment-air carrier inspector (121.548)
H18 Flying equipment (121.549)
H19 Admission to flight deck-Secret Service Agents (121.550)
Emergencies:
H20 domestic; flag (121.557)
H21 supplemental; commercial (121.559)
H22 Reporting: potentially hazardous meteorological conditions/irregularities of ground/navigation facilities (121.561)
H23 mechanical irregularities (121.563)
H24 engine inoperative—landing (121.565)
H25 Instrument approach procedures (IFR) (121.567)
H26 Briefing passengers before takeoff (121.571)
H27 Briefing passengers — extended overwater operations (121.573)
H28 Alcoholic beverages (121.575)
H29 Minimum altitudes for use of automatic pilot (121.579)
H30 Forward observer's seat—enroute inspections (121.581)
H31 Carriage of person in custody of law enforcement personnel (121.584)
H32 Carriage of weapons (121.585)
H33 Closing; locking of flight crew compartment door (121.587)
H34 Carry-on baggage (121.589)

Subpart U — Dispatching and Flight Release Rules

I10 Dispatching authority—domestic (121.593)
I11 Dispatching authority—flag (121.595)
I12 Flight release authority—supplemental; commercial (121.597)
I13 Aircraft dispatcher information to PIC; domestic; flag (121.601)
I14 Facilities; services—supplemental; commercial (121.603)
I15 Communication; navigation facilities: domestic, flag (121.607)
I16 Communication; navigation facilities: supplemental; commercial (121.609)
I17 Dispatch or flight release—under VFR (121.611)
I18 Dispatch or flight release—IFR or over-the-top (121.613)
I19 Dispatch or flight release—over water, flag; supplemental; commercial (121.615)
Alternate airport:
I20 for departure (121.617)
I21 for destination, IFR or over the top, domestic (121.619)
I22 for destination: flag (121.621)
I23 for destination: IFR or over the top, supplemental; commercial (121.623)
I24 Alternate airport weather minimums (121.625)
I25 Continuing flight in unsafe conditions (121.627)
I26 Operation in icing conditions (121.629)
I30 Original dispatch or flight release (amendment) (121.631)
I31 Dispatch to/from provisional airports—domestic (121.633)
I33 Dispatch to/from refueling or provisional airports—flag (121.635)
I34 Takeoffs from unlisted; alternate airports—domestic; flag (121.637)
Fuel supply—all operations:
I40 domestic (121.639)
I41 nonturbine; turbopropeller-powered airplanes: flag (121.641)
I42 supplemental; commercial (121.643)
I43 turbine-engine-powered airplanes other than turbopropeller: flag; supplemental; commercial (121.645)
I44 Factors for computing fuel required (121.647)
Takeoff, landing weather minimums;
I45 VFR—domestic (121.649)
I46 IFR—domestic; flag (121.651)
I47 IFR—supplemental; commercial (121.653)
I48 Landing weather minimums, IFR—all certificate holders (121.652)
I49 Applicability of reported weather minimums (121.655)
I50 Flight altitude rules (121.657)
Initial approach altitude:
I51 domestic; supplemental, commercial (121.659)
I52 flag (121.661)
I60 Responsibility for dispatch release—domestic; flag (121.663)
I61 Load manifest (121.665)
I62 Flight plan: VFR, IFR — supplemental; commercial (121.667)

Subpart V — Records and Reports

I70 Dispatch release—flag; domestic (121.687)
I71 Flight release form—supplemental; commercial (121.689)
Load manifest:
I72 domestic; flag (121.691)
I73 supplemental; commercial (121.693)
Disposition of load manifest, dispatch release, and flight plans:
I74 domestic, flag (121.695)
I75 supplemental; commercial (121.697)
I76 Mechanical reliability reports (121.703)
I77 Airworthiness release-aircraft log entry (121.709)
I78 Communications records: domestic; flag (121.711)

Subpart W — Crewmember Certificate: International

I80 Applicability (121.721)
I90 First aid kits (App. A)
I91 Doppler radar; INS (App. C)

AVIATION WEATHER, AC 00-6A

The Earth's Atmosphere (Ch. 1)

J10 Composition
J11 Vertical structure
J12 Standard atmosphere
J13 Density and hypoxia

Temperature (Ch. 2)

J20 Scales
J21 Heat and temperature
J22 Variations

Atmospheric Pressure and Altimetry (Ch. 3)

J30 Pressure
J31 Altimetry

Wind (Ch. 4)

J40 Convection
J41 Pressure gradient
J42 Coriolis force
J43 General circulation
J44 Friction
J45 Jet stream
J46 Local, small scale winds
J47 Wind shear
J48 Wind, pressure systems, and weather

Moisture, Cloud Formation, and Precipitation (Ch. 5)

K10 Water vapor
K11 Change of state
K12 Cloud formation
K13 Precipitation
K14 Land and water effects

Stable and Unstable Air (Ch. 6)

K20 Changes within upward/downward movement
K21 Stability, instability

Clouds (Ch. 7)

K30 Identification
K31 Signposts

Airmasses and Fronts (Ch. 8)

K40 Airmasses
K41 Fronts
K42 Flight planning

Turbulence (Ch. 9)

L10 Convective currents
L11 Obstructions to wind flow
L12 Wind shear
L13 Wake turbulence

Icing (Ch. 10)

L20 Structural
L21 Induction system
L22 Instrument
L23 Icing and cloud types
L24 Other factors
L25 Ground
L26 Frost

Thunderstorms (Ch. 11)

L30 Development
L31 Cycles, stages
L32 Types
L33 Hazards
L34 Thunderstorm flying; radar

IFR Producers (Ch. 12)

L40 Fog
L41 Low stratus clouds
L42 Haze and smoke
L43 Blowing restrictions to visibility
L44 Precipitation
L45 Obscured or partially obscured sky

High Altitude Weather (Ch. 13)
- M10 Tropopause
- M11 Jet stream
- M12 Cirrus clouds
- M13 Clear air turbulence
- M14 Haze layers
- M15 Icing
- M16 Thunderstorms

AVIATION WEATHER SERVICES, AC 00-45

Surface Aviation Weather Report (Sec. 2)
- N10 Type and time of report
- N11 Sky condition, ceiling, and visibility
- N12 Weather; obstructions to vision
- N13 Sea level pressure
- N14 Temperature, dewpoint
- N15 Wind
- N16 Altimeter setting
- N17 Remarks
- N18 Report identifiers
- N19 Reading the report

Pilot and Radar Reports (Sec. 3)
- N20 Pilot weather reports (PIREPS)
- N21 Radar weather reports (RAREPS)

Aviation Weather Forecasts (Sec. 4)
- N30 Terminal forecasts–FT
- N31 Area forecasts–FA
- N32 TWEB Route Forecasts: Synopsis
- N33 Inflight Advisories–WS, WA, WAC
- N34 Winds; Temperatures Aloft Forecast–FD
- N35 Special Flight Forecast
- N36 Hurricane Advisory–WH
- N37 Convective Outlook–AC
- N38 Severe Weather Watch Bulletin–WW

Surface Analysis (Sec. 5)
- N40 Valid time
- N41 Isobars
- N42 Pressure systems
- N43 Fronts
- N44 Other information
- N45 Use of chart

Weather Depiction Chart (Sec. 6)
- O10 Plotted data
- O11 Analysis
- O12 Use of chart

Radar Summary Chart (Sec. 7)
- O20 Echo pattern; coverage
- O21 Weather associated with echoes
- O22 Intensity; trend of precipitation
- O23 Heights of echo bases; tops
- O24 Movement of echoes
- O25 Additional information
- O26 Use of chart

Significant Weather Prognostics (Sec. 8)
- O30 Domestic flights
- O31 International flights
- O32 Using significant weather progs.

Winds and Temperatures Aloft (Sec. 9)
- O40 Forecast winds; temperatures aloft–FD
- O41 Observed winds aloft
- O42 Use of charts

Freezing Level Chart (Sec. 10)
- O50 Plotted data
- O51 Analysis
- O52 Use of chart

Stability Chart (Sec. 11)
- O60 Lifted index
- O61 K index
- O62 Stability analysis
- O63 Use of chart

Severe Weather Outlook Chart (Sec. 12)
- O70 General thunderstorms
- O71 Severe thunderstorms
- O72 Tornadoes
- O73 Use of chart

Constant Pressure Chart (Sec. 13)
- O80 Plotted data
- O81 Analysis
- O82 Three-dimensional aspects
- O83 Use of charts

Constant Pressure Prognostics (Sec. 14)
- P10 Height, contours, streamlines
- P11 Temperature
- P12 Windspeed
- P13 Formats
- P14 Use of charts

Tropopause, Max Wind, and Wind Shear Charts (Sec. 15)
- P20 Observed tropopause chart
- P21 Domestic tropopause wind, wind shear progs
- P22 International tropopause, wind shear progs

Tables and Conversion Graphs (Sec. 16)
- P30 Icing intensities
- P31 Turbulence intensities
- P32 Locations of turbulence by intensities vs. weather; terrain
- P33 Standard conversions
- P34 Density altitude computation
- P35 Selected contractions

ENROUTE LOW/HIGH ALTITUDE/AREA CHARTS

Legend:
- Q10 Aerodromes
- Q11 Radio aids to navigation, communication boxes
- Q12 Air traffic services, airspace information
- Q13 Special use airspace
- Q14 Cruising altitudes
- Q15 A/G voice communications

Route/Airway
- Q20 Identification, route structure
- Q21 Substitute; unusable
- Q22 Changeover points
- Q23 Operational status: VOR/VORTAC/NDB
- Q24 Altitudes: MEA, MCA, MRA, MOCA, MAA

INSTRUMENT APPROACH PROCEDURE CHARTS

- Q30 Pilot control of airport lighting
- Q31 Approach lighting systems–legend
- Q32 General information; abbreviations
- Q33 Plan view symbols
- Q34 Profile
- Q35 Inoperative components; visual aids
- Q36 Aircraft approach categories
- Q37 Takeoff minimums; departure procedures
- Q38 IFR alternate minimums
- Q39 Civil radar instrument approach minimums
- Q40 Interpretation

BASIC FLIGHT MANUAL & ATC PROCEDURES (AIM-1)

Navigation Aids (Ch. 1)
- R10 Aeronautical information; NAS
- R11 NDB
- R12 VOR, VORTAC, DME; equipment check
- R13 Class, operational use
- R14 Marker beacons
- R15 Instrument landing systems
- R16 SDF
- R17 Maintenance
- R18 VHF/UHF DF
- R19 Radar: ASR, PAR

Airport, Air Navigation Lighting; Marking Aids (Ch. 1)
- R20 Rotating beacon
- R21 Obstructions
- R22 Instrument approach light systems
- R23 Runway edge light systems
- R24 Marking
- R25 In-runway lighting
- R26 VASI

Airspace (Ch. 2)
- Distance from clouds, visibility–VFR
- R30 uncontrolled airspace
- R31 controlled airspace
- R32 Control Areas, Transition Area, Terminal Control Area, Positive Control Area, Control Zone
- R33 Special Use Airspace–Prohibited Area, Restricted Area, Warning Area, Alert Area, ISJTA, MOA
- R34 Airport Advisory/Traffic Areas, temporary light restrictions

Air Traffic Control (Ch. 3)
- R40 Services–control tower, FSS, VFR advisory service, airport
- R41 UNICOM, MULTICOM
- R42 ATIS
- R43 Radar service–traffic information, advisory, assistance, Stage I, II, III
- R44 Terminal Control Area operations–Group I, II, III
- R45 Transponder operation

Airport Operations
- R50 Use of runways, intersection takeoffs
- R51 Landings, approaches (instrument option)
- R52 Light signals

ATC Clearance/Separations (Ch. 3)
- S10 Clearance items
- S11 Amended clearance
- S12 Special VFR clearance
- S13 IFR separation standards
- S14 Speed adjustments
- S15 Visual separation
- S16 VFR restrictions
- S17 Runway separation

Preflight (Ch. 3)
- S20 Weather briefing, NOTAMs
- S21 Flight plan–VFR
- S22 DVFR
- S23 VFR/IFR (composite)
- S24 Flight plan–IFR
- S25 Airways/jet routes
- S26 Direct flights
- S27 VFR operations
- S28 Change in IFR flight plan, cancelling
- S29 Closing VFR/DVFR flight plan

Departures – IFR (Ch. 3)
- T10 Pre-taxi/taxi clearance
- T11 Abbreviated IFR departure clearance
- T12 Takeoff denial
- T13 Departure control; instrument departures
- T14 SIDs; filing, ATC clearance, procedures, transitions

Enroute – IFR (Ch. 3)

Communications
- T20 Direct: controller/pilots
- T21 Frequency change
- T22 IFR position reporting, additional reports
- T23 Airway/route systems, course changes
- T24 Changeover points
- T25 Aircraft climbing/descending
- T26 Operation in restricted airspace
- T27 Holding
- T28 STARs–filing, ATC clearance, procedures, transitions

Arrival – IFR (Ch. 3)
- U10 Radar approach control, instrument approach
- U11 Advance information
- U12 Clearance
- U13 Procedures
- U14 Radar approaches
- U15 Simultaneous ILS approaches
- U16 Radar monitoring
- U17 Timed approaches
- U18 Procedure turn
- U19 Visual approach
- U20 Contact approach
- U21 Side-step maneuver
- U22 Weather minimums
- U23 Missed approach
- U24 Landing priority

Emergency Procedures (Ch. 3)
- V10 General
- V11 VHF/UHF DF approach procedures
- V12 Two-way communications failure
- V13 Special emergency
- V14 Hijack procedures
- V15 Fuel dumping
- V16 Ditching
- V17 Search; rescue

National Security (Ch. 3)
- V20 Security control of aircraft – domestic/coastal ADIZ, DEWIZ
- V21 SCATANA
- V22 Interception pattern, signals

Safety of Flight (Ch. 4)
- V30 Enroute Flight Advisory Service (EFAS)
- V31 Transcribed weather broadcasts
- V32 Scheduled weather broadcasts
- V33 In-flight weather advisories
- V34 Pilot weather reports (PIREP)
- V35 Wake turbulence
- V36 Medical facts for pilots
- V37 NTSB Part 830

WEIGHT & BALANCE, COMPUTATIONS, PERFORMANCE CHARTS

Weight & Balance (AC 91-23)
- W10 Terms & definitions
- W11 Stability, balance
- W12 Index, graphic limits
- W13 CG location, determination
- W14 Shift/change of weight
- W15 Pallet/cargo loading

Computations
- X10 True airspeed, groundspeed, mach
- X11 Time enroute
- X12 Fuel requirements
- X13 Airspeed, mach adjust
- X14 Specific range (NAM/1,000)
- X15 Density altitude
- X16 Rate of climb, descent
- X17 Wind drift/speed
- X18 Off-course corrections

Performance Charts
- Y10 Crosswind, effective wind
- Y11 Takeoff EPR
- Y12 STAB trim
- Y13 Takeoff, distance/speeds
- Y14 Takeoff, limiting weights
- Y25 Climb EPR
- Y26 Cruise EPR, mach
- Y27 Fuel flow, consumption
- Y28 Descent–time/distance/fuel
- Y30 Holding–time, fuel, speed
- Y31 Fuel dump–time, weights
- Y32 Landing–limiting weights
- Y33 Go-around EPR/speeds
- Y40 Simplified flight planning
- Y41 Short Distance Cruise Altitude Chart

MISCELLANEOUS
- Z10 Airport/Facility Directory (AIM-3)
- Z11 Restrictions to Enroute Navigation Aids (AIM-4)
- Z12 Preferred routes (AIM-3)
- Z13 Area navigation
- Z14 DME Arc
- Z15 Instrument interpretation; indications
- Z16 Hydroplaning
- Z17 Aircraft performance–factors affecting
- Z18 Mach, mach number, critical mach
- Z19 Unusual attitude recovery

STUDY MATERIALS

The following materials may be obtained from:

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

- AC 61-18E Airline Transport Pilot (Airplane) Written Test Guide
- AC 65-4B Aircraft Dispatcher Written Test Guide
- AC 00-6A Aviation Weather
- AC 00-45 Aviation Weather Services
- AC 91-23 Pilot's Weight and Balance Handbook
- AC 61-27B Instrument Flying Handbook
- AC 91.11-1 Guide to Drug Hazards in Aviation Medicine
- Airman's Information Manual, Parts I, II, III, and IV
- Federal Aviation Regulations, Parts 1, 61, 65, 91, and 121

The following Advisory Circulars may be obtained free from:

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

- AC 00-24 Thunderstorms
- AC 00-30 Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence
- AC 00-50 Low Level Wind Shear
- AC 20-32B Carbon Monoxide (CO) Contamination in Aircraft – Detection and Prevention
- AC 60-4 Pilot's Spatial Disorientation
- AC 90-1A Civil Use of U.S. Government Produced Instrument Approach Charts (90-1A is included in the Instrument Flying Handbook)
- AC 90-12A Severe Weather Avoidance
- AC 90-14A Altitude–Temperature Effect on Aircraft Performance
- AC 90-23D Wake Turbulence
- AC 90-38A Use of Preferred IFR Routes
- AC 90-54A Cruise Clearances
- AC 90-60 Weather Observation Reporting Obscured or Partially Obscured Sky Condition
- AC 90-62 Flying DME Arcs
- AC 90-64 Automated Radar Terminal System (ARTS) III
- AC 90-68 Minimum Vectoring Altitudes (MVA)
- AC 91-6 Water, Slush, and Snow on the Runway
- AC 91-24 Aircraft Hydroplaning or Aquaplaning on Wet Runways
- AC 91-25A Loss of Visual Cues During Low Visibility Landings
- AC 91-43 Unreliable Airspeed Indications
- AC 95-1 Airway and Route Obstruction Clearance
- AC 120-5 High Altitude Operations in Areas of Turbulence
- AC 120-28A Criteria for Approval of Category IIIa Landing Weather Minima
- AC 120-29 Criteria for Approving Category I and Category II Landing Minima for FAR Part 121 Operators
- AC 121-12 Wet or Slippery Runways
- AC 121-18 Aviation Security–Carriage of Weapons and Escorted Persons
- AC 121-195 (d)-1 Alternate Operational Landing Distances for Wet Runways; Turbojet Powered Transport Category Airplanes

Single copies of Exam-O-Grams may be obtained free from:

FAA Aeronautical Center
Flight Standards Technical Division
Operations Branch, AAC-240
P. O. Box 25082
Oklahoma City, OK 73125.

TEST QUESTIONS

001 *B20* To renew Category II authorization, what is the recent instrument approach experience required prior to the due date of the practical test?

1—Within the previous 12 calendar months, six ILS approaches flown by use of an approach coupler to Category I or Category II minimum landing altitudes.

2—Within the previous 6 months, six ILS approaches, three of which may be flown to Category I minimum landing altitudes by use of an approach coupler.

3—Within the previous 12 months, six ILS approaches flown manually to Category I minimum landing altitudes.

4—Within the previous 6 months, three ILS approaches flown by use of an approach coupler to Category II minimum landing altitudes.

002 *F33* A flag carrier flight requires three pilots. What are the certificate and rating requirements for the second in command?

1—Commercial pilot with instrument rating only.

2—Commercial pilot with airplane type rating only.

3—Commercial pilot with airplane type and instrument rating.

4—Airline transport pilot with airplane type rating.

003 *B12* A flag air carrier flight which requires three pilots is scheduled to operate on June 5. Each of the pilots has a First-Class Medical Certificate dated November 28 of last year. For this scheduled flight,

1—only the pilot serving as pilot in command must have a new medical certificate prior to departure.

2—only the pilots serving as pilot in command and second in command must have new medical certificates prior to departure.

3—these medical certificates are adequate for each of the pilot positions.

4—all three pilots must have new medical certificates prior to departure.

004 *B32* What restriction is imposed by FAR Part 61 regarding an airline transport pilot instructing other pilots in air transportation?

1—A pilot must have a flight instructor certificate and a type rating in each airplane in which instruction is given.

2—A pilot may instruct no more than 7 hours in any 1-day period.

3—A pilot may instruct no more than 30 hours in any 7-day period.

4—A pilot may instruct only in the category, class, and type in which a rating is held.

005 *F36* A pilot, who meets all other training requirements, completed an approved simulator course of training in January of this year. He passed the proficiency flight check in June of last year. For an air carrier flight requiring three pilots in March of this year, the pilot may

1—serve as either second in command or third pilot only.

2—serve in any of the three pilot positions.

3—not serve in any pilot position.

4—serve as third pilot only.

006 *F22* Training in emergency procedures is required

1—every 6 months as appropriate to the required crewmembers.

2—as appropriate only to the flight deck crewmembers.

3—of only the pilot in command and the cabin attendants.

4—as appropriate to each required crewmember.

007 *F31* During which preceding time period must a crewmember have completed an established training program in order to perform duties associated with the handling and carriage of dangerous articles and magnetized materials?

1—6 months.

2—12 calendar months.

3—18 calendar months.

4—24 months.

008 *F32* During initial training for air carrier operations, all pilots must acquire 25 hours of operating experience in turbojet powered airplanes before serving as required flight crewmembers on the airplanes. This required operating experience may

1—include the flight time the pilot acquires while obtaining a type rating in the airplane.

2—be reduced up to 50% through the substitution of one additional takeoff and landing for 1 hour of the required experience.

3—be reduced up to 50% through substitution of 12½ hours of approved flight simulator training.

4—include 5 hours in an approved flight simulator.

009 *180* What additional certification, if any, is required for crewmembers of a flag air carrier of U.S. registry to facilitate entry and clearance into ICAO contracting states?

1—Appropriate certification procedures must be followed in each country.

2—An ICAO International Crewmember Certificate issued by ICAO.

3—A "Crewmember Certificate" issued by the Federal Aviation Administration.

4—None, if flights are made to ICAO member nations.

010 *F36* A pilot, second in command of a three-pilot crew, must complete a proficiency check

1—every 6 calendar months.

2—or a line check every 12 calendar months.

3—every 12 calendar months.

4—or a line check every 6 calendar months.

011 *F33* What are the minimum certificate and rating requirements for the second in command of a supplemental air carrier flight requiring three pilots?

1—Commercial pilot with aircraft type and instrument ratings.

2—Airline transport pilot with aircraft type rating.

3—Commercial pilot with instrument rating.

4—Commercial pilot with aircraft type rating.

012 *F34* How many takeoffs and landings must pilots, second in command in FAR Part 121 operations, have in the type airplane they are scheduled to fly?

1—Five, within the preceding 120 days.

2—Three, within the preceding 90 days.

3—Five, within the preceding 90 days.

4—Three, within the preceding 30 days.

013 *F31* During which preceding time period must a crewmember have completed an established training program in order to perform duties associated with the handling and carriage of dangerous articles and magnetized materials?

1—6 months.

2—24 months.

3—12 calendar months.

4—18 calendar months.

014 *B32* A commercial pilot who has a DC–3 type rating completes a flight test for his Airline Transport Pilot Certificate and type rating in a DC–9. Upon successful completion of the test, he may instruct other pilots in air transportation service in

1—any airplane, providing his student is training for an Airline Transport Pilot Certificate.

2—the DC–9 only, unless he holds a Flight Instructor Certificate.

3—the DC–3 and DC–9 only, unless he holds a Flight Instructor Certificate.

4—any airplane in which he is rated, but only if he holds a Flight Instructor Certificate.

015 *F33* The certificate and rating requirements for the second in command of a two-pilot crew on a domestic air carrier two-engine turbojet airplane are

1—Airline Transport Pilot Certificate with aircraft type rating.

2—Commercial Pilot Certificate with instrument and aircraft type ratings.

3—Commercial Pilot Certificate with instrument rating.

4—Flight Engineer Certificate and Commercial Pilot Certificate with aircraft type rating.

016 *B32* What restriction is imposed by FAR Part 61 regarding flight instruction of other pilots in air transportation by an airline transport pilot? A pilot may instruct no more than

1—6 hours in any 1-day period.

2—7 hours in any 1-day period.

3—30 hours in any 7-day period.

4—36 hours in any 7-day period.

017 *F33* Which pilot certificate, or pilot certificate and rating, is required for the second in command of a three-pilot crew operating under FAR Part 121?

1—Commercial Pilot Certificate and an appropriate aircraft type rating.

2—Commercial Pilot Certificate.

3—Airline Transport Pilot Certificate and an appropriate aircraft type rating.

4—Airline Transport Pilot Certificate.

018 *F39* To maintain route qualification, the pilot in command of a domestic air carrier must have made at least

1—two round trips between terminals within the preceding 12 months.

2—one trip between terminals within the preceding 12 months.

3—one trip between terminals within the preceding 3 months.

4—one takeoff and landing at each regular, provisional, and refueling airport within the preceding 6 months.

019 *B20* A pilot may not serve as pilot in command during a Category II instrument approach operation unless he has had certain experience with the make and basic model flight control guidance system used in that operation. This required recent experience includes

1—six ILS approaches within the preceding 3 months.

2—six ILS approaches within the preceding 6 months.

3—three ILS approaches within the preceding 6 months.

4—three ILS approaches within the preceding 3 months.

020 *B13* What instrument flight time may be logged by a pilot second in command of a two-pilot domestic air carrier flight?

1—All of the time he is controlling the airplane solely by reference to flight instruments.

2—One-half the time the flight is on an IFR flight plan.

3—One-half the time the airplane is in actual IFR conditions.

4—All of the time the airplane is in actual IFR conditions or he is wearing a view-limiting device.

021 *B32* A commercial pilot who has DC–3 and DC–9 type ratings completes a flight test for his Airline Transport Pilot Certificate and type rating in a Boeing 727. Upon successful completion of the test, he

1—may exercise ATP privileges in the Boeing 727 only, and is limited to commercial pilot privileges in the DC–9 and DC–3.

2—may exercise ATP privileges in the Boeing 727 and DC–9 (both jets), but is limited to commercial pilot privileges in the DC–3.

3—may exercise ATP privileges in the Boeing 727, DC–9, and DC–3.

4—may exercise ATP privileges in the Boeing 727 and DC–3, but is limited to commercial pilot privileges in the DC–9.

022 *B20* A pilot may not serve as pilot in command during a Category II instrument approach operation unless he has had certain experience with the make and basic model flight control guidance system used in that operation. This required recent experience includes

1—six ILS approaches within the preceding 6 calendar months.

2—three ILS approaches within the preceding 3 calendar months.

3—six ILS approaches within the preceding 3 calendar months.

4—three ILS approaches within the preceding 6 calendar months.

023 *F34* A flag air carrier pilot who has *not* made at least three takeoffs and landings within the preceding 90 days, in an airplane of the type in which the pilot is to serve, may

1—not serve as a required pilot flight crewmember.

2—serve as second in command on a two-pilot crew provided the pilot in command makes all takeoffs and landings.

3—serve as third pilot on a three-pilot crew provided the pilot does not occupy a pilot position during any takeoff or landing.

4—serve in any pilot position, except pilot in command, provided the pilot in command is a designated check airman.

024 *B12* A flag air carrier flight which requires three pilots is scheduled to operate on August 5. Each of the pilots has a First-Class Medical Certificate dated January 28 of the same year. For this scheduled flight

1—only the pilot serving as pilot in command must have a new medical certificate prior to departure.

2—these medical certificates are adequate for each of the pilot positions.

3—all three pilots must have new medical certificates prior to departure.

4—only the pilots serving as pilot in command and second in command must have new medical certificates prior to departure.

025 *B13* The second in command of a two-pilot domestic air carrier flight may log as instrument flight time

1—50% of the time the airplane is in actual IFR conditions.

2—50% of the time the flight is on an IFR flight plan.

3—100% of the time the airplane is in actual IFR conditions or he is wearing a view-limiting device.

4—100% of the time he is controlling the airplane solely by reference to flight instruments.

026 *B20* To be eligible for the renewal of Category II authorization, what recent instrument approach experience is required within the 6 months prior to the due date of the practical test?

1—Six ILS approaches to Category I landing minimums, three of which may be coupled approaches.

2—Six ILS approaches, all of which must be flown to Category II decision heights using either manual or approach coupler procedures.

3—Six ILS approaches, three of which must be flown to Category II decision height by the use of an approach coupler.

4—Three ILS approaches flown to Category I decision heights for the type airplane involved by the use of an approach coupler.

027 To maintain route qualification, the pilot
F39 in command of a flag air carrier airplane must have made at least

1—one takeoff and landing at each regular, provisional, and refueling airport within the preceding 6 months.

2—two round trips between terminals within the preceding 12 months.

3—one trip between terminals within the preceding 12 months.

4—one trip between terminals within the preceding 3 months.

028 A flag air carrier flight requires three
F33 pilots. What are the certificate and rating requirements for the third pilot?

1—Commercial pilot with instrument rating only.

2—Airline transport pilot with aircraft type rating.

3—Commercial pilot with aircraft type rating only.

4—Commercial pilot with aircraft type and instrument rating.

029 A pilot has completed all the required
F35 training and checks for qualification in more than one type airplane. To serve as pilot in command of a three-engine turbojet, domestic air carrier airplane, the pilot must have passed, during the preceding

1—6 months, a proficiency check in each type airplane.

2—12 months, a line check in each type airplane.

3—12 months, a line check in that type airplane.

4—12 months, a line check in any type airplane in which qualified.

030 A supplemental air carrier requires a three-
F33 pilot crew for operations conducted under FAR Part 121. What are the minimum certificate and rating requirements for the third pilot?

1—Airline Transport Pilot with airplane class or type rating.

2—Commercial Pilot Certificate with an aircraft type rating.

3—Airline Transport Pilot Certificate.

4—Commercial Pilot Certificate with an instrument rating.

031 An airline transport pilot may log as pilot
B13 in command time

1—all the flight time during which he acts as pilot in command.

2—all the flight time he acts as pilot in command or second in command in FAR Part 121 operations.

3—only the flight time during which he is the sole manipulator of the controls.

4—all the flight time during which he is required to be on the flight deck as a crewmember.

032 What minimum number of practical tests
B20 must be accomplished by a pilot during the 12 calendar months following issuance or renewal in order to retain Category II authorization in two different type aircraft?

1—A test in each type during the 5th or 6th month and in each type during the 11th or 12th month.

2—A test in each type during the 11th or 12th month.

3—A test in either type during the 11th or 12th month.

4—A test in one type during the 5th or 6th month and in the other type during the 11th or 12th month.

033 A flight requiring two pilots is scheduled
B12 for August 1. Both the pilot in command and the second in command have a First-Class Medical Certificate dated February 28. Prior to the scheduled flight, the pilot in command

1—must obtain a new First-Class Medical Certificate; the second in command's certificate is adequate.

2—must obtain a new First-Class Medical Certificate; the second in command must have a new medical certificate, but a second class certificate is adequate.

3—and the second in command's certificates are adequate for the flight.

4—and second in command must obtain new First-Class Medical Certificates.

034 *E32* A passenger carrying landplane is certificated with an escape slide which deploys automatically. When must the system be armed?

1—All phases of flight and ground operations.

2—Taxi, takeoff, and landing.

3—Takeoff and landing only.

4—Anytime an emergency condition exists.

035 *D17* Which indication is within acceptable tolerances when checking a dual VOR installation using a VOT?

	VOR #1	*To/From*	*VOR #2*	*To/From*
1—	180°	FROM	184°	FROM
2—	360°	TO	002°	TO
3—	001°	FROM	005°	FROM
4—	180°	TO	182°	TO

036 *E31* When two battery-powered megaphones are required on a passenger carrying airplane, where must they be located?

1—Both can be located at the forward end or most rearward location, whichever provides the easiest access by flight attendants.

2—As close as practicable to the midsection emergency exit or overwing exits.

3—One on the flight deck and one over the midsection emergency exits.

4—One at the forward end and one at the most rearward location readily accessible to a normal flight attendant seat.

037 *D52* Within which time period must a periodic inspection, or functional flight check, be performed on each item of equipment installed in an airplane engaged in Category II operations?

1—Every 30 days.

2—Every 60 days.

3—Every 3 calendar months.

4—Every 6 calendar months.

038 *E31* How many approved first aid kits for treatment of injuries likely to occur in flight must be evenly distributed throughout a domestic air carrier aircraft which has a seating capacity of 67?

1—Two

2—Three

3—Four

4—Five

039 *D17* Two independent VORs (except for the receiving antenna) are installed in a domestic air carrier airplane. What is the maximum allowable variation between the two bearing indicators using only one ground VOR station reference?

1—A difference between the two VOR bearing indicators not to exceed 3% of the difference between the desired and actual bearing indications.

2—Six degrees maximum bearing difference between the two VOR bearing indicators if using a VOT.

3—Two degrees from the desired bearing on one of the VORs; four degrees between both VOR bearing indicators.

4—Four degrees maximum bearing difference between the two VOR bearing indicators.

040 *E38* For an extended overwater operation, which equipment is required?

1—One survival type emergency locator transmitter.

2—One pyrotechnic signaling device for each lifevest.

3—A survival kit for each occupant.

4—Enough liferafts to accommodate the full seating capacity of the airplane.

041 *I91* Which equipment meets the requirement for an air carrier to be approved for the use of Inertial Navigation System (INS)?

1—A Doppler Radar Unit and a VOR/VORTAC or ILS navigation system.

2—Dual ILSs as backup systems and one INS.

3—One VOR/VORTAC and one INS.

4—One INS and one Doppler Radar Unit.

042 *E37* In a turbine powered airplane with a pressurized cabin, each flight crewmember is at his station and has a quick donning type oxygen mask. What is the highest flight level that operations may be conducted without the pilot at the controls wearing an oxygen mask and using oxygen?

1—FL 410
2—FL 390
3—FL 310
4—FL 250

043 *F35* For domestic or flag air carrier operations, the pilot in command line check

1—must include a landing at each regular, provisional, and refueling stop along the route.
2—may be waived if the pilot has had refresher flight training in the aircraft type within the preceding 6 months.
3—is required only when the pilot is scheduled on a new route.
4—is required each 12 calendar months in only one type of aircraft in which the pilot serves as pilot in command.

044 *E30* If a flag air carrier aircraft has a seating capacity of 153, how many approved first aid kits must be provided for the treatment of injuries likely to occur in flight?

1—Five
2—Four
3—Three
4—Two

045 *F33* What are the minimum certificate and rating requirements for the pilot second in command of a three-pilot crew on a flag air carrier flight?

1—Commercial Pilot Certificate with an instrument rating.
2—Airline Transport Pilot Certificate with an airplane category rating.
3—Airline Transport Pilot Certificate with an aircraft type rating.
4—Commercial Pilot Certificate with an airplane type rating.

046 *F36* An airline transport pilot with an appropriate airplane type rating, who meets all other training requirements, completed an approved simulator course of training in January of this year. The most recent proficiency flight check was passed in July of last year. For an air carrier flight during March of this year, where three pilots are required, the pilot may

1—not serve in any pilot position.
2—serve in any of the three pilot positions.
3—serve as either second in command or third pilot only.
4—serve as third pilot only.

047 *I80* To facilitate entry and clearance of crewmembers of a flag air carrier of U.S. registry into ICAO contracting states, what additional certification, if any, is required?

1—Appropriate certification procedures must be followed in each country.
2—No additional certification is required if flights are made only to ICAO member nations.
3—A "Crewmember Certificate" issued by the Federal Aviation Administration.
4—An ICAO International Crewmember Certificate issued by the ICAO.

048 *F33* The minimum certificate and rating requirements for the second in command of the two-pilot crew on a two-engine domestic air carrier turbojet airplane are

1—Commercial Pilot Certificate with instrument and aircraft type ratings.
2—Airline Transport Pilot Certificate with aircraft type rating.
3—Flight Engineer Certificate and Commercial Pilot Certificate with aircraft type rating.
4—Commercial Pilot Certificate with instrument rating.

049 *F22* An air carrier must provide crewmember emergency training on such subjects as respiration, hypoxia, and decompression to each crewmember on pressurized airplanes operated above

1—10,000 feet.
2—12,000 feet.
3—20,000 feet.
4—25,000 feet.

050 *F31* During which preceding time period must a crewmember have completed an established training program in order to perform the duties associated with the handling and carriage of dangerous articles and magnetized materials?

1—6 months.

2—24 months.

3—12 calendar months.

4—18 calendar months.

051 *E37* The supplemental oxygen requirements for passengers when a flight is operated up to FL 250 is dependent upon the airplane's ability to make an emergency descent to a flight altitude of

1—14,000 feet within 4 minutes.

2—12,000 feet within 4 minutes, or at a minimum rate of 2,500 feet per minute, whichever is quicker.

3—10,000 feet within 4 minutes.

4—8,000 feet at a minimum rate of 3,000 feet per minute.

052 *E32* Which operational feature is required for the interior emergency lights on a passenger-carrying airplane?

1—Each light must have a completely self-contained battery power source.

2—If the lights function automatically, they need not be turned on for taxi, takeoff, and landing operations.

3—Each light must provide the required level of illumination for a period of 30 minutes at critical ambient temperatures after an emergency landing.

4—In addition to automatic operation, manual operation is required in event of interruption of the normal electrical generator power source.

053 *E36* For flights with cabin pressure altitudes above 15,000 feet, the passenger oxygen supply required is enough for

1—10% of the passengers for the entire flight at those altitudes.

2—each passenger during the entire flight at those altitudes.

3—each passenger for 30 minutes.

4—30% of the passengers for 30 minutes.

054 *E36* For flights with cabin pressure altitudes above 15,000 feet, the passenger oxygen supply required is enough for

1—each passenger during the entire flight at those altitudes.

2—30% of the passengers for 30 minutes.

3—10% of the passengers for the entire flight at those altitudes.

4—each passenger for 30 minutes.

055 *D17* What is the maximum permissible variation between the two bearing indicators on a dual VOR system when checking one VOR against the other? (Each unit is independent of each other except for the receiving antenna.)

1—Four degrees on the ground and in flight.

2—Six degrees on the ground and in flight.

3—Four degrees in flight and six degrees on the ground.

4—Six degrees in flight and four degrees on the ground.

056 *D52* Which is a requirement for the maintenance and inspection program for Category II aircraft equipment as required by FAR Part 91, Appendix A?

1—The equipment must be inspected every 45 days.

2—Every third inspection must be replaced by a functional flight check.

3—A bench check for each item of equipment must be performed every 6 calendar months.

4—Each alternate equipment inspection may be replaced by a functional flight check.

057 *D17* Which figure indicates that both VOR navigation systems are within tolerances during a VOT check? (Fig. 1)

1—A

2—B

3—C

4—D

058 *D17* Which figure indicates that both VOR navigation systems are within tolerances during a VOT check? (Fig. 2)

1—A
2—B
3—C
4—D

059 *D17* Which figure indicates that both VOR navigation systems are within tolerances during a VOT check? (Fig. 3)

1—A
2—B
3—C
4—D

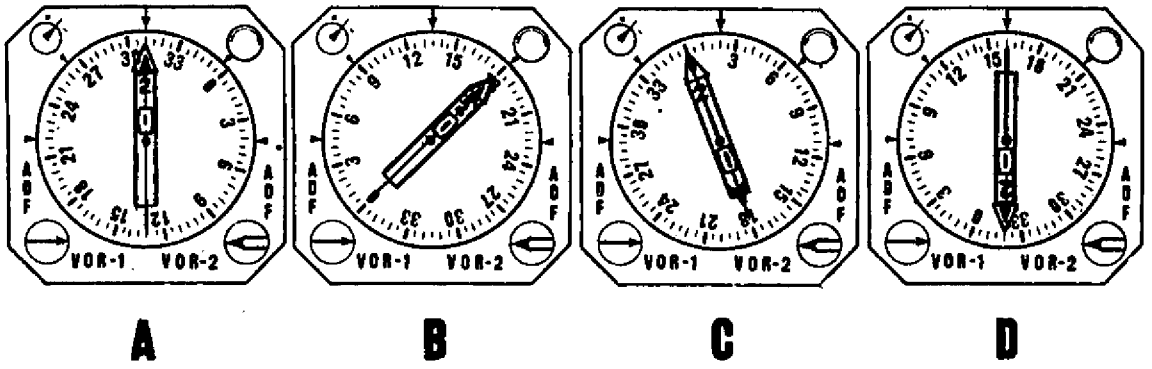

FIGURE 1

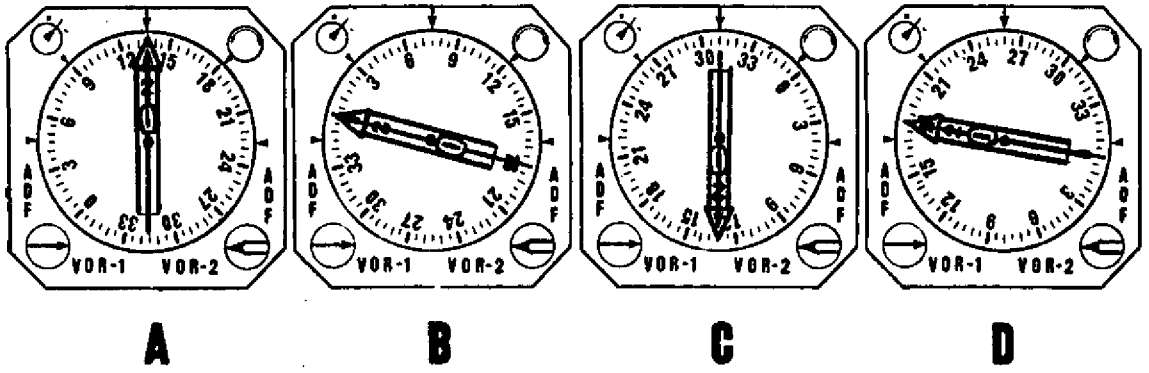

FIGURE 2

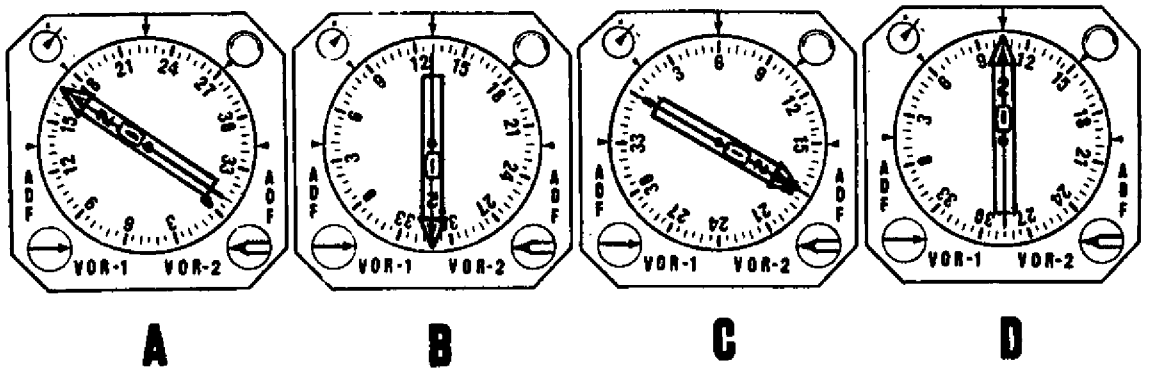

FIGURE 3

060 *D50* For Category II approaches to a DH below 150 feet, what airplane equipment is required in addition to the basic equipment required for Category II operations?

1—A radio altimeter which displays the actual height of the flight deck above the terrain.

2—A third gyroscopic pitch-and-bank indicating system.

3—Dual glide slope and localizer receiving antennas.

4—A marker beacon receiver providing aural and visual indications of the inner marker.

061 *D17* When dual independent VOR receivers are installed in an airplane (except for the antenna), what is the maximum acceptable variation between the bearing indicators when checking the receivers using a VOT?

	VOR #1	*To/From*	*VOR #2*	*To/From*
1—	360°	TO	002°	TO
2—	180°	TO	183°	TO
3—	001°	FROM	005°	FROM
4—	180°	FROM	184°	FROM

062 *D17* Dual VORs (units independent of each other except the antenna) are installed in an aircraft. What is the maximum permissible variation between the two bearing indications when one VOR receiver is checked against the other?

1—Four degrees in flight and six degrees on the ground.

2—Four degrees on the ground and in flight.

3—Six degrees on the ground and in flight.

4—Six degrees in flight and four degrees on the ground.

063 *E37* All flight crewmembers on flight deck duty on a turbine engine powered, pressurized airplane are not equipped with quick-donning oxygen masks. In this case, the maximum flight altitude authorized without one pilot wearing and using an oxygen mask is

1—FL 200.

2—FL 250.

3—FL 300.

4—FL 410.

064 *E31* Unless waived by the Administrator, when only one battery-powered megaphone is required, where must it be located within the passenger cabin on a domestic passenger-carrying airplane?

1—On the flight deck readily accessible to any crewmember.

2—As close as practicable to the midsection or the overwing exit.

3—The most accessible location in the forward portion of the passenger cabin.

4—The most rearward location readily accessible to a normal flight attendant seat.

065 *E32* During which operations must the automatic deploying escape slides be armed on a passenger carrying landplane which is certificated with this system?

1—During takeoff and landing only.

2—Anytime an emergency condition exists.

3—During taxi and takeoff only.

4—During taxi, takeoff, and landing.

DURATION - CABIN SYSTEM

The table below gives the approximate duration of the cabin oxygen system, based on a cylinder pressure of 1500 psi

CABIN ALTITUDE	NUMBER OF PASSENGERS	APPROXIMATE DURATION
15,000	50	2 hrs. 29 mins.
	75	1 hr. 39 mins.
	110	1 hr. 12 mins.
20,000	50	1 hr. 17 mins.
	75	51 mins.
	110	37 mins.
25,000	50	50 mins.
	75	33 mins.
	110	24 mins.

For cylinder pressures less than 1500 psi, reduce duration by 8% for each 100 psi.

066 *E36* What is the approximate duration of the passenger oxygen system under these conditions? (Use straight-line variation.)

Cabin altitude ---------- 15,000 feet
Passengers ---------- 90
Bottle pressure ---------- 1,300 PSI

1—1 hour 33 minutes.

2—1 hour 27 minutes.

3—1 hour 13 minutes.

4—58 minutes.

067 *E33* Which use of safety belts is approved in the passenger compartment of a domestic air carrier airplane during takeoff and landing?

1—Each person, regardless of age, must occupy a single seat with an approved safety belt.

2—Two persons, one of which is under 2 years of age, may occupy one seat and share one approved safety belt.

3—Two persons, regardless of age, may occupy a berth and share one approved safety belt.

4—Persons who have reached their second birthday, may occupy a divan when individual safety belts are provided.

068 *E20* A domestic air carrier introduces a three-engine passenger-carrying turbojet that has a seating capacity of 251 passengers. The air carrier must demonstrate that, after an aborted takeoff, all passengers and crew can be evacuated in

1—90 seconds using 50% of the emergency exits.

2—1 minute using all available exits.

3—90 seconds using 25% of the emergency exits.

4—2 minutes using 50% of the emergency exits.

DURATION - CABIN SYSTEM

The table below gives the approximate duration of the cabin oxygen system, based on a cylinder pressure of 1500 psi

CABIN ALTITUDE	NUMBER OF PASSENGERS	APPROXIMATE DURATION
15,000	50	2 hrs. 29 mins.
	75	1 hr. 39 mins.
	110	1 hr. 12 mins.
20,000	50	1 hr. 17 mins.
	75	51 mins.
	110	37 mins.
25,000	50	50 mins.
	75	33 mins.
	110	24 mins.

For cylinder pressures less than 1500 psi, reduce duration by 8% for each 100 psi.

069 *E36* What is the approximate duration of the passenger oxygen system under these conditions? (Use straight-line variation.)

Cabin altitude ---------- 20,000 feet
Passengers ---------- 90
Cylinder pressure ---------- 1,300 PSI

1—50 min.

2—45 min.

3—38 min.

4—30 min.

070 *E35* What supplemental oxygen supply shall a certificate holder, operating under FAR Part 121, provide passengers for flights at a cabin pressure altitude above 15,000 feet?

1—An adequate supply for each passenger for 30 minutes' duration.

2—A continuous supply based on 10% of the passengers for the entire flight at those altitudes.

3—Enough oxygen for each passenger for the entire flight at those altitudes.

4—An adequate supply to provide each seat location (potential passenger) for 30 minutes at those altitudes.

071 *D52* Which is a requirement for the maintenance and inspection program for Category II aircraft equipment as required by FAR Part 91, Appendix A?

1—Each alternate equipment inspection may be replaced by a functional flight check.

2—The equipment must be inspected every 60 days.

3—Every third inspection must be replaced by a functional flight check.

4—A bench check for each item of equipment must be performed every 6 calendar months.

072 *E31* A domestic air carrier has a seating capacity for 343 passengers. How many approved first aid kits must be provided for the treatment of minor injuries likely to occur in flight?

1—Three

2—Four

3—Five

4—Six

073 *I91* An air carrier that elects to use an Inertial Navigation System (INS) must meet which equipment requirement prior to takeoff if one INS is inoperative?

1—Only one INS need be operational and no other navigation equipment is required to substitute for the one inoperative INS.

2—The flight shall not takeoff since both INSs must be operative.

3—An operative Doppler Radar unit may be substituted for the inoperative INS.

4—Dual ILSs with a Flight Director System may be substituted for the inoperative INS.

074 *E30* On airplanes requiring a third gyroscopic bank-and-pitch indicator, which is a requirement regarding its operational features?

1—The power source must provide reliable operation for 30 minutes after total failure of the electrical generating system.

2—Operations must be dependent on the captain's attitude indicating system.

3—The power source must be manually selected to prevent an inadvertent failure during an automatic power transfer.

4—The operation and power source must be the same as the captain's and first officer's attitude indicating system.

075 *E32* Which is an operational requirement regarding airplane interior emergency exit lights on passenger-carrying airplanes?

1—Manual operation is required in addition to automatic operation in the event of interruption of the normal electrical generating power source.

2—Each light must have a completely self-contained battery power source.

3—If the lights require arming to function automatically, they must be armed for taxi, takeoff, and landing operations.

4—Each light must provide the required level of illumination for at least 15 minutes at critical ambient temperatures after emergency landing.

076 *E20* Upon introduction into service of an airplane with a seating capacity of more than 44 passengers, the air carrier must demonstrate that, after an aborted takeoff, all passengers and crew can be evacuated in

1—60 seconds through 75% of the emergency exits.

2—2 minutes through all the emergency exits.

3—5 minutes through all emergency exits.

4—90 seconds through 50% of the emergency exits.

077 *E37* The supplemental oxygen requirements for passengers when a flight is operated up to FL 250 is dependent upon the airplane's ability to make an emergency descent to a flight altitude of

1—8,000 feet at a minimum rate of 3,000 feet per minute.

2—10,000 feet within 4 minutes.

3—12,000 feet within 4 minutes or at a minimum rate of 2,500 feet per minute, whichever is quicker.

4—14,000 feet within 4 minutes.

078 *D60* In addition to the basic aircraft equipment required for Category II operations, which additional equipment is necessary for Category II instrument approaches with decision heights below 150 feet AGL?

1—A third gyroscopic pitch-and-bank indicating system.

2—A radio altimeter displaying height of the flight deck within ±5 feet above the terrain.

3—A marker beacon receiver providing visual and aural indications of the inner marker.

4—Dual localizer and glide slope receiver antennas.

079 *E33* Under which conditions may two persons be permitted to share one safety belt in a divan or lounge seat?

1—For all operations except turbulent air penetration.

2—When one is an adult and one is a child under 4 years of age.

3—During all operations except during the landing phase of flight.

4—Only during the enroute portion of flight.

080 *I91* An air carrier that elects to use an Inertial Navigation System (INS) must meet which equipment requirement prior to takeoff on a proposed flight?

1—Dual ILSs with an operative Flight Director System may be used as a backup for one inoperative INS.

2—One INS with a dual VORTAC/ILS system may be used as a backup.

3—Both INSs must be operational.

4—One INS may be inoperative but an operational Doppler Radar unit may be substituted in its stead.

081 *D12* Which ground components are required to be operative for a CAT II approach in addition to LOC, glide slope, marker beacons, and approach lights?

1—RCLS and REIL.

2—Radar and RVR.

3—HIRL, TDZL, RCLS, and RVR.

4—HIRL, TDZL, RCLS, and REIL.

082 *A10* Which factor is used to determine accelerate-stop distance?

1—An outboard engine failure between V_{MC} speed and V_1 speed.

2—Maximum allowable takeoff weight.

3—Critical engine failure at V_1 speed.

4—Dry runway and use of brakes without antiskid.

083 *D18* Which operational requirement must be observed when ferrying an air carrier airplane when one of its three turbine engines is inoperative?

1—The weather conditions at takeoff and destination must be VFR.

2—The flight cannot be conducted between official sunset and official sunrise.

3—Weather conditions must exceed the basic VFR minimums for the entire route, including takeoff and landing.

4—The computed takeoff run must not exceed 50% of the available runway; the computed landing distance must not exceed 60% of the available runway.

084 *D10* If an emergency requiring immediate action causes you to deviate from a rule in FAR Part 91, what is your responsibility as pilot in command?

1—A written report of the deviation must be submitted within 7 calendar days to the Administrator.

2—A written report of the deviation shall be submitted only if requested by the Administrator.

3—A written report shall be made immediately to the nearest Air Carrier District Office upon landing at destination.

4—No report is necessary unless priority handling by ATC was required.

085 *A20* Which is a correct airplane speed symbol and definition?

1—V_F—maximum speed for flap extension.

2—V_{MA}—design maximum maneuvering speed.

3—V_C—design cruising speed.

4—V_{LE}—maximum landing gear operating speed.

086 *D20* What is the maximum indicated airspeed a turbine-powered aircraft may be operated below 10,000 feet MSL?

1—288 knots

2—250 knots

3—230 knots

4—200 knots

087 *A20* FAR Part 1 defines V_{SO} as the stalling speed or the minimum steady flight speed

1—at which the airplane is controllable.

2—obtained in a specified configuration.

3—in the landing configuration.

4—with the critical engine inoperative.

088 *D20* At what maximum indicated airspeed may a reciprocating-engine aircraft be operated within an Airport Traffic Area?

1—156 knots
2—180 knots
3—200 knots
4—230 knots

089 *D22* While taxiing, you observe a steady red light followed shortly by a flashing green light from the control tower. What actions are you expected to take?

1—Taxi clear of runway in use.
2—Stop; then continue to taxi.
3—Exercise extreme caution but continue to taxi.
4—Stop; then return to the starting point on the airport.

090 *D10* In an emergency requiring immediate action, the pilot in command may deviate from any rule of FAR Part 91 to the extent

1—authorized by the air carrier's operations specifications.
2—necessary to conform to ATC instructions.
3—necessary except flight contrary to an ATC clearance.
4—necessary to meet that emergency.

091 *D18* A four-engine turbine powered domestic air carrier airplane must be ferried to another base for repair of an inoperative engine. What operational requirement must be observed?

1—Only the required flight crewmembers may be on board the airplane.
2—The takeoff gross weight must not exceed 65 percent of the minimum certificated gross takeoff weight.
3—The computed takeoff distance to reach V_1 must not exceed 70 percent of the available runway determined with all engines operating.
4—The existing and forecast weather for departure, enroute, and landing must be VFR.

092 *D12* During Category II operations, what additional ground equipment is required when the RVR for the TDZ is reported as less than 1,600 feet?

1—Runway remaining lights (amber) for the final 2,000 feet must be operating.
2—Touchdown Zone Lighting (TDZL).
3—Runway Centerline Lighting.
4—An operative runway visual range system in the rollout zone.

093 *D20* What is the maximum indicated airspeed a reciprocating engine aircraft may be operated below 10,000 feet MSL?

1—180 knots
2—200 knots
3—230 knots
4—250 knots

094 *D12* Which ground component or equipment is not required for a CAT II ILS instrument approach to the published RA decision height?

1—RVR system for the touchdown zone.
2—Touchdown Zone Lighting.
3—Centerline lighting and marking.
4—The Inner Marker.

095 *A20* Which is the correct symbol for the stalling speed or the minimum steady flight speed in a specified configuration?

1—V_{S1}
2—V_S
3—V_{SO}
4—$V_{2\ min}$

096 *D12* During Category II operations, an operative rollout runway visual range system is required when the RVR in the touchdown zone is reported to be less than

1—RVR 20.
2—RVR 18.
3—RVR 16.
4—RVR 14.

097 *D22* While taxiing, you observe a flashing red light from the control tower directed at your aircraft. What is the significance of this visual signal?

1—Taxi clear of runway in use.
2—Stop.
3—Exercise extreme caution.
4—Return to starting point on the airport.

098 *A20* FAR Part I defines V_{S1} as the stalling speed or the minimum steady flight speed

1—at which the airplane is controllable.
2—in the landing configuration.
3—with the critical engine operative.
4—obtained in a specified configuration.

099 *D12* In addition to the localizer, glide slope, marker beacons, approach lighting, and HIRL, which ground components are required to be operative for a Category II instrument approach to a DH below 150 feet AGL?

1—Radar and RVR.
2—TDZL, RCLS, and RVR.
3—RCLS and REIL.
4—TDZL, RCLS, and REIL.

100 *D20* Which of the following statements concerning airplane speed symbols is correct?

1—V_H is the maximum speed in level flight.
2—V_C is the design speed for maximum cruise.
3—V_{FE} is the maximum speed for flap extension.
4—V_{LO} is the maximum landing gear operating speed.

101 *E15* What is the maximum takeoff distance for a turbine-engine powered air carrier airplane as required by FAR Part 121?

Runway 24L:

Length	8,600 feet
Stopway	2,500 feet
Clearway	4,200 feet

1— 8,600 feet
2—11,100 feet
3—12,800 feet
4—12,900 feet

102 *D12* In addition to the localizer, glide slope, marker beacons, approach lighting, and High Intensity Runway Lights (HIRL), which ground components are required to be operative for a Category II instrument approach?

1—TDZL, RCLS, and REIL.
2—TDZL, RCLS, and RVR.
3—RCLS and REIL.
4—Radar and RVR.

103 *D22* While airborne, you observe a flashing green light from the control tower directed at your aircraft. What is the significance of this visual signal?

1—Give way to other aircraft and continue circling.
2—Cleared to land.
3—Exercise extreme caution.
4—Return for landing.

104 *E15* Which computation must not exceed the length of a runway plus the length of the stopway for a turbine engine powered transport category airplane?

1—Takeoff run.
2—Accelerate-stop distance.
3—Takeoff distance.
4—Takeoff path.

105 *E15* What is the maximum accelerate-stop distance for a turbopropeller powered air carrier airplane?

Runway length	8,800 feet
Clearway length	4,450 feet
Stopway length	2,700 feet

1—13,250 feet
2—11,500 feet
3—10,225 feet
4— 8,800 feet

106 *E18* Based on anticipated landing gross weight, for turbine powered domestic air carrier airplanes, a full stop landing can be made at destination airport within 3,330 feet on a dry runway. What is the minimum effective runway length required by FAR Part 121 when forecast weather conditions indicate that the runways may be wet at the flight planned ETA?

1—3,713 feet
2—5,550 feet
3—5,933 feet
4—6,382 feet

107 *A20* Which is the correct symbol for design cruising speed?

1—V_{MA}
2—M_{MO}
3—V_A
4—V_C

108 *A20* Which is the correct symbol for the stalling speed or the minimum steady flight speed in the landing configuration?

1—V_{S1}
2—V_S
3—V_{SO}
4—V_2

109 *D20* What is the maximum indicated airspeed a reciprocating engine airplane may be operated within a TCA?

1—180 knots
2—200 knots
3—230 knots
4—250 knots

110 *D20* What is the maximum indicated airspeed a turbine-powered airplane may be operated within a Terminal Control Area?

1—200 knots
2—230 knots
3—250 knots
4—288 knots

111 *D20* What is the maximum indicated airspeed a turbine powered airplane may be operated within an Airport Traffic Area?

1—156 knots
2—180 knots
3—200 knots
4—230 knots

112 *E15* What is the maximum takeoff distance for a turbine-engine powered air carrier airplane?

Runway 8L:

Length	8,800 feet
Clearway	4,450 feet
Stopway	2,700 feet

1—13,250 feet
2—13,200 feet
3—12,900 feet
4—11,500 feet

113 *E15* What is the maximum takeoff run for a turbine engine transport category aircraft on this runway?

Runway length	8,800 feet
Clearway length	3,000 feet
Stopway length	1,000 feet

1— 8,800 feet
2— 9,000 feet
3— 9,500 feet
4—11,000 feet

114 *E15* When departing this runway in the direction indicated, a turbojet powered airplane must be able to accelerate to V_1; thereafter, lose the most critical engine and continue to a height of 35 feet within a total distance of (Fig. 5)

1— 7,500 feet.
2— 8,500 feet.
3— 9,500 feet.
4—10,500 feet.

115 *E15* When departing the illustrated runway, in the direction indicated, a turbojet powered airplane must be able to accelerate to V_1; thereafter, lose the most critical engine and continue to a height of 35 feet within a total distance of (Fig. 4)

1— 8,000 feet.
2— 9,500 feet.
3—10,000 feet.
4—12,000 feet.

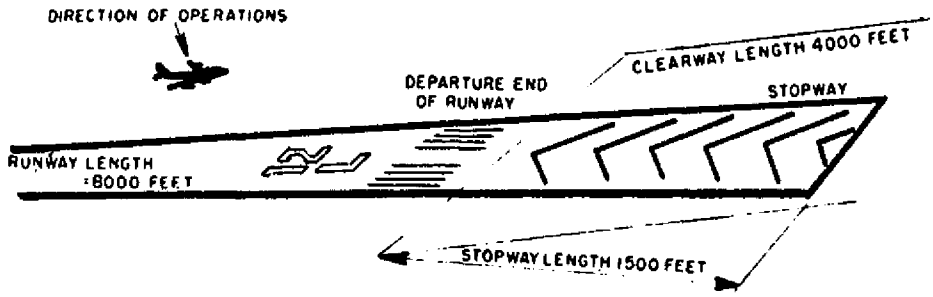

FIGURE 4

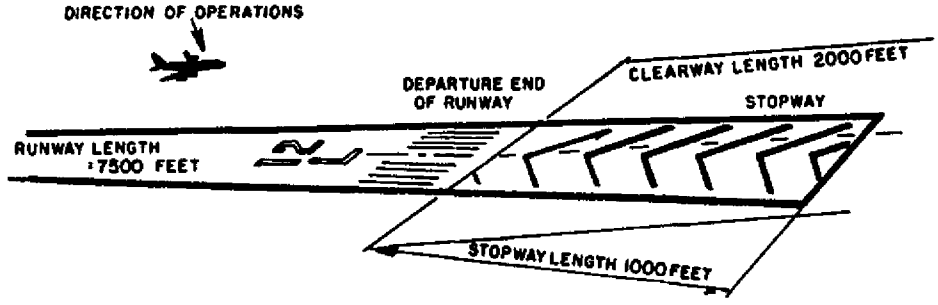

FIGURE 5

116 *E15* Which takeoff computation must not be longer than the runway length for a domestic air carrier transport category airplane?

1—Takeoff distance.

2—Takeoff path.

3—Takeoff run.

4—Accelerate-stop distance.

117 *E15* Which takeoff limitation for a turbine engine, flag air carrier airplane must not exceed 11,100 feet when the (1) runway length is 8,600 feet, (2) stopway is 2,500 feet, and (3) the clearway is 4,200 feet?

1—Takeoff path.

2—Takeoff distance.

3—Accelerate-stop distance.

4—Takeoff run.

118 *E19* What restrictions must be observed regarding the carrying of cargo forward of the foremost seated passengers?

1—All cargo must be separated from all seated passengers by a partition capable of withstanding certain load stresses.

2—All cargo must be carried in a suitable bin and secured to the floor structure of the airplane.

3—The cargo may be carried in an open bin if it is of a non-toxic or non-flammable nature.

4—Cargo may be carried in a passenger seat if properly secured by a safety belt.

119 *E15* For which of these aircraft is the "clearway" for a particular runway considered in computing takeoff weight limitations?

1—Large aircraft (more than 12,500 pounds).

2—Passenger-carrying transport aircraft.

3—Turbine-engine powered transport airplanes.

4—U.S. certificated air carrier airplanes.

120 *E18* What is the maximum landing distance permitted for a turbojet-powered transport to list an airport as an alternate if the effective length of the most favorable runway at this airport is 9,000 feet?

1—5,400 feet
2—6,300 feet
3—7,200 feet
4—8,100 feet

121 *E42* When an air carrier turbojet airplane is to be operated in VFR over-the-top conditions navigating by low frequency or ADF equipment, it must also be equipped with

1—VOR and a standby ADF.
2—VOR, ILS, and Marker Beacon.
3—VOR and Marker Beacon.
4—dual VOR receivers.

122 *E43* A commercial operator has scheduled you to fly a cargo-only, turbojet-powered airplane flight from Chicago-O'Hare to Logan International Airport. Potentially hazardous weather conditions are forecast along the proposed route. Weather radar installed in the airplane is inoperative. For these conditions, the

1—weather radar equipment must be repaired before departure for day VFR or IFR flight.
2—trip must be made in day VFR conditions if the weather radar is not repaired.
3—weather radar is not required for a cargo-only operation.
4—trip may be made day or night but must be in VFR flight conditions if the weather radar is not repaired.

123 *E18* The effective length of the most favorable runway at a certain airport is 7,000 feet. The maximum computed landing distance permitted for a turbopropeller powered transport category airplane to list this airport as an alternate is

1—4,200 feet.
2—4,900 feet.
3—5,600 feet.
4—6,300 feet.

124 *E15* In determining takeoff weight limitations for a turbopropeller powered transport category airplane, what is the maximum takeoff distance for these conditions?

Available runway length ---- 6,500 feet
Length of stopway ---------- 1,500 feet
Length of clearway --------- 3,500 feet

1— 8,250 feet
2— 8,455 feet
3— 9,750 feet
4—10,000 feet

125 *E18* Based on anticipated aircraft landing gross weight, a full stop landing can be made at destination airport within 3,570 feet on a dry runway. What is the minimum effective runway length required by FAR Part 121?

1—5,100 feet
2—5,712 feet
3—5,950 feet
4—6,069 feet

126 *E42* If a turbojet air carrier flight is to be operated in VFR over-the-top conditions, which radio navigation equipment is required to be a dual installation?

1—VOR and DME
2—VOR, DME, and ILS
3—VOR and ILS
4—VOR

127 *E38* What emergency equipment is required for an extended over-water operation for a supplemental air carrier flight?

1—A self-buoyant, water resistant, portable radio for each required liferaft.
2—An appropriately equipped survival kit attached to each required liferaft.
3—A life preserver or other flotation device for the full seating capacity of the airplane.
4—Enough liferafts to accommodate the full seating capacity of the airplane.

128 During which phases of operation must a
E40 flight recorder on a turbine engine powered airplane be continuously operated?

1—From the instant the airplane begins the takeoff roll until it has completed the landing roll at an airport.

2—From starting, to taxi for departure, to engine shutdown after landing at an airport.

3—During taxi, takeoff, and landing.

4—From engine start at departure airport to engine shutdown at landing airport.

129 A commercial operator has scheduled you
E43 to fly a cargo-only, turbojet powered airplane from Logan International to Chicago-O'Hare International. Potentially hazardous weather conditions are forecast along the route. Weather radar installed in the airplane is inoperative. For these conditions,

1—weather radar is not required since this is a cargo operation.

2—the weather radar equipment must be repaired before departure for day VFR or IFR flight.

3—the trip must be made in day VFR conditions if the weather radar is not repaired.

4—the trip may be made day or night but must be in VFR flight conditions if the radar is not repaired.

130 What action should be taken by the pilot
E43 in command if the airborne weather radar becomes inoperative enroute to an air carrier IFR flight for which weather reports indicate possible thunderstorms?

1—Return to the departure airport if closer than the destination airport.

2—Proceed in accordance with the approved instructions in the operations manual for such an event.

3—Fly to and land at the nearest approved air carrier airport.

4—Request ATC for radar vectors to the nearest airport suitable for large aircraft landings.

131 What is the minimum operative equipment
E42 a passenger-carrying turbojet airplane operating under FAR Part 121 must have installed when operating under IFR in the conterminous United States?

1—One DME, two independent VOR receivers, and airborne weather radar.

2—Two DMEs, two LF navigation receivers, and airborne weather radar.

3—One DME, one VOR receiver, and Doppler radar may be substituted for weather radar.

4—One DME and two independent navigation receivers.

132 What is the minimum number of flight at-
F11 tendants required for an airplane having a seating capacity of 176 passengers with only 113 passengers aboard?

1—Two

2—Three

3—Four

4—Five

133 Which emergency equipment is required for
E38 a flag air carrier flight between JFK International and London, England?

1—A self-buoyant, water resistant, portable radio for each required liferaft.

2—Enough liferafts to accommodate the full seating capacity of the airplane.

3—An appropriately equipped survival kit attached to each required liferaft.

4—A life preserver or other flotation device for the full seating capacity of the airplane.

134 What is the maximum takeoff run for a
E15 turbine powered domestic air carrier airplane?

Available runway length ..... 6,500 ft.
Length of clearway ..... 3,500 ft.
Length of stopway ..... 1,500 ft.

1—10,000 feet

2— 9,750 feet

3— 8,000 feet

4— 6,500 feet

135 *E41* What communications capability must the radio equipment required on an air carrier airplane provide when operating VFR over routes navigated by pilotage?

1—Communicate with all traffic control facilities from any point in the PCA within which the flight is conducted.

2—Communicate with all ground stations from any point on the route.

3—Communicate with all the traffic control facilities from any point on the route.

4—Receive meteorological information from any point enroute by either of the two required independent systems.

136 *E20* A flag air carrier proposes to operate a four-engine passenger-carrying landplane in extended overwater operations. Prior to introducing this airplane into service, the air carrier must conduct a simulated ditching demonstration in

1—a mockup of the airplane or a floating device, in night conditions.

2—the airplane, a mockup of the airplane, or a floating device, in daylight conditions.

3—the airplane in both daylight and night conditions.

4—a floating device with a lifesize mockup of the interior of the airplane, in both daylight and night conditions.

137 *E15* What is the maximum takeoff distance on Runway 33R for a turbine-powered air carrier airplane as required by FAR Part 121?

Runway 33R:

Length	8,600 feet
Stopway	2,500 feet
Clearway	4,400 feet

1— 8,600 feet

2—11,100 feet

3—12,800 feet

4—12,900 feet

138 *E18* The anticipated weight for the estimated time of arrival at the destination and alternate airports, for a three-engine jet transport, must allow a full stop landing from a point 50 feet above the intersection of the obstruction clearance plane and the runway within

1—70% of the effective runway length at the destination and 80% at the alternate.

2—60% of the effective runway length at the destination and 70% at the alternate.

3—60% of the effective runway length at both destination and alternate.

4—50% of the effective runway length at the destination and 60% at the alternate.

139 *E19* When cargo is carried aft of the foremost seated passengers in an air carrier airplane, what requirement must be met regarding this cargo?

1—The bin in which the cargo is carried must not be installed in a position that restricts access to or use of any required emergency exit.

2—The cargo may be carried in a passenger seat if properly secured by a safety belt.

3—The cargo may be carried in an open bin if it is of a non-toxic or nonflammable nature.

4—The container or bin in which the cargo is carried must be made of material which is at least flash resistant.

140 *E42* A three-engine turbojet transport airplane operated IFR along victor or jet airways by a domestic air carrier must be equipped with an approved DME receiver

1—only during operations at or above FL 240.

2—only during operations at or above FL 180.

3—regardless of operating altitude.

4—during operations in positive control airspace only.

141 *E42* In which situation must domestic air carriers be equipped with an approved DME receiver for IFR operations on victor or jet airways?

1—At or above FL 240 only.
2—In positive control airspace only.
3—In controlled airspace at all altitudes.
4—At or above FL 180 only.

142 *E40* For what period of time must the flight recorder data be maintained for a large turbine-engine-powered airplane certificated for operations above FL 250?

1—At least 45 days after termination of a flight.
2—A minimum of 10 days.
3—Twenty-five hours of cockpit voice recorder time.
4—At least 30 calendar days.

143 *E44* Information recorded during normal operation by a required cockpit voice recorder in a passenger-carrying airplane

1—may be erased only once each flight.
2—must be retained for at least 12 hours.
3—must be retained for 30 minutes after landing.
4—may all be erased except the last 30 minutes after recording.

144 *E40* An incident occurs which requires termination of a flight and immediate notification of the NTSB under Part 830. Unless otherwise requested by the Administrator, what is the minimum time period the certificate holder is required to keep the flight recorder data?

1— 30 days
2— 60 days
3— 90 days
4—180 days

145 *F11* A flag carrier is operating a four-engine turbojet with a seating capacity of 275 passengers. If the emergency evacuation demonstration was accomplished using eight flight attendants, what is the minimum number of flight attendants required to be on board for a passenger load of 156?

1—Three
2—Five
3—Six
4—Eight

146 *E42* When operating IFR on victor or jet airways, in which situation must domestic air carriers be equipped with an approved DME receiver?

1—At or above FL 180 only.
2—At or above FL 240 only.
3—In controlled airspace at all altitudes or flight levels.
4—In positive control airspace only.

147 *F11* An airplane has a seating capacity for 149 passengers. What is the minimum number of flight attendants required with 97 passengers aboard?

1—Two
2—Three
3—Four
4—Five

148 *E43* Which is an operational requirement concerning airborne weather radar equipment?

1—A separate electrical power supply is required for weather radar equipment.
2—Weather radar equipment must be operating prior to dispatch.
3—If weather radar becomes inoperative enroute, the flight must be terminated by landing at the nearest suitable airport.
4—Turbojet aircraft engaged in passenger or cargo-only operations must have weather radar equipment installed.

149 *E40* When using a flight recorder which has the erasure feature, which amount of data may be erased for the purpose of testing the flight recorder system?

1—Any amount of prerecorded data may be erased.
2—A total of 1 hour of the oldest recorded data accumulated at the time of testing.
3—Not more than 30 minutes of prerecorded data.
4—Not more than a total of 30 minutes of the oldest data accumulated prior to conducting system testing.

150 *F11* A domestic air carrier airplane has a seating capacity for 186 passengers. The certificate holder used two additional flight attendants in conducting the emergency evacuation demonstration. What is the minimum number of flight attendants required?

1—Four

2—Five

3—Six

4—Seven

151 *F10* The airplane is certificated for operation with a minimum flight deck crew of two pilots and one flight engineer. For domestic air carrier operations under FAR Part 121, the flight engineer must be qualified, certificated, and current. In addition, in case of emergency,

1—the flight engineer must be qualified to perform duties at one pilot position.

2—each pilot must be qualified to perform flight engineer duties.

3—at least one pilot must be qualified to perform flight engineer duties.

4—at least one pilot must have served as flight engineer within the preceding 90 days.

152 *G10* Your total flying time for the current month to date is:

July 3 Flight instruction -- 3.0 hrs. (pay)
July 4 Air carrier ------- 7.2 hrs.
July 5 Flight instruction -- 3.0 hrs. (pay)
July 6 Air carrier ------- 8.0 hrs.
July 7 Pleasure trip ------ 3.8 hrs.

You are scheduled for an 8-hour domestic air carrier flight on the 8th of July. Considering your previous flying, this flight would

1—leave you 0.8 hours of flight time below the maximum authorized for a 7-day period.

2—exceed the maximum flight time authorized for a 7-day period by 8 hours.

3—exceed the maximum flight time authorized for a 7-day period by 8 hours.

4—leave you 6.8 hours of flight time below the maximum authorized for a 7-day period.

153 *E38* In addition to fully equipped liferafts and life preservers, what emergency equipment must be provided on an air carrier airplane during extended overwater operations?

1—One survival kit for each 25 occupants.

2—One survival-type emergency locator transmitter.

3—One pyrotechnic signaling device for each 10 occupants.

4—One self-buoyant, water resistant, portable emergency radio transceiver for each 10 occupants.

154 *E43* A commercial operator has scheduled you for a cargo-only flight from Dallas, Texas, to Las Vegas, Nevada. Thunderstorms are forecast along the route of flight. During preflight, you discover that the weather radar installed in the airplane is inoperative. Under these conditions, you know that

1—you must make the trip in day VFR conditions if the radar is not repaired.

2—you may make the trip day or night but, it must be in VFR conditions if the radar is not repaired.

3—you must have the radar repaired before departure.

4—weather radar is not required since this is a cargo-only operation.

155 *F11* A certificate holder used one additional flight attendant when conducting the emergency evacuation demonstration. If the airplane has a seating capacity for 145 passengers, how many flight attendants are required?

1—Three

2—Four

3—Five

4—Six

156 At which altitudes or flight levels is an
E42 approved DME receiver required on a domestic air carrier, three-engine turbojet operating along victor or jet airways?

1—For operations in positive controlled airspace only.

2—At all operating altitudes or flight levels.

3—Only for operations above FL 180.

4—Only for operations between FL 240 and FL 450.

157 When a flight engineer is a required crew-
F10 member on a flight, it is necessary for

1—at least one pilot to hold a Flight Engineer Certificate.

2—at least one pilot to be qualified to perform flight engineer duties, but a certificate is not required.

3—the flight engineer to be properly certificated and qualified, but there is no requirement for any other crewmember to be qualified or certificated to perform flight engineer duties.

4—both pilots to hold Flight Engineer Certificates.

158 The flight time limitations established for
G10 flight crewmembers for operations under FAR Part 121, include

1—all commercial flying in any aircrew position.

2—all flight time in any aircrew position.

3—flight time in scheduled air transportation operations only.

4—only commercial flying in an aircrew position in which FAR Part 121 operations are conducted.

159 A domestic air carrier schedules a two-
G20 pilot crew for two flights within 24 consecutive hours. The first flight takes 6 hours and the second flight is scheduled for 4 hours. Prior to the second flight, the flight crewmembers must be given a rest period of at least

1—12 hours.

2—10 hours.

3— 8 hours.

4— 4 hours.

160 A certificate holder used 10 flight attend-
F11 ants when demonstrating the emergency evacuation procedures on an airplane having a seating capacity of 305 passengers. If the seating capacity is reduced to 285, what is the minimum number of required flight attendants?

1—Seven
2—Eight
3—Nine
4—Ten

161 What is the minimum number of flight at-
F11 tendants required for an airplane having a seating capacity of 160 passengers, if only 100 passengers are aboard?

1—Two
2—Three
3—Four
4—Five

162 Domestic air carriers operating IFR on
E42 victor or jet airways must be equipped with an approved DME receiver

1—for operations at or above FL 240 only.
2—for operations at or above FL 180 only.
3—regardless of operating altitude.
4—for operations in positive airspace only.

163 A flag air carrier airplane has a seating
F11 capacity of 345 passengers. The certificate holder used two additional flight attendants in conducting the emergency evacuation demonstration. What is the minimum number of flight attendants required?

1—Six
2—Seven
3—Eight
4—Nine

164 A certificate holder used eight flight attend-
F11 ants when demonstrating the emergency evacuation procedures on an airplane having a seating capacity of 275 passengers. What is the minimum number of required flight attendants if this airplane's seating capacity is reduced to 245?

1—Six
2—Seven
3—Eight
4—Nine

165 *G10* Your logbook shows these entries:

Date	*Hours*	*Purpose of flight*
Apr. 28	4.5	Air carrier
Apr. 29	6.5	Air carrier
Apr. 30	6.5	Charter
May 1	3.0	Instruction (for pay)
	2.0	Pleasure
May 3	1.0	Pleasure
May 4	7.5	Air carrier

How many additional hours, if any, can you fly for this domestic air carrier on May 5 and not exceed the maximum authorized in any 7 consecutive days?

1—7.5 hours
2—6.5 hours
3—2.0 hours
4—None

166 *G20* A domestic air carrier schedules a two-pilot crew for two flights within 24 consecutive hours. The first flight took 5 hours and the second flight is scheduled for 4 hours. Prior to the second flight, the flight crewmembers must be given a rest period of at least

1—12 hours.
2—10 hours.
3— 8 hours.
4— 5 hours.

167 *G21* What is the maximum number of hours you may fly in 7 consecutive days as pilot in command of a two-pilot crew for a flag air carrier?

1—28 hours
2—30 hours
3—32 hours
4—35 hours

168 *G10* Your logbook shows these entries:

Date	*Hours*	*Purpose of flight*
Oct. 5	4.5	Air carrier
Oct. 6	5.5	Air carrier
	5.0	Air carrier
Oct. 8	5.5	Charter
Oct. 9	3.0	Instruction (for pay)
	2.0	Pleasure
Oct. 10	1.0	Pleasure
Oct. 11	3.5	Air carrier
	4.0	Air carrier

How many additional hours, if any, can you fly for this domestic air carrier on October 12 and not exceed the maximum authorized in any 7 consecutive days?

1—7.5 hours
2—5.5 hours
3—3.5 hours
4—None

169 *G20* What is the maximum flight time a flag air carrier may schedule you to fly as pilot of a two-pilot crew without a rest period?

1—12 hours
2—10 hours
3— 8 hours
4— 6 hours

170 *G22* You are assigned as a flight crewmember for a flag air carrier using three pilots and an additional flight crewmember. What is the maximum number of hours you may fly during any 90 consecutive days?

1—350 hours
2—325 hours
3—300 hours
4—275 hours

171 *G22* What is the maximum number of hours you may fly lduring any 30 consecutive days as pilot in command on a three-pilot crew for a flag air carrier?

1—150 hours
2—120 hours
3—100 hours
4— 90 hours

172 *G10* Your logbook shows these entries:

Date	*Hours*	*Purpose of flight*
Sept. 28	4.5	Air carrier
Sept. 29	6.5	Air carrier
Sept. 30	5.5	Charter
Oct. 1	3.0	Instruction (for pay)
	2.0	Pleasure
Oct. 3	1.0	Pleasure
Oct. 4	7.5	Air carrier

How many additional hours, if any, can you fly for this domestic air carrier on Oct. 5 and not exceed the maximum authorized in any 7 consecutive days?

1—None
2—3.0 hours
3—5.5 hours
4—7.5 hours

173 *E43* The weather radar is inoperative on a three-engine jet transport which is scheduled for a cargo flight from Atlanta to Denver. Thunderstorms are forecast along the route. Under these conditions, the

1—flight may operate without radar only if it can be dispatched during daylight and in VFR conditions.

2—flight may operate day or night without radar if it can be dispatched in VFR conditions.

3—radar must be repaired before the flight is dispatched.

4—flight may operate without radar since it is not carrying passengers.

174 *G10* Your logbook shows these entries:

Date	*Hours*	*Purpose of flight*
Nov. 6	5.5	Air carrier
Nov. 7	4.5	Air carrier
	3.0	Air carrier
Nov. 9	7.5	Charter
Nov. 10	3.5	Instruction (for pay)
	2.0	Pleasure
Nov. 11	4.5	Pleasure
Nov. 12	4.0	Air carrier
	4.0	Air carrier

How many additional hours, if any, can you fly for this domestic air carrier on November 13 and not exceed the maximum authorized in any 7 consecutive days?

1—5.5 hours

2—3.5 hours

3—1.0 hours

4—None

175 *H29* If your airplane flight manual specifies a maximum altitude loss of 75 feet for an autopilot malfunction, what is the lowest height above the terrain the autopilot may be used during enroute operations, including climb and descent?

1—500 feet

2—175 feet

3—150 feet

4—125 feet

176 *H29* The altitude loss for a malfunctioning automatic pilot with an approach coupler for your airplane is 45 feet. The reported weather conditions for a particular airport are less than basic VFR minimums. To what minimum altitude can the automatic pilot be used for an ILS approach to a landing?

1— 30 feet AGL.

2— 50 feet AGL.

3— 95 feet AGL.

4—105 feet AGL.

177 *H24* Should it become necessary to shut one engine down on a domestic air carrier two-engine jet transport, the pilot in command

1—may continue to the planned destination if it is considered as safe as landing at a closer airport.

2—must land at the nearest suitable airport in point of time.

3—may continue to the planned destination if VFR conditions can be maintained for the approach and landing.

4—may continue to the planned destination if approved by the dispatcher.

178 *H24* Should it become necessary to shut one engine down on a flag air carrier three-engine jet transport, the pilot in command

1—may continue on to the planned destination providing the flight can maintain VFR.

2—may continue on to the planned destination if this action is considered as safe as landing at a closer airport.

3—may continue on to the planned destination if this course of action has the concurrence of the dispatcher.

4—must land at the nearest suitable airport in point of time.

179 *H14* Which flight crewmembers may leave their stations during cruising flight to perform normal duties?

1—One pilot or the flight engineer, if that station is occupied by a pilot.

2—Either pilot or the flight engineer, but only one at a time.

3—One pilot and the flight engineer together, when required.

4—Either pilot, but not the flight engineer.

180 May flight crewmembers on flight deck
H14 duty, leave their stations during cruising flight?

1—No, unless there is a relief crewmember to take their place.

2—Yes, if there is one pilot and the flight engineer on duty.

3—Yes, but only one at a time to perform normal duties.

4—Only in case of an emergency.

181 Which procedure should you follow if it
H24 becomes necessary to shut down one engine on a three-engine domestic air carrier airplane after takeoff?

1—Proceed to an airport as directed by the company dispatcher.

2—Land at the takeoff alternate airport listed in the original flight release.

3—Land at the nearest suitable airport in point of time only.

4—Land at any airport you consider as safe as the nearest suitable airport in point of time.

182 What procedure should you follow if it
H24 were necessary to shut down one engine on a four-engine domestic air carrier airplane while enroute?

1—Land at any airport you consider as safe as the nearest suitable airport in point of time.

2—Land at the nearest suitable airport in point of time only.

3—Land at the takeoff alternate listed in the flight dispatch.

4—Proceed to the airport specified by the company dispatcher.

183 What flying equipment must be readily
H18 available for the use of each crewmember on each flight?

1—Flashlight.

2—Sun glasses.

3—Protective gloves.

4—Personal oxygen mask.

184 A person who appears to be intoxicated,
H28 has created a disturbance aboard an air carrier aircraft. Within which time period shall the certificate holder submit a written report of the incident to the Administrator?

1—48 hours

2— 5 days

3— 7 days

4—10 days

185 Prior to checking personal baggage, a pas-
H32 senger notifies the certificate holder that an unloaded weapon is inside. What procedure is required regarding the handling of this baggage?

1—The baggage may be carried in the flight crew compartment, provided it is locked and a flight crewmember retains the key.

2—When baggage size permits, it must be placed beneath the passengers seat or within the passenger compartment, and the passenger must retain the key.

3—The baggage must remain locked and custody of the key to the baggage must remain with a designated person other than the owner of the weapon.

4—The baggage must remain locked and carried in an area other than the flight crew compartment that is inaccessible to other passengers.

186 A passenger notifies the certificate holder
H32 prior to checking baggage that an unloaded weapon is in the baggage. What is the requirement regarding this baggage aboard the aircraft?

1—The baggage may be carried in the flight crew compartment, provided the baggage remains locked.

2—The baggage must remain locked and custody of the key shall remain with a designated person other than the owner of the weapon.

3—The baggage must be placed under the passenger's seat and the key retained by a flight crewmember.

4—The baggage must remain locked and only the passenger retains the key.

187 A crewmember, on flight deck duty, may *H14* leave the station during cruising flight to perform normal duties only if

1—accompanied by another crewmember for security purposes.

2—one pilot and another crewmember qualified for the flight engineer station remain on duty.

3—one pilot occupies the pilot in command station.

4—one crewmember leaves their station at a time.

188 Within what time period before departure, *H31* should a certificatee holder normally be notified that a person, in the custody of law enforcement personnel, will be aboard the aircraft?

1—Anytime, provided the escorted person is seated in the foremost portion of the passenger cabin.

2—At least 5 hours, if the person being escorted is considered dangerous by the government entity having custody.

3—At least 1 hour.

4—At least 2 hours.

189 A person, in the custody of law enforcement *H31* personnel, is scheduled on your flight. What procedures are required regarding boarding of this person and the escort?

1—They shall be boarded before all other passengers enplane, and deplane after all passengers have left the aircraft.

2—They must be seated next to, or directly across from, the rearmost emergency exit.

3—They shall enplane and deplane before all other passengers.

4—They shall be boarded after all other passengers enplane, and deplane before all other passengers deplane.

190 Each certificate holder operating a passen- *H26* ger-carrying airplane shall ensure that all passengers are orally briefed by the approcrewmember before each takeoff on

1—location of emergency exits, oxygen masks, and liferafts.

2—use of seat belts, oxygen, and life preservers.

3—smoking, use of seat belts, and location of emergency exits

4—use of oxygen, location of emergency exits, and life preservers.

191 A three-engine air carrier airplane is on *I20* the ground at an airport where the weather has deteriorated so that it is below the air carrier's landing minimums for that airport. The airplane may be dispatched from that airport when an alternate airport is located not more than

1—2 hours from the departure airport at normal cruising speed under the most adverse wind conditions forecast during that period.

2—1 hour from the departure airport at normal cruising speed in still air with one engine inoperative.

3—2 hours from the departure airport at normal cruising speed in still air with one engine inoperative.

4—1 hour from the departure airport at normal cruising speed.

192 At 1815Z, a domestic air carrier flight lands *I10* at an intermediate airport specified in the dispatch release. If the flight is delayed, what is the latest time it may depart the intermediate airport without a redispatch release?

1—1845Z

2—1915Z

3—1945Z

4—2015Z

193 What is the maximum distance specified *I20* for an alternate airport for two-engine airplanes, if weather conditions at the departure airport are below the landing minimums in the operations specifications for that airport?

1—Two hours at normal cruise speed in still air with one engine operating.

2—Two hours at normal cruise speed in still air with both engines operating.

3—One hour at normal cruise speed in still air with one engine operating.

4—One hour at normal cruise speed in still air with both engines operating.

194 What is the maximum time a flag air carrier may remain on the ground after landing at an intermediate airport before a redispatch release is required for the destination airport?
I11

1—30 minutes
2— 1 hour
3— 3 hours
4— 6 hours

195 An airport may not be listed as an alternate in the dispatch release unless the weather reports or forecasts indicate that the weather conditions will be at or above the alternate minimums
I24

1—listed on the approach charts of that airport, from 2 hours before to 2 hours after the ETA for that flight.
2—listed on the approach charts of that airport, at the time the flight is expected to arrive.
3—specified in the certificate holder's operations specification for that airport, from 1 hour before to 1 hour after the ETA for that flight.
4—specified in the certificate holder's operations specification for that airport, when the flight arrives.

196 The altitude loss for a malfunctioning automatic pilot with an approach coupler is 20 feet. The reported weather is below basic VFR minimums and you are making an ILS approach using the approach coupler. What is the minimum altitude to which the autopilot may be used?
H29

1— 40 feet AGL.
2— 70 feet AGL.
3— 90 feet AGL.
4—150 feet AGL.

197 What is the maximum time a domestic flight may remain on the ground after landing at an intermediate airport specified in the dispatch release before a redispatch release is required for the destination airport?
I10

1—30 minutes
2— 1 hour
3— 3 hours
4— 6 hours

198 If your flight is advised that pilot reports indicate icing conditions which might adversely affect the safety of flight, the operations
I26

1—shall not be continued except by joint approval of the dispatcher and ATC.
2—may be continued only if all anti-icing and deicing equipment is operating normally.
3—may be continued, but a landing shall not be made in such icing conditions.
4—shall not be continued or a landing made in such icing conditions.

199 If weather conditions at the departure airport are below the landing minimums in the operations specifications for that airport, what is the maximum distance specified for an alternate airport for airplanes having four engines?
I20

1—One hour at normal cruise speed in still air with all engines operating.
2—Two hours at normal cruise speed in still air with one engine inoperative.
3—Two hours at normal cruise speed in still air with all engines operating.
4—One hour at normal cruise speed in still air with one engine inoperative.

200 For IFR operations within the 48 contiguous states and the District of Columbia, supplemental air carriers and commercial operators are required to list an alternate airport for each destination airport
I23

1—only when the forecast ceiling and visibility are less than 5,000 and 5, from 2 hours before to 2 hours after the ETA.
2—only when the forecast ceiling and visibility are less than 3,000 and 3, from 2 hours before to 2 hours after the ETA.
3—regardless of the reported and forecast weather conditions.
4—only when the forecast ceiling is less than 1,000 feet above the MEA, MOCA, or initial approach altitude, or forecast visibility is less than 3 miles from 2 hours before to 2 hours after the ETA.

201 *123* For IFR operations within the 48 contiguous states and the District of Columbia, supplemental air carriers are required to list an alternate airport for each destination airport

1—only when the forecast ceiling and visibility are less than 5,000 and 5, from 2 hours before to 2 hours after the ETA.

2—only when the forecast ceiling and visibility are less than 3,000 and 3, from 2 hours before to 2 hours after the ETA.

3—only when the forecast ceiling is less than 1,000 feet above the MEA, MOCA, or initial approach altitude, or forecast visibility is less than 3 miles, from 2 hours before to 2 hours after the ETA.

4—regardless of the reported and forecast weather conditions.

202 *111* At 1805Z, a flag air carrier flight lands at an intermediate airport. If the flight experiences a delay for maintenance, what is the latest time it may depart for the destination airport without a redispatch release?

1—0005Z

2—2005Z

3—1905Z

4—1850Z

203 *120* If a scheduled flight in a four-engine domestic air carrier airplane requires a departure alternate airport, what is the greatest distance in flying time it may be located from the departure airport at normal cruising speed in still air?

1—One hour, with all engines operative.

2—Two hours, with all engines operative.

3—Two hours, with one engine inoperative.

4—One hour, with two engines inoperative.

204 *111* At 1345Z, a flag air carrier flight lands at an intermediate airport. If the flight experiences a delay, what is the latest time it may depart for the destination airport without a redispatch release?

1—1415Z

2—1445Z

3—1545Z

4—1945Z

205 *140* How is the reserve fuel supply computed for a three-engine turbojet powered domestic air carrier airplane?

1—30 minutes at holding fuel consumption, 1,500 feet above the destination or alternate airport.

2—45 minutes at holding fuel consumption, 1,500 feet above the destination or alternate airport.

3—30 minutes at normal fuel consumption.

4—45 minutes at normal fuel consumption.

206 *125* As pilot in command, you note that a specific item of airplane equipment is inoperative. Which document specifies the approved procedures to be followed for a particular air carrier regarding inoperative equipment?

1—Original dispatch release.

2—Minimum Equipment List.

3—Amended flight or dispatch release.

4—Certificate holders operating manual or AFM.

207 *148* Your FAR Part 121 flight time as pilot in command consists of only 100 hours in a Boeing 707 type airplane. How does this affect the MDA, DH, or minimum visibility for IFR Category I approaches?

1—The MDA or DH is decreased by 100 feet.

2—MDA or DH and visibility minimums are decreased by 100 feet and ½ mile.

3—Has no affect.

4—MDA or DH and visibility minimums are increased by 100 feet and ½ mile.

208 For a flag air carrier flight, to be released
143 to an island airport for which an alternate airport is not available, a turbojet powered airplane must have enough fuel to fly to that airport and thereafter to fly

1—for 2 hours at normal cruising fuel consumption.

2—back to the departure airport.

3—for 2 hours at a fuel consumption computed for 10,000 feet MSL at a specific weight and holding airspeed.

4—for at least 10% of the total ETE to the destination airport.

209 A domestic air carrier may list an airport
124 as an alternate airport when the appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions at that airport will be at or above

1—600–2 if the airport has a precision approach or 800–2 if it has only nonprecision approaches, when the flight arrives at that airport.

2—the sliding scale alternate airport weather minimums of 800–2, 900–1½, or 1000–1, until 1 hour after the flight arrives at that airport.

3—the alternate weather minimums listed in the certificate holder's operations specifications, when the flight arrives at the airport.

4—the sliding scale alternate airport weather minimums of 800–2, 900–1½, or 1000–1, when the flight arrives at that airport.

210 What are the IFR takeoff minimums for
147 supplemental air carriers and commercial operators?

1—One-half statute mile—aircraft having more than two engines.

2—As specified in the operations specifications.

3—As printed on the approach chart for that runway.

4—As printed on IFR takeoff and departure procedures.

211 Your FAR Part 121 flight time as pilot in
148 command consists of only 90 hours in a Boeing 727 type airplane. How does this affect DH, MDA, or minimum visibility requirements for an instrument approach to RWY 4L in this type airplane? (The airplane is approach Category C.)

CATEGORY	A	B	C	D
S-ILS-4L	312-¾ 300 (300-¾)			312-1 300 (300-1)
S-LOC-4L	400-1 388 (400-1)			

1—The DH would be 412 feet MSL with 1¼ miles visibility; the MDA would be 500 feet MSL with 1½ miles visibility.

2—The minimums would remain unchanged.

3—The DH would remain 300 feet MSL; the MDA would be increased to 700 feet MSL.

4—The DH would be 512 feet MSL, visibility 1¾ miles; MDA 600 feet MSL with 1½ miles visibility.

212 The reserve fuel supply required for a do-
140 mestic air carrier flight in a turbojet powered airplane is

1—45 minutes at holding fuel consumption, 1,500 feet above the destination or alternate airport.

2—30 minutes at holding fuel consumption, 1,500 feet above the destination or alternate airport.

3—45 minutes at normal fuel consumption.

4—30 minutes at normal fuel consumption.

213 In addition to the required trip fuel, which
144 factor is used when computing fuel requirements for all operations?

1—Enough fuel for one instrument approach and possible missed approach at destination.

2—Forty-five minutes of reserve fuel computed at normal cruise fuel flow at 10,000 feet.

3—Thirty minutes reserve computed at normal cruise fuel flow.

4—Additional fuel for unanticipated traffic delays and two missed approaches.

226 *I44* Which factor is used when computing fuel requirements for all Part 121 operations?

1—Additional fuel for unanticipated traffic delays and two missed approaches.

2—Enough fuel for flight to destination airport, plus 30 minutes reserve computed at normal cruise fuel flow.

3—In addition to planned trip fuel, enough fuel for one instrument approach and possible missed approach at destination.

4—Enough fuel to land at destination airport, plus 45 minutes of reserve fuel computed at normal cruise fuel flow at 10,000 feet.

227 *E20* Which criteria must be met for the demonstration of emergency evacuation procedures for a domestic air carrier?

1—Employees of the certificate holder may participate as "passengers" in the demonstrations.

2—Certain emergency equipment normally installed on the airplane may be simulated during the demonstrations.

3—A ditching demonstration may be conducted either during dark-of-night or daylight conditions.

4—The aborted takeoff evacuation demonstration must be conducted in simulated or actual dark-of-night conditions.

228 *I25* Which document contains the approved procedures for dispatch, or continuing flight, if a required item of equipment becomes inoperative?

1—Minimum Equipment List.

2—Operations Specifications.

3—Amended flight/dispatch release.

4—Original dispatch release.

CATEGORY	A	B	C	D
S-ILS 24 *		323-1	280 (300-1)	
S-LOC-24		420-1	377 (400-1)	
CIRCLING	540-1	488 (500-1)	540-1½ 488 (500-1½)	620-2 568 (600-2)

*Increase DH 50' when ALS not available.
When control zone not effective: Use Otis Approach Control altimeter setting, increase all MDA's 20' and alternate minimums not authorized.
Inoperative table does not apply to HIRLS and ALS Rwy 24.
Glide slope unusable below 270 feet, unusable auto-pilot coupled approaches below 320 feet.

FIGURE 7

229 *I48* Your FAR Part 121 flight time as pilot in command consists of only 95 hours in a Boeing 727 type airplane. What effect would this experience have on the approach minimums for an instrument approach in this type airplane to RWY 24 at the destination airport? (Figure 7; use the following conditions.)

Approach Category ..... D
Approach Light System ... In service
Control Zone ..... Not effective

1—The MDA would be 540 feet MSL; visibility 1 mile.

2—The DH would be 478 feet MSL; visibility 1½ miles.

3—The DH would be 520 feet MSL; visibility 1½ miles.

4—The DH would be 423 feet MSL; visibility 1½ miles.

230 *I48* Your FAR Part 121 flight time as pilot in command consists of only 87 hours in a DC-10 type airplane. What effect would this experience have on the approach minimums for an instrument approach in this type airplane to RWY 24 at the destination airport? (Figure 7; use the following conditions.)

Control Zone ..... Not effective
Approach Light System ... OTS
Approach Category C

DH/Visibility

1—473 feet MSL/1½ miles

2—453 feet MSL/1 mile

3—373 feet MSL/1 mile

4—373 feet MSL/1½ miles

231 *E20* For a demonstration of emergency evacuation procedures under FAR Part 121, the passengers

1—must not include training personnel assigned to the seats next to the emergency exits and ditching equipment.

2—may be assigned specific seats in order to proportion the females and children under 12 years of age.

3—should be briefed on the procedures to be followed in the demonstration so as to minimize injury.

4—may be given prior knowledge of the emergency exits to be used for the demonstration.

232 *I26* What action shall be taken if a flight encounters icing conditions that might adversely affect the safety of flight? The flight

1—shall not be continued unless approval is received from the company dispatcher and flight operations.

2—may be continued to the original destination airport, provided that all anti-icing and deicing equipment is operational and is used.

3—may be continued to the alternate airport, but a landing shall not be made in such icing conditions.

4—shall not be continued, nor shall a landing be made, in such icing conditions.

233 *E20* Which requirement meets the criteria for the demonstration of an aborted takeoff evacuation?

1—Certain required emergency equipment normally installed in the aircraft may be simulated during the demonstration.

2—Certain crewmembers may be given prior knowledge of emergency exits available for the demonstration.

3—The demonstration must be conducted during actual or simulated dark-of-night conditions.

4—Training personnel who operate the airplane in the normal course of their duties may be used as passengers.

234 *I73* Which certificated air carrier operator must contain in the load manifest information for the airplane at takeoff concerning the maximum allowable takeoff weight for the runway intended to be used?

1—Commercial and Supplemental.

2—Domestic only.

3—Flag and Domestic.

4—Supplemental only.

235 *I70* Which information must be contained in, or attached to, the dispatch release for a domestic carrier?

1—Total fuel supply on board the airplane.

2—Type of operation (e.g., IFR, VFR).

3—Weight and balance data.

4—Passenger manifest and cargo weight.

236 *I71* Which certificated air carrier operator must contain in the load manifest the names of passengers?

1—Flag air carriers only.

2—Domestic and Flag air carriers.

3—Commercial air carriers only.

4—Supplemental and Commercial air carriers.

237 *I72* What information must be contained in the load manifest for a domestic and flag air carrier?

1—Distribution of passengers and cargo.

2—CG position at takeoff.

3—Maximum allowable weight for the flight.

4—The names of passengers.

238 *I72* What information from the load manifest must the pilot in command of a domestic air carrier operator carry to the destination airport?

1—Cargo and passenger distribution.

2—Evidence that the aircraft is loaded according to an approved schedule.

3—Names of passengers.

4—Flight number and statement of type of operation (e.g., IFR, VFR).

239 *I76* When a Mechanical Reliability Report is required of a certificate holder, when shall this report be submitted in writing to the FAA Maintenance Inspector?

1—The following workday.

2—Within 10 days.

3—Within 7 days.

4—Within 48 hours.

214 If a departure alternate airport is required
120 for dispatch of a three-engine airplane, what is the maximum distance it may be from the departure airport?

1—One hour at normal cruise speed in still air.

2—Two hours at slow cruise speed in still air with all engines operating.

3—One hour at high cruise speed in still air with one engine inoperative.

4—Two hours at normal cruise speed in still air with one engine inoperative.

A Mechanical Reliability Report shall be [illegible] by a certificate holder when [illegible] warning sys-

alternate airport for each destination airport

1—regardless of the reported and forecast weather conditions.

2—only when the forecast ceiling and visibility are less than 3,000 feet and 3 miles for the ETA ±2 hours.

3—only when the forecast ceiling and visibility are less than 5,000 feet and 5 miles for the ETA ±2 hours.

4—only when the forecast ceiling is less than 1,000 feet above the MEA, MOCA, or initial approach altitude, and the forecast visibility is less than 3 miles for the ETA ±2 hours.

218 Your FAR Part 121 flight time as pilot in
148 command consists of only 80 hours in a DC-10 type airplane. How does this affect the MDA, DH, or minimum visibility for [illegible] Category I approaches?

[illegible] DH and visibility minimums [illegible] 100 feet and ½ mile. [illegible] minimums [illegible] ½ mile.

[illegible] An air carrier airplane had a brake failure during landing. After repairs have been made, an airworthiness release is the responsibility of the

I7

1—flight engineer

2—aircraft dispatcher.

3—pilot in command.

4—certif[illegible]

[illegible]—For the [illegible]

parture alternate airport is required
120 for dispatch of a three-engine airplane, what is the maximum distance it may be from the departure airport?

1—One hour at normal cruise speed in still air.

2—Two hours at slow cruise speed in still air with all engines operating.

3—One hour at high cruise speed in still air with one engine inoperative.

4—Two hours at normal cruise speed in still air with one engine inoperative.

215 A Mechanical Reliability Report shall be
176 submitted by a certificate holder when

1—the main landing gear warning system fails.

2—an engine is shut down during flight due to icing.

3—minor repairs must be made on any part of the aircraft structure.

4—a brake system fails whether the aircraft is stationary or in motion.

216 Under what condition may a pilot of a
146 domestic air carrier complete an instrument approach procedure to the DH, if the reported weather conditions are less than the prescribed minimums for that airport?

1—If the pilot specifically requests and is cleared for a radar monitored ILS approach.

2—If the weather report indicating below minimum conditions is received after the pilot has been cleared for a PAR or ILS approach.

3—When the airport is served by an operative ILS or PAR and one is used by the pilot.

4—When the weather report indicating below minimum conditions is received after the pilot has passed the OM on an ILS approach.

217 For operations within the 48 contiguous
123 states and the District of Columbia, a commercial operator is required to list an

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3—For the localizer-only approach, the MDA is 1,120 feet MSL, and the visibility is RVR 50.

4—All minimums applicable to all approach procedures must be increased by at least 100 feet additional altitude and 1 mile visibility.

CATEGORY	A	B	C	D
S-ILS 14L	852/18 200 (200-½)			852/20 200 (200-½)
S-LOC 14L	1120/24 468 (500-½)			1120/40 468 (500-¾)
CIRCLING	1160-1 493 (500-1)		1160-1½ 493 (500-1½)	1220-2 553 (600-2)

FIGURE 6

224 *148* Your FAR Part 121 flight time as pilot in command consists of only 95 hours in an L–1011 type airplane. What affect, if any, would this experience have on the approach minimums for an instrument approach in this type airplane to RWY 14L at the ultimate destination airport? (The airplane is approach Category C. Figure 6)

1—The MDA is 1,220 feet MSL and the DH is 952 feet MSL; the RVR for each is increased by 2,400 feet.

2—The MDA is 1,220 feet MSL, visibility RVR 40; the DH is 952 feet, visibility RVR 34.

3—The approach minimums would not be affected.

4—The MDA is 1,120 feet MSL and the DH is 952 feet MSL; the visibility requirements remain the same.

225 *148* Your FAR Part 121 flight time as pilot in command consists of only 85 hours in an L–1011 type airplane. How would this experience affect the approach minimums for an instrument approach in this type airplane for a landing on RWY 18 at a destination airport? (Figure 7; use the following conditions.)

Approach Category C
Approach Light System ... Out of service
Control Zone ..... Not effective

MDA/Visibility

1—540 feet MSL/1½ miles

2—560 feet MSL/1½ miles

3—640 feet MSL/2 miles

4—660 feet MSL/2 miles

240 *144* Which factor is used when computing fuel requirements for all Part 121 operations?

1—Enough fuel for flight to destination airport, plus 1 hour reserve computed at normal cruise fuel flow.

2—Additional fuel for unanticipated traffic delays and two missed approaches.

3—Enough fuel to land at destination airport, plus 2 hours of reserve fuel computed at normal cruise fuel flow at 10,000 feet.

4—In addition to planned trip fuel, enough fuel for one instrument approach and possible missed approach at destination.

241 *177* The pilot in command of an air carrier airplane has shut down an engine in flight due to foreign object ingestion. After repairs have been made, the preparation of the airworthiness release is the responsibility of the

1—aircraft dispatcher.

2—certificate holder.

3—pilot in command.

4—flight engineer.

242 *176* Each certificate holder shall submit a Mechanical Reliability Report when

1—minor repairs must be made on any portion of the aircraft structure.

2—any part or component on the aircraft requires repair.

3—an aircraft component fails, which results in the pilot taking emergency action (other than engine shutdown).

4—the main landing gear warning system fails.

You are taking off at night in VFR flight conditions from an airport located within a Control Zone where Special VFR flight is permitted.

* * * * * *

243 *145* Which adjustment, if any, may be made to the takeoff ceiling and visibility requirements when a restriction to surface visibility exists? (All flight maneuvers will be accomplished beyond 1 mile from the airport boundary and outside the area of surface visibility restriction.)

1—No reduction may be made to ceiling requirements; the visibility may be reduced to 1 mile, providing RVR information is available.

2—The visibility requirement may be reduced to ½ mile; the ceiling must be 1,000 feet AGL.

3—No reduction may be made to the ceiling or visibility requirement during night operations.

4—Visibility requirements may be reduced to 1 mile; the ceiling must be 1,500 feet.

244 *171* Which certificated air carrier operators must attach to, or include on, the flight release form the name of each flight crewmember, flight attendant, and designated pilot in command?

1—Domestic and Flag.

2—Supplemental and Domestic.

3—Flag and Commercial.

4—Supplemental and Commercial.

245 *150* Which inflight conditions are required by a supplemental air carrier to conduct a day, over-the-top, flight below the specified IFR minimum enroute altitude?

1—The flight must be conducted at least 2,000 feet above and 1,000 feet below any overcast or broken cloud layer and have at least 5 miles flight visibility.

2—The flight must be conducted at least 1,000 feet above an overcast or broken cloud layer and have at least 5 miles flight visibility.

3—The height of any higher overcast or broken layer must be at least 500 feet above the IFR MEA.

4—The flight must remain clear of clouds by at least 500 feet vertically and 1,000 feet horizontally and have at least 3 miles flight visibility.

246 *Q24* On an Enroute Low Altitude Chart or Area Chart, which altitude ensures acceptable navigational signal coverage for accurate navigation only within 25 statute miles of a VOR/VORTAC?

1—MEA

2—MRA

3—MOCA

4—MCA

247 *R34* What is an Airport Advisory Area?

1—That airspace within 5 statute miles of an airport, extending up to but not including 3,000 feet, within which a control tower is in operation.

2—That airspace within 5 statute miles of an airport which does not have a control tower but where an FSS is located.

3—That airspace identified by an area on the surface within which flight of an aircraft is subject to special restrictions.

4—The airspace which extends upward from the surface and terminates at the base of the Continental Control Area (CCA).

248 *S26* On a direct flight off established airways, what is the maximum distance between (H) class navigation aids that may be used to ensure adequate signal reception for a flight at FL 450?

1—180 nmi

2—150 nmi

3—200 nmi

4—260 nmi

249 *R34* What is an airport traffic area?

1—That airspace extending upward to, but not including 3,000 feet, within a 5-statute mile radius from the center of an airport which has an operating control tower.

2—That airspace within 5 statute miles of an airport which does not have a control tower but where an FSS is located.

3—The airspace identified by an area on the surface within which flight of an aircraft is subject to restrictions.

4—That airspace which extends upward from the surface and terminates at the base of the Continental Control Area.

250 *145* You are taking off at night in VFR conditions from an airport located within a control zone where Special VFR flight is permitted. Which adjustment, if any, may be made to the takeoff ceiling and visibility requirement when a restriction to surface visibility exists? (All turns will be accomplished beyond 1 mile from the airport boundary and outside the area of surface visibility restriction.)

1—Visibility requirements may be reduced to ½ mile; the ceiling must be 1,000 feet AGL.

2—No reduction may be made to the ceiling or visibility requirements during night operations.

3—Visibility requirements may be reduced to 1 statute mile; the ceiling must be 1,500 feet AGL.

4—No reduction may be made to ceiling requirements; the visibility may be reduced to 1 mile, providing RVR information is available.

251 *Q24* On Enroute Low Altitude or Area Charts, which altitude ensures acceptable signal coverage for accurate navigation only within 25 statute miles of a VOR/VORTAC?

1—MOCA

2—MCA

3—MEA

4—MRA

252 *I50* Which inflight conditions are required for a domestic air carrier to conduct a day, over-the-top, flight below the specified IFR minimum enroute altitude?

1—The flight must be conducted at least 2,000 feet above and 1,000 feet below any overcast or broken cloud layer and have at least 5 miles flight visibility.

2—The height of any higher overcast or broken layer must be at least 500 feet above the IFR MEA.

3—The flight must be conducted at least 1,000 feet above an overcast or broken cloud layer and have at least 5 miles flight visibility.

4—The flight must remain clear of any clouds by at least 500 feet vertically and 1,000 feet horizontally and have at least 3 miles flight visibility.

253 *R12* A particular VORTAC station is undergoing routine maintenance. This is evidenced by

1—removal of the identification feature.

2—transmitting a series of dashes after each identification signal.

3—removal of the voice feature of the TACAN.

4—broadcasting a maintenance alert notice on the voice channel.

254 *Q24* On an Enroute Low Altitude Chart, which altitude ensures acceptable navigational signal reception by which an accurate determination of position can be made at a specified intersection?

1—MRA

2—MOCA

3—MEA

4—MCA

255 *R12* What is the operational status of a VOR/VORTAC if you receive only the coded identifier every 37½ seconds?

1—The VOR is inoperative; the DME is operating normally.

2—The DME is inoperative; the VOR is operating normally.

3—Maintenance is being performed and that neither the VOR nor DME is operating normally.

4—Both the VOR and DME signals are operating normally.

256 *S26* For operations off established airways between 14,500 feet MSL and 17,999 feet MSL in the conterminous United States, (H) class facilities used to define the proposed route should not be further apart than

1—130 nmi.

2—180 nmi.

3—200 nmi.

4—260 nmi.

257 *R13* Unless determined otherwise through flight inspection procedures, what is the normal expected service range of an (H) class navigation aid as it appears on the Enroute High Altitude Chart for a proposed flight at FL 350?

1—130 nmi

2—120 nmi

3—110 nmi

4—100 nmi

258 *S20* What is the purpose of the FDC NOTAMs?

1—To provide the latest information on the status of navigation facilities to all FSS facilities for scheduled broadcasts.

2—To issue notices for all airports and navigation facilities in the shortest possible time.

3—To advise of regulatory changes in instrument approach procedures prior to their normal publication cycle.

4—To provide all information considered essential to flight safety in one publication.

259 *R10* Of the three methods used to disseminate aeronautical information concerning the National Airspace System, which is considered to be the *primary* method?

1—The Airman's Information Manual.

2—The NOTAM system.

3—Flight Service Stations and ARTCCs.

4—The Aeronautical Charts.

260 An area navigation high route is confined
T23 to the airspace between

1—18,000 feet MSL and FL 450.

2—FL 240 and FL 450.

3—FL 240 and FL 600.

4—FL 310 and FL 600.

261 Unless determined otherwise through flight
R13 inspection procedures, what is the normal expected service range of an (L) class navigation aid as it appears on an Enroute Low Altitude Chart?

1—40 nmi

2—30 nmi

3—20 nmi

4—10 nmi

262 An area navigation low route is confined
T23 to the airspace from

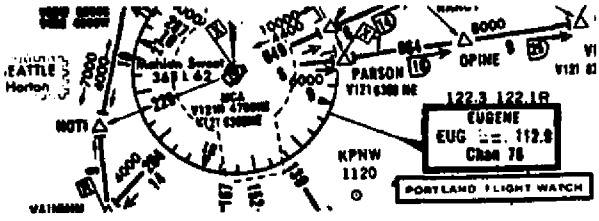
1—1,200 feet above the surface up to, but not including, 18,000 feet MSL.

2—10,000 feet MSL up to, but not including, 18,000 feet MSL.

3—10,000 feet MSL up to, but not including, FL 240.

4—1,200 feet above the surface up to, but not including, 10,000 feet MSL.

263 What frequency should a pilot use to con-
Q11 tact Portland Flight Watch?



1—122.6

2—122.1R

3—122.0

4—122.2

264 What service should you normally expect
V30 from an Enroute Flight Advisory Service station?

1—Preferential routing and provide radar vectoring to circumnavigate severe weather.

2—Severe weather information, changes to flight plans, and receive routine position reports.

3—Routine weather information and thunderstorm activity along your route.

4—Radar vectors for traffic avoidance, routine weather advisories, and altimeter settings.

265 What weather service is provided by an
V32 FSS having broadcast capability on VORs and NDBs?

1—AIRMETs & SIGMETs at 15 minutes past each hour, and every 15 minutes as long as they are in effect.

2—AIRMETs & SIGMETs during their valid time period when they pertain to the area within 450 nmi of the FSS.

3—Weather reports 15 minutes past each hour, from reporting points within approximately 150 miles of the broadcasting station.

4—Weather reports, 15 and 45 minutes past each hour, from reporting points within approximately 150 miles of the broadcasting station.

266 What is one important difference between
R16 the simplified directional facility (SDF) and the ILS localizer? The SDF

1—has a wider course resulting in less precision.

2—utilizes a lower frequency band.

3—range information is provided by DME.

4—coded identification consists of a two-letter identifier.

267 *Z10* In which publication will you find the restrictions to service range for a particular NAVAID?

1—AIM, Part 1, Basic Flight Manual, and ATC procedures.

2—FDC NOTAMs.

3—AIM, Part 3 and 3A, Operational Data, and Notices to Airmen.

4—AIM, Part 4, Graphic Notices, and Supplemental Data.

268 *R32* The vertical extent of the Positive Control Area throughout the conterminous United States is from

1—FL 240 to FL 600.

2—18,000 feet to FL 600.

3—18,000 feet to FL 450.

4—14,500 feet to FL 450.

269 *V30* How should you establish contact with an Enroute Flight Advisory Station Station?

1—Call "METRO" on 127.0.

2—Call "ARTCC" on 122.5.

3—Call "FLIGHT ADVISORY" on 122.1.

4—Call "FLIGHT WATCH" on 122.0.

270 *D44* IFR altitudes or flight levels assigned by ATC normally conform to the hemispheric rule. Which of the following groups contain altitudes or flight levels appropriate for a westbound IFR flight?

1—6,000, 8,000, FL 280, FL 310.

2—6,500, 8,500, FL 285, FL 315.

3—7,000, 9,000, FL 290, FL 330.

4—7,500, 9,500, FL 295, FL 315.

271 *D44* IFR altitudes or flight levels assigned by ATC normally conform to the hemispheric rule. Which of the following groups contain altitudes or flight levels appropriate for an eastbound IFR flight?

1—7,000, 9,000, FL 290, FL 330.

2—7,500, 9,500, FL 295, FL 315.

3—6,000, 8,000, FL 280, FL 310.

4—6,500, 8,500, FL 285, FL 315.

272 *D44* Flight levels assigned to IFR flights by ATC normally conform to the hemispheric rule. Which of the following would be appropriate flight levels for an IFR flight from New York to Chicago?

1—FL 300, 320, 340.

2—FL 310, 330, 350.

3—FL 280, 300, 320.

4—FL 280, 310, 350.

273 *R32* The vertical extent of the Positive Control Area throughout the conterminous United States is from

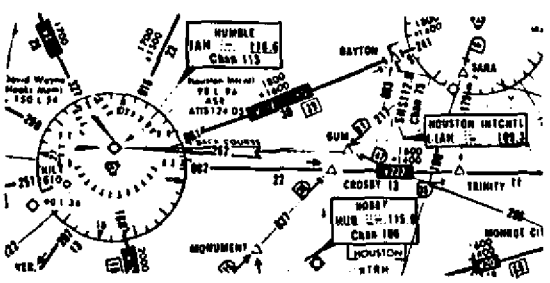
1—14,500 feet to FL 450.

2—18,000 feet to FL 450.

3—18,000 feet to FL 600.

4—FL 240 to FL 600.

274 *Q12* What operational consideration is indicated by this symbol (TTTT) surrounding the Control Zone at Houston Intercontinental Airport?



1—Only aircraft which are transponder equipped and under radar control are authorized within the Control Zone.

2—Both visual and contact approaches are prohibited.

3—Fixed-wing special VFR approaches are prohibited.

4—The Control Zone terminates at the base of the Terminal Control Area (TCA).

275 *T11* An abbreviated departure clearance, "cleared as filed," will always contain the

1—name of destination airport to which cleared.

2—name of each location where the route changes airways.

3—name of the first compulsory reporting point.

4—assigned cruising altitude.

276 When designated in conjunction with an
R32 airport which has a published instrument approach procedure, what airspace is defined as a Transition Area?

1—That airspace extending upward from the surface and terminating at the base of the overlying Continental Control Area (CCA).

2—The airspace extending upward from the surface to 3,000 feet within a 5-statute mile radius from the center of an airport.

3—That airspace extending upward from 700 feet or more AGL and terminating at the base of the overlying controlled airspace.

4—Areas that are designated as Group I or Group II TCAs for which all aircraft are subject to the operating rules of FAR Part 91.

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§ CHICAGO-O'HARE INTL (ORD) *IFR* 16NW LRA FSS: CHICAGO (LC 626-8266)

667 H116/14R-32L(7) (S-100, D-185, DT-350)
BL4,6,7A,8,10,11,12,13,14,15 SS F12,18,22,30,34 Qx1,2,3,4 U2
VASI: Rwy 4R and STOL rwy 18.
REIL: Rwy 22R RVV: Rwys 4L, 9L RVR-1: Rwy 27R RVR-2: Rwys 14L, 32R, 14R, 32L
Remarks: Fee. High-Density Traffic Arpt, prior reservation required, contact FSS for instructions. VFR reservations information avbl on ATIS. VASI set at 6° for STOL acft. Rwys 9R-27L, 14R-32L, 4R-22L and 9L-27R surface grooved. Rwy 18 clsd indg and rwy 36 clsd tkof. Cert.-FAR 139, CFR Index E. F40 fuel avbl byp rior permission.

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277 What service is provided by the Chicago
Z10 FSS as indicated by this symbol (§)? (Refer to the AIM, Part 3 excerpt above.)

1—IFR flight reservations with ATC are mandatory unless otherwise authorized.

2—Chicago-O'Hare is a U.S. Customs airport of entry.

3—Complete NOTAM service is available.

4—User fee for landing is required of air carrier operators.

278 What is the speed and weight combination
Q36 used to determine aircraft approach categories?

1—Stalling speed in approach configuration at maximum certificated landing weight.

2—1.3 times the stalling speed in approach configuration at maximum certificated gross weight.

3—Stalling speed in landing configuration at maximum certificated gross weight.

4—1.3 times the stalling speed in landing configuration at maximum certificated landing weight.

279 If severe turbulence should be encountered,
Z19 a pilot should make the necessary power adjustments and attempt to maintain

1—a level flight attitude.

2—both a constant airspeed and altitude.

3—a constant altitude.

4—a constant airspeed.

280 How does the wake turbulence vortex cir-
V36 culate around each wingtip?

1—Inward, upward, and around each tip.

2—Clockwise as viewed from behind.

3—Inward, upward, and counterclockwise.

4—Outward, upward, and around each tip.

ST. LOUIS FSS 121.5 122.0 122.1R 122.2 122.6 (WR)

§ ST LOUIS, LAMBERT-ST LOUIS INTL (STL) *IFR* 10NW LRA
FSS: ST LOUIS on Fld
589 H100/12R-30L(4) (S-100, D-184, DT-346) BL6,7A,8,12,13 SS F18,34,40 U2 RVR-2: Rwy 24, 12R VASI: Rwy 30R
Remarks: Rwy 12R threshold displaced 458'. A-gear all rwys except 12L-30R and 17-35. Arresting Cables rwy 12R 1125' from threshold, rwy 30L 610' from threshold, rwy 6 1509' from threshold, rwy 24 622' from threshold. Rwy 6-24 grooved. Cert.-FAR 139, CFR Index C.

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281 What service is provided by the St. Louis
Z10 FSS as indicated by this symbol (§)? (Refer to the AIM, Part 3 excerpt above.)

1—Complete NOTAM service.

2—U. S. customs (airport of entry).

3—User fee (landing) is required for all air carrier operations.

4—Pilot to forecaster weather briefing on frequency 122.1.

282 *Q36* To determine which instrument approach category minimums are applicable to a turbojet airplane, you must know the

1—number of engines and stall speed at the anticipated landing weight.

2—V_{SO} at maximum certificated landing weight.

3—V_{SO} at maximum certificated takeoff weight.

4—V_A at maximum certificated landing weight.

283 *T14* If you do not file for a specific Standard Instrument Departure (SID) on your flight plan, ATC

1—may assign a SID if they deem it appropriate.

2—will ask if you will accept a SID before assigning one as part of your clearance.

3—will not assign a SID as part of your clearance.

4—will not assign a SID unless you request it when you call for your clearance.

284 *D44* Altitudes or flight levels for IFR flights assigned by ATC normally conform to the hemispheric rule, which of the following contain only flight levels appropriate for an eastbound flight?

1—FL 270, 290, 310.

2—FL 280, 300, 320.

3—FL 310, 350, 390.

4—FL 290, 330, 370.

285 *T14* What operational consideration normally applies to a SID clearance?

1—A SID clearance will not be issued to an air carrier IFR flight unless the pilot in command specifically requests it.

2—The pilot in command of an air carrier airplane may either accept or decline a SID clearance.

3—ATC will not issue a SID clearance to any aircraft departing VFR on an IFR flight plan.

4—An air carrier pilot must accept a SID clearance issued by ATC.

286 *V35* As compared to a wind down the landing runway, what effect would a light crosswind of approximately 7 knots have on wingtip vortex behavior?

1—The downwind vortex would tend to remain in the touchdown zone longer than the upwind vortex.

2—Both vortices would move downwind at a greater rate than if the surface wind was directly down the landing runway.

3—The upwind vortex would tend to remain in the touchdown zone longer than the downwind vortex.

4—A light crosswind would rapidly dissipate the strength of both vortices.

287 *Z18* What is critical Mach number? It is the

1—same for all high altitude aircraft.

2—speed at which the aircraft starts to "buffet" or "tuck."

3—speed where the airflow over the wing is completely supersonic.

4—highest speed possible without supersonic airflow over any part of the wing.

288 *V35* What are the pilots' and air traffic controllers' responsibilities with regard to minimizing the hazards associated with wake turbulence?

1—Pilots are not expected to adjust their operations or flight paths for wake avoidance in a VFR traffic pattern, unless the tower advises "CAUTION —WAKE TURBULENCE."

2—Pilots can expect at least a 3-minute takeoff clearance separation by air traffic controllers when making a VFR intersection departure behind heavy jet aircraft, unless they request to deviate from the interval.

3—Pilots are responsible for their own wake turbulence separation, except when ATC issues instructions to follow another aircraft on a visual approach.

4—Pilots can expect at least a 2-minute takeoff clearance separation by air traffic controllers for VFR departures behind heavy jet aircraft, unless they request to deviate from the interval.

289 *Q36* In determining the aircraft approach category for an instrument approach procedure, airplane speeds are based upon 1.3 times the stalling speed of the aircraft in the

1—landing configuration at the estimated gross landing weight.

2—approach configuration at the estimated landing weight.

3—approach configuration at V_{REF} at the certificated landing weight.

4—landing configuration at the maximum certificated gross landing weight.

290 *Z16* What term is used to describe hydroplaning which occurs when an airplane's tire is effectively held off a smooth runway surface by steam generated by friction?

1—Viscous hydroplaning.

2—Frictional hydroplaning.

3—Reverted rubber hydroplaning.

4—Dynamic hydroplaning.

291 *Z17* For a given airplane gross weight at a constant Mach .82 cruise, what is the relationship between fuel flow, temperature, and altitude? Fuel flow is higher when

1—temperature is decreased and altitude is increased.

2—both temperature and altitude are increased.

3—temperature is increased and altitude is decreased.

4—both temperature and altitude are decreased.

292 *Q36* Which information is necessary to determine the category of an airplane for instrument approaches?

1—The stall speed in landing configuration (at maximum certificated landing weight) and the maximum certificated landing weight.

2—The stall speed in landing configuration (at maximum certificated landing weight) and the maximum takeoff weight.

3—The minimum steady flight speed at which the airplane is controllable and the actual landing weight.

4—The minimum steady flight speed at which the airplane is controllable and the actual takeoff weight.

293 *Z15* Which illustration correctly depicts FL 260? (Fig. 8)

1—A

2—B

3—C

4—D

294 *Z15* Which altimeter correctly depicts FL 210? (Fig. 9)

1—A

2—B

3—C

4—D

295 *V34* A pilot encounters turbulence which causes rapid bumps or jolts without appreciable changes in aircraft altitude less than ⅓ of the time. This should be reported as

1—intermittent light to moderate chop.

2—intermittent moderate turbulence.

3—occasional light turbulence.

4—occasional moderate chop.

296 *Z15* Which altimeter correctly depicts FL 330? (Fig. 10)

1—A

2—B

3—C

4—D

297 *Z15* Which altimeter correctly depicts FL 370? (Fig. 11)

1—A

2—B

3—C

4—D

298 *Z15* Which altimeter correctly depicts FL 290? (Fig. 12)

1—A

2—B

3—C

4—D

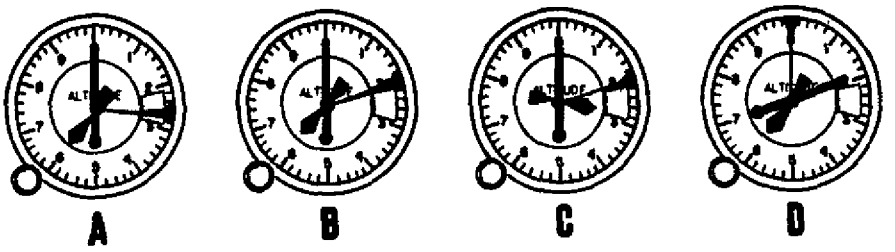


FIGURE 8

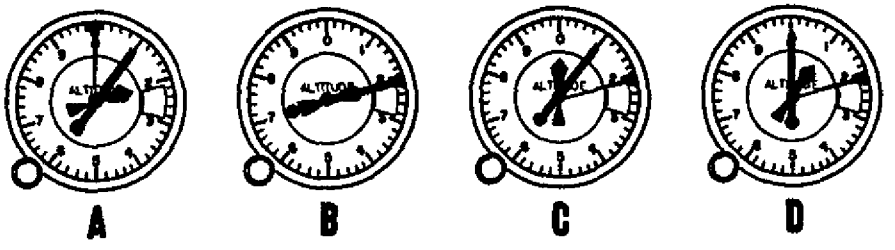


FIGURE 9

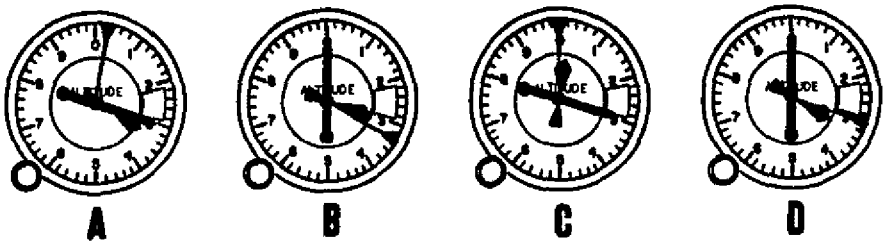


FIGURE 10

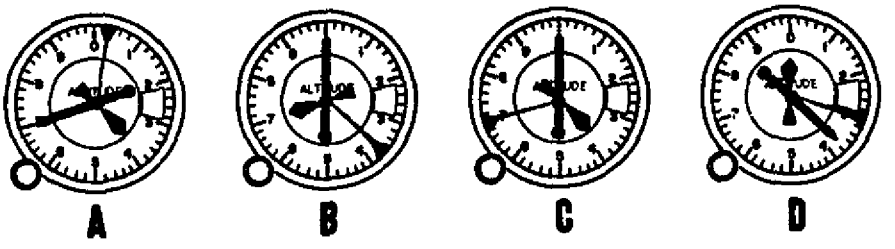


FIGURE 11

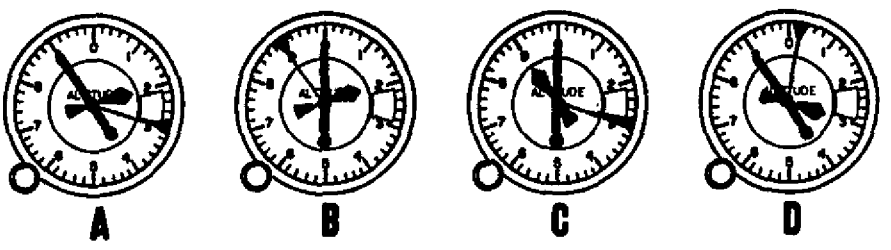
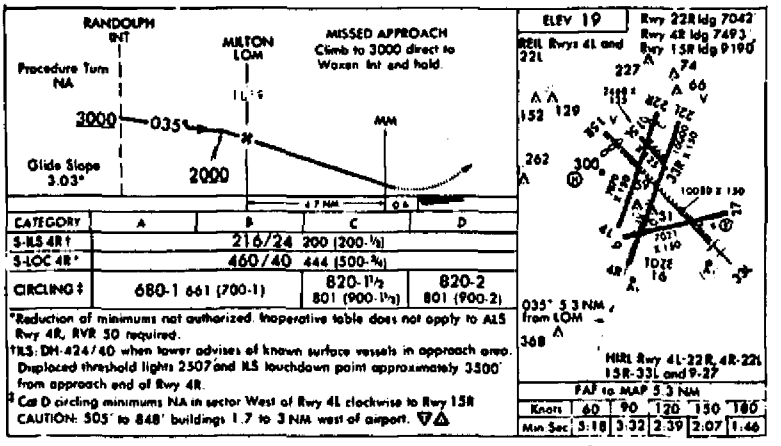


FIGURE 12



ILS RWY 4R

LOGAN INTERNATIONAL

Approach Chart Excerpt

FIGURE 13

Flight conditions dictate that a left circling approach be made to RWY 15R after reaching circling minimums while on an ILS approach to RWY 4 to Logan International Airport. (Fig. 13)

299 *Q40* Use these conditions and determine the approach category and landing restrictions, if any, which would apply to this airplane.

Certificated maximum gross landing weight ---------- 154,000 lbs.
1.3 V_{SO} at this weight ---- 140 knots
Computed landing weight --- 141,000 lbs.
Maneuvering airspeed at this weight ---------- 141 knots

1—Category C only; no circling restrictions would apply.

2—Category D only; however, a right circling approach to RWY 15R must be made.

3—Category D only; no maneuvering restrictions would apply.

4—Either category C or D depending upon approach airspeed; no maneuving restrictions would apply.

300 *V35* If you takeoff behind a heavy jet that has just landed, you should plan to lift-off

1—past the point where it touched down.

2—prior to the point where it touched down and on the upwind edge of the runway.

3—prior to the point where it touched down.

4—at the point where it touched down.

301 *J22* The most frequent type of temperature inversion encountered over land is that produced by

1—widespread sinking of air within a thick layer aloft resulting in heating by compression.

2—warm air being lifted rapidly aloft in the vicinity of mountainous terrain.

3—terrestrial radiation on a clear, relatively still night.

4—the movement of colder air under warm air, or the movement of warm air over colder air.

302 *J30* What term is used, with regard to pressure systems, to denote a neutral pressure area between two lows (L) and two highs (H)?

1—TROUGH

2—COL

3—RIDGE

4—GRADIENT

303 *K11* What is the process by which ice can form on a surface directly from water vapor on a cold, clear night?

1—Evaporation

2—Supersaturation

3—Condensation

4—Sublimation

304 *J31* What causes variations in altimeter settings between weather reporting points?

1—Friction of the air with the earth's surface.

2—Unequal heating of the earth's surface.

3—Variation of terrain elevation creating barriers to the movement of an airmass.

4—Coriolis force reacting with friction.

305 *J31* The altimeter is set correctly while cruising at FL 290; however, you fail to reset it to the local altimeter setting of 30.08 during descent. Assuming a properly functioning altimeter and a field elevation of 2,150 feet, approximately what will the altimeter indicate after landing?

1—2,000 feet

2—2,130 feet

3—2,170 feet

4—2,300 feet

306 *J44* What relationship exists between the winds above the friction level and the surface winds?

1—Upper winds are lighter and their directions are approximately 30° to the right of deflected surface winds.

2—Upper winds are stronger and their directions are approximately 30° to the left of the deflected surface winds.

3—Upper winds are stronger and their directions are approximately 30° to the right of deflected surface winds.

4—Upper winds are lighter and their directions are approximately 30° to the left of deflected surface winds.

307 *J22* The following temperature conditions exist at a certain weather reporting station.

Surface	−7°C.
2,500 feet	0°C.
5,000 feet	+8°C.
7,000 feet	+11°C.
10,000 feet	+4°C.

A temperature inversion exists only between

1—7,000 and 10,000 feet.

2—5,000 and 7,000 feet.

3—2,500 and 5,000 feet.

4—the surface and 7,000 feet.

308 *K10* What determines the amount of water vapor a parcel of air can hold?

1—Relative humidity.

2—Temperature of the air.

3—Stability of the airmass.

4—Temperature/dewpoint spread.

309 *K10* To what does the term "dewpoint" refer?

1—The temperature to which air must be cooled to become saturated.

2—The temperature at which fog will form.

3—The spread between actual temperature and temperature during evaporation.

4—The temperature at which the evaporation and condensation points are equal.

310 *J47* What is an important characteristic of wind shear?

1—It can be present at any level and can exist in both a horizontal and vertical direction.

2—It usually exists only in the vicinity of thunderstorms but may be found near a strong temperature inversion.

3—It occurs primarily at the lower levels and is usually associated with mountain waves.

4—It exists in a horizontal direction only, and is normally found near a jetstream.

311 *K21* Moisture and vertical movement have what effect on the stability of an airmass?

1—Lifting of an airmass and removal of water vapor from the lower layers tend to decrease its stability.

2—Sinking of an airmass and removal of water vapor from the lower layers tend to increase its stability.

3—Sinking of an airmass and addition of water vapor to the lower layers tend to decrease its stability.

4—Lifting of an airmass and addition of water vapor to the lower layers tend to increase its stability.

312 In what localities is radiation fog most
L40 likely to occur?

1—Level inland areas.

2—Coastland areas.

3—Mountain valleys.

4—Mountain slopes.

313 What conditions are necessary for the for-
L30 mation of thunderstorms?

1—Lifting force, high temperature, and unstable conditions.

2—Lifting force, high humidity, and unstable conditions.

3—High humidity, high temperature, and cumulus clouds.

4—Low pressure, high humidity, and cumulus clouds.

314 Which thunderstorms generally produce
L33 the most severe conditions, such as heavy hail and destructive winds?

1—Cold front thunderstorms.

2—Airmass thunderstorms.

3—Warm front thunderstorms.

4—Squall line thunderstorms.

315 Winds at 8,000 feet on a particular flight
J43 are generally southwesterly, while most of the surface winds are southerly. This difference in direction is primarily due to

1—a stronger pressure gradient at higher altitudes.

2—the influence of pressure systems at the lower altitudes.

3—friction between the wind and the surface.

4—stronger Coriolis force at the surface.

316 What are the processes by which moisture
K11 is added to unsaturated air?

1—Heating and sublimation.

2—Evaporation and sublimation.

3—Heating and condensation.

4—Supersaturation and evaporation.

317 What are some typical characteristics of
K40 a warm airmass?

1—Stratiform clouds, turbulence, and good visibility.

2—Cumuliform clouds, turbulence, and good visibility.

3—Stratiform clouds, smooth air, and poor visibility.

4—Cumuliform clouds, smooth air, and poor visibility.

318 From which measurement of the atmos-
J22 phere can stability be determined?

1—Actual lapse rate.

2—Atmospheric pressure.

3—Wind.

4—Surface temperature.

319 At approximately what altitude above the
K21 surface would you expect the base of cumuliform clouds if the surface air temperature is 96°F. and the dewpoint is 82°F?

1—9,000 feet

2—7,000 feet

3—5,000 feet

4—3,000 feet

320 At flight level 330, the temperature is
J22 −55°C. In relation to the International Standard Atmosphere, this temperature is

1—10° colder than standard.

2—standard.

3—5° warmer than standard.

4—5° colder than standard.

321 Which is an operational consideration re-
L20 garding inflight aircraft structural icing?

1—Clear ice is brittle and thus more easily removed than rime ice.

2—Clear ice is most frequently encountered in stratiform clouds.

3—Rime ice tends to spread over and take the shape of the airfoil.

4—Fast-freezing rime ice can accumulate when the temperature is between 0° and −40°C.

322 *L20* Which is an operational consideration regarding inflight structural icing?

1—The most dangerous icing conditions are always associated with freezing rain.

2—The most severe icing occurs when temperatures are between 0° and −10°C.

3—Rime icing in stratiform clouds is usually not a problem when the temperature is −5°C. or colder.

4—Rime ice formation is usually the result of large supercooled water droplets that freeze upon contact.

323 *L40* Which conditions are most conducive to the formation of advection fog?

1—A warm, moist airmass on the windward side of a mountain range.

2—A light breeze which moves a colder airmass out to sea.

3—A warm, moist airmass which moves over a relatively cooler surface.

4—An airmass which moves inland from a coastline in winter.

324 *L40* Fogs produced by frontal activity are generally a result of saturation due to

1—adiabatic cooling.

2—evaporation of surface moisture.

3—nocturnal cooling.

4—evaporation of precipitation.

325 *L26* What conditions are most favorable to the formation of frost on an aircraft in flight?

1—A warm aircraft ascending into a zone of temperatures slightly below freezing with high relative humidity.

2—A cold aircraft descending from subzero temperatures to a zone of temperatures slightly below freezing with visible moisture.

3—A warm aircraft ascending into a zone of subfreezing temperatures and visible moisture.

4—A cold aircraft descending from subzero temperatures to above freezing temperatures and high relative humidity.

326 *L31* Which of the following features do you normally associate with the "cumulus" stage" of thunderstorm formation?

1—Continuous updraft.

2—Frequent lightning.

3—Roll cloud.

4—Heavy rain at surface.

327 *L20* What determines the type of structural icing that can form on the surface of an aircraft?

1—Size of the water droplets and outside air temperature.

2—Percent of relative humidity and outside air temperature.

3—Rate at which it freezes upon contact with aircraft.

4—Temperature of the air and the aircraft surface.

328 *L31* Which weather phenomenon signals the beginning of the mature stage of a thunderstorm?

1—A sharp drop in temperature.

2—The start of rain at the surface.

3—The appearance of an anvil top.

4—Strong and gusty surface winds.

329 *L40* Which conditions are most conducive to the formation of radiation fog?

1—Moist, tropical air moving over cold offshore water.

2—Warm, moist air over flatland areas on clear nights with calm winds.

3—The movement of cold air over much warmer water.

4—A warm, moist airmass on the windward side of mountains.

330 *L40* In which type of fog will turbulence and icing often be encountered?

1—Radiation fog.

2—Advection fog.

3—Steam fog.

4—Ice fog.

331 *L40* In which situation is advection fog most likely to form?

1—Warm, moist air moving over a relatively cooler surface with no-wind conditions.

2—A warm, moist airmass on the windward side of a mountain range.

3—An airmass moving inland from the coast in winter.

4—A light breeze moving colder air out to sea.

332 *L40* Advection fog has drifted over a coastal airport during the day. What may tend to dissipate or lift this fog into low stratus clouds?

1—Dryness of the land surface.

2—Nighttime cooling.

3—Sea breeze effect.

4—Heating from adjacent industrial areas.

333 *N17* What is the significance of the "RB35" entered in the remarks of the SA 1914ØØ for MLC?

SA21 1914ØØ

MLC SP 8 SCT E18 OVC 7R-123/64/62/33Ø7/992/RB35

1—Runway braking factor is 35% of dry runway surface due to light rain.

2—Runway arresting gear is inoperative on Runway 35.

3—Rain began at 1335Z at MLC.

4—Cloud tops of rain showers at 3,500 feet AGL determined by radiosonde balloon soundings.

334 *L40* Which situation is most conducive to the formation of advection fog?

1—An airmass moving inland from the coast in wintertime.

2—Warm, moist air settling over a cool surface under no-wind conditions.

3—A light breeze blowing colder air out to sea.

4—A warm, moist airmass on the windward side of the mountains.

335 *U19* For an IFR flight to be cleared for a visual approach, what approach and landing minimum must prevail?

1—Ceiling which permits at least a 1,000-foot obstacle clearance.

2—1,000-foot ceiling and 1-mile visibility.

3—The same minimums as the IFR approach to that runway.

4—Basic VFR conditions (VMC).

336 *L45* The reporting station originating the SA below, has a field elevation of 1,000 feet MSL. If the reported sky condition is one continuous layer, what is its thickness?

W7X1/2FK 172/34/33/ØØØØ/ØØ3/OVC 5Ø

1—5,000 feet

2—4,300 feet

3—4,000 feet

4—3,300 feet

337 *U19* What approach and landing minimums must prevail for an IFR flight cleared for for a visual approach?

1—The same minimums as the IFR approach to that runway.

2—Basic VFR conditions (VMC).

3—Ceiling which permits at least a 1,000-foot obstacle clearance.

4—1,000-foot ceiling and 1-mile visibility.

338 *N15* What wind conditions would you anticipate when squalls are reported at your destination?

1—Rapid variations in windspeed of 10 knots or more between peaks and lulls.

2—Peak gusts of at least 35 knots combined with a change in wind direction of 30° or more.

3—Sudden increases in windspeed of at least 15 knots to a sustained speed of 20 knots or more.

4—Variations of at least 60° in wind direction when windspeeds are above 10 knots.

339 What is the significance of the "F2" in the
N12 Remarks portion of this SA?

SA21 191105

ORF SP −X E80 BKN 250 OVC 1GF 169/67/672105/0003/R05VV11/2 F2

1—The partial obscuration is caused by fog and the visibility value is variable to 1½ to 2 statute miles.

2—Fog is obscuring two-tenths of the sky.

3—The restriction to visibility is caused by fog and the prevailing visibility is 2 statute miles.

4—Surface based obscuration is caused by fog and is 200 feet thick.

340 How often are Area Forecasts (FA) pre-
N31 pared by the National Weather Service?

1—18 hours

2—12 hours

3— 8 hours

4— 6 hours

341 What is the significance of the "LE30"
N17 entry in the Remarks of this SA?

SA21 191105

HAR M3 OVC 2R-F 128/62/62/0000/005/ LE30→HAR↘7/15

1—Drizzle is expected to end 30 minutes past the hour.

2—Lightning has been observed approximately 30 miles to the east.

3—Drizzle ended at 1030Z.

4—Leading edge of warm front is 30 miles east of station.

342 What is the significance of the "RB32"
N17 entered in the Remarks of this SA?

SA22 191106

FSM 25 SCT M44 OVC 7RW—093/71/68/ 0000/983/RB32

1—The runway barrier (arresting gear) for Runway 32 is inoperative.

2—Rain began at 1032Z at FSM.

3—Runway braking factor is 32.

4—The maximum weight limitation (runway bearing) is 32,000 pounds.

343 What cloud coverage was reported by a
N20 pilot as indicated by this SA?

SA 191908

MSY M8 OVC 2RW—132/45/44/3010/ 990/UA/OV 17NW MSY 1845/SK OVC 020/045 OVC 090

1—Three separate overcast layers exist with bases at 2,000, 4,500, and 9,000 feet respectively.

2—The top of the lower overcast is 2,000; base and top of second layer are 4,500 and 9,000 feet respectively.

3—Three separate overcast layers exist with tops at 2,000, 4,500, and 9,000 feet.

4—The base of a second overcast cloud layer is 2,000 feet, top at 4,500 feet; base of third layer is 9,000 feet.

344 What significant cloud coverage is reported
N20 by a pilot in this SA?

SA22 181407

MOB M9 OVC 2LF 131/44/43/3212/991/ UA/OV 15NW MOB 1355/SK OVC 025/045 OVC 090

1—Three separate overcast layers exist with bases at 2,500, 7,500, and 13,500 feet.

2—Three separate overcast layers exist with tops at 2,500, 7,500, and 13,500 feet.

3—The base of second overcast layer is 2,500 feet; top of second overcast layer is 7,500 feet; base of third layer is 13,500 feet.

4—The top of lower overcast is 2,500 feet; base and top of second overcast layer is 7,500 and 13,500 feet respectively.

345 What is the valid time period for an Area
N31 Forecast (FA)?

1—12 hours, plus an 8-hour outlook.

2—8 hours, plus a 12-hour outlook.

3—18 hours, plus a 12-hour outlook.

4—8 hours, plus an 8-hour outlook.

VALID 141200Z FOR USE 0900-1500Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
MLT	2807	2715-07	2728-10	2842-13	2867-21	2891-30	781842	782650	780456
BOS	9900	2313-01	2525-04	2637-07	2661-16	2674-27	269041	269450	278458
EMI	1415	2118+07	2230+04	2341-01	2360-13	2469-25	247940	248649	259458
PLB	0210	9900-07	2714-09	2728-12	2656-19	2677-29	760142	760850	269658
ALB	0710	1906-01	2418-04	2532-07	2558-16	2572-27	258941	269450	269159

FIGURE 14

346 *N34* A certain station forecasts the wind and temperature aloft for 39,000 feet as 310° at 205 knots, temperature −55°C. How would this information be encoded on the FD?

1—362055

2—260505

3—819955

4—810555

347 *N30* What meteorological condition is expected to exist at 0900Z for LGA?

LGA 191515 5 SCT C8 OVC SCT OCNL 2 L-R-F. 18Z C8 BKN 15 OVC 3F 1010 OCNL 2 L-R-F. 00Z C5 OVC 2 L-F OCNL C2 X 1/2 L-F. 092 LIFR CIG LF.

1—Ceiling less than 500 feet and/or visibility less than 1 mile due to drizzle and fog.

2—Intermittent drizzle, fog, and rain; ceiling lifting after 0900Z.

3—Intermittent lowering ceilings caused by drizzle and fog.

4—Lowering ceilings due to light drizzle, light rain, and fog.

348 *N30* What expected windspeed is specifically implied at 0200Z–

JFK 121515 C18 OVC 2ZL 2210. 18Z C22 OVC 4R– 2420 CHC C10 OVC 2TRW AFT 20Z. 22Z 35 SCT 2515. 00Z CLR. 02Z VFR WIND.

1—Fifteen knots or stronger.

2—Twenty-five knots or stronger.

3—Five knots or less.

4—Ten knots or less.

349 *N34* What is the nearest average wind and temperature (relative to ISA) a pilot should expect when planning a flight over PLB at FL 270? (Fig. 14)

1—260° @ 64 knots; ISA −3°C.

2—270° @ 90 knots; ISA −3°C.

3—280° @ 65 knots; ISA +5°C.

4—260° @ 90 knots; ISA +3°C.

350 *N34* What wind and temperature (relative to ISA) should a pilot expect when planning a flight over MLT at FL 280? (Fig. 14)

1—280° TRUE @ 166 knots; ISA +3°C.

2—280° TRUE @ 109 knots; ISA +3°C.

3—280° MAGNETIC @ 109 knots; ISA −3°C.

4—080° MAGNETIC @ 119 knots; ISA.

351 *N30* What expected visibility is specifically implied at 2200Z?

SAT 131010 C15 OVC 3ZR 2315. 16Z C20 OVC 4R– 2420 CHC C5 OVC 2TRW AFT 18Z. 22Z 35 SCT 2415. 00Z CLR. 04Z VFR WIND.

1—More than 12 miles.

2—Five miles or more.

3—More than 6 miles.

4—Ten miles or more.

352 *N34* What wind and temperature (relative to ISA) should a pilot expect when planning a flight for FL 320 over MLT? (Fig. 14)

1—280° @ 122 knots; ISA −3°C.

2—280° @ 122 knots; ISA +3°C.

3—200° @ 120 knots; ISA −7°C.

4—200° @ 78 knots; ISA +3°C.

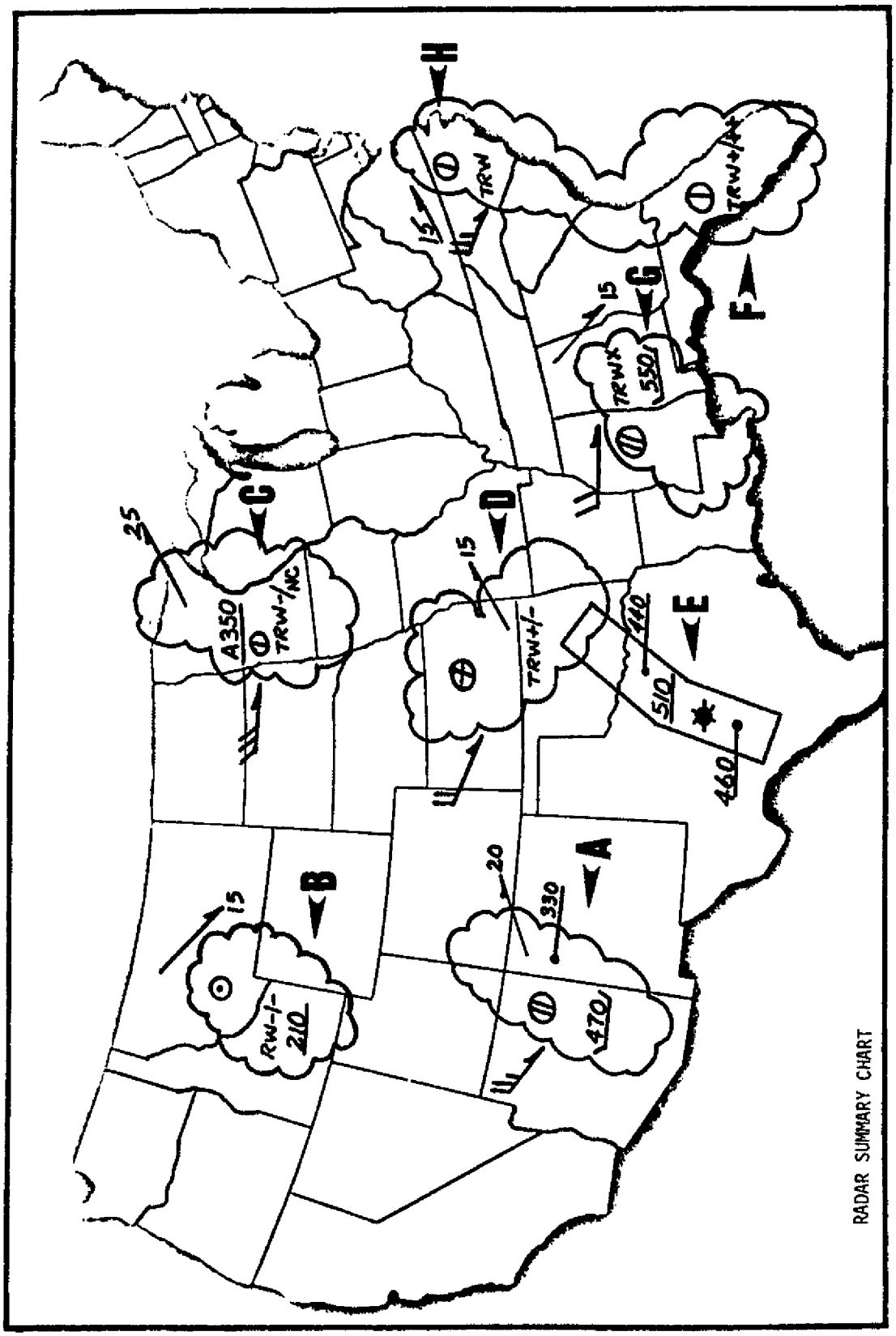

RADAR SUMMARY CHART
A
B
C
D
E
F
G
H
330
470
RW+/-
210
A350
TRW-/NC
TRW+/-
440
510
460
TRW
TRW+/-
TRW+
550
15
20
25

FIGURE 15

353 *O26* What weather conditions are depicted on the Radar Summary Chart within the area indicated by Arrow E? (Fig. 15)

1—Area of echoes with average tops of 46,000 feet in south-central Texas and 44,000 feet in north-central Texas, and individual echo with top at 51,000 feet.

2—Line of echoes with average tops 51,000 feet; a strong cell detected by two or more radars.

3—Line of echoes with average tops of 51,000 feet, tornado activity detected in central Texas by two or more radars.

4—A severe weather watch is in effect for this area; average tops of echoes is 51,000 feet, tornado activity possible.

354 *N34* A certain station is forecasting wind and temperature aloft to be 290° at 200 knots, temperature −52°C. at 39,000 feet pressure altitude. How would this information be encoded on the FD?

1—799952

2—29ØØ-52

3—79ØØ-52

4—299952

355 *O26* What weather conditions are depicted on the Radar Summary Chart within the area indicated by Arrow C? (Fig. 15)

1—Scattered thunderstorms; rain showers decreasing in intensity (no change), average tops 35,000 feet.

2—Average cloud tops are 35,000 feet; thunderstorms, light rain showers, area movement northeasterly at 25 knots, individual cell movement is easterly at 30 knots.

3—Scattered rain showers decreasing in intensity; tops 35,000 feet reported by aircraft, movement of individual cells is easterly at 30 knots.

4—Tops 35,000 feet reported by aircraft, area movement easterly at 30 knots, individual cell movement northeasterly at 25 knots.

356 *L45* Assume a field elevation of 1,800 feet at the station originating this weather report. If the sky cover is one continuous layer, what is its thickness?

W8 X 1FK 174/174/ØØØØ/ØØ4/OVC 4Ø

1—3,200 feet

2—4,000 feet

3—2,200 feet

4—3,000 feet

357 *O26* What weather conditions are depicted within the area indicated by Arrow B on the Radar Summary Chart in Fig. 15?

1—Very light rain showers decreasing in intensity, average tops 21,000 feet; one isolated cell detected by two radars.

2—Widely scattered echoes, average tops of echoes are 21,000 feet, individual cell movement southeast at 15 knots.

3—An individual cell was detected by two weather radars, average tops of echoes is 21,000 feet, light rain showers dissipating.

4—Widely scattered thunderstorms with area movement southeast at 15 knots; bases of echoes average 21,000 feet.

358 *O26* What weather conditions are depicted on the Radar Summary Chart within the area indicated by Arrow A? (Fig. 15)

1—Six-tenths to nine-tenths coverage, average tops of echoes is 47,000 feet, line movement is northeast at 20 knots.

2—Top of an individual cell is 33,000 feet, broken cloud condition, average tops of clouds is 47,000 feet, line movement is southeast at 25 knots.

3—Six-tenths to nine-tenths coverage, average tops of echoes is 47,000 feet, area movement is southeast at 25 knots.

4—Five-tenths to eight-tenths coverage, maximum top of one individual echo is 47,000 feet, individual cell movement is southeast at 25 knots.

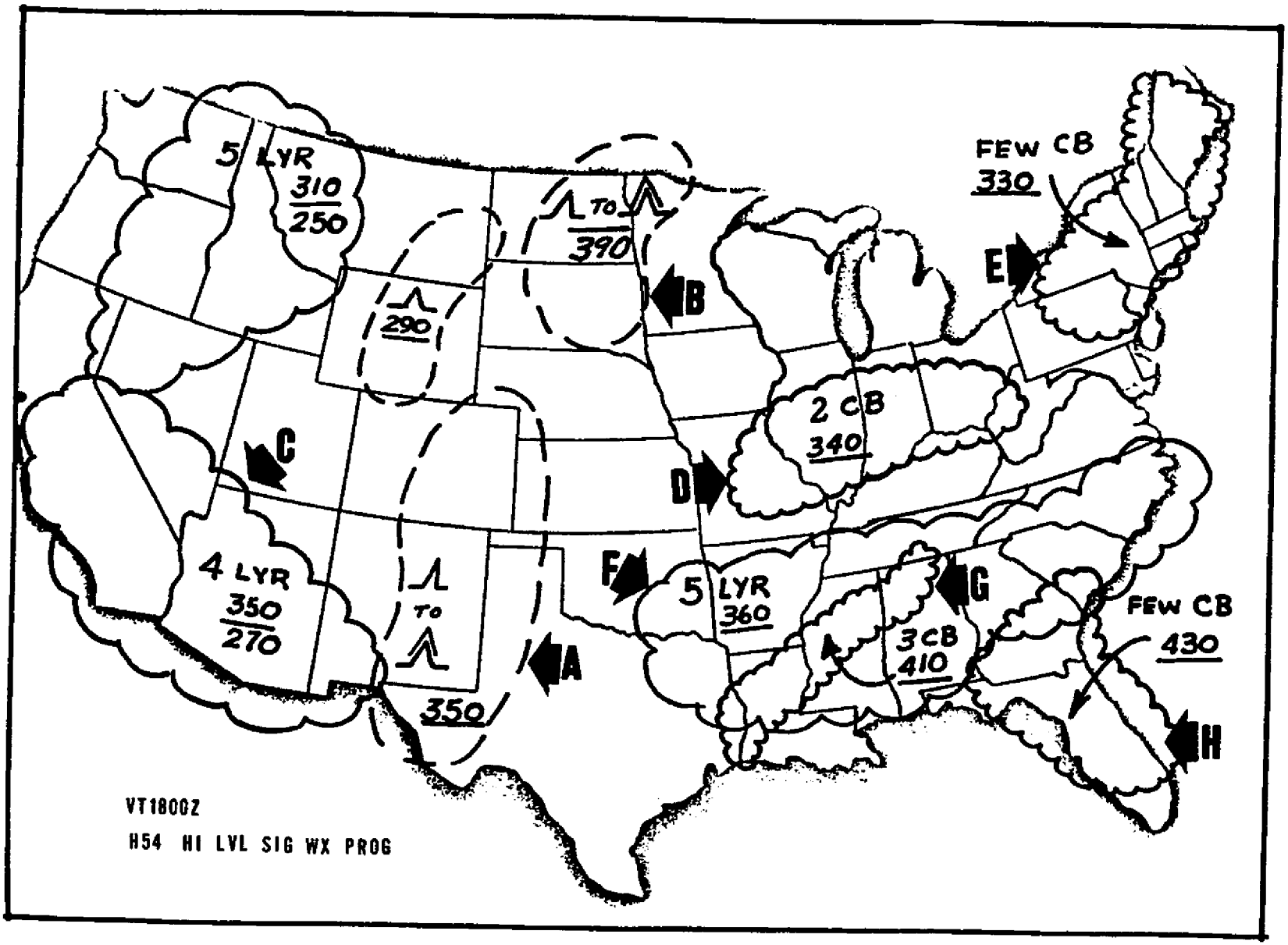

5 LYR
310
250
TO
390
290
FEW CB
330
E
B
2 CB
340
C
D
4 LYR
350
270
TO
350
A
F
5 LYR
360
G
3 CB
410
FEW CB
430
H
VT1800Z
H54 HI LVL SIG WX PROG

FIGURE 16

359 What flight planning information can a
040 pilot derive from constant pressure charts?

1—Clear air turbulence and icing conditions.

2—Frontal systems and obstructions to vision aloft.

3—Winds and temperatures aloft.

4—Levels of widespread cloud coverage.

360 What weather conditions are depicted on
026 the Radar Summary Chart within the area indicated by Arrow G? (Fig. 15, page 52)

1—Broken cloud coverage with intense echo return, maximum tops at 55,000 feet; line movement easterly at 20 knots.

2—Broken echo coverage, average tops at 55,000 feet; intense thunderstorms and rain showers; line movement is southeasterly at 15 knots.

3—Top of highest echo detected is 55,000 feet; thunderstorms, rain showers, and hail detected; line movement is easterly at 20 knots.

4—Broken echo coverage, maximum tops at 55,000 feet, intense thunderstorms and rain showers; individual cell movement is southeasterly at 15 knots.

361 What significant weather condition is de-
031 picted in area A indicated on the HI LVL SIG PROG, Fig. 16?

1—Broken cloud coverage with bases at 35,000 feet with moderate to severe turbulence.

2—Moderate to severe turbulence from below 24,000 feet to 35,000 feet.

3—Scattered cloud coverage with bases reported at 35,000 feet.

4—Light to moderate CAT with base of turbulence at 35,000 feet.

362 What significant weather condition is ex-
031 pected to exist within area B as depicted on the HI LVL SIG PROG? (Refer to Fig. 16.)

1—Moderate to severe turbulence from 39,000 feet to above 45,000 feet.

2—Light to moderate CAT from 24,000 feet to 39,000 feet.

3—Moderate to severe turbulence from 24,000 feet to 39,000 feet.

4—Light to moderate turbulence from 39,000 feet to 40,000 feet inclusive.

363 What significant weather conditions are ex-
031 pected after 1800Z, in area E of the HI LVL SIG PROG, Fig. 16?

1—Few (less than $\frac{1}{10}$ coverage) towering cumulus, tops above 33,000 feet.

2—Multi-layered cirriform clouds, overall bases average 33,000 feet.

3—Few cirrus stratus cloud layers, overall tops average 33,000 feet.

4—Few (less than $\frac{1}{8}$ coverage) cumulonimbus, tops at 33,000 feet; bases are below 24,000 feet.

364 What significant weather condition is ex-
031 pected to exist in area F as depicted on the HI LVL SIG PROG? (Fig. 16)

1—Five-eighths coverage, layered cirriform clouds, bases below 24,000 feet, tops 36,000 feet.

2—Five-tenths coverage (scattered) stratocumulus clouds, base at 36,000 feet, tops above 45,000 feet.

3—Five layers (scattered coverage) tops of highest layer at 36,000 feet.

4—Five layers (broken coverage), base of lowest layer at 36,000 feet.

365 What significant weather condition is ex-
031 pected to exist after 1800Z within area D on the HI LVL SIG PROG, Fig. 16?

1—Two layers of cumulonimbus, bases at 34,000 feet, tops at 45,000 feet.

2—Two-eighths cumulonimbus, tops at 34,000 feet.

3—Two layers of cirriform (broken) clouds, bases at 34,000 feet MSL.

4—Two-tenths coverage, cirriform clouds, with tops at 34,000 feet.

366 What significant weather conditions are ex-
031 pected to exist within area C as depicted on the HI LVL SIG PROG? (Fig 16, page 54)

1—Four-tenths coverage (broken), layered cumuliform clouds, bases at 27,000 feet, tops at 35,000 feet.

2—Four-eighths coverage (broken), layered cirriform clouds, bases at 27,000 feet, and tops at 35,000 feet.

3—Multi-layered cirriform clouds, eight-tenths coverage from 27,000 feet to 35,000 feet.

4—Four layers of cirriform clouds from 27,000 feet to 35,000 feet.

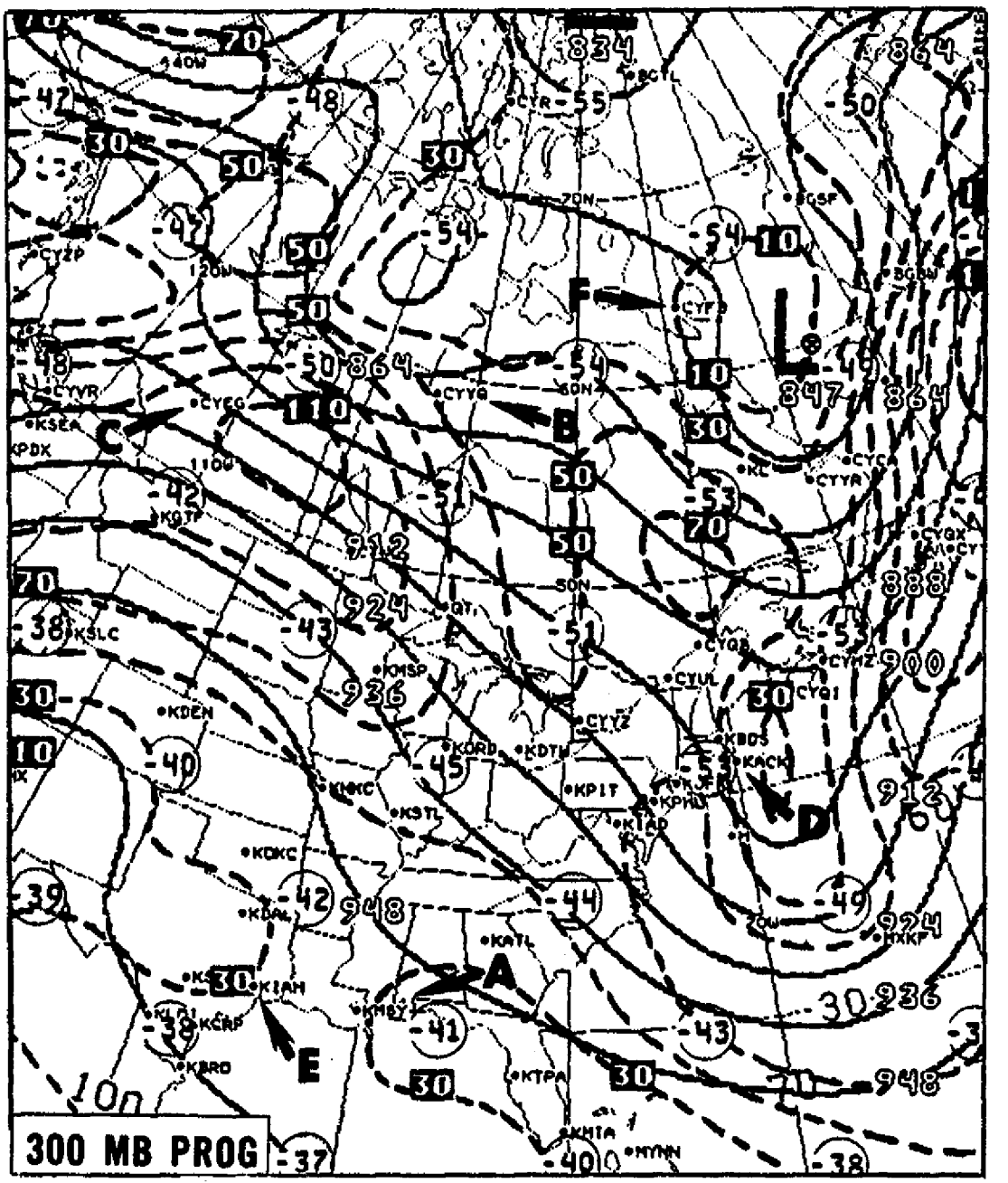


FIGURE 17

367 For what maximum time period is a CON-
N37 VECTIVE OUTLOOK (AC) valid?

1—24 hours
2—18 hours
3—12 hours
4— 6 hours

368 What information does a CONVECTIVE
N37 OUTLOOK (AC) provide?

1—Forecast of low level convective activity (shear) and restrictions to visibility for the next 12 hours.
2—Prospects of both severe and general thunderstorm activity during the next 24 hours.
3—Forecasts areas of clear air turbulence (CAT) and other known wind shear conditions for the next 18 hours.
4—Outlines areas of unstable airmasses at the upper wind shear level (300 mbar) for the next 12 hours.

369 What information is provided by a CON-
N37 VECTIVE OUTLOOK (AC)?

1—Prospects of both general and severe thunderstorm activity during the following 24 hours.
2—Outlined areas of stable and unstable airmasses at the upper wind shear levels predicted for the next 12 hours.
3—Forecast of low level cloudiness and fog conditions for the next 24 hours.
4—Clear air turbulence (CAT) expected at the lower wind shear levels for the following 12- to 18-hour period.

370 What is the approximate wind direction
P13 and velocity at CYFB? (Arrow F, Fig. 17)

1—300°/10 knots
2—170°/10 knots
3—120°/30 knots
4—020°/54 knots

371 What is the approximate wind direction
P13 and velocity at KIAH? (Arrow E, Fig. 17)

1—130°/40 knots
2—310°/30 knots
3—170°/30 knots
4—350°/40 knots

372 What is the approximate wind direction
P13 and velocity at KACK? (Arrow D, Fig. 17)

1—160°/60 knots
2—340°/50 knots
3—180°/30 knots
4—360°/30 knots

373 What is the approximate wind direction
P13 and velocity at CYEG? (Arrow C, Fig. 17)

1—270°/90 knots
2—090°/110 knots
3—230°/80 knots
4—050°/50 knots

374 What significant weather is expected within area H on the HI LVL SIG PROG? (Fig. 16, Page 54)

1—Multi-layered cirriform clouds, average bases 43,000 feet.
2—Less than one-tenth coverage, cirriform clouds, bases at 43,000 feet.
3—Less than one-eighth coverage, cumulonimbus, bases below 24,000, tops above 43,000 feet.
4—Scattered cumuliform buildups, average tops above 43,000 feet.

375 What is the approximate wind direction
P13 and velocity at KMSY? (Arrow A, Fig. 17)

1—190°/40 knots
2—010°/40 knots
3—300°/30 knots
4—120°/30 knots

376 What significant weather condition is ex-
O31 pected within area G on the HI LVL SIG PROG? (Fig. 16, page 54)

1—Three layers of cirrostratus, tops 41,000 feet, bases unknown.
2—Three cumulonimbus cells with average tops above 41,000 feet.
3—Three-tenths coverage, layered cirriform clouds, base at 41,000 feet.
4—Three-eighths cloud coverage, cumulonimbus, tops 41,000 feet, bases below 24,000 feet.

377 What is the approximate wind direction
P13 and velocity at CYYQ? (Arrow B, Fig. 17)

1—150°/50 knots
2—090°/75 knots
3—270°/50 knots
4—310°/84 knots

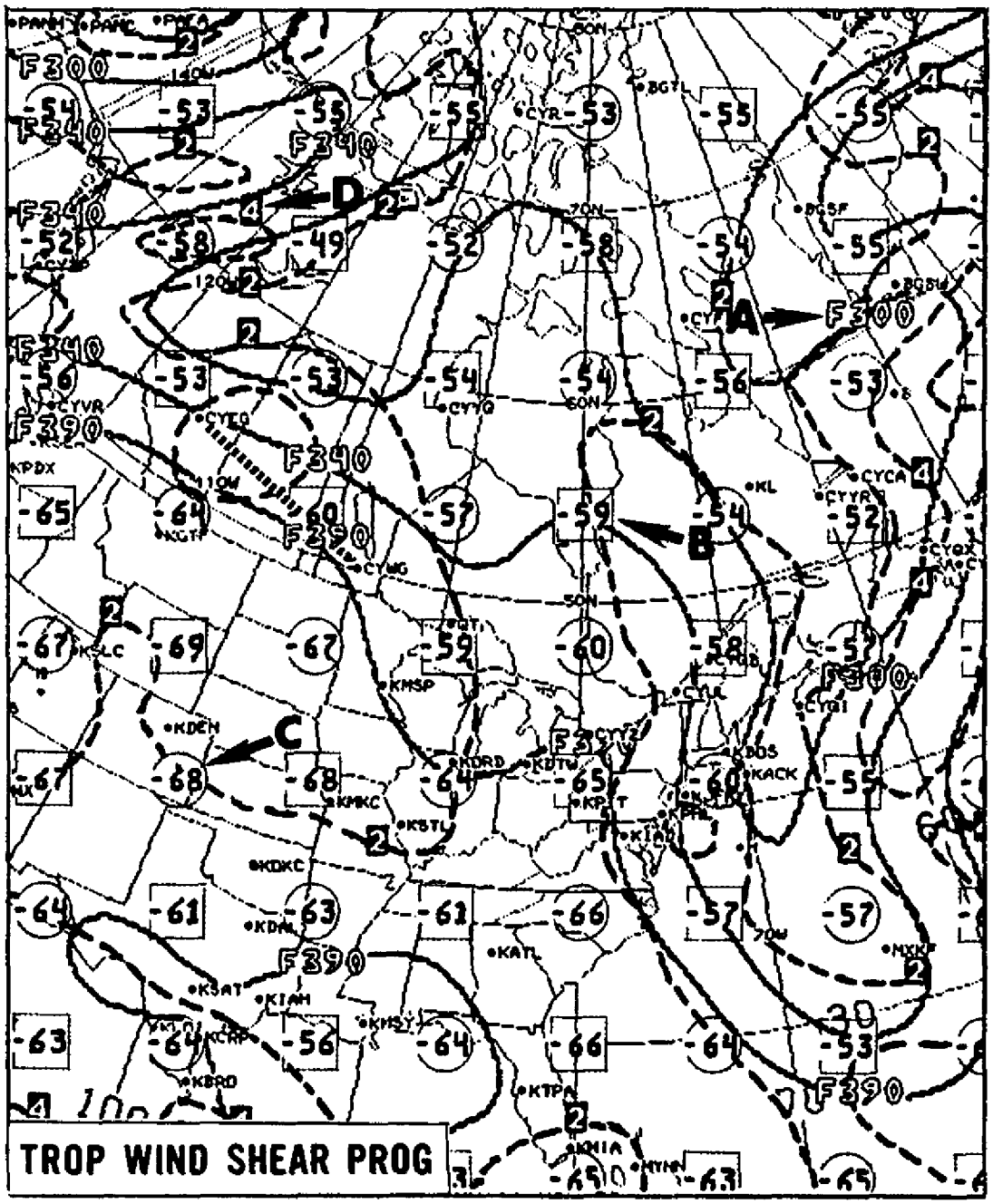


FIGURE 18

378 *M11* Which of the following is a characteristic of jet streams in the northern hemisphere?

1—The core of strongest winds in a jet stream is usually between 25,000 feet and 40,000 feet.

2—The most severe CAT occurs in the center of the jet core.

3—The magnitude of wind shear is greater on the equatorial side than on the polar side of a jet stream.

4—As a jet stream migrates northward, its core rises and its speed increases.

379 *V30* How should you establish contact with an Enroute Flight Advisory Service station and what service should you normally expect?

1—Call "FLIGHT ASSISTANCE" on 121.5 for preferential routing and radar vectoring during emergency situations.

2—Call "METRO" on 127.0 for routine weather, current reports on hazardous weather, and altimeter settings.

3—Call "ARTCC" on 122.5 MHz for routine position reports, changes to your flight plan, and information regarding weather along the proposed route.

4—Call "FLIGHT WATCH" on 122.0 for information regarding routine weather and thunderstorm activity along the proposed route.

380 *R42* When the sky condition and visibility are omitted on an ATIS broadcast, the minimum surface visibility is implied to be at least

1—8 miles.
2—7 miles.
3—5 miles.
3—3 miles.

381 *O32* A prognostic chart depicts the conditions

1—existing at the time of observation.

2—representing the trend of the weather at the time of observation.

3—which existed at the surface during the preceding 12-hour period.

4—forecast to exist at a specific time in the future.

382 *R42* Absence of the sky condition and visibility on an ATIS broadcast specifically implies that

1—the ceiling is at least 5,000 feet and visibility is 5 miles or more.

2—conditions are changing rapidly and the pilot is requested to contact the tower for the latest report.

3—weather conditions are at or above VFR minimums.

4—the sky condition is clear and visibility is unlimited.

383 *P22* The symbol  on the TROP WIND SHEAR PROG (Arrow C, Fig. 18) represents the

1—300 millibar-level temperature.

2—tropopause temperature.

3—150 millibar-level temperature.

4—temperature at 30,000 feet.

384 *P22* The symbol  on the TROP WIND SHEAR PROG (Arrow D, Fig. 18) represents the

1—temperature lapse rate of 4° per 1,000 feet.

2—wind shear in knots per thousand feet.

3—temperature drop at the tropopause.

4—maximum wind shear at FL 340.

385 *P22* The symbol  on the TROP WIND SHEAR PROG represents the (Arrow B, Fig. 18)

1—tropopause temperature.

2—300 millibar-level temperature.

3—150 millibar-level temperature.

4—temperature at 34,000 feet.

386 *P22* The symbol  on the TROP WIND SHEAR PROG represents the (Arrow A, Fig. 18)

1—height of the tropopause in millibars (300 mbar).

2—wind direction at the tropopause (300°).

3—flight level of the tropopause.

4—height of maximum wind shear (30,000 feet).

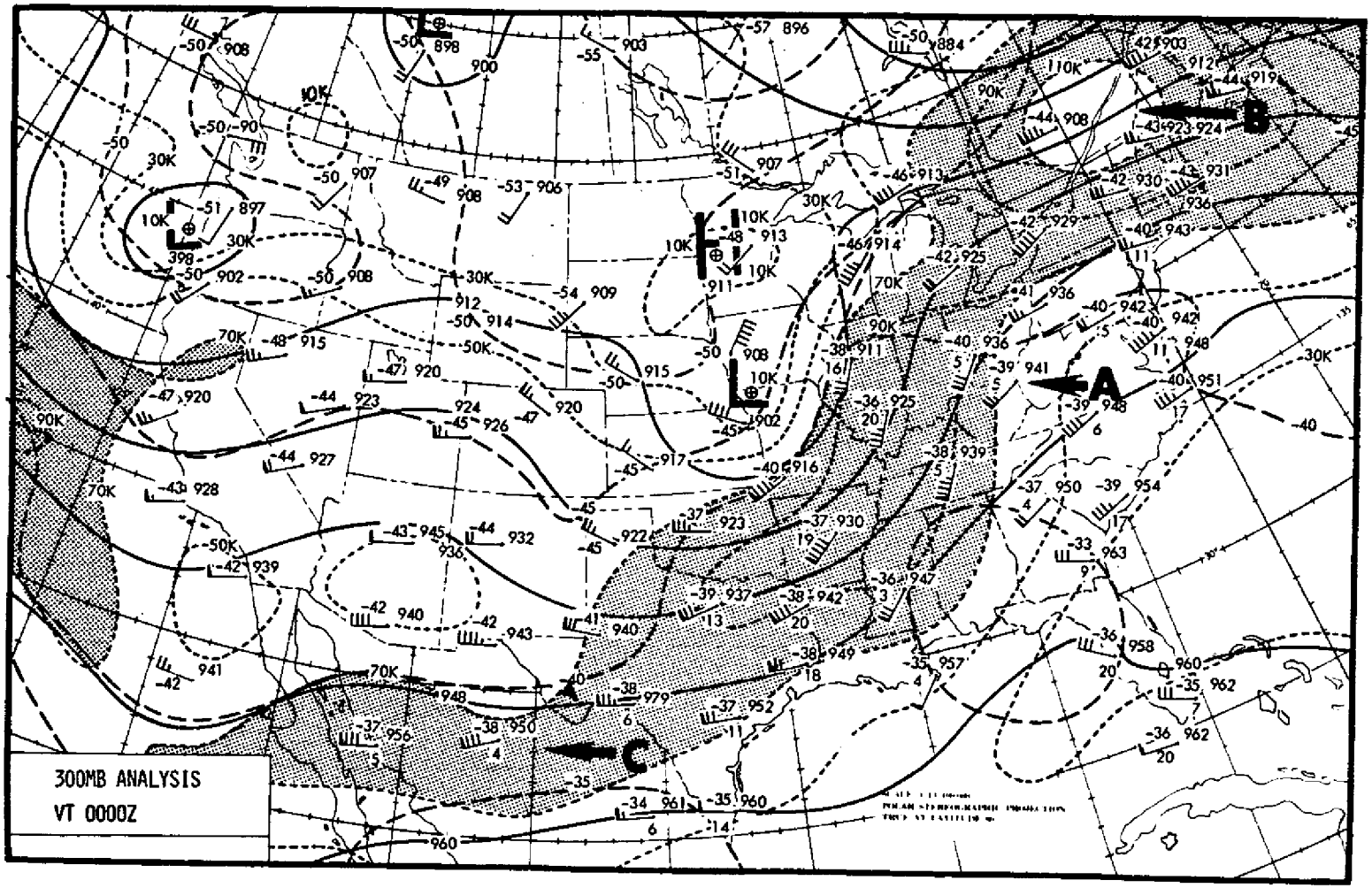


FIGURE 19

387 What approach and landing minimums
U19 must prevail for an IFR flight cleared for a visual approach?

1—The same minimums as the IFR approach to that runway.

2—Basic VFR condtions (VMC).

3—Ceiling which permits at least a 1,000-foot obstacle clearance.

4—1,000-foot ceiling and 1-mile visibility.

388 How often are Area Forecasts prepared by
N31 the National Weather Service, and what is the valid time period for each?

1—*Prepared:* every 12 hours; *Valid time period:* 18 hours, plus 12-hour outlook.

2—*Prepared:* every 12 hours; *Valid time period:* 8 hours, plus 12-hour outlook.

3—*Prepared:* every 6 hours; *Valid time period:* 12 hours, plus 12-hour outlook.

4—*Prepared:* every 8 hours; *Valid time period:* 8 hours, plus 8-hour outlook.

389 Which is an operational consideration re-
M11 garding jet stream characteristics?

1—Mean position of jet stream shifts north in winter and south in summer.

2—Maximum horizontal wind shear is greater on the equitorial side of the jet stream.

3—A weak horizontal temperature gradient exists between the warm and cold airmasses.

4—Maximum occurrence of severe clear air turbulence is on the polar side and below the jet core.

390 What is the windspeed at the station plot
P12 indicated by Arrow A? (Fig. 19)

1—30 knots

2—40 knots

3—55 knots

4—65 knots

391 Which is a characteristic of jet streams in
M11 the northern hemisphere?

1—In the middle and high latitudes, the strength of jet streams is greater in summer than in winter.

2—The magnitude of wind shear is greater on the polar side than on the equatorial side of a jet stream.

3—The core of a jet stream descends and its speed decreases as it migrates southward.

4—The mean position of a jet stream shifts north in winter and south in summer.

392 Which is an accurate decode of the station
P14 plot indicated by Arrow C? (Fig. 19)

1—Windspeed, 55 knots; temperature, −38°F.; pressure altitude, 29,500 feet; 4°F. temperature lapse rate per 1,000 feet.

2—Windspeed, 105 knots; temperature, −38°F.; flight level, 29,500 feet; temperature-dewpoint spread, 4°F.

3—Windspeed, 75 knots; temperature, −38°C.; height of pressure surface 950 meters; 4°F. temperature lapse rate per 1,000 feet.

4—Windspeed, 80 knots; temperature, −38°C.; height of pressure surface, 9,500 meters; temperature-dewpoint spread, 4°C.

393 What is the significance of the clear area
P12 (Arrow B) which lies within the hatched area? (Fig. 19)

1—Windspeeds within the clear area range from 110 knots to 150 knots.

2—The windspeeds within the clear area range from 75 to 100 knots.

3—The clear area has lower average windspeeds than does the surrounding hatched area.

4—Windspeeds within the clear area average more than 150 knots.

394 The payload of a transport aircraft con-
W10 sists of

1—passengers, baggage, and cargo only.

2—all weights in excess of the zero fuel weight.

3—crew, passengers, baggage, cargo, and fuel only.

4—passengers, cargo, and fuel only.

395 *W10* Ramp or taxi weight is determined by

1—takeoff weight minus taxi fuel.

2—payload plus operating weight.

3—zero fuel weight plus payload, fuel, and oil.

4—zero fuel weight plus total fuel load.

396 *Z17* Which of these factors would effectively reduce the V_1 speed?

1—High density altitude.

2—Slush or water on the runway.

3—A dry runway with an uphill gradient.

4—High gross weight.

397 *W10* The maximum allowable aircraft weight above which all of the load must consist of disposable fuel, is called

1—basic operating weight.

2—maximum landing weight.

3—maximum zero fuel weight.

4—maximum payload weight.

398 *N30* What meteorological condition is expected to exist at 0900Z for LGA?

FT 191440

LGA 191515 5 SCT C8 OVC 3F SCT OCNL 2L-R-F. 18Z C8 BKN 15 OVC 3F 1Ø1Ø OCNL. 2L-R-F. ØØZ C5 OVC L-F C2 X 1/2 L-F. Ø9Z LIFR CIG LF.

1—Ceiling 1,000 to 3,000 feet, and/or visibility greater than 5 miles due to lifting of fog.

2—Ceiling between 500 and 1,000 feet, 1 to less than 3 miles due to drizzle and fog.

3—Ceiling less than 500 feet, and/or visibility less than 1 mile; drizzle and fog.

4—Intermittent drizzle, fog, and rain, ceiling should lift after 0900Z.

399 *N30* A Terminal Forecast (FT) is issued at specific times in the continental U.S. for a geographical area within

1—25 miles of the center of an airport.

2—a 15-mile radius of a control tower.

3—10 miles of the station originating the FT.

4—a 5-mile radius of the center of a runway complex.

DFW 191Ø1Ø C1ØØBKN 1815 BKN V SCT CHC RW-. 12Z C1ØBKN 1ØØBKN 1815 LWR BKN V SCT CHC RW-. 14Z 25SCT C1ØØBKN 1815 SCT V BKN CHC C1ØX 1TRW+ G4Ø. 19Z CFP C3ØBKN 1ØØBKN 3515 CHC C1ØX 1TRW+ G4Ø. ØØZ C3ØBKN 1ØØBKN Ø11Ø CHC RW-. Ø47 MVFR CIG RW-..

FIGURE 20

400 *N30* You plan to arrive at DFW at 0445Z. According to the DFW FT, what cloud ceiling and visibility should you expect upon arrival? (Fig. 20)

1—Ceiling 1,000 to 1,500 feet; and/or visibility 1 to 3 miles.

2—Ceiling 1,000 to 3,000 feet and/or visibility 3 to 5 miles.

3—Ceiling 1,000 to 2,000 feet; visibility 2 to 3 miles.

4—Ceiling 2,000 to 3,000 feet; visibility 5 to 7 miles.

401 *N30* For what geographical area is the FT for DFW valid? (Refer to Fig. 20.)

1—Ten-mile radius of the station originating the FT.

3—Five-mile radius of the center of the runway complex.

3—Twenty-five miles of the center of the airport.

4—Fifteen-mile radius of the airport complex.

402 *N30* For what minimum time period is the categorical outlook expected to exist at DFW? (Fig. 20)

1—12 hours

2— 8 hours

3— 6 hours

4— 2 hours

403 How far will the CG shift if 500 pounds of *W14* cargo are moved from the aft compartment to the forward compartment?

Airplane gross weight—150,000 pounds
CG prior to shift—980 in. aft of datum
Arm of fwd compartment—680 in. aft of datum
Arm of aft compartment—1,130 in. aft of datum

1—3.2 inches

2—2.5 inches

3—2.0 inches

4—1.5 inches

404 Determine the maximum allowable load *W15* which may be carried on a pallet that has dimensions of 73 by 59 inches?

Floor load limit—177 lbs./sq. ft.
Pallet weight—83.5 lbs.
Tiedown devices—45 lbs.

1—5,163 pounds

2—5,375 pounds

3—5,292 pounds

4—5,208 pounds

405 During an enroute stop, baggage weighing *W14* 1,000 pounds is removed from the forward cargo compartment, baggage weighing 500 pounds is added to the aft cargo compartment, and fuel weighing 500 pounds is added to tank 2. How far, if any, will the CG move?

Airplane gross weight—150,000 pounds
CG prior to change—1,000 in. aft of datum
Arm of forward compartment—560 in. aft of datum
Arm of aft compartment—1,151 in. aft of datum
Arm of fuel tank 2—917 in. aft of datum

1—1.58 inches

2—3.16 inches

3—4.74 inches

4—0 inches

406 What determines the zero fuel weight *W10* (ZFW) for a particular air carrier flight?

1—Basic operating weight plus useful load.

2—Empty weight plus passengers, baggage, and cargo.

3—Basic operating weight plus passengers, baggage, and cargo.

4—Empty weight plus payload.

407 An airplane's gross weight is 160,500 *W14* pounds and center of gravity is located at 970 inches aft of datum reference point. The arm of the forward compartment is 420 inches and the arm of the aft compartment is 1,150 inches. If 700 pounds of cargo are shifted from the forward to the aft compartment, how far will the new center of gravity move aft?

1—3.1 inches

2—4.3 inches

3—1.3 inches

4—2.6 inches

408 The basic operating weight of a transport *W10* airplane is the empty weight plus

1—required crewmembers and standard operating items.

2—fixed ballast, hydraulic fluid, and undrainable fuel and oil.

3—fuel and oil.

4—required crewmembers.

409 How far will the CG shift if 750 pounds of *W14* cargo are moved from the aft compartment to the forward compartment?

Airplane gross weight—160,000 pounds
CG prior to shift—945 in. aft of datum
Arm of fwd compartment—660 in. aft of datum
Arm of aft compartment—1,194 in aft of datum

1—3.2 inches

2—2.5 inches

3—2.0 inches

4—1.5 inches

AIRPLANE DATUM CONSTANTS	
MAC	180.7 inches
L.E. of MAC	860.2 inches
OPERATING LIMITATIONS	
Maximum Takeoff Slope	± 2%
Maximum Takeoff/Landing Tailwind Component	10 knots
Maximum Takeoff/Landing Crosswind Component	29 knots
WEIGHT LIMITATIONS	
Basic Operating Weight	105,000 pounds
Maximum Zero Fuel Weight	138,000 pounds
Maximum Taxi Weight	185,200 pounds
Maximum Takeoff Weight (Brake Release)	184,200 pounds
Maximum Inflight Weight (Flaps 30)	155,000 pounds
(Flaps 40)	143,500 pounds
Maximum Landing Weight (Flaps 30)	154,500 pounds
(Flaps 40)	142,500 pounds

FIGURE 21

410 *W15* What is the maximum allowable load which may be carried on a pallet 75×75 inches in a cargo compartment that has a floor load limit of 175 lbs./square foot?

Pallet weight—87 pounds
Tiedown devices—35.5 pounds

1—6,958 pounds
2—6,835 pounds
3—6,748 pounds
4—6,713 pounds

411 *W15* What is the maximum allowable load which may be carried in a cargo compartment which has a floor load limit of 182 lbs./square foot?

Pallet size—102 in×95 in.
Pallet weight—93 lbs.
Tiedown devices—49 lbs.

1—12,248 pounds
2—12,390 pounds
3—12,106 pounds
4—12,068 pounds

412 *W15* Determine the maximum allowable load which may be carried in a cargo compartment on a pallet 85 by 68 inches.

Floor load limit—123 lbs./sq. ft.
Pallet weight—67 lbs.
Tiedown devices—27 lbs.

1—4,865 lbs.
2—4,838 lbs.
3—5,674 lbs.
4—4,932 lbs.

413 *W14* An airplane's gross weight is 159,000 pounds and center of gravity is located at 970 inches aft of datum reference point. The arm of the forward compartment is 420 inches and the arm of the aft compartment is 1,110 inches. If 700 pounds of cargo are shifted from the forward to the aft compartment, how far will the new center of gravity move aft?

1—4.3 inches
2—3.0 inches
3—2.6 inches
4—1.3 inches

PASSENGER LOADING TABLE

Number of Pass.	Weight Lbs.	Moment / 1000
FORWARD COMPARTMENT CENTROID—582.0		
5	850	495
10	1,700	989
15	2,550	1,484
20	3,400	1,979
25	4,250	2,473
29	4,930	2,869
AFT COMPARTMENT CENTROID—1028.0		
10	1,700	1,748
20	3,400	3,495
30	5,100	5,243
40	6,800	6,990
50	8,500	8,738
60	10,200	10,486
70	11,900	12,233
80	13,600	13,980
90	15,300	15,728
100	17,000	17,476
110	18,700	19,223
120	20,400	20,971
133	22,610	23,243

CARGO LOADING TABLE

	Moment / 1000	
	Forward Hold	Aft Hold
Weight Lbs.	Arm 680.0	Arm 1166.0
6,000		6,966
5,000	3,400	5,830
4,000	2,720	4,664
3,000	2,040	3,498
2,000	1,360	2,332
1,000	680	1,166
900	612	1,049
800	544	933
700	476	816
600	408	700
500	340	583
400	272	466
300	204	350
200	136	233
100	68	117

NOTE: THESE COMPUTATIONS ARE TO BE USED FOR TESTING PURPOSES ONLY.

FUEL LOADING TABLE

TANKS 1 & 3 (EACH)			TANK 2 (3 CELL)					
Weight Lbs.	Arm	Moment / 1000	Weight Lbs.	Arm	Moment / 1000	Weight Lbs.	Arm	Moment / 1000
8,500	992.1	8,433	8,500	917.5	7,799	22,500	914.5	20,576
9,000	993.0	8,937	9,000	917.2	8,255	23,000	914.5	21,034
9,500	993.9	9,442	9,500	917.0	8,711	23,500	914.4	21,488
10,000	994.7	9,947	10,000	916.8	9,168	24,000	914.3	21,943
10,500	995.4	10,451	10,500	916.6	9,624	24,500	914.3	22,400
11,000	996.1	10,957	11,000	916.5	10,082	25,000	914.2	22,855
11,500	996.8	11,463	11,500	916.3	10,537	25,500	914.2	23,312
12,000	997.5	11,970	12,000	916.1	10,993	26,000	914.1	23,767
FULL CAPACITY			**(See note at lower left)			26,500	914.1	24,244
**Note: Computations for Tank 2 weights for 12,500 lbs. to 18,000 lbs. have been purposely omitted.			18,500	915.1	16,929	27,000	914.0	24,678
			19,000	915.0	17,385	27,500	913.9	25,132
			19,500	914.9	17,841	28,000	913.9	25,589
			20,000	914.9	18,298	28,500	913.8	26,043
			20,500	914.8	18,753	29,000	913.7	26,497
			21,000	914.7	19,209	29,500	913.7	26,954
			21,500	914.6	19,664	30,000	913.6	27,408
			22,000	914.6	20,121	FULL CAPACITY		

FIGURE 22

414 Determine the CG in percent of MAC.
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- 22
Aft compt. ---------- 95

Cargo load: *Weight/Lbs.*
Forward hold ---------- 1,950
Aft hold ---------- 900

Fuel load:
Tanks 1 & 3 (Each) ---------- 11,500
Tank 2 ---------- Full

1—26.8% MAC
2—26.2% MAC
3—27.1% MAC
4—27.9% MAC

415 What is the CG in percent of MAC? (Fig.
W13 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- Full
Aft compt. ---------- 85

Fuel load: *Weight/Lbs.*
Tanks 1 & 3 (Each) ---------- 11,500
Tank 2 ---------- 27,000

Cargo load:
Forward hold ---------- 1,750
Aft hold ---------- 750

1—26.6% MAC
2—27.1% MAC
3—26.2% MAC
4—25.2% MAC

416 Determine the CG in percent of MAC.
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- 27
Aft compt. ---------- 105

Cargo load: *Weight/Lbs.*
Forward hold ---------- 1,800
Aft hold ---------- 800

Fuel load:
Tanks 1 & 3 (Each) ---------- 11,000
Tank 2 ---------- Full

1—27.2% MAC
2—26.9% MAC
3—25.2% MAC
4—26.6% MAC

417 Determine the CG in percent of MAC.
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Fuel load: *Weight/Lbs.*
Tanks 1 & 3 (Each) ---------- 10,500
Tank 2 ---------- 26,000

Cargo load:
Forward hold ---------- 2,500
Aft hold ---------- 1,500

Passenger load:
Forward compt. ---------- Full
Aft compt. ---------- Full

1—26.6% MAC
2—25.5% MAC
3—27.7% MAC
4—28.8% MAC

418 Determine the CG location in inches aft of
W13 LEMAC. (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- Full
Aft compt. ---------- 83

Fuel load: *Weight/Lbs.*
Tanks 1 & 3 (Each) ---------- 12,000
Tank 2 ---------- Full

Cargo load:
Forward hold ---------- 3,500
Aft hold ---------- 2,000

1—45.7 inches
2—43.8 inches
3—47.4 inches
4—46.3 inches

419 Determine the CG in percent of MAC.
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- 17
Aft compt. ---------- 75

Fuel load: *Weight/Lbs.*
Tanks 1 & 3 (Each) ---------- 11,000
Tank 2 ---------- 18,500

Cargo load:
Forward hold ---------- 1,800
Aft hold ---------- 800

1—27.1% MAC
2—26.2% MAC
3—27.9% MAC
4—25.3% MAC

420 What is the CG in inches aft of datum?
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- 19
Aft compt. ---------- 66

Cargo load: *Weight/Lbs.*
Forward hold ---------- 950
Aft hold ---------- 775

Fuel load:
Tanks 1 & 3 (Each) ---------- 10,500
Tank 2 ---------- 24,500

1—902.6 inches
2—910.4 inches
3—905.3 inches
4—906.5 inches

421 Determine the maximum allowable load
W15 which may be carried on a pallet that has dimensions of 74×63 inches.

Floor load limit ---------- 180 lbs./sq. ft.
Pallet weight ---------- 87 lbs.
Tiedown devices ---------- 27.2 lbs.

1—5,727 lbs.
2—5,901 lbs.
3—5,718 lbs.
4—5,814 lbs.

422 Determine the CG in percent of MAC.
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- 27
Aft compt. ---------- 105

Cargo load: *Weight/Lbs.*
Forward hold ---------- 2,100
Aft hold ---------- 1,100

Fuel load:
Tanks 1 & 3 (Each) ---------- Full
Tank 2 ---------- Full

1—26.2% MAC
2—26.7% MAC
3—27.2% MAC
4—27.7% MAC

423 Determine the CG in percent of MAC.
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Fuel load: *Weight/Lbs.*
Tanks 1 & 3 (Each) ---------- Full
Tank 2 ---------- 24,000

Cargo load
Forward hold ---------- 3,500
Aft hold ---------- 1,200

Passenger load:
Forward compt. ---------- Full
Aft compt. ---------- 105

1—28.0% MAC
2—27.0% MAC
3—26.0% MAC
4—25.0% MAC

424 Determine the CG in inches aft of LEMAC
W13 (Fig. 21, page 64; Fig. 22, page 65)

Basic Operating Index ------ 92,827.0 / 1,000

Passenger load:
Forward compt. ---------- 27
Aft compt. ---------- 90

Fuel load: *Weight/Lbs.*
Tanks 1 & 3 (Each) ---------- 11,000
Tank 2 ---------- 23,500

Cargo load:
Forward hold ---------- 2,200
Aft hold ---------- 2,000

1—47.4 inches
2—49.2 inches
3—46.9 inches
4—46.3 inches

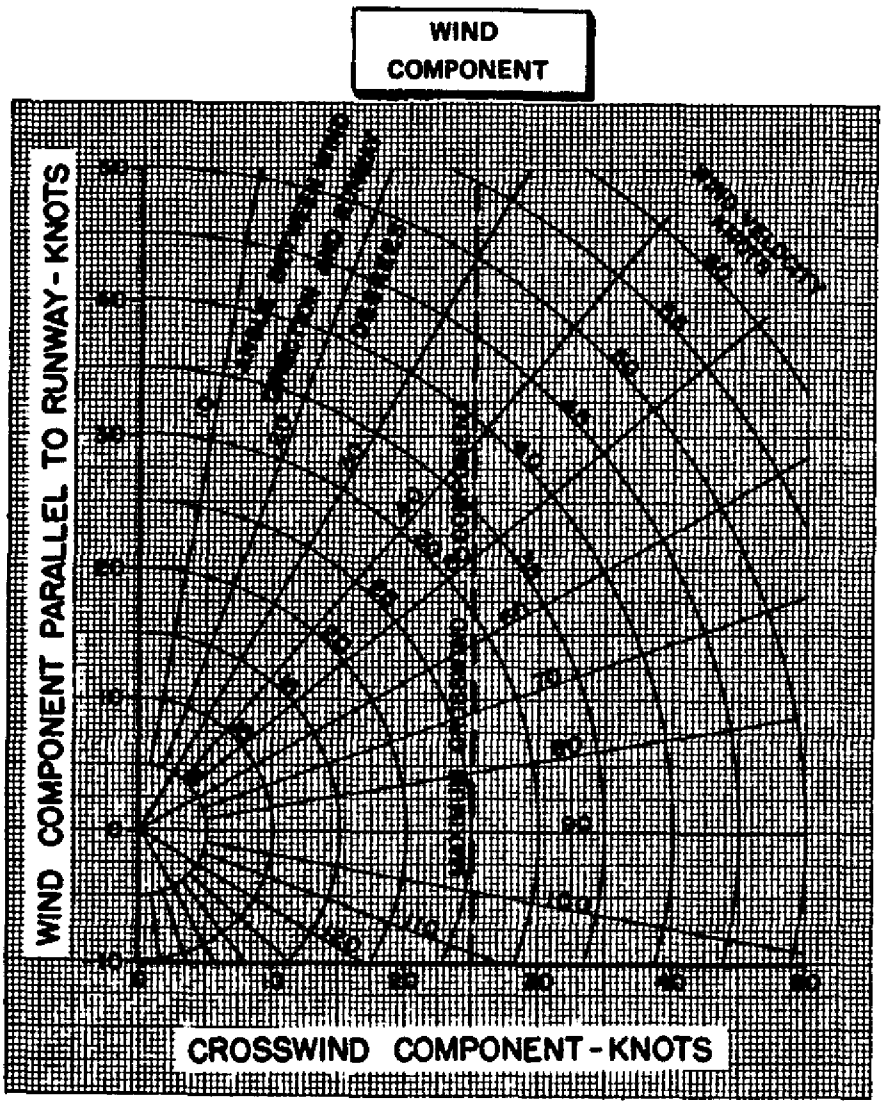

WIND
COMPONENT
WIND COMPONENT PARALLEL TO RUNWAY - KNOTS
CROSSWIND COMPONENT - KNOTS

FIGURE 23

425 *Y14* Determine the climb limit gross weight for these coditions. (Fig. 24, page 70)

Pressure altitude ..... 5,500 feet
OAT ..... 95°F.
Flap position 5
Autopack trip ..... INOPERATIVE
Engine anti-ice ..... OFF
Sixth stage bleed ..... OFF
A/C bleed ..... ON

1—161,700 lbs.

2—164,300 lbs.

3—167,000 lbs.

4—171,200 lbs.

426 *Y10* What is the crosswind component for a Runway 12 takeoff if the tower-reported wind is 170° at 28 knots? (Fig. 23)

1—18 knots

2—22 knots

3—25 knots

4—15 knots

427 *Y10* You receive this information from ATIS: ". . . SURFACE WINDS ZERO TWO ZERO DEGREES AT ONE EIGHT...." The magnetic variation is 10° easterly. Compute the crosswind component for takeoff on Runway 35. (Fig. 23)

1—16 knots

2—14 knots

3—12 knots

4— 9 knots

428 *Y10* You receive this information from ATIS: "... SURFACE WINDS ZERO THREE ZERO DEGREES AT ONE EIGHT...." The magnetic variation is 10° easterly. Compute the crosswind component for takeoff on Runway 35. (Fig. 23)

1—16 knots

2—10 knots

3—12 knots

4—14 knots

429 *Y10* You receive this information from ATIS: ". . . SURFACE WINDS ZERO THREE ZERO DEGREES AT ONE EIGHT...." The magnetic variation is 15° westerly. Compute the crosswind component for takeoff on Runway 33. (Fig. 23)

1—13 knots

2—16 knots

3— 8 knots

4—11 knots

430 *Y14* Which weight, field length or climb, is limiting for these conditions? (Fig. 24, page 70)

Runway length ..... 8,800 feet
Runway slope 0%
Pressure altitude ..... 2,000 feet
Headwind Component ..... 20 knots
OAT ..... 95°F.
Flaps 15
Autopack trip ..... INOP
Engine anti-ice ..... OFF
Sixth stage bleed ..... OFF
A/C bleed ..... ON

1—182,000 lbs.; runway limited

2—173,000 lbs.; climb limited

3—172,000 lbs.; runway limited

4—185,000 lbs.; climb limited

431 *Y10* If the tower-reported wind is 160° at 38 knots and the departure Runway is 13, the crosswind component is (Fig. 23)

1—21 knots.

2—19 knots.

3—17 knots.

4—15 knots.

432 *Y10* Which of these winds, as reported by the control tower, would exceed a crosswind limitation of 25 knots for a Runway 1 departure from MKC? (Fig. 23)

1—275°/25 knots

2—070°/28 knots

3—040°/47 knots

4—300°/30 knots

TAKEOFF PERFORMANCE

AVERAGE TAKEOFF EPR A/C BLEED ON											
PRESS ALT FT	°F	-67 TO -9	-4	14	32	50	68	86	104	122
	°C	-55 TO -23	-20	-10	0	10	20	30	40	50
1000		2.05	2.05	2.05	2.05	2.05	2.05	2.05	1.99	1.90
S.L.		2.10	2.10	2.10	2.10	2.10	2.10	2.09	1.99	1.90
1000		2.16	2.15	2.15	2.15	2.14	2.12	2.09	1.99	1.90
2000		2.21	2.21	2.21	2.20	2.15	2.14	2.09	1.99	1.90
3000		2.27	2.27	2.26	2.20	2.15	2.14	2.09	1.99	1.90
3856 & ABOVE		2.31	2.30	2.26	2.20	2.15	2.14	2.09	1.99	1.90

BASED ON
1. ANTI-SKID OPERATIVE (ANTI-SKID INOP SEE TEXT)
2. A/C BLEED ON
3. AUTOPACK TRIP OPERATIVE
4. ENGINE FAILURE WARNING LIGHT OPERATIVE

NOTE: DETERMINE AVERAGE TAKEOFF EPR FROM TABLE. WITH 6th STAGE BLEED ON AT 10°C (50°F) AND WARMER, REDUCE CLIMB LIMIT WEIGHT BY 4400 LB (2000 KG) & FIELD LIMIT WT BY 1800 LB (800 KG). FOR ENGINE A/I ON REDUCE AVERAGE EPR BY .01.
STRUCTURAL WEIGHT LIMITS MUST BE OBSERVED

	CLIMB LIMIT	RUNWAY LIMIT
AUTOPACK TRIP INOP	-2700 LB	-800 LB
ENG FAIL WARN LT INOP	0	-2400 LB

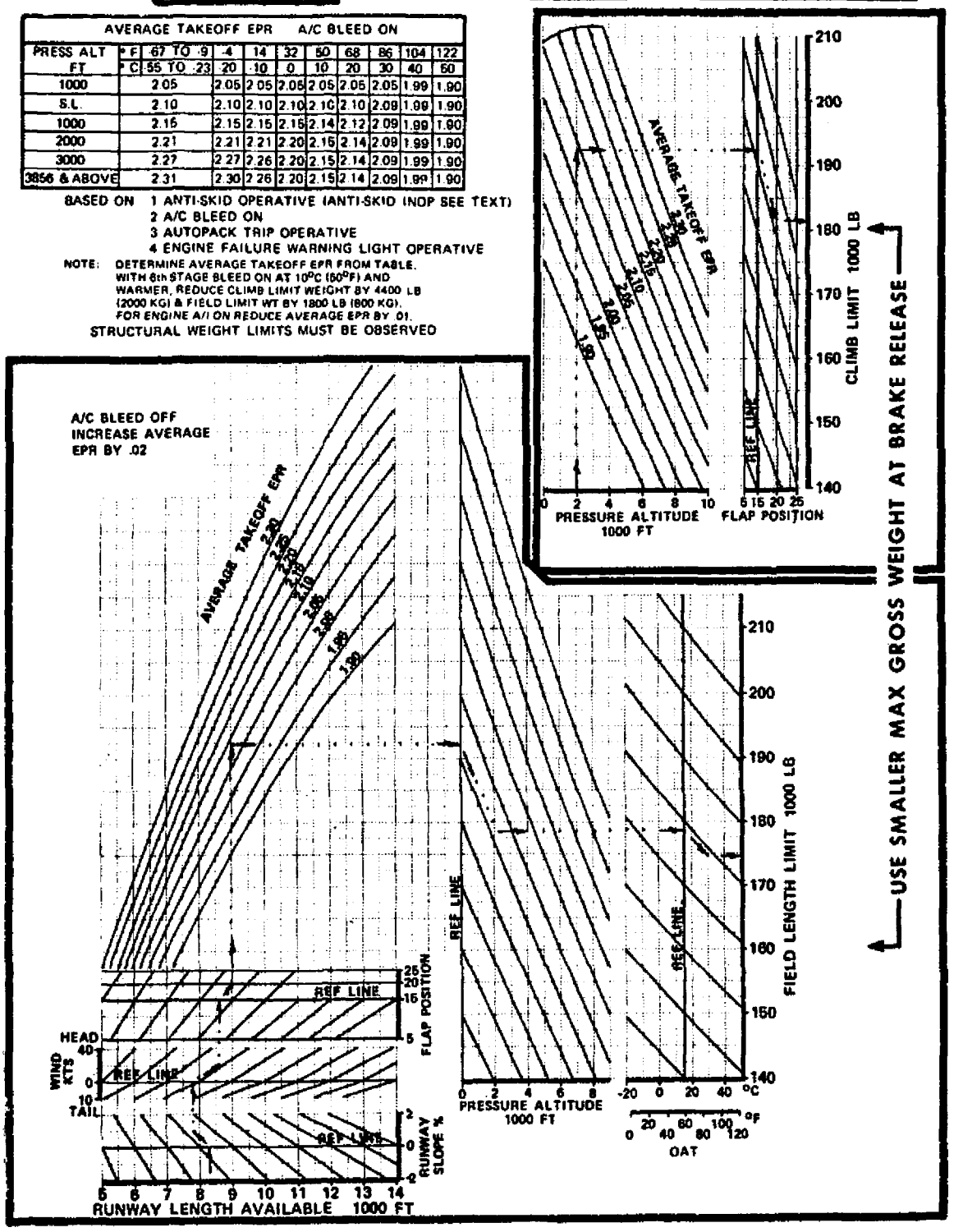


FIGURE 24

433 *Y14* Determine the field length limit gross weight for these conditions. (Fig. 24)

Pressure altitude	1,500 feet
OAT	+60°F.
Headwind component	15 knots
Runway length	8,800 feet
Runway slope	1% DOWN
Flaps	20
Autopack trip	INOPERATIVE
Engine anti-ice	OFF
Sixth stage bleed	OFF
A/C bleed	ON

1—198,200 lbs.
2—200,200 lbs.
3—189,200 lbs.
4—196,300 lbs.

434 *Y14* Which maximum gross weight is limiting at brake release under the following conditions? (Fig. 24)

Runway length	9,500 feet
Runway slope	1% DOWN
Pressure altitude	1,500 feet
Headwind component	20 knots
OAT	+59°F.
Flaps	20
Autopack trip	INOPERATIVE
Sixth stage bleed	OFF
Engine anti-ice	OFF
A/C bleed	ON

1—214,200 lbs.; runway limited
2—189,800 lbs.; climb limited
3—215,000 lbs.; runway limited
4—192,500 lbs.; climb limited

435 *Y14* Determine the climb limit gross weight under the following conditions. (Fig. 24)

Pressure altitude	2,500 feet
OAT	+77°F.
Flap position	20
Auto-pack trip	ON
Sixth stage bleed	ON
Engine anti-ice	OFF
A/C bleed	ON

1—177,800 lbs.
2—179,000 lbs.
3—174,600 lbs.
4—176,300 lbs.

436 *Y14* Which maximum weight is limiting at brake release under the following conditions? (Fig. 24)

Runway length	8,200 feet
Runway slope	2% UP
Pressure altitude	2,500 feet
Tailwind component	5 knots
OAT	+59°F.
Flaps	20
Autopack trip	INOPERATIVE
Sixth stage bleed	ON
Engine anti-ice	OFF
A/C bleed	ON

1—184,300 lbs.; climb limited
2—179,900 lbs.; climb limited
3—158,200 lbs.; runway limited
4—157,400 lbs.; runway limited

437 *Y14* What is the field length limit gross weight under the following conditions? (Fig. 24)

Runway length	9,600 feet
Runway slope	1% UP
Pressure altitude	1,000 feet
Tailwind component	5 knots
OAT	+95°F.
Flaps	20
Autopack trip	INOPERATIVE
Engine anti-ice	OFF
Sixth stage bleed	OFF
A/C bleed	ON

1—151,100 lbs.
2—176,200 lbs.
3—177,200 lbs.
4—182,600 lbs.

438 *Y14* Determine the climb limited gross weight. (Fig. 24)

Field elevation	1,000 feet
QNH	29.91 in. Hg
OAT	69°F.
Sixth stage bleed air	ON
Autopack trip	OPERATIVE
Flaps	20
Engine anti-ice	OFF
A/C bleed	ON

1—191,000 lbs.
2—186,600 lbs.
3—183,600 lbs.
4—178,500 lbs.

TAKEOFF EPR, SPEEDS AND STAB TRIM SETTING

MAX TAKEOFF EPR

0 - 60 KNOTS — ENG 1 & 3 AIRBLEED ON — ENG 2 NO AIRBLEED

PRESS ALT FT	ENG	OAT °F / °C	-67 TO -9 / -55 TO -23	-4 / -20	5 / -15	14 / -10	23 / -5	32 / 0	41 / 5	50 / 10	59 / 15	68 / 20	77 / 25	86 / 30	95 / 35	104 / 40	113 / 45	120 / 49
-1000	1 & 3		2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.03	1.99	1.94	1.91
	2		2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.05	2.00	1.96	1.92
S.L.	1 & 3		2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.08	2.03	1.99	1.94	1.91
	2		2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.10	2.05	2.00	1.96	1.92
1000	1 & 3		2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.13	2.12	2.12	2.11	2.08	2.03	1.99	1.94	1.91
	2		2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.15	2.13	2.13	2.12	2.10	2.05	2.00	1.96	1.92
2000	1 & 3		2.21	2.21	2.21	2.21	2.21	2.20	2.17	2.14	2.14	2.14	2.11	2.08	2.03	1.99	1.94	1.91
	2		2.22	2.22	2.22	2.22	2.22	2.21	2.18	2.16	2.16	2.15	2.12	2.10	2.05	2.00	1.96	1.92
3000	1 & 3		2.26	2.26	2.26	2.25	2.23	2.20	2.17	2.14	2.14	2.14	2.11	2.08	2.03	1.99	1.94	1.91
	2		2.28	2.28	2.28	2.27	2.24	2.21	2.18	2.16	2.16	2.15	2.12	2.10	2.05	2.00	1.96	1.92
3856 & ABOVE	1 & 3		2.31	2.29	2.27	2.25	2.23	2.20	2.17	2.14	2.14	2.14	2.11	2.08	2.03	1.99	1.94	1.91
	2		2.32	2.31	2.29	2.27	2.24	2.21	2.18	2.16	2.16	2.15	2.12	2.10	2.05	2.00	1.96	1.92

EPR BLEED CORRECTIONS	ENG 1 & 3	ENG 2
AIR CONDITIONING	OFF+.04	-
ENGINE ANTI-ICE ON	-	-.03

REDUCE ENG 2 EPR BY .06 WITH 6TH STAGE BLEED ON (IF INSTALLED) FOR 10°C (50°F) OAT & WARMER

V_1, V_R, V_2

ANTI-SKID OPERATIVE

PRESSURE ALT - 1000 FT		OAT (ABOVE CERTIFIED ALTITUDE)									
9 TO 11	°F / °C	-65 / -54	TO	25 / -4		26 / -3	TO	87 / 31			
7 TO 9	°F / °C	-65 / -54	TO	9 / -13	10 / -12	TO	75 / 24	76 / 25	TO	104 / 40	
5 TO 7	°F / °C	-65 / -54	TO	-10 / -23	-8 / -22	TO	42 / 5	43 / 6	TO	97 / 36	98 / 37	TO	111 / 44
3 TO 5	°F / °C	-65 / -54	TO	32 / 0	33 / 1	TO	90 / 32	91 / 33	TO	113 / 45	114 / 46	TO	120 / 49
1 TO 3	°F / °C	-65 / -54	TO	83 / 28	84 / 29	TO	106 / 41	107 / 42	TO	120 / 49			
-1 TO 1	°F / °C	-65 / -54	TO	99 / 37	100 / 38	TO	120 / 49						

FLAPS	GROSS WEIGHT 1000 LB	V_1=V_R	V_2	V_1=V_R	V_2	V_1=V_R	V_2	V_1=V_R	V_2
5	210	165	175	166	175				
	200	160	171	162	171				
	190	155	167	157	167	158	167		
	180	150	163	152	163	154	163		
	170	144	159	147	159	149	159	150	158
	160	140	154	141	153	143	153	145	153
	150	135	149	136	149	138	149	140	148
	140	129	145	130	145	132	144	134	144
	130	124	140	125	139	126	138	128	138
	120	119	135	120	134	120	134	121	133
15	210	156	166	157	166				
	200	151	162	153	162				
	190	146	158	148	158	149	158		
	180	141	154	143	154	145	154		
	170	136	150	138	150	140	150	141	149
	160	132	146	133	145	135	145	137	145
	150	127	141	128	141	130	141	132	140
	140	122	137	123	137	124	136	126	136
	130	117	133	118	132	118	131	120	131
	120	112	128	113	127	113	127	115	126
20	210	151	161	152	161				
	200	146	157	148	157				
	190	141	153	143	153	144	153		
	180	136	150	138	150	140	149		
	170	132	146	133	146	135	145	136	145
	160	128	142	129	141	131	141	133	141
	150	123	137	124	137	126	136	128	136
	140	118	133	119	133	120	132	122	132
	130	113	129	114	128	114	127	116	127
	120	109	124	109	123	109	123	111	122
25	210	146	157	147	157				
	200	141	153	143	153				
	190	137	149	138	149	139	149		
	180	132	145	134	145	136	145		
	170	127	141	129	141	131	141	132	140
	160	123	137	124	137	126	137	128	136
	150	119	133	120	133	122	133	124	132
	140	114	129	115	129	116	128	118	128
	130	109	125	110	124	110	124	112	123
	120	105	120	106	120	106	119	108	118

STAB TRIM SETTING

CG%	FLAPS 5	FLAPS 15 /20	FLAPS 25
	UNITS AIRPLANE NOSE UP		
10	6 3/4	7 1/2	8 1/4
12	6 1/2	7 1/4	8
14	6 1/4	7	7 3/4
16	6	6 3/4	7 1/2
18	5 3/4	6 1/2	7
20	5 1/2	6	6 1/2
22	5	5 3/4	6 1/4
24	4 3/4	5 1/4	5 3/4
26	4 1/2	4 3/4	5 1/4
28	4	4 1/2	4 3/4
30	3 3/4	4	4 1/4
32	3 1/2	3 3/4	4
34	3 1/4	3 1/4	3 1/2
36	2 3/4	3	3
38	2 1/2	2 1/2	2 1/2
40	2 1/2	2 1/2	2 1/2
42	2 1/2	2 1/2	2 1/2

FLAP RETRACTION/ MANEUVERING SPEEDS

GROSS WEIGHT LB	FLAP POSITION 15	5	2	0
154500 & BELOW	150	160	190	200
154501 TO 176000	160	170	200	210
176001 TO 191000	170	180	210	220
ABOVE 191000	180	190	225	235

FOR MANEUVERS IMMEDIATELY AFTER TAKEOFF EXCEEDING 15° BANK MAINTAIN AT LEAST V_2+10 AT TAKEOFF FLAPS

FIGURE 25

OPERATING CONDITIONS A	
Field elevation- - - - -	1,500 feet
Altimeter setting (ATIS)	29.92 in. Hg
OAT- - - - - - - - - - -	51°F.
Wing flap setting- - - -	15
Engines 1 & 3- - - - - -	Airbleed ON
Engine 2 - - - - - - - -	6th stage airbleed ON
Leading edge of MAC- - -	860.2 in. aft of datum
MAC- - - - - - - - - - -	180.7 in.

OPERATING CONDITIONS B	
Field elevation- - - -	490 feet
ATIS:	
Altimeter setting- -	29.92 in. Hg
OAT- - - - - - - - -	45°F.
Wing flap setting- - -	25
Air-conditioning - - -	OFF
Engine anti-ice- - - -	ON
Sixth stage airbleed -	ON
MAC- - - - - - - - - -	180.7 in.
Leading edge of MAC- -	860.2 in. aft of datum

439 *Y12* What should be the STAB TRIM SETTING when the CG is located 45.1 inches aft of LEMAC? (Use Operating Conditions A, and Fig. 25.)

1—4¾ units ANU
2—4½ units ANU
3—5¼ units ANU
4—5 units ANU

440 *Y13* Determine the critical engine failure speed and takeoff safety speed for a gross weight of 195,000 pounds. (Use Operating Conditions A, and Fig. 25.)

1—151; 162 knots
2—150; 160 knots
3—148; 160 knots
4—146; 158 knots

441 *Y13* What should be the minimum maneuvering speed immediately after takeoff using a 20° banked turn if the airplane gross weight is 175,000 pounds? (Use Operating Conditions A, and Fig. 25.)

1—160 knots
2—162 knots
3—150 knots
4—152 knots

442 *Y11* What should be the MAX TAKEOFF EPR for all engines with sixth stage airbleed OFF? (Use Operating Conditions A, and Fig. 25.)

	Engines 1 & 3	*Engine 2*
1—	2.06	2.10
2—	2.09	2.15
3—	2.13	2.15
4—	2.13	2.10

443 *Y11* Determine the critical engine failure and takeoff safety speeds for a gross weight of 180,000 pounds. (Use Operating Conditions B, and Fig. 25.)

	V_1	V_2
1—	141 knots	154 knots
2—	150 knots	163 knots
3—	145 knots	132 knots
4—	132 knots	145 knots

444 *Y12* What should be the STAB TRIM SETTING when the CG is located 910.8 inches aft of datum? (Use Operating Conditions B, and Fig. 25.)

1—4¼ units ANU
2—4½ units ANU
3—4¾ units ANU
4—4 units ANU

445 *Y11* What should be the minimum maneuvering speed immediately after takeoff using a 20° banked turn if the airplane gross weight is 165,000 pounds? (Use Operating Conditions B, and Fig. 25.)

1—149 knots
2—154 knots
3—131 knots
4—135 knots

446 *Y11* What should be the MAX TAKEOFF EPR for all engines? (Use Operating Conditions B, and Fig. 25.)

	Engines 1 & 3	*Engine 2*
1—	2.12	2.13
2—	2.21	2.13
3—	2.13	2.15
4—	2.16	2.10

MAX CLIMB EPR

MAX CLIMB EPR

ENG 1 & 3 A/C BLEED
ENG 2 NO BLEED

PRESS ALT FT	ENG	TAT °C																		
		-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
S.L.	1 & 3	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.03	1.97	1.93	1.88	1.84	1.79	1.75	1.72	1.68	1.64
	2	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
1000	1 & 3	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.08	2.03	1.97	1.93	1.88	1.84	1.79	1.75	1.72	1.68	1.64
	2	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
2000	1 & 3	2.19	2.19	2.19	2.19	2.19	2.19	2.18	2.13	2.08	2.03	1.97	1.93	1.88	1.84	1.79	1.75	1.72	1.68	1.64
	2	2.21	2.21	2.21	2.21	2.21	2.21	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
3000	1 & 3	2.24	2.24	2.24	2.24	2.23	2.21	2.17	2.13	2.08	2.02	1.97	1.92	1.88	1.83	1.79	1.75	1.71	1.67	1.63
	2	2.26	2.26	2.26	2.26	2.26	2.23	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
3900 TO 5000	1 & 3	2.29	2.28	2.27	2.25	2.23	2.20	2.17	2.13	2.08	2.02	1.97	1.92	1.87	1.83	1.79	1.75	1.71	1.67	1.63
	2	2.32	2.31	2.29	2.28	2.26	2.23	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
10000	1 & 3	2.28	2.27	2.26	2.24	2.22	2.20	2.16	2.12	2.07	2.01	1.96	1.91	1.86	1.82	1.78	1.74	1.70	1.66	1.62
	2	2.32	2.31	2.29	2.28	2.26	2.23	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
20000	1 & 3	2.27	2.26	2.24	2.23	2.21	2.18	2.15	2.10	2.05	2.00	1.94	1.90	1.85	1.81	1.76	1.72	1.69	1.65	1.61
	2	2.32	2.31	2.29	2.28	2.26	2.23	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
30000	1 & 3	2.25	2.24	2.23	2.21	2.19	2.17	2.13	2.09	2.04	1.98	1.93	1.88	1.83	1.79	1.75	1.71	1.67	1.63	1.59
	2	2.32	2.31	2.29	2.28	2.26	2.23	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67
40000 & ABOVE	1 & 3	2.23	2.22	2.20	2.19	2.17	2.14	2.11	2.06	2.01	1.96	1.90	1.86	1.81	1.77	1.72	1.68	1.65	1.61	1.57
	2	2.32	2.31	2.29	2.28	2.26	2.23	2.20	2.16	2.11	2.05	2.00	1.95	1.90	1.86	1.82	1.78	1.74	1.70	1.67

FIGURE 26

EPR BLEED CORRECTIONS		ENG 1 & 3	ENG 2
AIR CONDITIONING AIR BLEED	S.L.	OFF + .04	ON - .04
	10000 FT	OFF + .05	ON - .05
	20000 FT	OFF + .07	ON - .07
	30000 FT	OFF + .08	ON - .08
	40000 FT	OFF + .11	ON - .10
ENGINE ANTI-ICE ON		- .08	- .12
ENG AND WING ANTI-ICE	TWO ENG BLEEDS	- .17	- .12
	ONE ENG BLEED	- .17	

TOTAL TEMPERATURE AT ISA

PRESSURE ALTITUDE 1000 FT	INDICATED MACH NUMBER													
	0	.40	.50	.60	.70	.74	.78	.80	.82	.84	.86	.88	.90	.92
	TOTAL TEMPERATURE AT ISA DEGREES C													
36 TO 45	-56			-41	-35	-33	-30	-29	-27	-26	-24	-23	-21	-20
35	-54			-39	-33	-30	-28	-26	-25	-23	-22	-20	-19	-17
34	-52		-41	-36	-31	-28	-25	-24	-23	-21	-20	-18	-17	-15
33	-50		-39	-34	-29	-26	-23	-22	-20	-19	-17	-16	-14	-13
32	-48		-37	-32	-26	-24	-21	-20	-18	-17	-15	-14	-12	-10
31	-46		-35	-30	-24	-22	-19	-17	-16	-14	-13	-11	-10	-8
30	-44		-33	-28	-22	-19	-17	-15	-14	-12	-11	-9	-7	-6
29	-42		-31	-26	-20	-17	-14	-13	-11	-10	-8	-7	-5	-3
28	-40		-29	-24	-18	-15	-12	-11	-9	-8	-6	-4	-3	-1
27	-38		-27	-22	-15	-13	-10	-8	-7	-5	-4	-2	0	1
26	-37		-25	-19	-13	-11	-8	-6	-5	-3	-2	0	2	4
25	-35		-23	-17	-11	-8	-5	-4	-2	-1	1	2	4	6
24	-33	-25	-21	-15	-9	-6	-3	-2	0	1	3	5	6	8
23	-31	-23	-18	-13	-7	-4	-1	0	2	4	5	7	9	11
22	-29	-21	-16	-11	-5	-2	1	3	4	6	8	9	11	13
21	-27	-19	-14	-9	-2	0	3	5	7	8	11	12	13	
20	-25	-17	-12	-7	0	3	6	7	9	10	12	14		
19	-23	-15	-10	-5	2	5	8	9	11	13	14			

FIGURE 27

447 What should be the adjusted MAX CLIMB *Y25* EPR at FL 200 when climbing from 15,000 feet to FL 300? (Fig. 26 and 27)

Average TAT ..... −10°C.

Air-conditioning air bleed:

Engine 2 ..... OFF

Engine anti-ice (all engines) .... ON

	Engines 1 & 3	*Engine 2*
1—	2.06	2.07
2—	2.22	2.15
3—	2.06	2.13
4—	2.07	2.08

448 What should be the adjusted MAX CLIMB *Y25* EPR at 15,000 feet when climbing from 10,000 feet to FL 200? (Fig. 26)

Average TAT ..... −5°C.

Air-conditioning air bleed:

Engines 1 & 3 ..... ON

Engine 2 ..... OFF

	Engines 1 & 3	*Engine 2*
1—	2.11	2.10
2—	2.11	2.16
3—	2.12	2.16
4—	2.05	2.16

449 When climbing at a constant indicated *Y25* Mach of .80 from FL 250 to FL 350, what should be the MAX CLIMB EPR at FL 300? (Fig. 26 and 27)

Engine anti-ice (all engines) ..... ON

	Engines 1 & 3	*Engine 2*
1—	2.15	2.18
2—	2.11	2.09
3—	2.09	2.11
4—	2.17	2.20

450 What should be the MAX CLIMB EPR *Y25* at FL 250 when climbing at a constant .78 indicated Mach from FL 200 to FL 350? (Fig. 26 and 27)

Air-conditioning air bleed:

Engines 1 & 3 ..... ON

Engine 2 ..... OFF

	Engines 1 & 3	*Engine 2*
1—	2.09	2.16
2—	2.11	2.16
3—	2.25	2.09
4—	2.32	2.31

451 What should be the MAX CLIMB EPR *Y25* at FL 350 when climbing at a constant .74 indicated Mach from FL 280 to FL 410? (Fig. 26 and 27)

Air-conditioning air bleed:

Engines 1 & 3 ..... OFF

Engine 2 ..... ON

Engine anti-ice (all engines ..... ON

	Engines 1 & 3	*Engine 2*
1—	2.24	2.12
2—	2.30	2.20
3—	2.16	2.00
4—	2.22	2.08

452 What should be the adjusted MAX CLIMB *Y25* EPR at FL 250 when climbing from FL 200 to FL 350? (Fig. 26)

Average TAT ..... −25°C.

Air-conditioning air bleed:

Engines 1 & 3 ..... ON

Engine 2 ..... OFF

Engine anti-ice (all engines) .... ON

	Engines 1 & 3	*Engine 2*
1—	2.16	2.18
2—	2.22	2.28
3—	2.07	2.08
4—	2.14	2.16

453 What should be the adjusted MAX CLIMB *Y25* EPR at FL 250 at a constant .78 indicated Mach? (Fig. 26 and 27)

OAT @ FL 250 ..... −40°C.

Engine anti-ice (all engines) .... ON

	Engines 1 & 3	*Engine 2*
1—	1.97	1.99
2—	2.06	2.08
3—	2.09	2.02
4—	2.14	2.20

454 What should be the MAX CLIMB EPR *Y25* at FL 300 at a constant .74 indicated climb Mach? (Fig. 26 and 27)

OAT at FL 300 ..... −55°C.

Air-conditioning air bleed:

Engines 1 & 3 ..... ON

Engine 2 ..... OFF

	Engines 1 & 3	*Engine 2*
1—	2.31	2.29
2—	2.19	2.16
3—	2.23	2.29
4—	2.19	2.29

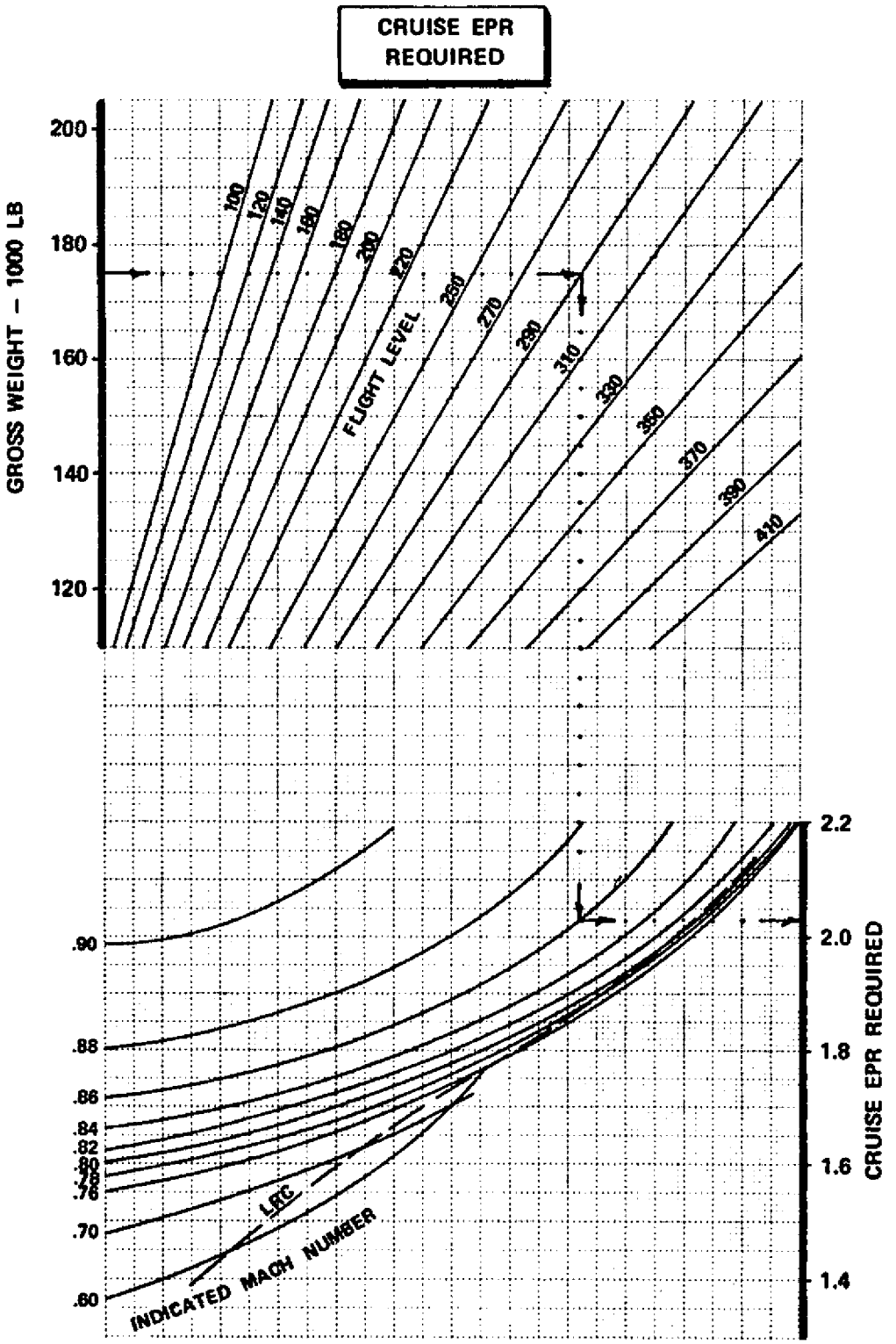

CRUISE EPR REQUIRED
GROSS WEIGHT – 1000 LB
200
180
160
140
120
100
120
140
160
180
200
220
240
250
270
290
310
330
350
370
390
410
FLIGHT LEVEL
.90
.88
.86
.84
.82
.80
.78
.76
.70
.60
LRC
INDICATED MACH NUMBER
2.2
2.0
1.8
1.6
1.4
CRUISE EPR REQUIRED

FIGURE 28

455 *Y26* What adjustment to cruise EPR should be made to maintain .80 cruise speed at FL 300 when the airplane gross weight has decreased from 178,000 to 168,000 pounds? (Fig. 28)

1—+.01
2—+.05
3—−.01
4—−.05

456 *Y26* Determine the EPR required for cruise at FL 310 at .82 Mach with a gross weight of 173,000 pounds. (Fig. 28)

1—1.91
2—1.89
3—1.97
4—1.93

457 *Y26* What indicated Mach should be obtained with a cruise EPR of 1.98 at FL 340 at a gross weight of 160,000 pounds? (Fig. 28)

1—.84
2—.82
3—.80
4—.78

458 *Y26* What adjustment to cruise EPR should be made to maintain .82 cruise speed at FL 260 when the airplane gross weight has decreased from 182,000 to 170,000 pounds? (Fig. 28)

1—Reduce EPR .03.
2—Increase EPR .03.
3—Reduce EPR .30.
4—Increase EPR .10.

459 *Y26* What indicated Mach should be obtained with a cruise EPR of 1.84 at FL 290 and a gross weight of 164,000 pounds? (Fig. 28)

1—.75
2—.79
3—.81
4—.83

460 *Y26* Determine the cruise EPR required at FL 260 with a gross weight at level-off of 182,000 pounds for a cruise Mach of .82. (Fig. 28)

1—1.85
2—1.82
3—1.90
4—1.88

461 *Y26* What should be the maximum cruise EPR at FL 410, TAT −45°C., A/C AIR-BLEED OFF on engines 1 and 3, engine anti-ice ON all engines? (Refer to Fig. 29, page 78)

	Engines 1 & 3	*Engine 2*
1—	2.16	2.16
2—	2.18	2.13
3—	2.18	2.24
4—	2.08	2.13

462 *Y26* What should be the maximum cruise EPR at FL 350, TAT −25°C., and engine anti-ice ON? (Fig. 29, page 78)

	Engines 1 & 3	*Engine 2*
1—	2.14	2.19
2—	2.04	2.10
3—	2.06	2.08
4—	2.08	2.06

463 *Y26* What should be the maximum cruise EPR at FL 350, TAT −25°C., engine and wing anti-ice ON? (Fig. 29, page 78)

	Engines 1 & 3	*Engine 2*
1—	1.98	2.08
2—	2.14	2.19
3—	2.19	2.09
4—	2.24	2.13

464 *Y26* What should be the maximum cruise EPR at FL 350, TAT −45°C., A/C airbleed OFF on engines 1 and 3, engine anti-ice ON all engines? (Fig. 29, page 78)

	Engines 1 & 3	*Engine 2*
1—	2.27	2.14
2—	2.19	2.13
3—	2.20	2.24
4—	2.13	2.16

465 *Y26* What should be the maximum cruise EPR at FL 410, TAT −35°C., engine and wing anti-ice ON? (Fig. 29, page 78)

	Engines 1 & 3	*Engine 2*
1—	1.98	2.08
2—	2.00	2.11
3—	2.08	2.11
4—	2.16	2.22

AVG EPR REQUIRED
MAX TAT AT WHICH EPR CAN BE SET
ISA FUEL FLOW LB/HR/ENG

IND. MACH .82 CRUISE
ALL ENGINES 2 AIRBLEEDS
MAX CRUISE THRUST LIMITS

FLIGHT LEVEL 320 TO 410

FLIGHT LEVEL	IAS STD TAT	GROSS WEIGHT 1000 LB									
		165	160	155	150	145	140	135	130	125	120
410	243 -27									2.16 -36 2566	2.10 -19 2417
400	249 -27							2.21 -59 2812	2.15 -30 2646	2.09 -16 2503	2.04 -10 2383
390	255 -27						2.19 -47 2685	2.13 -25 2725	2.08 -14 2586	2.03 -8 2471	1.99 -4 2370
380	261 -27				2.22 -64 3126	2.17 -36 2954	2.11 -20 2800	2.06 -12 2668	2.02 -7 2558	1.98 -3 2460	1.95 0 2375
370	267 -27			2.20 -50 3185	2.14 -27 3021	2.10 -16 2873	2.05 -10 2750	2.01 -6 2644	1.97 -2 2549	1.94 1 2469	1.91 3 2404
360	273 -27	2.22 -61 3418	2.17 -36 3242	2.12 -21 3086	2.08 -13 2949	2.04 -8 2833	2.00 -4 2731	1.96 -1 2641	1.93 2 2565	1.91 4 2502	1.88 6 2444
350	279 -25	2.14 -26 3314	2.10 -16 3163	2.06 -11 3038	2.02 -6 2929	1.99 -3 2831	1.95 0 2744	1.93 2 2675	1.90 4 2613	1.88 6 2556	1.86 8 2503
340	286 -23	2.08 -13 3255	2.04 -8 3137	2.00 -5 3032	1.97 -2 2938	1.94 1 2856	1.92 3 2789	1.89 5 2728	1.87 7 2671	1.85 8 2619	1.83 10 2569
330	292 -20	2.02 -6 3237	1.99 -3 3136	1.96 -0 3040	1.93 2 2970	1.91 4 2906	1.89 6 2846	1.87 7 2789	1.85 9 2737	1.83 10 2687	1.81 12 2640
320	297 -18	1.97 -1 3243	1.95 1 3158	1.92 3 3080	1.90 5 3025	1.88 6 2965	1.86 8 2910	1.84 9 2858	1.83 11 2809	1.81 12 2761	1.79 13 2717

MAX CRUISE EPR — ENG 1 & 3 A/C AIRBLEED ON; ENG 2 NO AIRBLEED												
FLIGHT LEVEL	ENG	TAT °C										
		-50	-40	-30	-20	-10	0	10	20	30	40
100	1 & 3	2.24	2.22	2.19	2.16	2.09	1.99	1.86	1.74	1.65	1.56
200		2.23	2.21	2.18	2.14	2.08	1.98	1.85	1.73	1.64	1.55
300		2.22	2.20	2.17	2.13	2.07	1.97	1.84	1.72	1.63	1.54
400		2.19	2.17	2.15	2.11	2.04	1.94	1.82	1.70	1.60	1.52
420		2.19	2.17	2.14	2.11	2.04	1.94	1.82	1.69	1.60	1.52
0-420	2	2.26	2.23	2.21	2.17	2.10	2.01	1.89	1.76	1.67	1.59

EPR BLEED CORRECTIONS			ENG 1 & 3	ENG 2
AIR COND AIR BLEED	FL100		OFF + .04	ON − .04
	FL200		OFF + .05	ON − .05
	FL300		OFF + .06	ON − .06
	FL400		OFF + .08	ON − .07
	FL420		OFF + .08	ON − .07
ENG ANTI-ICE ON			− .08	− .11
ENG & WING ANTI-ICE	TWO	ENG BLD	− .16	− .11
	ONE	ENG BLD	− .16	

FIGURE 29

EPR
IAS - KTS
FF PER ENG - LB/HR

HOLDING

MINIMUM DRAG AIRSPEED
(200KTS LOWER LIMIT)

PRESSURE ALTITUDE FT	GROSS WEIGHT - 1000 LB								
	200	190	180	170	160	150	140	130	120
25000	1.85 268 3600	1.81 261 3400	1.77 253 3210	1.73 246 3030	1.69 238 2860	1.64 230 2680	1.60 222 2510	1.55 213 2340	1.51 205 2180
20000	1.69 265 3630	1.66 258 3450	1.62 251 3280	1.59 244 3110	1.55 236 2940	1.51 228 2770	1.48 220 2600	1.44 212 2440	1.40 204 2270
15000	1.56 263 3670	1.53 256 3500	1.50 249 3340	1.47 242 3170	1.44 235 3000	1.41 227 2850	1.38 219 2680	1.35 211 2520	1.32 203 2350
10000	1.45 262 3800	1.43 255 3640	1.40 248 3460	1.38 241 3310	1.35 234 3140	1.33 226 2970	1.30 218 2810	1.28 210 2640	1.25 202 2480
5000	1.36 260 3890	1.34 254 3720	1.32 247 3550	1.30 240 3380	1.28 233 3220	1.26 225 3060	1.24 218 2890	1.22 210 2730	1.20 201 2560

FIGURE 30

466 *Y30* Determine the approximate total fuel required to hold for 8 minutes at 10,000-feet pressure altitude at a gross weight of 165,000 pounds? (Fig. 30)

1—1,410 pounds

2—1,500 pounds

3—1,290 pounds

4—1,320 pounds

467 *Y30* What amount of fuel should be required to hold for 20 minutes at 8,000 feet pressure altitude at a gross weight of 155,000 pounds? (Fig. 30)

1—3,975 pounds

2—4,250 pounds

3—3,100 pounds

4—3,500 pounds

468 *Y30* Determine the approximate total fuel flow required to hold at 22,000 feet at a gross weight of 145,000 pounds. (Fig. 30)

1—9,250 pounds

2—9,375 pounds

3—7,920 pounds

4—8,090 pounds

469 *Y30* What should be the recommended EPR, IAS, and total fuel required to hold for 15 minutes at 5,000 feet pressure altitude at a gross weight of 165,000 pounds? (Fig. 30)

EPR	*IAS (Knots)*	*Total Fuel (Pounds)*
1—1.28	227	2,475
2—1.29	237	2,475
3—1.29	227	2,355
4—1.28	230	2,405

470 *Y30* Determine the approximate total fuel required to hold at 20,000 feet for 8 minutes at an airplane gross weight of 165,000 pounds. (Fig. 30)

1— 800 pounds

2—1,000 pounds

3—1,200 pounds

4—1,400 pounds

471 *Y40* Determine the approximate time and fuel required for a flight under these conditions. (Fig. 33, page 83)

Trip distance ---------- 1,800 nmi
Average wind factor --- 30 knots tailwind
Cruise altitude -------- FL 330
Landing weight ------- 128,000 lbs.
Temperature at FL 330 - −45°C.

1—3 hours 45 minutes; 31,800 pounds
2—4 hours 15 minutes; 36,200 pounds
3—2 hours 55 minutes; 20,800 pounds
4—3 hours 05 minutes; 24,600 pounds

472 *Y40* Determine the trip time and fuel using these conditions and Fig. 33, page 83.

Total trip distance ---------- 1,420 nmi
Average headwind ---------- 60 knots
Cruise pressure altitude ----- FL 340
Landing gross weight ------- 128,000 lbs.
OAT ---------- −42°C.
Indicated Mach ---------- .82

1—3 hours 25 minutes; 27,500 pounds
2—3 hours 31 minutes; 30,300 pounds
3—3 hours 20 minutes; 22,800 pounds
4—3 hours 22 minutes; 23,300 pounds

473 *Y40* Determine the trip time and fuel for these conditions. (Fig. 33, page 83)

Total trip distance ---------- 1,940 nmi
Average wind factor -------- +55 knots
Cruise pressure altitude ----- FL 330
Landing gross weight ------- 122,000 lbs.
Average OAT ---------- −38°C.

1—4 hours 40 minutes; 40,800 pounds
2—4 hours 50 minutes; 41,600 pounds
3—3 hours 40 minutes; 39,700 pounds
4—3 hours 52 minutes; 32,100 pounds

OPERATING CONDITIONS C

Runway length	7,500 feet
Pressure altitude	1,500 feet
Nose gear brakes	OFF
Antiskid	ON

474 *Y32* What is the runway limited gross weight on a dry runway with a tailwind component of 10 knots? (Use Operating Conditions C and Fig. 31.)

1—186,500 pounds
2—200,000 pounds
3—188,000 pounds
4—192,500 pounds

475 *Y32* What is the runway limited gross weight for landing on a wet runway with a headwind component of 10 knots? (Use Operating Conditions C and Fig. 31.)

1—187,500 pounds
2—190,000 pounds
3—192,500 pounds
4—195,000 pounds

476 *Y32* What is the climb limited gross weight? (Refer to Fig. 31)

Pressure altitude ---------- 5,000 feet
OAT ---------- 92°F.
Sixth stage bleed ---------- ON

1—172,500 pounds
2—165,000 pounds
3—167,000 pounds
4—168,500 pounds

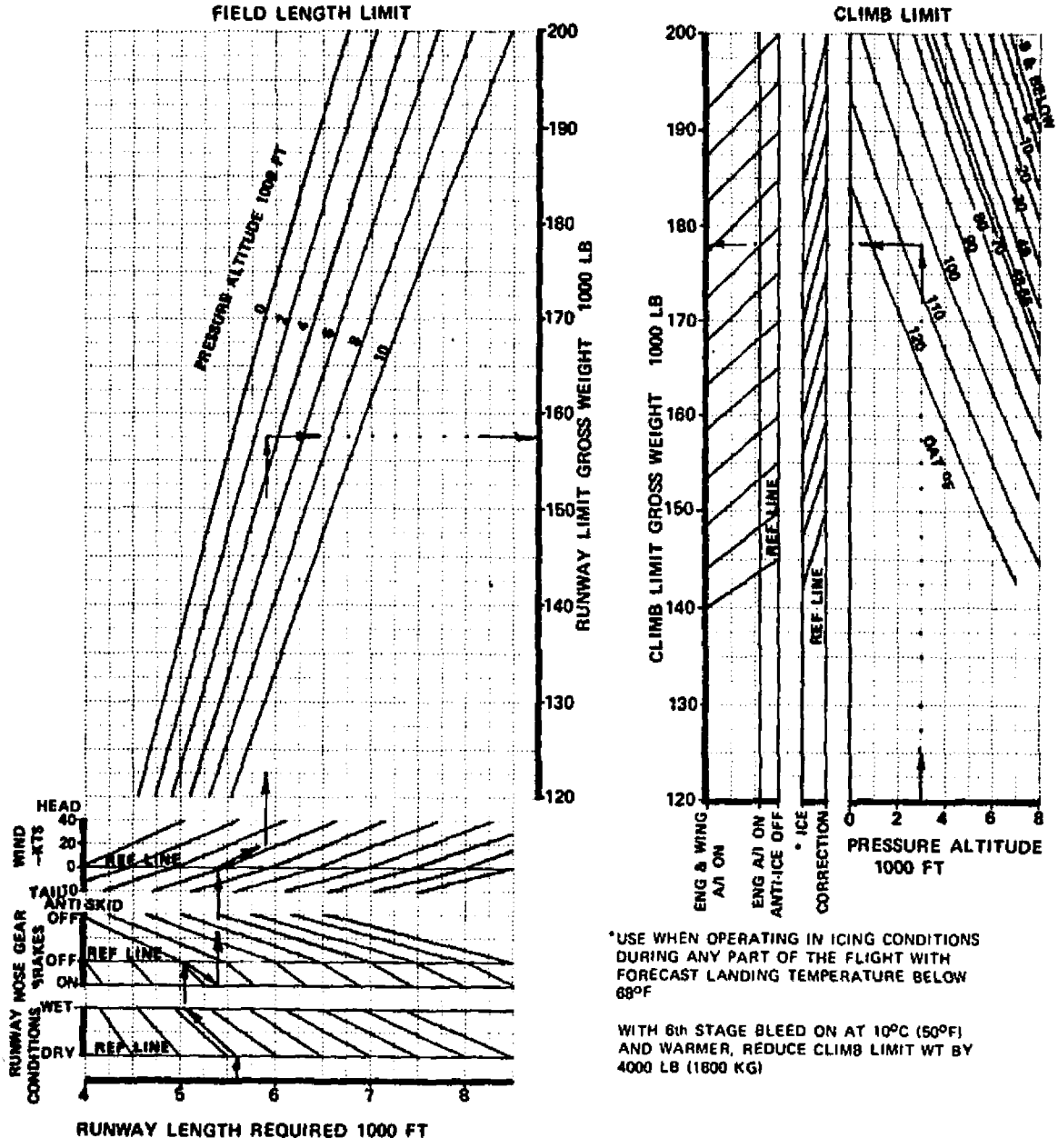
477 *Y32* What is the runway limited gross weight on a wet runway with a tailwind component of 5 knots? (Use Operating Conditions C and Fig. 31.)

1—183,500 pounds
2—186,000 pounds
3—172,500 pounds
4—178,000 pounds

478 *Y32* What is the climb limited gross weight when using FLAPS 30 and OAT is 75°F? (Use Operating Conditions C and Fig. 31.)

1—200,000 pounds
2—197,000 pounds
3—192,500 pounds
4—195,500 pounds

LANDING PERFORMANCE FLAPS 30



*USE WHEN OPERATING IN ICING CONDITIONS DURING ANY PART OF THE FLIGHT WITH FORECAST LANDING TEMPERATURE BELOW 68°F

WITH 6th STAGE BLEED ON AT 10°C (50°F) AND WARMER, REDUCE CLIMB LIMIT WT BY 4000 LB (1800 KG)

FIGURE 31

INITIAL FUEL WEIGHT 1000 LB	ENDING FUEL WEIGHT - 1000 LB															
	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
70	28	27	25	23	22	20	18	17	15	13	12	10	8	5	3	0
66	26	25	23	21	20	18	16	15	13	11	10	8	5	3	0	
62	23	23	20	18	17	15	13	12	10	8	7	5	3	0		
58	21	20	18	16	15	13	11	10	8	6	5	3	0			
54	18	16	15	13	12	10	8	7	5	3	2	0				
50	16	15	13	12	10	8	7	5	3	2	0					
46	15	13	12	10	8	7	5	3	2	0						
42	13	12	10	8	7	5	3	2	0							
38	12	10	8	7	5	3	2	0								
34	10	8	7	5	3	2	0									
30	8	7	5	3	2	0										
26	7	5	3	2	0											
22	5	3	2	0												
18	3	2	0													
14	2	0														
10	0															

FUEL DUMP TIME

FUEL JETTISON TIME-MINUTES

FIGURE 32

479 *Y40* Determine the approximate time and fuel required under these conditions. (Fig. 33)

Trip distance ---------- 1,400 nmi
Average wind factor --- 40 knots tailwind
Cruising altitude ------ FL 370 (use 350 on chart)
Landing weight ------- 118,000 pounds
Temperature at FL 370 - −45°C.

1—3 hours 02 minutes; 23,800 pounds
2—3 hours 15 minutes; 26,200 pounds
3—3 hours 23 minutes; 26,750 pounds
4—2 hours 50 minutes; 22,400 pounds

480 *Y31* How long will it take to dump a sufficient amount of fuel to have 16,000 pounds of fuel remaining? (Fig. 32)

Zero fuel weight ---------- 135,000 lbs.
Airplane gross weight
at start of dump ---------- 165,000 lbs.

1—7 minutes
2—8 minutes
3—5 minutes
4—6 minutes

481 *Y31* How long will it take to dump a sufficient amount of fuel so that 10,000 pounds of fuel will remain? (Fig. 32)

Zero fuel weight ---------- 135,500 lbs.
Airplane gross weight
at start of dump ---------- 179,500 lbs.

1—14 minutes
2—15 minutes
3—12 minutes
4—13 minutes

482 *Y31* How long will it take to dump a sufficient amount of fuel to reach the maximum landing weight for FLAPS 30? (Fig. 32)

Airplane gross weight
at start of dump ---------- 164,500 lbs.
Zero fuel weight ---------- 134,500 lbs.
Max. landing weight
for FLAPS 30 ---------- 154,500 lbs.

1—7 minutes
2—8 minutes
3—4 minutes
4—5 minutes

483 *Y31* A three-engine air carrier airplane shuts down one engine after takeoff. How long will it take to dump a sufficient amount of fuel to reach maximum inflight weight of 155,000 pounds *prior* to entering holding? (Fig. 32)

Airplane gross weight
at start of dump ---------- 163,800 lbs.
Zero fuel weight ---------- 133,800 lbs.
(Holding fuel—10 minutes @ 3,600 pph/engine.)

1—4 minutes
2—6 minutes
3—7 minutes
4—9 minutes

484 *Y31* How long will it take to dump enough fuel to reach a maximum landing weight of 142,500 pounds? (Fig. 32)

Airplane gross weight
at start of dump ---------- 176,500 lbs.
Zero fuel weight ---------- 132,500 lbs.

1—12 minutes
2—11 minutes
3—15 minutes
4—14 minutes

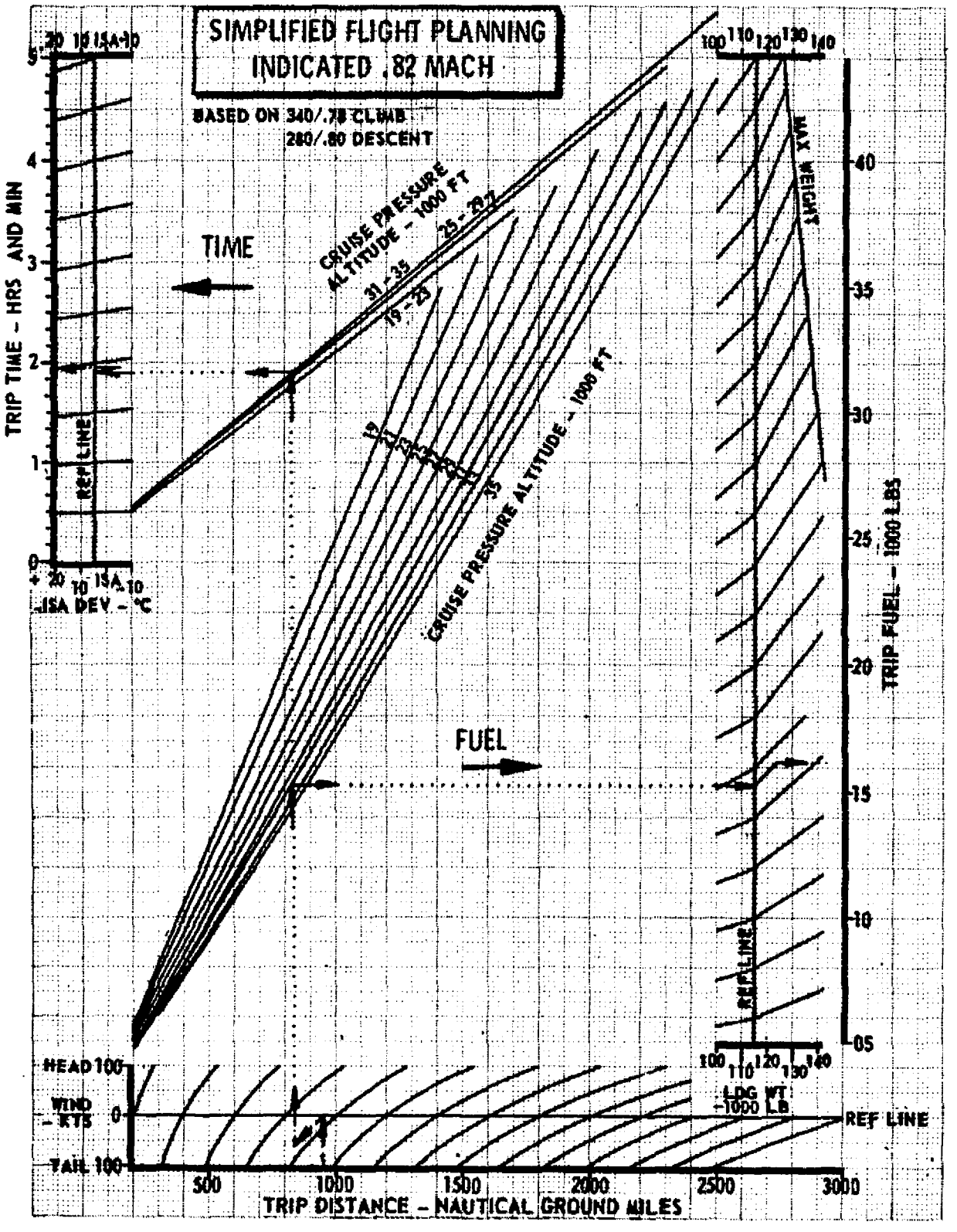

SIMPLIFIED FLIGHT PLANNING
INDICATED .82 MACH
BASED ON 340/.78 CLIMB
280/.80 DESCENT
TRIP TIME - HRS AND MIN
TIME
CRUISE PRESSURE ALTITUDE - 1000 FT
25 - 27
31 - 33
19 - 23
REF LINE
+ 20 10 ISA 10
ISA DEV - °C
CRUISE PRESSURE ALTITUDE - 1000 FT
FUEL
MAX WEIGHT
TRIP FUEL - 1000 LBS
REF LINE
LDG WT -1000 LB
HEAD 100
WIND - KTS
0
TAIL 100
REF LINE
500
1000
1500
2000
2500
3000
TRIP DISTANCE - NAUTICAL GROUND MILES

FIGURE 33

JT8D-15

GO AROUND EPR AND LANDING SPEEDS

GO AROUND EPR

NORMAL BLEED CONDITIONS

PRESSURE ALTITUDE-FT	OAT °F		-82	-10	0	10	18	27	38	47	55	69	73	83	91	100	110	119
	°C		-63	-23	-18	-13	-8	-3	3	8	13	18	23	28	33	38	43	48
	TAT °C		-60	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
-1000	ENGINE	1&3	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	1.99	1.94	1.89
		2	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.01	1.97	1.91
SEA LEVEL		1&3	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.04	1.99	1.94	1.89
		2	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.06	2.01	1.97	1.91
1000		1&3	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.09	2.09	2.09	2.08	2.04	1.99	1.94	1.89
		2	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.12	2.12	2.12	2.10	2.06	2.01	1.97	1.91
2000		1&3	2.18	2.18	2.18	2.18	2.18	2.18	2.17	2.13	2.12	2.12	2.10	2.08	2.04	1.99	1.94	1.89
		2	2.20	2.20	2.20	2.20	2.20	2.20	2.19	2.16	2.15	2.15	2.13	2.10	2.06	2.01	1.97	1.91
3000		1&3	2.24	2.24	2.24	2.24	2.23	2.20	2.17	2.13	2.12	2.12	2.10	2.08	2.04	1.99	1.94	1.89
		2	2.27	2.27	2.27	2.27	2.25	2.22	2.19	2.16	2.15	2.15	2.13	2.10	2.06	2.01	1.97	1.91
3900 AND ABOVE		1&3	2.30	2.30	2.28	2.26	2.23	2.20	2.17	2.13	2.12	2.12	2.10	2.08	2.04	1.99	1.94	1.89
		2	2.32	2.32	2.30	2.28	2.25	2.22	2.19	2.16	2.15	2.15	2.13	2.10	2.06	2.01	1.97	1.91

EPR BLEED CORRECTIONS		ENG 1&3	ENG 2
A/C BLEEDS		OFF +.04	ON -.04
ENGINE ANTI-ICE ON		--	-.03
ENGINE AND WING ANTI-ICE	TWO ENGINE BLEEDS	-.09	-.03
	ONE ENGINE BLEED	-.10	-.03

FLAP EXTENSION/ MANEUVERING SPEEDS

FLAPS	BELOW 154,500	154,501 TO 176,000
	APPROACH NORMAL MANEUVERING SPEED	
0	200	210
2	190	200
5	160	170
15	150	160
25	140	150
30	V_{REF}+4	V_{REF}+4
40	V_{REF}*	V_{REF}*

*ADD WIND FACTOR OF:
1/2 HEADWIND COMPONENT
+ GUST (MAX: 20 KTS)

LANDING SPEEDS

GROSS WT 1000 LB	SPEED V_{REF}*
180	147
175	145
170	142
165	139
160	136
155	133
150	130
145	127
140	125
135	122
130	119
125	116
120	113
115	110
110	108

FIGURE 34

OPERATING CONDITIONS D

RWY 35L:
Elevation in TDZ - - - - 500 feet

ATIS Information:
QNH- - - - - - - - - - - 29.92 in. Hg
OAT- - - - - - - - - - - +32°F.
Surface wind - - - - - - 350°/15 G25 knots

OPERATING CONDITIONS E

RWY 23R:
Elevation in TDZ - - - - - 1,300 feet MSL
ILS DH - - - - - - - - - - 1,501 feet MSL

ATIS Information:
QNH- - - - - - - - - - - - 29.92 in. Hg
OAT- - - - - - - - - - - - 62°F.
Surface wind - - - - - - - 240°/10 knots

485 *Y33* What should be the maneuvering speed using FLAPS 40 at an airplane gross weight of 154,000 pounds? (Use Operating Conditions D, and Fig. 34.)

1—145 knots
2—150 knots
3—132 knots
4—140 knots

486 *Y33* What is the EPR setting for all engines with engine and wing anti-ice ON (two engine bleeds), engine 1 and 3 air-condition bleed ON, and engine 2 NO BLEED. (Use Operating Conditions D, and Fig. 34.)

	Engines 1 & 3	*Engine 2*
1—	2.09	2.09
2—	2.00	2.09
3—	2.11	2.12
4—	2.06	2.09

487 *Y33* Determine the EPR setting for all engines with engine anti-ice ON; engine 1 and 3 air-condition bleed ON, and engine 2 NO A/C BLEED. (Use Operating Conditions D, and Fig. 34.)

	Engines 1 & 3	*Engine 2*
1—	2.08	2.05
2—	2.09	2.09
3—	2.13	2.12
4—	2.07	2.12

488 *Y33* What should be the EPR setting for all engines with all A/C Bleeds OFF? (Use Operating Conditions E, and Fig. 34.)

	Engines 1 & 3	*Engine 2*
1—	2.15	2.10
2—	2.12	2.12
3—	2.11	2.11
4—	2.11	2.15

489 *Y33* What should be the EPR setting for all engines with engine anti-ice ON? (Use Operating Conditions E, and Fig. 34.)

	Engines 1 & 3	*Engine 2*
1—	2.13	2.13
2—	2.14	2.10
3—	2.11	2.14
4—	2.11	2.11

490 *Y40* Determine the approximate time and fuel required for these conditions. (Fig. 33, page 83)

Trip distance ---------- 1,600 nmi
Average wind factor --- 40 knots tailwind
Cruising altitude ------ FL 330
Landing weight ------- 118,000 pounds
Temperature at
FL 330 ---------- −40°C.

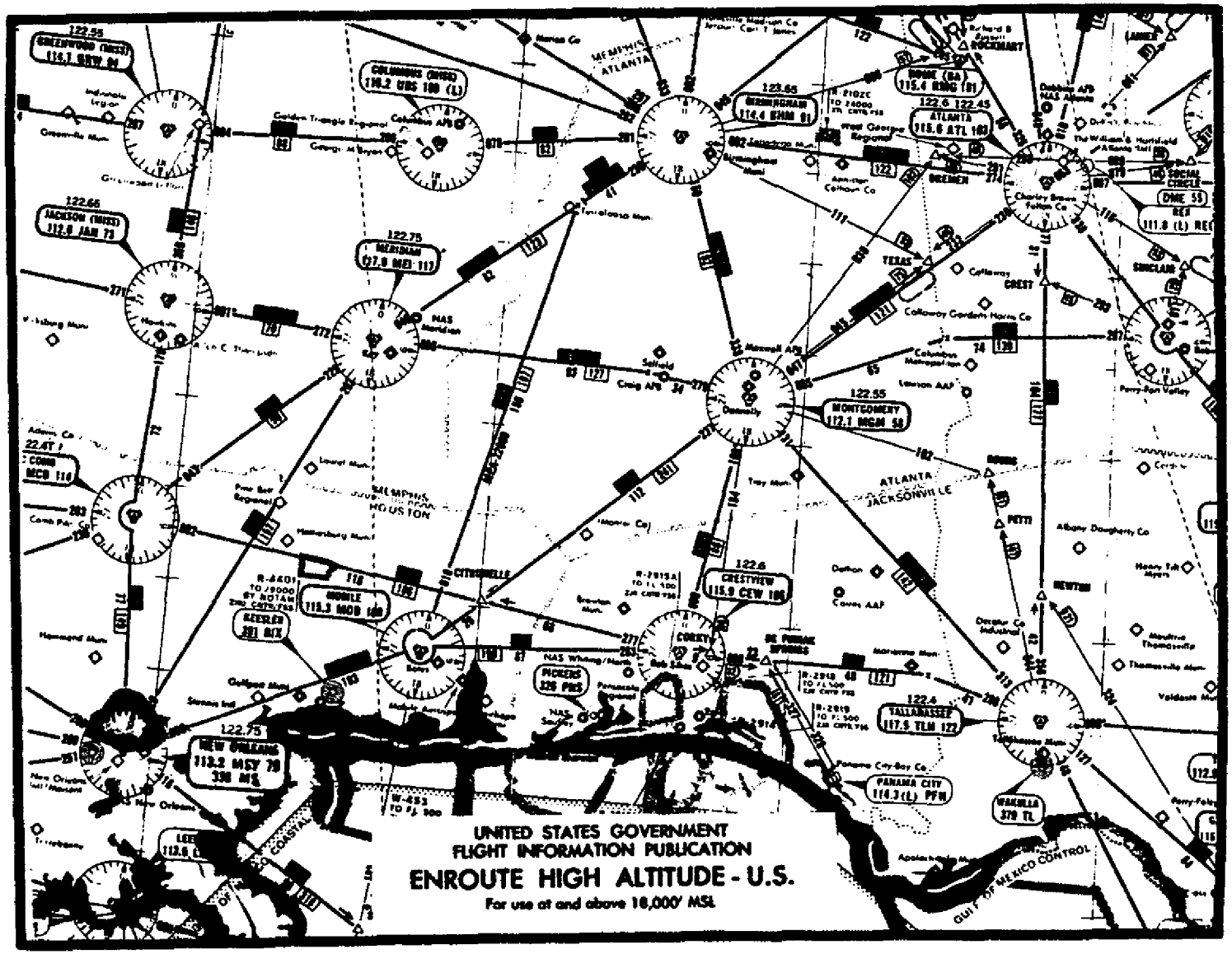
1—4 hours 15 minutes; 36,200 pounds
2—2 hours 55 minutes; 20,800 pounds
3—3 hours 05 minutes; 24,600 pounds
4—3 hours 17 minutes; 26,600 pounds

491 *Y33* What should be the minimum maneuvering speed using FLAPS 30 and a gross weight of 157,500 pounds? (Use Operating Conditions E, and Fig. 34.)

1—139 knots
2—143 knots
3—135 knots
4—137 knots

492 *X13* You arrive over the MGM VORTAC at 1439Z. What indicated Mach must be maintained to arrive over the MSY VORTAC at 1515Z? (Fig. 35, page 86 and Fig. 36, page 87)

1—.73 Mach
2—.71 Mach
3—.70 Mach
4—.68 Mach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For use at and above 18,000' MSL

FIGURE 35

CHECK POINTS		ROUTE	MACH NO.	WIND FACTOR	SPEED-KNOTS		DIST N.M.	TIME		FUEL CONSUMPTION (POUNDS)		MISC
FROM	TO	ALTITUDE FLT/LEVEL		TEMPERATURE	TAS	GRND SPEED		LEG	TOTAL	LEG	TOTAL	
ATL VORTAC	LEVEL OFF	J-37 FL 280	- -	- - - - - -	- -	- -	63	:13		*6,200		*Includes 800 lbs. fuel for taxi allowance
LEVEL OFF	MGM VORTAC	J-37 FL 280	- -	-30 knots ISA +6°C.								Use 8,600 pph total fuel flow. level-off to MSY VORTAC.
MGM VORTAC	MSY VORTAC	J-37/J-2 FL 280	- -	-30 knots ISA +6°C.								

FIGURE 36

493 *X14* What is the specific range in nautical air miles per 1,000 pounds of fuel (NAM/1,000) for the enroute segment between the MGM and MSY VORTACs at .78 cruise Mach? (Fig. 35 and 36)

1—49.8 NAM/1,000
2—54.4 NAM/1,000
3—57.0 NAM/1,000
4—59.8 NAM/1,000

494 *X12* What should be the estimated fuel consumption from brake release at the start of takeoff roll at Atlanta International to the MSY VORTAC computed at .78 cruise Mach after level-off? (Fig. 35 and 36)

1—12,000 pounds
2—12,600 pounds
3—10,900 pounds
4—11,400 pounds

495 *X14* What is the specific range in nautical air miles per 1,000 pounds of fuel (NAM/1,000) from level-off to the MGM VORTAC at a cruise Mach of .78? (Fig. 35 and 36)

1—54.4 NAM/1,000
2—57.5 NAM/1,000
3—50.9 NAM/1,000
4—52.5 NAM/1,000

496 *X11* What should be the estimated time enroute from level-off to the MSY VORTAC at .78 Mach? (Fig. 35 and 36)

1—39 min.
2—42 min.
3—46 min.
4—50 min.

497 *X13* What indicated Mach must be maintained to arrive over the MSY VORTAC 45 minuates after level-off for a timed approach? (Fig. 35 and 36)

1—.75 Mach
2—.73 Mach
3—.71 Mach
4—.69 Mach

498 *X14* What is the specific range in nautical air miles per 1,000 pounds of fuel (NAM/1,000) for the enroute portion between the RKA and JFK VORTACs? (Fig. 37, page 88 and Fig. 38, page 89)

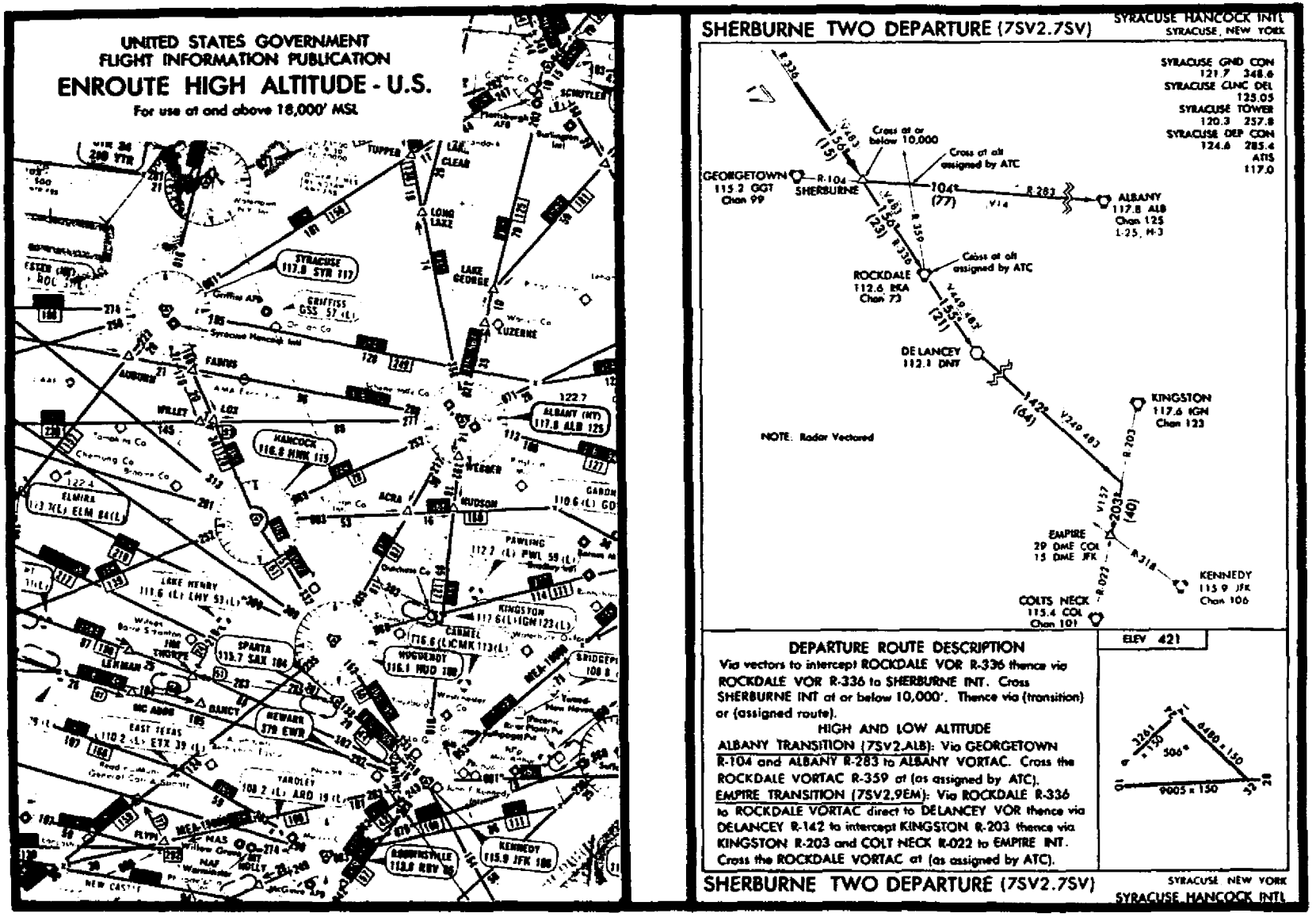
1—48.7 NAM/1,000
2—51.5 NAM/1,000
3—42.5 NAM/1,000
4—44.9 NAM/1,000

499 *X13* What Mach should be maintained to arrive over the JFK VORTAC in 18 minutes from the RKA VORTAC? (Fig. 37, page 88 and Fig. 38, page 89)

1—.79 Mach
2—.82 Mach
3—.75 Mach
4—.77 Mach

500 *X11* What is the estimated time enroute from Syracuse Hancock International to landing at Kennedy International? (Fig. 37, page 88 and Fig. 38, page 89)

1—40 minutes
2—42 minutes
3—36 minutes
4—38 minutes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ENROUTE HIGH ALTITUDE - U.S.
For use at and above 18,000' MSL
SHERBURNE TWO DEPARTURE (7SV2.7SV)
SYRACUSE HANCOCK INTL
SYRACUSE, NEW YORK
SYRACUSE GND CON 121.7 348.6
SYRACUSE CLNC DEL 123.05
SYRACUSE TOWER 120.3 257.8
SYRACUSE DEP CON 124.8 285.4
ATIS 117.0
GEORGETOWN 115.2 GGT Chan 99
R-104
SHERBURNE
Cross at or below 10,000
Cross at alt assigned by ATC
ALBANY 117.8 ALB Chan 125
ROCKDALE 112.6 RKA Chan 73
DELANCEY 112.1 DNY
KINGSTON 117.6 IGN Chan 123
EMPIRE 29 DME COL 15 DME JFK
KENNEDY 115.9 JFK Chan 106
COLTS NECK 115.4 COL Chan 101
NOTE: Radar Vectored
DEPARTURE ROUTE DESCRIPTION
Via vectors to intercept ROCKDALE VOR R-336 thence via ROCKDALE VOR R-336 to SHERBURNE INT. Cross SHERBURNE INT at or below 10,000'. Thence via (transition) or (assigned route).
HIGH AND LOW ALTITUDE
ALBANY TRANSITION (7SV2.ALB): Via GEORGETOWN R-104 and ALBANY R-283 to ALBANY VORTAC. Cross the ROCKDALE VORTAC R-359 at (as assigned by ATC).
EMPIRE TRANSITION (7SV2.9EM): Via ROCKDALE R-336 to ROCKDALE VORTAC direct to DELANCEY VOR thence via DELANCEY R-142 to intercept KINGSTON R-203 thence via KINGSTON R-203 and COLT NECK R-022 to EMPIRE INT. Cross the ROCKDALE VORTAC at (as assigned by ATC).
ELEV 421
SHERBURNE TWO DEPARTURE (7SV2.7SV)
SYRACUSE NEW YORK
SYRACUSE HANCOCK INTL

FIGURE 37

FLIGHT TIME ANALYSIS

CHECK POINTS		ROUTE	MACH NO.	WIND FACTOR	SPEED-KNOTS		DIST	TIME		FUEL CONSUMPTION (POUNDS)		MISC
FROM	TO	ALTITUDE FLT/LEVEL		TEMPERATURE	TAS	GRND SPEED	N.M.	LEG	TOTAL	LEG	TOTAL	
SYRACUSE HANCOCK INT'L.	RKA VORTAC	7SV2.9EM	--	- - -	--	--	--	:09		*1,600		*Includes 600 lbs. taxi fuel allowance
		CLIMB		- - -								
RKA VORTAC	EMPIRE INTSXN	7SV2.9EM	.78	-25 knots								Use total fuel flow of 10,500 pph for enroute computations
		FL 210		STD. -5°C.								
EMPIRE INTSXN	JFK VORTAC	J-70	.78	-25 knots								
		FL 210		STD. -5°C.								
JFK VORTAC	KENNEDY INT'L.	Descent	&	Approach				:12		1,250		

FIGURE 38

501 What is the estimated total fuel required
X12 from brake release at the start of takeoff roll at Chicago-O'Hare International to landing at Kansas City International computed at a cruise indicated Mach of .78? (Fig. 39, page 90; Fig. 40, page 91)

1—21,100 pounds
2—22,800 pounds
3—19,000 pounds
4—19,800 pounds

502 What indicated Mach would you have to
X13 maintain to arrive over the MKC VORTAC in 44 minutes after level-off, at FL 280? (Fig. 39, page 90; Fig. 40, page 91)

1—.74 Mach
2—.76 Mach
3—.56 Mach
4—.66 Mach

503 What is the specific range in nautical air
X14 miles per 1,000 pounds of fuel (NAM/1,000) for the enroute segment between level-off and the MKC VORTAC at .78 Mach? (Fig. 39, page 90; Fig. 40, page 91)

1—43.5 NAM/1,000
2—48.0 NAM/1,000
3—53.8 NAM/1,000
4—56.8 NAM/1,000

504 What is the estimated time enroute from
X11 takeoff at Chicago-O'Hare International to landing at Kansas City International at a .80 Mach cruise after level-off? (Fig. 39, page 90; Fig. 40, page 91)

1—1 hour 12 minutes
2—1 hour 15 minutes
3—1 hour 04 minutes
4—1 hour 08 minutes

505 What is the estimated total fuel required
X12 from brake release at the start of takeoff roll at Chicago-O'Hare International to landing at Kansas City International computed at a cruise indicated Mach of .80? (Fig. 39, page 90; Fig. 40, page 91)

1—19,725 pounds
2—18,925 pounds
3—21,725 pounds
4—20,725 pounds

506 What is the specific range in nautical air
X14 miles per 1,000 pounds of fuel (NAM/1,000) for the enroute segment between level-off and the MKC VORTAC at .80 Mach? (Fig. 39, page 90; Fig. 40, page 91)

1—58.4 NAM/1,000
2—60.5 NAM/1,000
3—38.2 NAM/1,000
4—52.0 NAM/1,000

507 What is the estimated time enroute from
X11 takeoff at Chicago-O'Hare International to landing at Kansas City International using a cruise Mach of .82 after level-off? (Fig. 39, page 90; Fig. 40, page 91)

1—1 hour 06 minutes
2—1 hour 09 minutes
3—58 minutes
4—1 hour 02 minutes

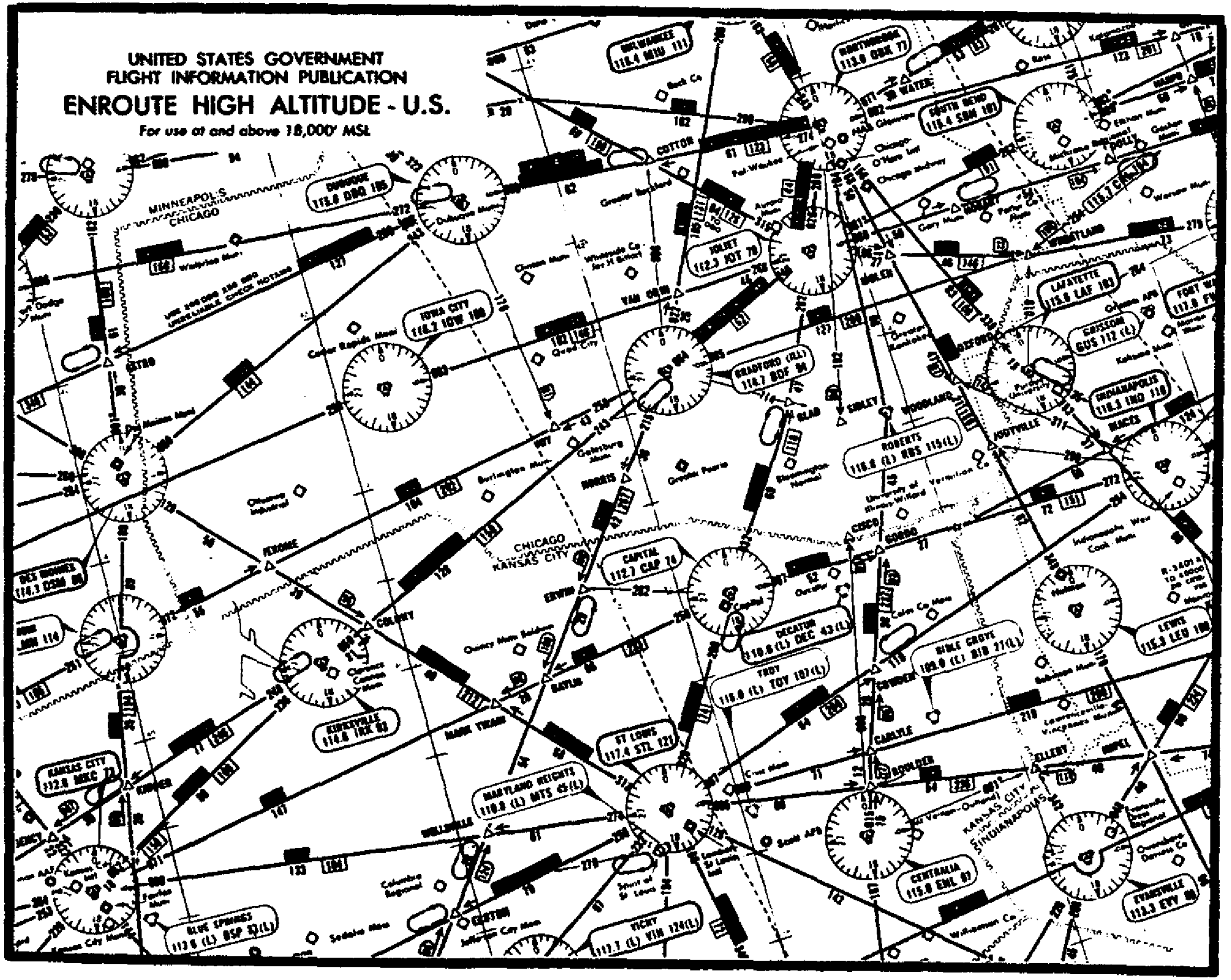

UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION
ENROUTE HIGH ALTITUDE - U.S.
For use at and above 18,000' MSL
MINNEAPOLIS
CHICAGO
CHICAGO
KANSAS CITY

FIGURE 39

FLIGHT TIME ANALYSIS

CHECK POINTS		ROUTE	MACH NO.	WIND FACTOR	SPEED-KNOTS		DIST	TIME		FUEL CONSUMPTION (POUNDS)		MISC
FROM	TO	ALTITUDE FLT/LEVEL		TEMPERATURE	TAS	GRND SPEED	N.M.	LEG	TOTAL	LEG	TOTAL	
CHICAGO O'HARE INT'L.	JOT VORTAC	Direct C/O/C			–	Avg. 326	30	—	—	—	—	*Fuel from Chicago-O'Hare to level-off includes 800 lbs. taxi fuel allowance.
JOT VORTAC	LEVEL OFF	J-26 FL 280			–	Avg. 326	39	—	:12		*5,800	
LEVEL OFF	BDF VORTAC	J-26 FL 280		-50 knots ISA -4°C.								
BDF VORTAC	MKC VORTAC	J-26 FL 280		-50 knots ISA -4°C.								
MKC VORTAC	KANSAS CITY INT'L.	DESCENT		APPROACH				:12		1,500		

ALTERNATE AIRPORT DATA

NOTE: Use 8,050 lbs./hr. total fuel flow from level-off to the MKC VORTAC and reserve requirements.

FLIGHT SUMMARY

TIME	FUEL	
		ENROUTE
		ALTERNATE
		RESERVE
—	1,000	MISSED APPROACH
		TOTAL

FIGURE 40

508 *X12* What is the estimated total fuel required from Chicago-O'Hare International to Kansas City International computed at a cruise indicated Mach of .82? (Fig. 39, page 90; Fig. 40, page 91)

1—21,300 pounds

2—21,900 pounds

3—18,700 pounds

4—19,550 pounds

509 *X14* What is the specific range in nautical air miles per 1,000 pounds of fuel (NAM/1,000) for the enroute segment between level-off and the MKC VORTAC at .82 Mach? (Fig. 39, page 90; Fig. 40, page 91)

1—59.8 NAM/1,000

2—61.5 NAM/1,000

3—53.5 NAM/1,000

4—55.8 NAM/1,000

510 *Y41* What should be the recommended flight pressure altitude on a proposed flight from the OKC VORTAC to the SHV VORTAC on J20 if the average OAT is ISA +10°C? (Fig. 42, page 93; Fig. 43, page 94)

1—FL 290

2—FL 310

3—FL 260

4—FL 280

511 *Y41* What should be the recommended flight pressure altitude on a flight from the OKC VORTAC to the GSW VORTAC on J-21 if the average OAT is ISA? (Fig. 42, page 93; Fig. 43, page 94)

1—FL 200

2—FL 230

3—16,000 feet

4—FL 180

512 *Y41* What should be the recommended flight pressure altitude on a flight from the TUL VORTAC to the LANE Intersection via the TUL.BUJ2 transition if the average OAT is ISA +10°C? (Fig. 43 and 44, page 94)

1—FL 250

2—FL 280

3—FL 190

4—FL 230

513 *X11* What should be the estimated time enroute between the OKC and SAT VORTACs at .78 cruise Mach? (Fig. 41, this page; Fig. 42, page 93)

1—52 minutes

2—1 hour 03 minutes

3—45 minutes

4—48 minutes

514 *Q20* What navigation facilities are used to determine the turning point on J-21 between the OKC and GSW VORTACs? (Fig. 42, page 93)

1—R-149 of the OKC VORTAC and R-347 of the GSW VORTAC.

2—R-149 of the OKC VORTAC and station passage indication of the ADM VORTAC.

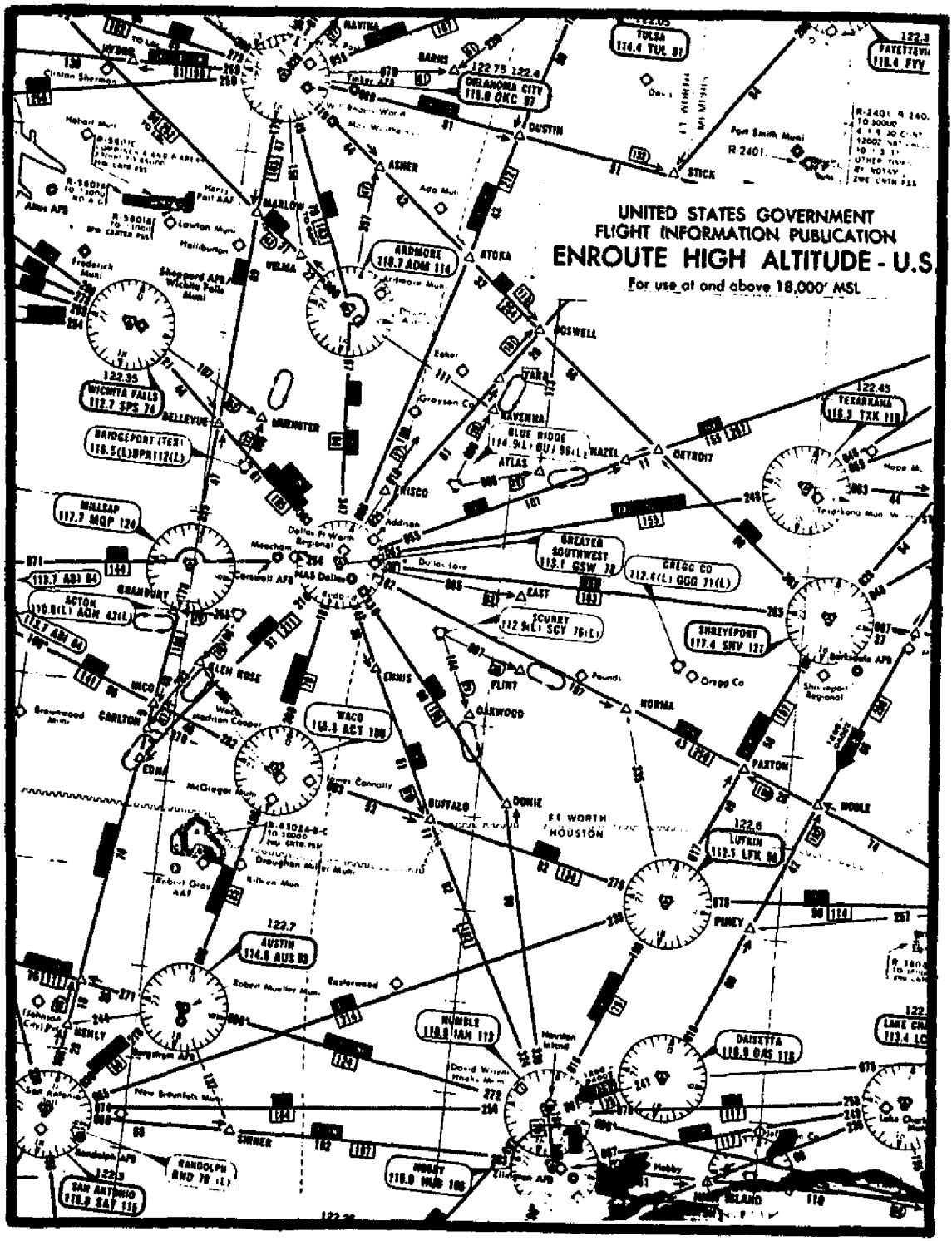
3—R-149 of the OKC VORTAC and R-300 of the ADM VORTAC.

4—R-329 of the ADM VORTAC and R-149 of the OKC VORTAC.

FLIGHT TIME ANALYSIS

CHECK POINTS		ROUTE	MACH NO.	WIND FACTOR	SPEED-KNOTS		DIST N.M.	TIME	
FROM	TO	ALTITUDE FLT/LEVEL		TEMPERATURE.	TAS	GRND SPEED		LEG	TOTAL
OKC VORTAC	ACT VORTAC	J-21		-30 knots					
		FL 310		ISA +7°C.					
ACT VORTAC	SAT VORTAC	J-21		-30 knots					
		FL 310		ISA +7°C.					

FIGURE 41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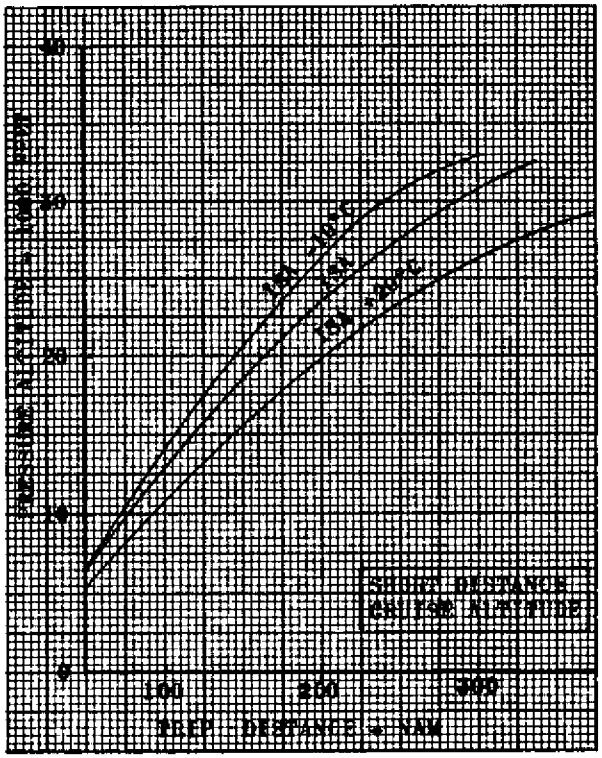
For use at and above 18,000' MSL

FIGURE 42

SHORT DISTANCE-CRUISE ALTITUDE CHART

FIGURE 43

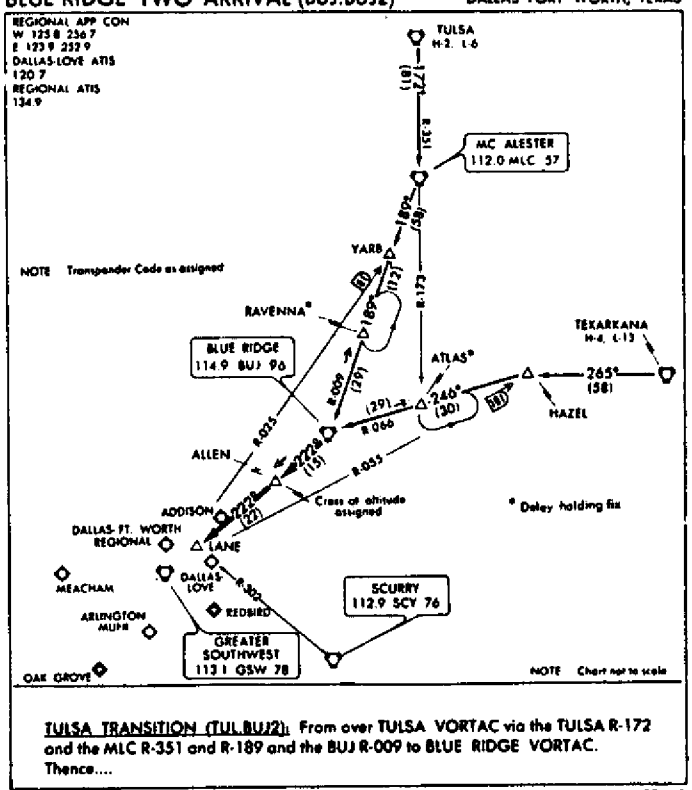


NOTE

Chart is based on the maximum altitude at which it is possible to cruise at least 1/3 of the total trip distance. The remaining 2/3 of the trip distance is for climb and descent.

For planning purposes, use 300/.78 for climb and .85/350 (250 below 10,000) for descent.

BLUE RIDGE TWO ARRIVAL (BUJ.BUJ2) DALLAS-FORT WORTH, TEXAS



TULSA TRANSITION (TUL.BUJ2): From over TULSA VORTAC via the TULSA R-172 and the MLC R-351 and R-189 and the BUJ R-009 to BLUE RIDGE VORTAC. Thence....

BLUE RIDGE TWO ARRIVAL (BUJ.BUJ2) DALLAS-FORT WORTH, TEXAS

EXCERPT

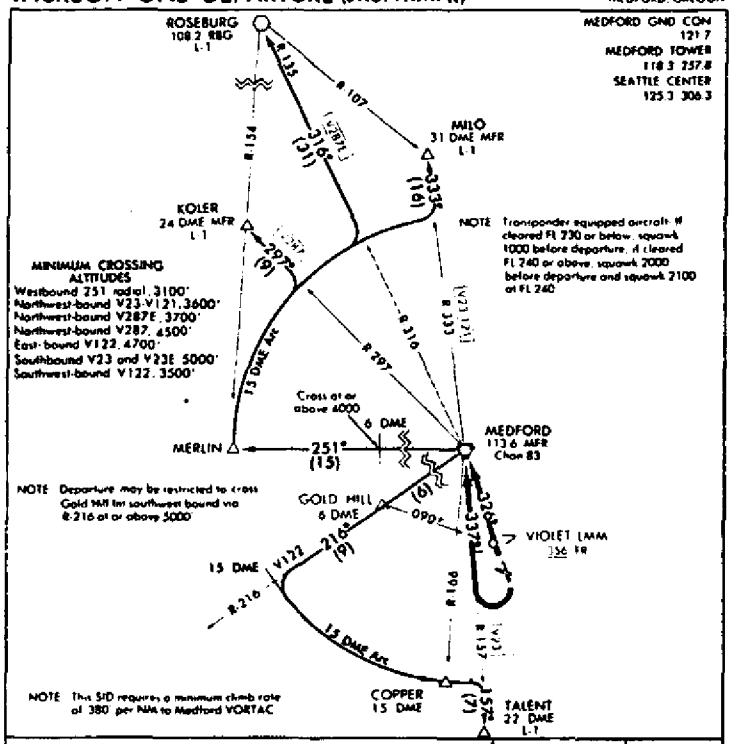
BLUE RIDGE TWO ARRIVAL

(STAR)

FIGURE 44

JACKSON ONE DEPARTURE (JKSN1.MFR)

MEDFORD–JACKSON CO
MEDFORD, OREGON



DEPARTURE ROUTE DESCRIPTION

Climb direct to the MEDFORD VORTAC, (south take-off turn right), then climb on R-157 between the VORTAC and a point 5 NM south to (assigned crossing altitude), thence via (transition) or (assigned route).

COPPER TRANSITION (JKSN1.4QP): Via MEDFORD R-216 to 15 DME Fix, turn left via MEDFORD 15 DME Arc to COPPER INT.

KOLER TRANSITION (JKSN1.4KL): Via MEDFORD R-251 to the MERLIN INT, turn right via 15 DME Arc to intercept V287 to KOLER INT.

(Continued on next Page)

ELEV 1331

JACKSON ONE DEPARTURE (JKSN1.MFR)

MEDFORD, OREGON
MEDFORD–JACKSON CO

JACKSON-ONE DEPARTURE (JKSN1.MFR)

MEDFORD–JACKSON CO
MEDFORD, OREGON

DEPARTURE ROUTE DESCRIPTION (Continued)

MILO TRANSITION (JKSN1.4MI): Via MEDFORD R-251 to the MERLIN INT, turn right via 15 DME Arc to intercept V23-121 to MILO INT.

ROSEBURG TRANSITION (JKSN1.RBG): Via MEDFORD R-251 to the MERLIN INT, turn right via 15 DME Arc to intercept V287E to ROSEBURG VOR.

TALENT TRANSITION (JKSN1.4TQ): Via MEDFORD R-216 to 15 DME Fix, turn left via MEDFORD 15 DME Arc to intercept V23 to TALENT INT.

JACKSON ONE DEPARTURE (JKSN1.MFR)

MEDFORD, OREGON
MEDFORD–JACKSON CO

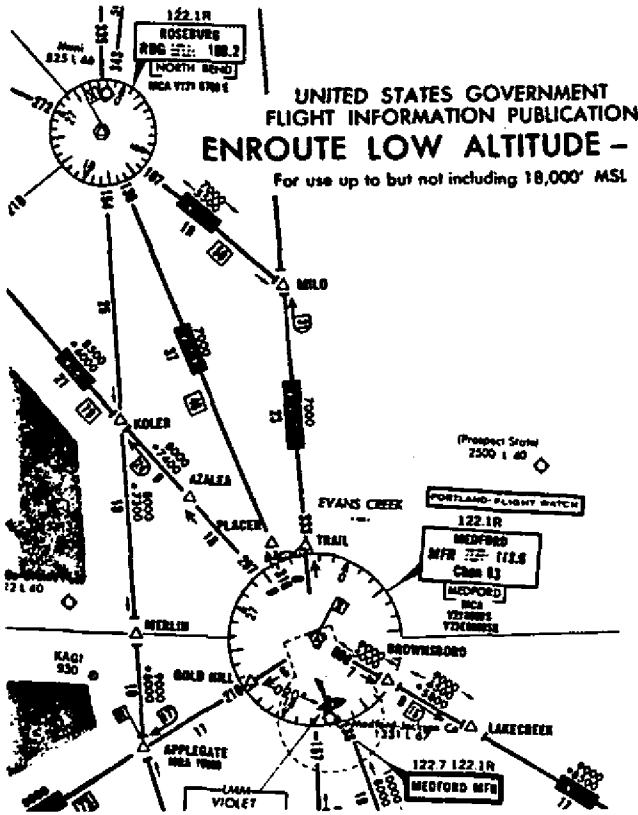


FIGURE 45

515 *X14* What should be the specific range in nautical air miles per 1,000 pounds of fuel (NAM/1,000) for the segment between the OKC VORTAC and the GSW VORTAC at .78 Mach and a total fuel flow of 8,150 lbs./hr? (Fig. 41, page 92; Fig. 42, page 93)

1—56.8 NAM/1,000

2—60.5 NAM/1,000

3—51.2 NAM/1,000

4—53.2 NAM/1,000

516 *T14* What is the total distance from the MFR VORTAC to complete the JKSN1.4KL transition? (Fig. 45)

1—35.5 nmi

2—26.5 nmi

3—47 nmi

4—39 nmi

517 *X11* Using an average groundspeed of 280 knots, what should be the estimated time enroute from the MFR VORTAC to the RBG VOR via the KOLER TRANSITION? (Fig. 45)

1—13 minutes

2—11 minutes

3—18 minutes

4—16 minutes

518 *T14* What is the total distance from the MFR VORTAC to complete the JKSN1.4MI transition? (Fig. 45)

1—46.0 nmi

2—35.5 nmi

3—57.5 nmi

4—51.5 nmi

* * * * * * *

You have filed and received ATC clearance for the JACKSON ONE DEPARTURE, TALENT TRANSITION.

* * * * * * *

519 *T14* Unless otherwise advised by ATC, what transponder codes should be set if your flight is cleared to FL 230? ((Fig. 45)

1—2100

2—2000 and 2100

3—1000

4—1000 and 2000

520 *X11* Using an average groundspeed of 264 knots, what should be the estimated time enroute from the MFR VORTAC to the RBG VOR via the JKSN1.4MI transition, V-121 RBG? (Fig. 45)

1—18.5 minutes

2—23.0 minutes

3—11.5 minutes

4—16.0 minutes

* * * * * * *

You file the JKSN1.4TQ departure and receive this clearance—"CLEARANCE AS FILED—CROSS THE MEDFORD VORTAC AT THREE THOUSAND—CROSS GOLD HILL AT SIX THOUSAND FIVE HUNDRED...."

* * * * * * *

521 *X16* What minimum rate of climb is necessary to comply with this ATC clearance. (Fig. 45) The average groundspeed is 190 knots.)

1—1,900 FPM

2—2,000 FPM

3—1,700 FPM

4—1,800 FPM

* * * * * * *

You have filed and received ATC clearance for the JACKSON ONE DEPARTURE, ROSEBURG TRANSITION.

* * * * * * *

522 *T14* Unless otherwise advised by ATC, what transponder codes should be set if your flight is cleared to FL 310? (Fig. 45)

1—1000 and 2000

2—2100

3—2000

4—2000 and 2100

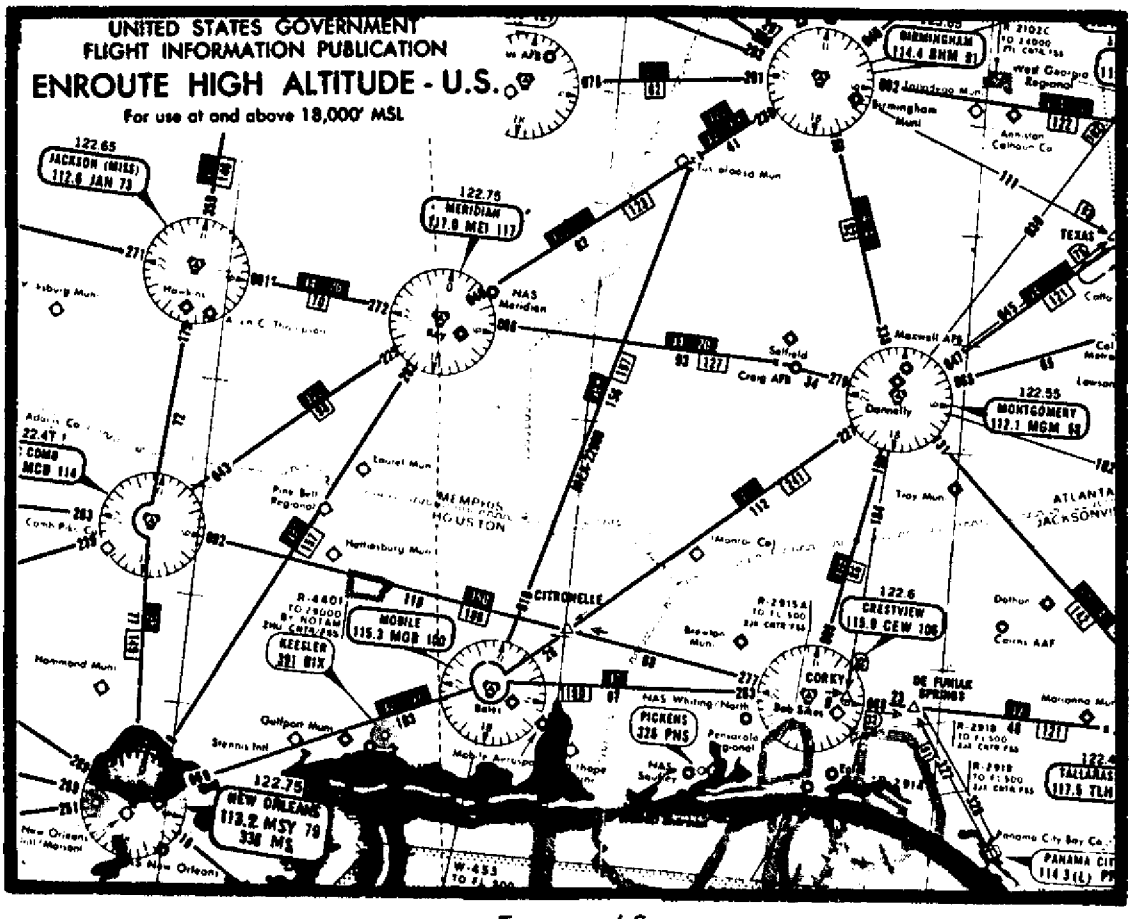


FIGURE 46

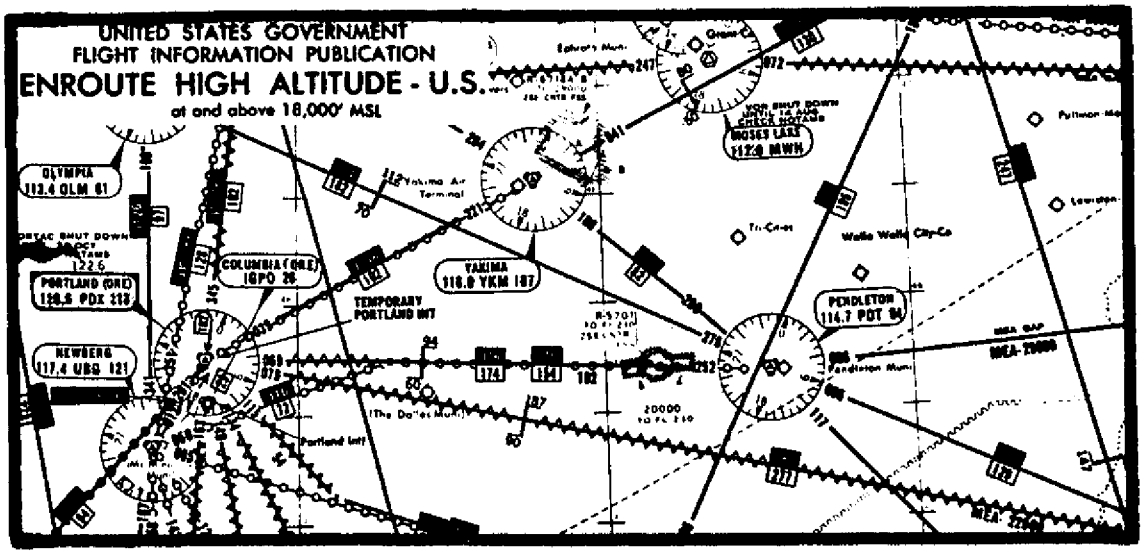


FIGURE 47

523 *Q40* What does this symbol (▽) indicate when it appears on an instrument approach procedure chart?

1—Takeoff minimums are non-standard only for air carrier type airplanes; consult a separate listing.

2—A SID has been published for that particular airport.

3—Takeoff minimums are standard, ½ statute mile, for a 3-engine aircraft.

4—Takeoff minimums are non-standard and that a certain IFR departure procedure may have been established for obstruction avoidance after takeoff.

524 *Z17* In level cruise flight at a constant power setting, the highest indicated airspeed will be obtained when flying in

1—warm, dry air.

2—cold, dry air.

3—warm, moist air.

4—cold, moist air.

525 *V34* The pilot reports "moderate CAT" along a portion of the proposed route. What turbulence-reporting criteria is indicated?

1—Large variations in indicated airspeed; abrupt changes in altitude and/or attitude.

2—Rapid jolts or bumps with an appreciable change in aircraft attitude.

3—Rhythmic bumpiness without an appreciable change in altitude and/or attitude.

4—Variations in indicated airspeed; changes in attitude and/or altitude; aircraft is in positive control at all times.

526 *T11* Which of these ATC clearances may be issued to a domestic air carrier without prior pilot request?

1—Contact and Visual Approach.

2—SID, STAR, and Contact Approach.

3—SID, STAR, Contact and Visual Approach.

4—SID, STAR, and Visual Approach.

527 *Q20* What is the total distance on J–16 between the PDT VORTAC and the UBG VORTAC? (Fig. 47)

1—162 nmi

2—154 nmi

3—174 nmi

4—166 nmi

528 *Q20* Which navigation facility(ies) should be used to determine the intersection of J–2 and J–37 between the MSY and MGM VORTACs? (Fig. 46)

1—MOB R–047 and MSY R–060

2—MOB VORTAC and CEW R–263

3—MOB VORTAC

4—MSY R–060 and MGM R–227

529 *Q20* On a flight between the BHM and MSY VORTACs, which navigation facility(ies) should be used to identify the intersection of J–69 and J–2? (Fig. 46)

1—CEW R–263 and MSY R–060

2—MOB R–010 and MSY R–060

3—MOB R–190 and MSY R–240

4—MOB VORTAC

530 *Q20* At what DME on J–16 should a pilot change navigational aid reference on a flight from the PDT VORTAC to the UBG VORTAC? (Fig. 47)

1— 94 nmi

2— 60 nmi

3—154 nmi

4—102 nmi

531 *X14* What is the specific range in nautical air miles per 1,000 pounds of fuel (NAM/1,000) for a flight from the PDT VORTAC to the UBG VORTAC at FL 280 using these conditions? (Fig. 47)

Average OAT	ISA +6°C.
Cruise Mach	.78
Total fuel flow	8,150 PPH
Average wind factor	−30 knots

1—51.5 NAM/1,000

2—57.5 NAM/1,000

3—55.6 NAM/1,000

4—54.5 NAM/1,000

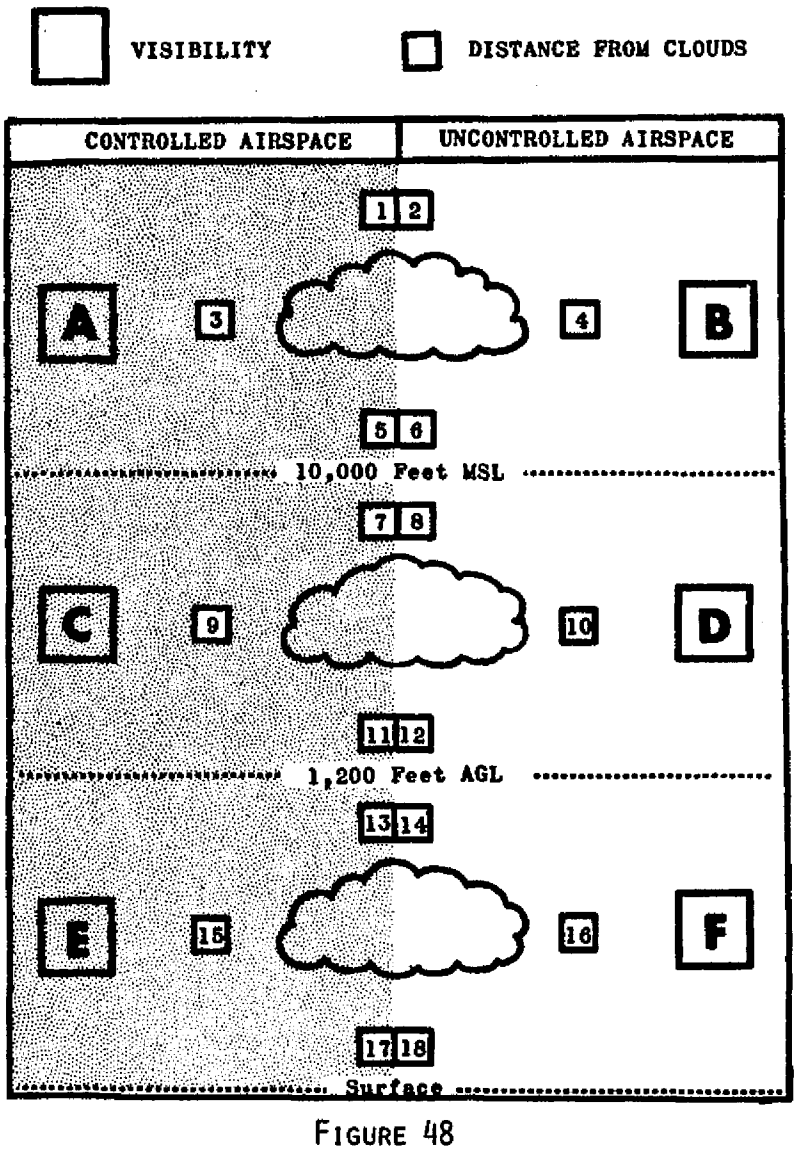


FIGURE 48

532 *D30* A flight is to be conducted in "VFR-ON-TOP" conditions at 12,500 feet MSL (above 1,200 feet AGL). What is the in-flight visibility and distance from clouds required for operation in CONTROLLED AIRSPACE? (Fig. 48)

1—(A) 5 miles, (1) 1,000 feet, (3) 2,000 feet, (5) 500 feet.

2—(A) 5 miles, (1) 1,000 feet, (3) 1 mile, (5) 1,000 feet.

3—(A) 3 miles, (1) 1,000 feet, (3) 2,000 feet, (5) 1,000 feet.

4—(A) 3 miles, (1) 500 feet, (3) 1,000 feet, (5) 500 feet.

533 *D30* What minimum inflight visibility and distance from clouds is required on a "VFR-ON-TOP" clearance for area (B), (2), (4), and (6)? (Fig. 48)

1—(B) 3 miles, (2) 500 feet, (4) 1,000 feet, (6) 500 feet.

2—(B) 5 miles, (2) 1,000 feet, (4) 2,000 feet, (6) 500 feet.

3—(B) 3 miles, (2) 1,000 feet, (4) 1 mile, (6) 1,000 feet.

4—(B) 5 miles, (2) 1,000 feet, (4) 1 mile, (6) 1,000 feet.

534 *V20* A proposed flight from England to New York is to penetrate the Coastal ADIZ at 1415Z at a TAS of 485 knots. To what recommended tolerances should a pilot adhere for ADIZ penetration?

1—Within 5 minutes of estimate and 20 miles of proposed courseline.

2—Within 3 minutes of estimate and 20 miles of proposed courseline.

3—Within 5 minutes of estimate and 10 miles of proposed courseline.

4—Within 3 minutes of estimate and 10 miles of proposed courseline.

"CLEARED AS FILED, MAINTAIN 5,000, EXPECT FLIGHT LEVEL TWO ONE ZERO TEN MINUTES AFTER DEPARTURE. MAINTAIN RUNWAY HEADING FOR RADAR VECTOR TO JOIN J20. SQUAWK 0105. DEPARTURE CONTROL FREQUENCY WILL BE 124.6." (OKC WEATHER IS 100 OBSCURED AND ONE-HALF MILE IN FOG.)

535 *V12* You depart Runway 35R at Will Rogers after receiving the above clearance and immediately lose two-way radio communications. Your best course of action is to

1—maintain runway heading until reaching 5,000, then turn to intercept J20, and climb to FL 210.

2—turn immediately to intercept J20. At 10 minutes after departure, climb to your flight planned altitude.

3—turn immediately to intercept J20, climb to FL 210 10 minutes after departure.

4—maintain runway heading for 10 minutes, then turn to intercept J20, and climb to FL 210.

536 *Q36* Use these conditions and determine the approach category which would apply to this airplane.

Certificated maximum gross land weight	154,000 lbs.
1.3 V_{so} at this weight	141 knots
Computed landing weight	142,000 lbs.
Maneuvering airspeed at this weight	139 knots

1—Category C only.

2—Category D only.

3—Either category C or D, depending upon the maneuvering airspeed at the computed landing weight.

4—Either category C or D, depending upon the stall speed at the computed landing weight.

537 *Z15* If *both* the ram air input and the drain hole of the pitot system are blocked, what reaction should you observe on the airspeed indicator when power is applied and a climb is initiated out of severe icing conditions?

1—The indicated airspeed would show a continuous deceleration while climbing.

2—The airspeed would drop to, and remain at, zero.

3—No change until an actual climb rate is established, then indicated airspeed will increase.

4—No change in indicated airspeed would occur.

538 *D41* When takeoff minimums are not prescribed for a civil airport listed in the air carrier's operations specifications, what is the takeoff minimum under IFR for a three-engine airplane?

1—2,000 feet RVR

2—½ statute mile

3—¾ statute mile

4—1 statute mile

539 *D30* What is the minimum inflight visibility and distance from clouds required on a "VFR-ON-TOP" flight at 13,500 feet MSL (above 1,200 feet AGL) for areas (B), (2), (4), and (6)? (Fig. 48)

1—(B) 5 miles, (2) 1,000 feet, (4) 2,000 feet, (6) 500 feet.

2—(B) 3 miles, (2) 1,000 feet, (4) 1 mile, (6) 1,000 feet.

3—(B) 5 miles, (2) 1,000 feet, (4) 1 mile, (6) 1,000 feet.

4—(B) 3 miles, (2) 500 feet, (4) 1,000 feet, (6) 500 feet.

540 *D30* What inflight visibility and distance from clouds is required for a flight at 8,500 feet MSL (above 1,200 feet AGL) in uncontrolled airspace on a "VFR-ON-TOP" flight? (Fig. 48, page 100)

1—(D) 1 mile, (8) 1,000 feet, (10) 2,000 feet, (12) 500 feet.

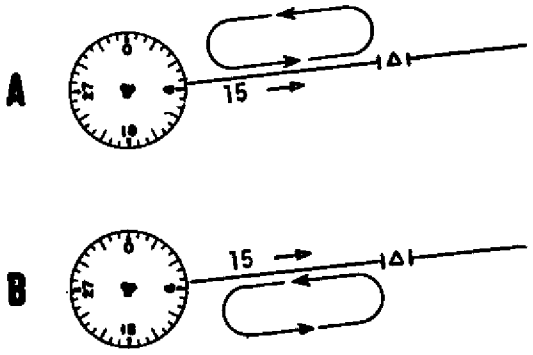
2—(D) 3 miles, (8) 1,000 feet, (10) 2,000 feet, (12) 500 feet.

3—(D) 5 miles, (8) 1,000 feet, (10) 1 mile, (12) 1,000 feet.

4—(D) 1 mile, (8) Clear of clouds, (10) Clear of clouds, (12) Clear of clouds.

"HOLD WEST OF THE ONE FIVE DME FIX ON THE ZERO EIGHT SIX RADIAL OF THE ABC VORTAC, FIVE MILE LEGS, LEFT TURNS...."

541 *T27* You arrive at the 15 DME fix on a heading of 350°. Which holding pattern correctly complies with these instructions, and what is the recommended entry procedure?



1—A; teardrop entry

2—B; parallel entry

3—A; direct entry

4—B; direct entry

"CLEARED AS FILED, MAINTAIN 6,000, EXPECT FLIGHT LEVEL TWO FOUR ZERO FIVE MINUTES AFTER DEPARTURE. MAINTAIN RUNWAY HEADING FOR RADAR VECTOR TO JOIN J26. SQUAWK 0105. DEPARTURE CONTROL FREQUENCY WILL BE 125.7." (ORD weather is 100 obscured and one-half mile in fog.)

* * * * * *

542 *V12* You depart Runway 32R at Chicago-O'Hare after receiving the above clearance and immediately lose two-way communications. Your best course of action is to

1—maintain runway heading for 5 minutes, then turn to intercept J26, and climb to FL 240.

2—turn immediately to intercept J26, climb to FL 240 5 minutes after departure.

3—turn immediately to intercept J26. At 5 minutes after departure, climb to your flight planned altitude.

4—maintain runway heading until reaching 6,000, then turn to intercept J26, and climb to FL 240.

543 *Z15* What would be the indication on the Vertical Speed Indicator (VSI) during entry into a 500 FPM actual descent from level flight if the static ports were iced over?

1—The indication would be in reverse of the actual rate of descent (500 FPM climb).

2—The initial indication would be a climb, then descent at a rate in excess of 500 FPM.

3—The VSI pointer would remain at zero regardless of the actual rate of descent.

4—The VSI pointer would indicate a descent, but at a rate less than 500 FPM.

544 *V20* To which recommended tolerances are you expected to adhere when planning a flight which will penetrate a domestic ADIZ?

1—Within 5 minutes of estimate and 10 miles of course centerline.

2—Within 5 minutes of estimate and 20 nmi of the proposed flight path centerline.

3—Within 3 minutes of estimate and ±15 nmi of course centerline.

4—Within ±10 knots of the flight planned true airspeed and ±5 nmi of the proposed flight path centerline.

545 *V15* If it is necessary to jettison fuel, the pilot in command should

1—descend to the MEA or, if within 24 miles of the VOR, to the MOCA.

2—advise ATC immediately so an advisory may be broadcast to other aircraft.

3—request a clearance from ATC to use the nearest fuel jettison area.

4—alter flight path at least 1 mile to the right of the airway.

546 *R32* Unless otherwise specified on the chart, the minimum enroute altitude along a jet airway is

1—18,000 feet MSL.

2—24,000 feet MSL.

3—10,000 feet MSL.

4—14,500 feet MSL.

547 *T11* An abbreviated departure clearance ". . . CLEARED AS FILED . . ." will always contain the name

1—and number of the SID to be flown when filed in the flight plan.

2—of the destination airport to which cleared.

3—and number of the STAR to be flown when filed in the flight plan.

4—of the first compulsory reporting point if not in a radar environment.

548 *M13* Which is the recommended pilot action, with respect to temperature indications, to cross a jet stream core with minimum CAT effect?

1—Descend to a lower altitude when the temperature increases or decreases.

2—Climb if the temperature increases; descend if the temperature decreases.

3—Descend if the temperature increases; climb if the temperature decreases.

4—Climb to a higher altitude when the temperature increases or decreases.

549 *T27* At what point should the timing begin for the first leg outbound in a non-standard holding pattern?

1—Abeam the holding fix, or wings level, whichever occurs last.

2—Abeam the holding fix, or wings level, whichever occurs first.

3—When the wings are level at the completion of the 180° turn outbound.

4—When abeam the holding fix.

550 *S10* What is the significance of an ATC clearance which reads ". . . CRUISE SIX THOUSAND . . ."?

1—The pilot must maintain six thousand feet until reaching the IAF serving the destination airport, then execute the published approach procedure.

2—Climbs may be made to, or descents made from, six thousand feet at the pilot's discretion.

3—The pilot may utilize any altitude from the MEA/MOCA to six thousand feet, but each change in altitude must be reported to ATC.

4—Six thousand feet MSL should be maintained until further advised.

551 *T27* To ensure proper airspace protection while holding at 5,000 feet in a civil turbojet airplane, what is the recommended maximum indicated airspeed a pilot should use?

1—220 knots

2—230 knots

3—200 knots

4—210 knots

552 *Z17* For a given airplane gross weight at a constant Mach .82 cruise, what is the relationship between fuel flow, temperature, and altitude? Fuel flow is higher when

1—temperature is increased and altitude is decreased.

2—both temperature and altitude are decreased.

3—temperature is decreased and altitude is increased.

4—both temperature and altitude are increased.

553 A proposed flight from Calcutta to Boston
V20 is to penetrate the coastal ADIZ at 2130Z at a TAS of 475 knots. To what recommended tolerances should a pilot adhere regarding ADIZ penetration?

1—Within 20 miles of proposed courseline and 3 minutes of estimate.

2—Within 10 miles of proposed courseline and 10 minutes of estimate.

3—Within 20 miles of proposed courseline and 5 minutes of estimate.

4—Within 10 miles of proposed courseline and 3 minutes of estimate.

554 What factors are used to determine the
Q36 instrument approach category (A, B, C, or D) for a domestic air carrier airplane?

1—The number of engines, gross landing weight, and V_{so} in the landing configuration.

2—The maximum certificated gross landing weight and 1.3 V_{so}.

3—The maximum gross weight and 1.3 V_{so} in the landing configuration.

4—The maximum certificated landing weight and 1.3 V_A.

555 To ensure proper airspace protection while
T27 in a holding pattern, what is the recommended maximum airspeed above 14,000 feet?

1—220 knots

2—230 knots

3—200 knots

4—210 knots

556 Both the ram air input passage and the
Z15 drain hole of a pitot system are blocked by foreign matter. What reaction should you observe on the Mach indicator when descending from FL 300 to FL 200 at a constant thrust setting? The Mach indication should

1—remain fixed at a constant value.

2—drop to the minimum value shown on the indicator.

3—show a decrease.

4—show an increase.

"CLEARED AS FILED, MAINTAIN 8,000, EXPECT FLIGHT LEVEL TWO NINER ZERO TEN MINUTES AFTER DEPARTURE. MAINTAIN RUNWAY HEADING FOR RADAR VECTOR TO JOIN J37. SQUAWK 0105. DEPARTURE CONTROL FREQUENCY WILL BE 124.8." (ATL WEATHER IS ONE HUNDRED OBSCURED AND ONE-HALF MILE.)

557 You depart Runway 27R at William B.
V12 Hartsfield after receiving the above clearance and immediately lose two-way radio communications. Your best course of action is to

1—maintain runway heading until reaching 8,000, then turn to intercept J37 and climb to FL 290.

2—turn immediately to intercept J37. At 10 minutes after departure, climb to your flight planned altitude.

3—turn immediately to intercept J37, climb to FL 290 10 minutes after departure.

4—maintain runway heading for 10 minutes, then turn to intercept J37 and climb to FL 290.

558 What reaction of the airspeed indicator
Z15 should you observe if *both* the ram air input and the drain hole of the pitot system are blocked?

1—Large power changes will not alter indicated airspeed even if actual airspeed changes.

2—The airspeed indication would have dropped to zero and remain at that value until the blockage is removed.

3—During climb, the airspeed indication will decrease.

4—During descent, the airspeed indication will remain constant.

559 *Z15* At a fixed thrust setting during an enroute descent, what should an airspeed/Mach indicator show if *both* the ram air input and drain hole were completely blocked with ice?

1—No change would be indicated from the airspeed shown prior to the system becoming blocked.

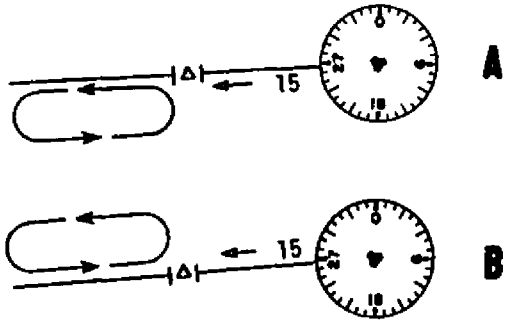
2—The airspeed indication would increase.

3—The airspeed indication would drop to zero and remain at that value until the blockage is removed.

4—The airspeed indication would decrease.

"HOLD WEST OF THE ONE FIVE DME FIX ON THE TWO SIX EIGHT RADIAL OF THE ABC VORTAC, FIVE MILE LEGS, LEFT TURNS. . . ."

560 *T27* You arrive over the 15 DME fix on a heading of 350°. Which holding pattern correctly complies with the ATC clearance above, and what is the recommended entry procedure?



1—A; teardrop entry

2—B; direct entry

3—A; direct entry

4—B; parallel entry

561 *S10* What is the significance of an ATC clearance which reads ". . . CRUISE EIGHT THOUSAND . . ."?

1—Climbs may be made to, or descents made from, eight thousand feet at the pilots' discretion.

2—The pilot may utilize any altitude from the MEA/MOCA to eight thousand feet, but each change in altitude must be reported to ATC.

3—Eight thousand feet MSL shall be maintained until further advised.

4—The pilot must maintain eight thousand feet until reaching the IAF serving the destination airport, then execute the published approach procedure.

562 *Z16* Which is a characteristic of hydroplaning which might affect airplane control on takeoff or landing on a slush covered runway?

1—Nose wheel hydroplaning occurs at a lower speed than main wheel hydroplaning.

2—Main wheel hydroplaning occurs at a lower speed than nose wheel hydroplaning.

3—Hydroplaning occurs only when brakes are applied.

4—When hydroplaning occurs, it affects drag on all tires simultaneously.

563 *T28* Which should be an operational consideration regarding Standard Terminal Arrival Routes (STARs) that are established for certain airports?

1—Pilots of scheduled air carrier aircraft must accept a STAR whenever ATC deems it appropriate.

2—A STAR is an air traffic control coded arrival routing used to simplify clearance delivery procedures.

3—VFR and IFR flights may be issued STARs.

4—STAR clearances will not be issued to air carrier flights unless requested by the pilot.

564 *Z19* Which flight instruments should be primarily used to *initiate* recovery from a nose-low, increasing airspeed, spiraling flight attitude?

1—Airspeed indicator, altimeter, vertical speed, and turn-and-slip indicators.

2—Attitude indicator, vertical speed, and turn-and-slip indicators.

3—Airspeed indicator, altimeter, vertical speed, and attitude indicators.

4—Attitude indicator, airspeed, and turn-and-slip indicators.

565 *T27* What is the recommended maximum indicated airspeed to use while holding at 10,000 feet in a civil turbojet airplane that will insure proper airspace protection?

1—210 knots
2—230 knots
3—175 knots
4—200 knots

566 *Z17* What is the effect of the load factor induced by a turn?

1—Increases parasite drag and reduces airspeed.
2—Increases stall speed.
3—Reduces stability and causes overbanking tendency.
4—Decreases the stalling angle of attack.

567 *T27* To ensure airspace protection for turbulent air holding, what maximum KIAS or Mach number does ATC expect you to maintain?

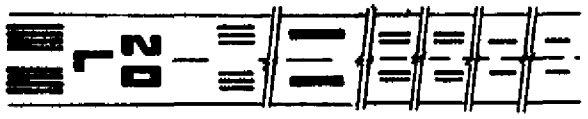
1—280 KIAS or .75, whichever is higher.
2—300 KIAS or .78, whichever is higher.
3—280 KIAS or .80, whichever is lower.
4—270 KIAS or .78, whichever is lower.

568 *D20* What is the maximum indicated airspeed a turbine powered airplane may be operated in the airspace underlying a TCA?

1—230 knots
2—250 knots
3—180 knots
4—200 knots

569 *R24* What is the distance from the end of the runway to the touchdown zone?

1—1,000 feet
2—1,500 feet
3— 300 feet
4— 500 feet



570 *Z16* What type of hydroplaning occurs when water is changed into steam and supports the airplane tire off the runway?

1—Viscous hydroplaning.
2—Dynamic hydroplaning.
3—Thermal hydroplaning.
4—Reverted rubber hydroplaning.

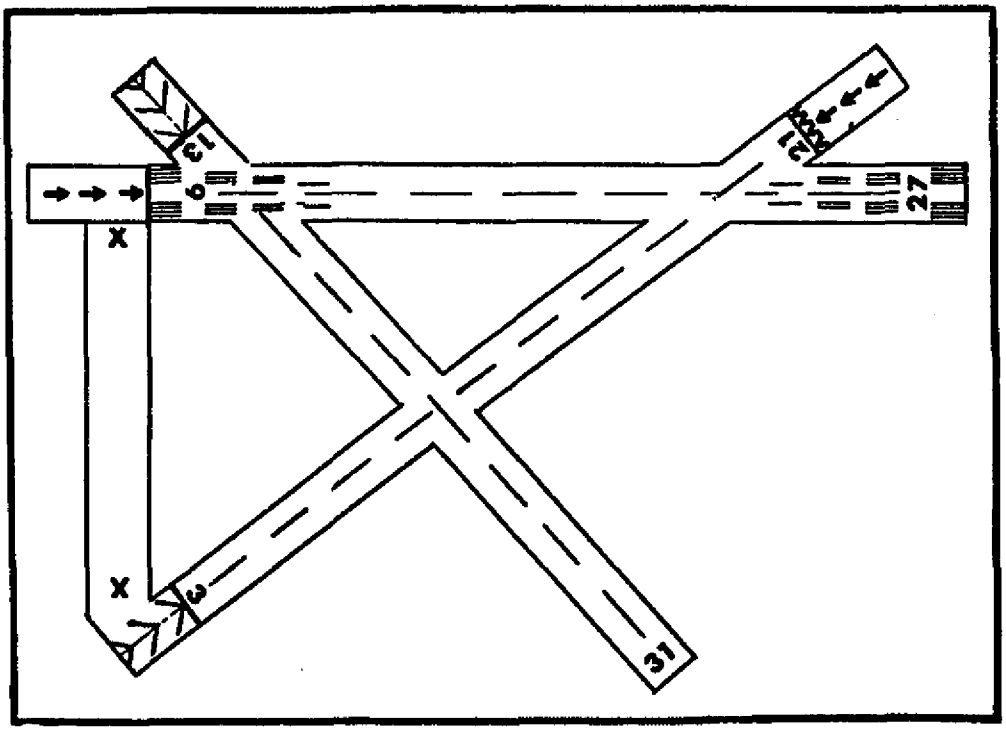


FIGURE 49

571 *R25* What distance from the threshold does the TDZ lighting system installed on a Category II runway extend?

1—2,500 feet

2—2,000 feet

3—3,500 feet

4—3,000 feet

572 *R24* What operational restrictions are indicated for Runways 9, 13, and 21 as indicated by the particular markings? (Fig. 49)

1—The area preceding the threshold of Runway 13 is usable for taxiing and takeoff, but not for landing.

2—The arrows and chevrons mark areas in which no landing is authorized.

3—The area preceding the displayed threshold of Runway 21 is usable for taxiing, but not for takeoff and landing.

4—The arrows preceding the displaced thresholds for Runways 9 and 21 indicate areas unusable for taxiing, takeoff, and landing.

573 *R23* When landing at night on a Category II runway, the high intensity runway edge lights (HIRL) will be white until the last

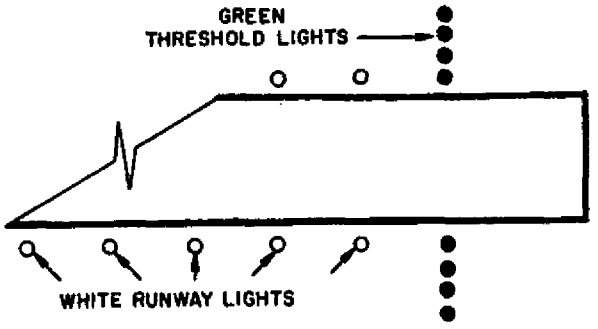
1—1,500 feet.

2—2,000 feet.

3—1,000 feet.

4—1,200 feet.

574 *R24* What night operations, if any, are authorized between the end of the runway and the displaced threshold on the runway shown below?



1—All operations if the pilot is aware of the overrun condition.

2—None.

3—Taxi only.

4—Taxi and takeoff only.

575 *R26* When using the Standard FAA 2-Bar VASI, which of the following would be the indication for on glide path?

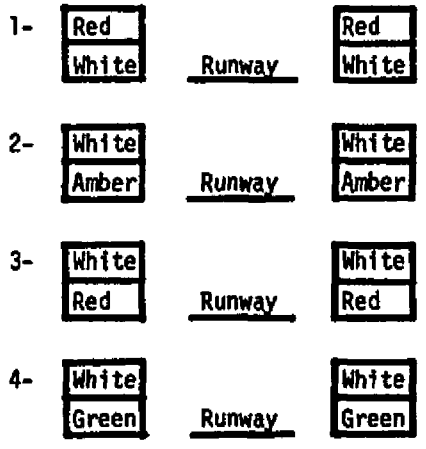
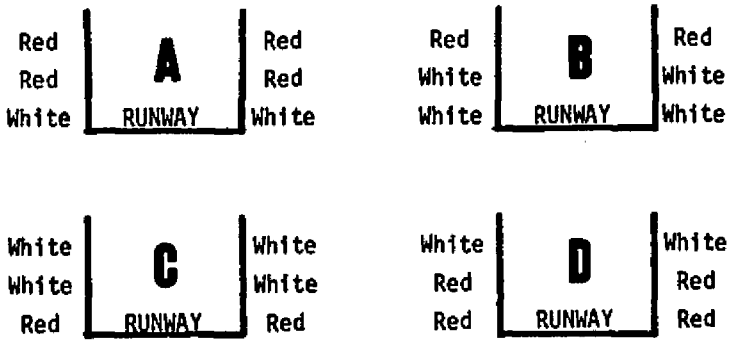


FIGURE 50



3-BAR VASI

576 What should be the visual indication while
R26 a long-bodied aircraft is on the upwind glide path? (Fig. 50, page 107)

1—D
2—C
3—B
4—A

577 An airplane has a main wheel tire pressure
Z16 of 135 PSI and nose wheel tire pressure of 45 PSI. What is the relationship, if any, between tire pressure and dynamic hydroplaning?

1—The nose wheel tire would hydroplane before the main wheel tires.
2—Speed only, not tire pressure, determines when dynamic hydroplaning occurs.
3—The main wheel tires would hydroplane before the nose wheel tire.
4—Hydroplaning would occur only on the nose wheel with these tire pressures.

578 What should be the visual indication while
R26 a long-bodied aircraft is on the downwind glide path? (Fig. 50, page 107)

1—D
2—C
3—B
4—A

579 What frequency is assigned for use as
R41 Aeronautical Multicom Service?

1—122.8 MHz
2—123.05 MHz
3—123.0 MHz
4—122.9 MHz

580 What Aeronautical Advisory Station fre-
R41 quency is assigned to airports *not* served by a control tower or FSS?

1—122.9 MHz
2—122.8 MHz
3—123.05 MHz
4—123.0 MHz

581 What should be the visual indication for
R26 on the glide path when using a tri-color VASI?

1—AMBER
RED
2—GREEN
AMBER
3—GREEN
4—AMBER
GREEN

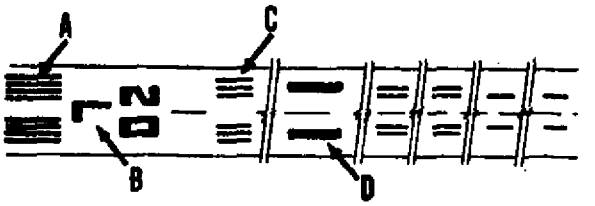
582 Where should the bearing pointer be lo-
Z14 cated relative to the wingtip reference to maintain the 16 DME range in a left-hand arc with a left crosswind component?

1—On the left wingtip reference.
2—Ahead of the left wingtip reference.
3—Ahead of the right wingtip reference.
4—On the right wingtip reference.

583 While arcing right on a 16 DME arc, you
Z14 experience a left crosswind component. Where should the bearing pointer be located relative to the wingtip reference to maintain the 16 DME range?

1—Behind the left wingtip reference.
2—On the right wingtip reference.
3—Behind the right wingtip reference.
4—Ahead of the right wingtip reference.

584 Which marking designates the touchdown
R24 zone on this precision instrument runway?



1—D
2—C
3—B
4—A

585 *Q40* What is the lowest defined CAT II DH in terms of HAT?

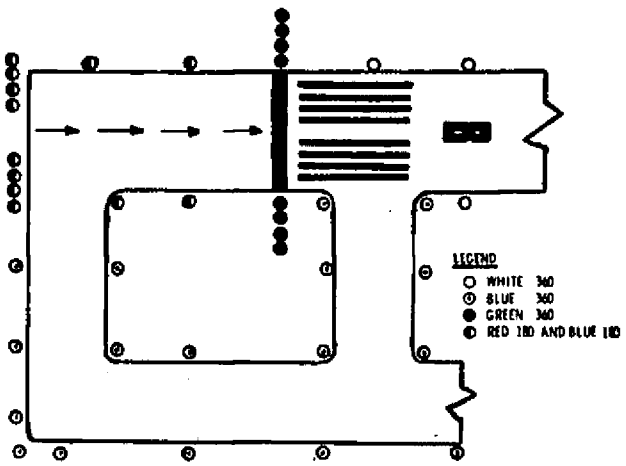
1—150 feet

2—200 feet

3— 50 feet

4—100 feet

586 *R24* What night operations may be conducted in the area west of the displaced runway threshold?



1—Taxiing and takeoff on Runway 8, but not landing.

2—Taxi operations only.

3—Taxiing and takeoff on Runway 8 or 26, but not landing on Runway 26.

4—All operations may be conducted by aircraft weighing less than 12,500 pounds; only taxiing for aircraft above that weight.

587 *Q40* The lowest defined Category II decision height in terms of HAT is

1—100 feet.

2— 75 feet.

3—200 feet.

4—150 feet.

* * * * * *

At 1515Z, you enter a holding pattern and receive an EAC time of 1530Z. At 1520Z, complete two-way communications failure occurs. The holding fix is not the same as the approach fix.

588 *V12* What is the recommended procedure to follow to execute the approach to a landing?

1—Depart the holding fix at the EAC time, and complete the approach.

2—Depart the holding fix to arrive at the approach fix as close as possible to the EAC time and complete the approach.

3—Depart the holding fix on the flight planned ETA (as amended with ATC), proceed to the approach fix and complete the approach.

4—Proceed to the approach fix, hold until the EAC time, and complete the approach.

589 *R24* When are Category II holding lines on airport taxiways required to be used?

1—When weather conditions are below Category I landing approach minimums.

2—At all times on an airport that is approved for Category II operations.

3—When the pilot is operating a Category II equipped airplane.

4—Anytime Category II operations are in progress at that airport.

590 *D24* When operating to an airport with an operating control tower, each pilot of a large airplane shall, unless otherwise required by the applicable distance from cloud criteria, enter the airport traffic area and, until further descent is necessary for landing, maintain an altitude above the surface of at least

1—2,000 feet.

2—1,500 feet.

3—1,200 feet.

4— 700 feet.

591 *Z16* What condition could decrease the speed at which wheel brakes become effective when landing on a wet runway?

1—Viscous hydroplaning due to inoperative antiskid.

2—Dynamic hydroplaning due to rough or grooved runway surface.

3—Application of spoilers immediately upon touchdown.

4—Reverted rubber hydroplaning due to prolonged wheel skid.

592 *T28* Standard Terminal Arrival Routes (STARs) are established for certain airports. Which would be an operational consideration?

1—Pilots of scheduled air carrier aircraft must accept a STAR whenever ATC deems it appropriate.

2—STARs are published for all airports having standard instrument departures.

3—All civil IFR flights may be issued STARs when ATC deems it appropriate.

4—STAR clearances will not be issued to air carrier flights unless requested by the pilot.

593 *Z14* While arcing left on the 15 DME arc, a right crosswind component is experienced. Where should the bearing pointer be located relative to the wingtip reference to maintain the desired distance?

1—Behind the right wingtip reference.

2—Behind the left wingtip reference.

3—Ahead of the left wingtip reference.

4—On the left wingtip reference.

594 *Q40* How can an IAF be identified on a Standard Instrument Approach Procedure (SIAP) Chart?

1—The procedure turn and the fixes labeled IAF where no procedure turn is authorized.

2—Any fix illustrated within the 10-mile ring other than the FAF or stepdown fix.

3—The procedure turn and the fixes on the feeder facility ring.

4—Any fix illustrated between the 10-mile ring and the enroute facilities ring.

595 *R23* What distance from the roll-out end of a Category II runway will the runway edge lights of an HIRL system be amber?

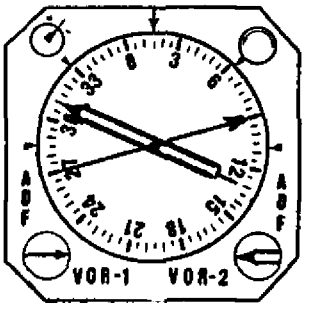
1—1,000 feet

2— 500 feet

3—2,000 feet

4—1,500 feet

596 *Z14* Where should the bearing pointer be located relative to the wingtip reference to maintain the 16 DME range in a left-hand arc with a right crosswind component?



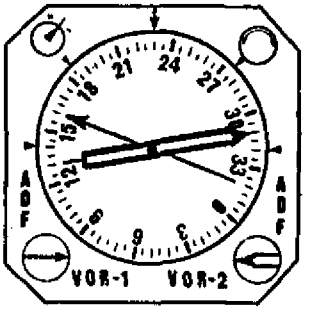
1—On the right wingtip reference for the VOR–1.

2—Ahead of the left wingtip reference for the VOR–2.

3—Ahead of the right wingtip reference for the VOR–1.

4—Behind the left wingtip reference for the VOR–2.

597 *Z14* Where should the bearing pointer be located relative to the wingtip reference to maintain the 16 DME range in a right-hand arc with a left crosswind component?



1—Behind the right wingtip reference for VOR–2.

2—Ahead of the left wingtip reference for VOR–1.

3—Ahead of the right wingtip reference for the VOR–2.

4—Behind the right wingtip reference for VOR–1.

598 When making an ILS approach, which
D42 facilities may be substituted for the middle marker?

1—Surveillance radar.

2—VOR and DME Fix combination.

3—DME.

4—Compass locator or precision radar.

599 What is the maximum indicated airspeed a
D20 turbine-powered airplane may be operated in a VFR corridor designated through a Terminal Control Area?

1—200 knots

2—156 knots

3—250 knots

4—230 knots

600 What effect will a change in wind direction
Z17 have upon maintaining a 3° glide slope angle at a constant true airspeed?

1—When groundspeed decreases, rate of descent must remain constant to maintain a 3° glide slope.

2—When groundspeed increases, rate of descent must increase.

3—When groundspeed decreases, rate of descent must increase.

4—When groundspeed increases, rate of descent must decrease.

601 What power management would normally
Z17 be required to maintain a constant IAS and ILS glide slope when passing through an abrupt wind shear which involves a shift from a tailwind to a headwind?

1—Higher than normal power initially, followed by a decrease as the shear is encountered, then an increase.

2—Lower than normal power initially, followed by a further decrease as the shear is encountered, then an increase.

3—Higher than normal power initially, followed by a further increase as the shear wind is encountered, then a decrease.

4—Lower than normal power initially, followed by an increase as the shear is encountered, then a decrease.

602 Which complete runway lighting system is
Q31 installed for RWY 1? (Fig. 51, page 112)

1—High Intensity Approach Lights with sequenced flashers, TDZL, and runway centerline lighting.

2—Medium Intensity Approach Light System with sequenced flashers and RAIL.

3—Medium Intensity Approach Light System, TDZL, and runway centerline lighting.

4—High Intensity Approach Lights with sequenced flashers and 16 box 3-bar VASI.

603 You enter holding at CAMDEN Intersec-
V12 tion at 1305Z, and receive an EAC time of 1315Z. At 1310Z, you experience complete two-way communications failure. Which procedure does ATC expect you to follow to execute the ILS approach? (Fig. 51, page 112)

1—Continue holding at CAMDEN until the EAC time, then proceed to the approach fix, and complete the approach.

2—Depart CAMDEN at the flight planned ETA (as amended with ATC) proceed to the approach fix, and complete the approach.

3—Depart CAMDEN at the EAC time and complete the approach.

4—Depart CAMDEN to arrive over the approach fix as close as possible to the EAC time, and complete the approach.

604 What is the elevation of the highest point
Q40 in the touchdown zone of RWY 9R? (Fig. 53, page 113)

1—1,176 feet MSL
2—1,150 feet MSL
3—1,026 feet MSL
4—1,015 feet MSL

605 On the glide slope at the DH during the
Z15 ILS RWY 9R (CAT II), the radio altimeter measures (Fig 53, page 113)

1—MSL altitude.
2—height above the touchdown point.
3—threshold crossing height.
4—height above the terrain.

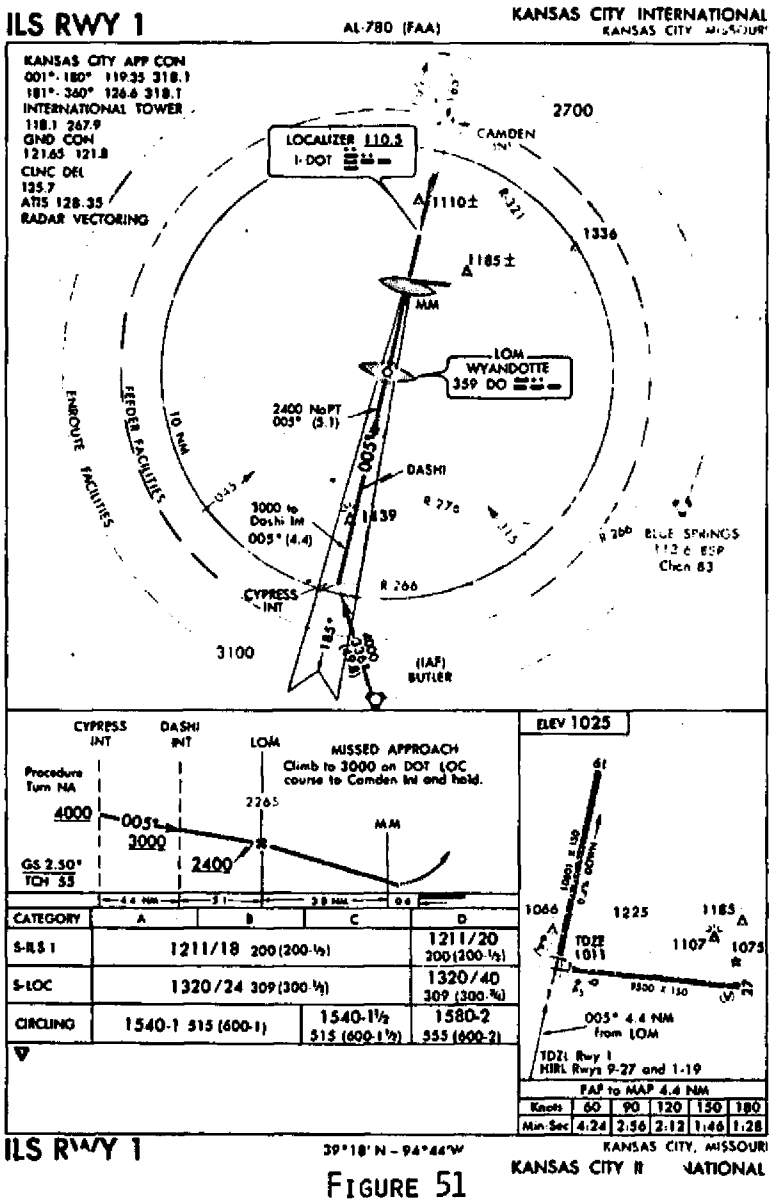


FIGURE 51

606 *Q40* The radio altimeter is inoperative; however, all other required Category II airborne equipment and ground components are operational. To which DH are you authorized to descend for a Category II ILS RWY 9R approach? (Fig. 53)

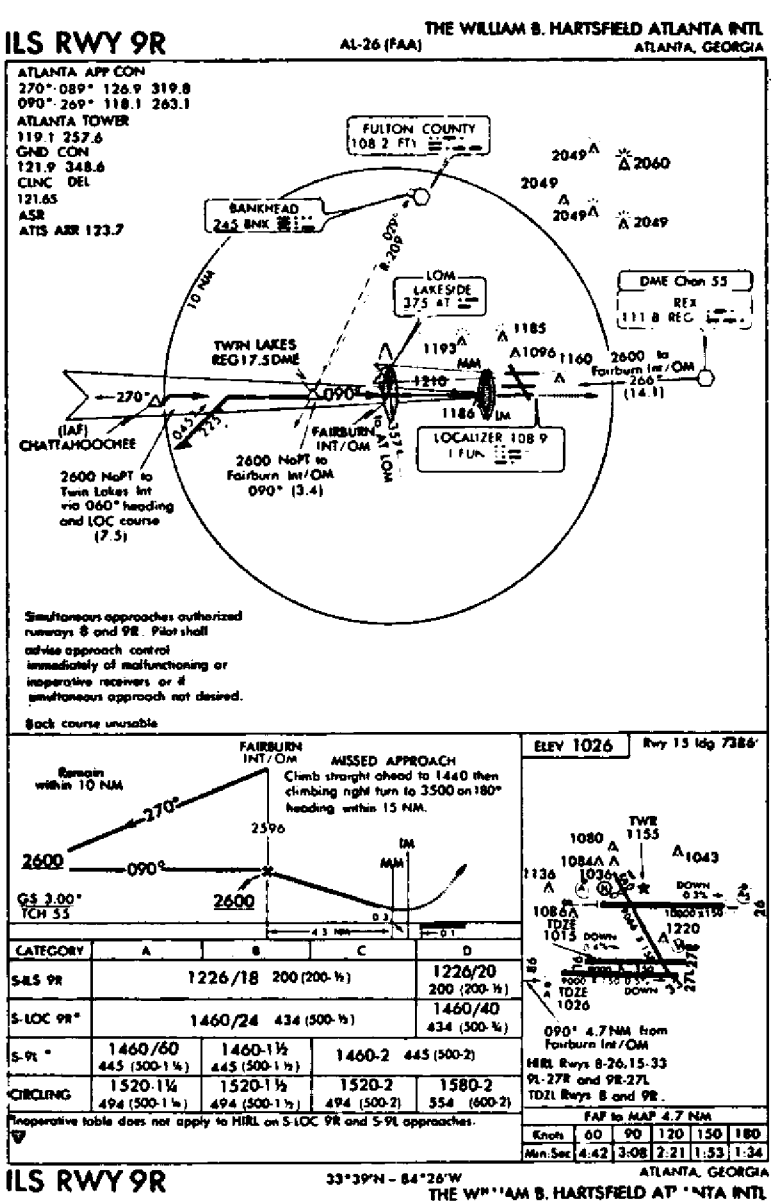
1—1,111 feet MSL
2—1,176 feet MSL
3— 96 feet AGL
4— 145 feet AGL

607 *Q40* With an operative radio altimeter, to which DH are you authorized to descend for a Category II ILS to RWY 9R if the Inner Marker is NOTAMed OTS? (Fig. 53)

1— 196 feet AGL
2— 114 feet AGL
3—1,176 feet MSL
4—1,126 feet MSL

608 *Q40* Assuming an aircraft is on glide slope, at what height will it cross the threshold of RWY 9R? (Fig. 52)

1— 75 feet
2— 55 feet
3—196 feet
4—114 feet



CATEGORY	A	B	C	D
S-ILS 9R	1226/18 200 (200-½)			1226/20 200 (200-½)
S-LOC 9R*	1460/24 434 (500-½)			1460/40 434 (500-¾)
S-9L*	1460/60 445 (500-1¼)	1460-1½ 445 (500-1½)	1460-2 445 (500-2)	
CIRCLING	1520-1¼ 494 (500-1¼)	1520-1½ 494 (500-1½)	1520-2 494 (500-2)	1580-2 554 (600-2)

FIGURE 52

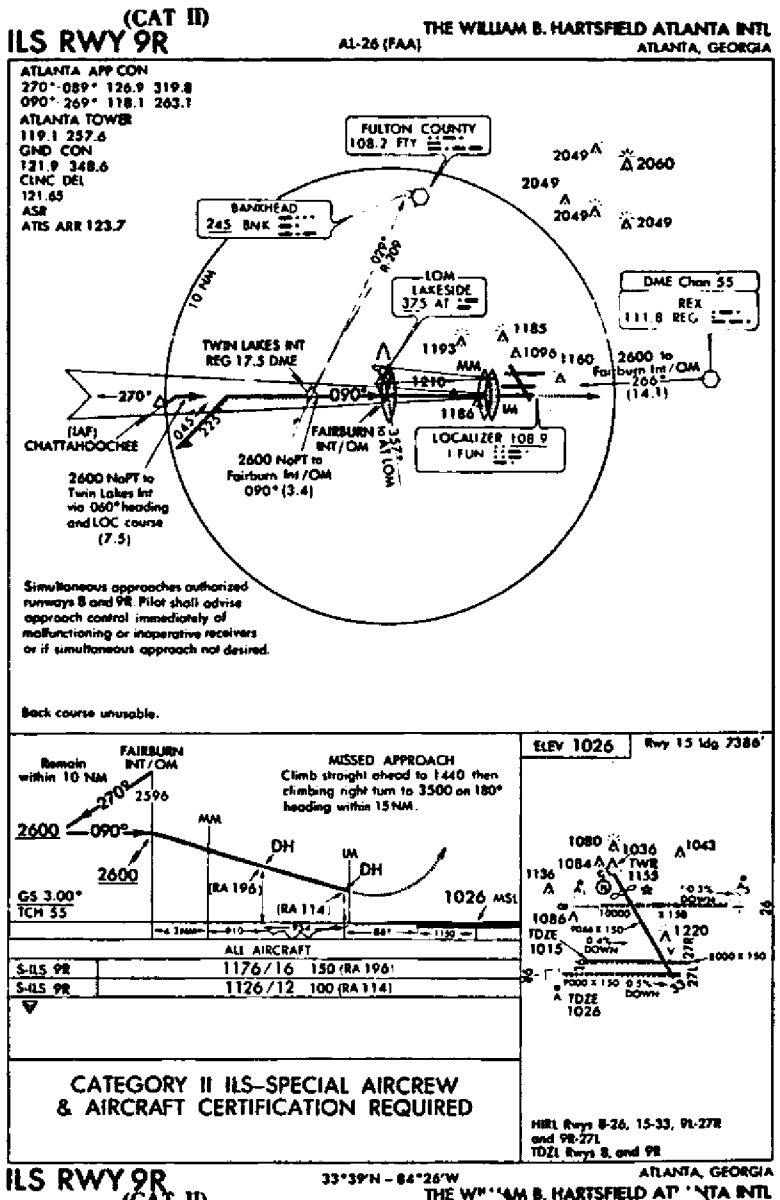


FIGURE 53

609 Which condition indicates that you are at
Q40 the MAP for the localizer-only approach to Runway 9R in an approach Category C airplane? (Fig. 52, page 113)

Final approach airspeed—145 knots TAS
Average headwind component—10 knots

	Altitude (MSL)	*Time*
1—	1,460	2:21
2—	1,226	2:02
3—	1,226	2:21
4—	1,560	2:07

610 Which complete lighting system is installed
Q31 for RWY 9R? (Fig. 52, page 113)

1—Sequence flashers, runway end identification lights, high intensity runway lights, and touchdown zone lighting.

2—Short approach light system, visual approach slope indicator, centerline lighting, touchdown zone lighting, and runway end identification lights.

3—Standard approach light system, sequence flashers, high intensity runway lights, centerline lighting, and touchdown zone lighting.

4—Visual approach slope indicator, medium intensity runway lights, sequence flashers, and runway end identification lights.

611 What are the landing minimums for a side-
Q40 step maneuver in an approach Category D airplane? (Fig. 52, page 113)

1—1460–2
2—1520–2
3—1226/18
4—1460/24

612 The DH (RA 114) shown at the IM loca-
Q40 tion for the ILS RWY 9R (CAT II) is also the (Fig. 53, page 113)

1—minimum descent altitude for an ILS approach to Runway 9R at night.

2—height of the glide path above the highest elevation in the touchdown zone.

3—absolute minimum altitude to which you can descend during any ILS approach to Runway 9R.

4—height of the main wheels of an aircraft above the terrain assuming the aircraft is on the glide slope.

613 What are the landing minimums for a side-
Q40 step maneuver in an approach Category C airplane? (Fig. 52, page 113)

1—1460–2
2—1520–2
3—1226/18
4—1460/40

614 What is the significance of this symbol
Q34 (✖) shown at the LOM for the ILS RWY 5R approach? (Fig. 54)

1—It indicates that point at which the aircraft should be at 2,712 feet MSL on the ILS approach.

2—It represents the final approach fix (FAF) for the complete ILS instrument approach.

3—It indicates the beginning of the final approach angle for vertical path computers.

4—It indicates the final approach fix (FAF) for a localizer-only instrument approach.

615 When is a pilot required to utilize Category
R24 II holding lines on a taxiway leading to Runway 19 at Kansas City International? (Fig. 55)

1—At all times, since Kansas City International is approved for Category II operations.

2—Anytime Category II operations are in progress.

3—Anytime the pilot is operating a Category II equipped airplane.

4—When weather conditions are below Category I instrument approach minimums.

616 If an airplane is on the electronic glide
Q40 slope, at what altitude should it cross the runway threshold? (Fig. 54)

1—100 feet AGL
2— 52 feet AGL
3—150 feet AGL
4—827 feet MSL

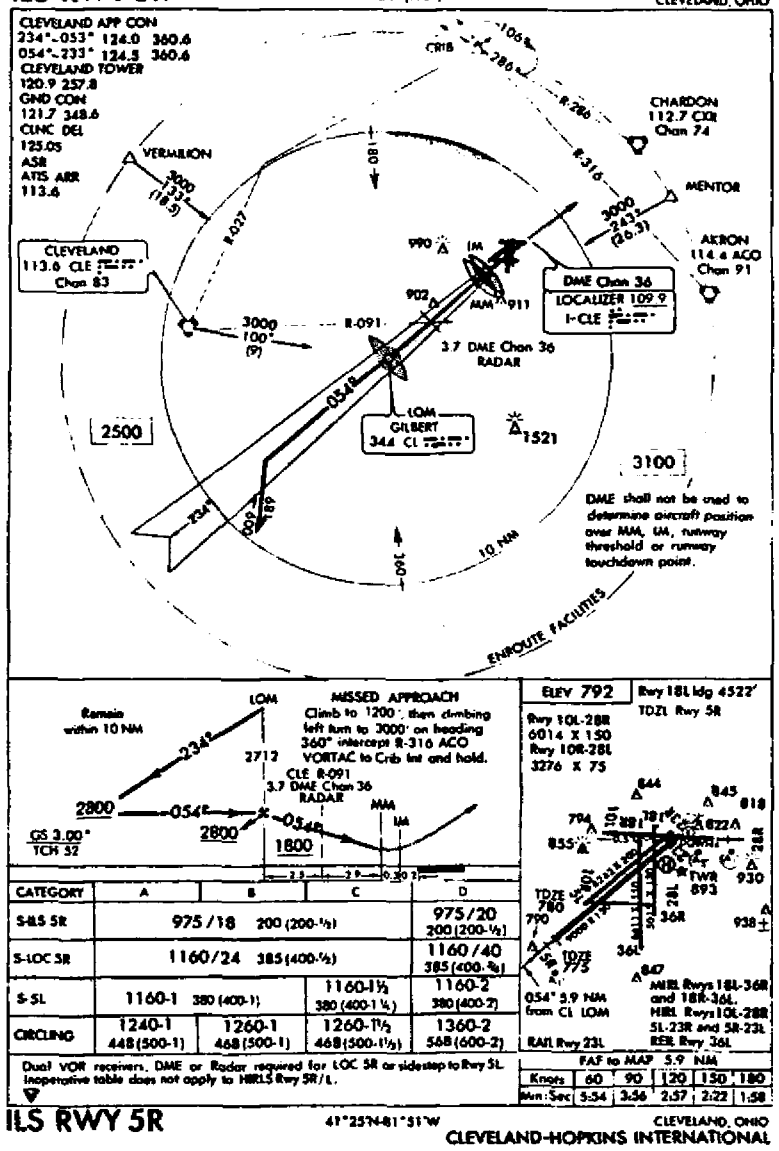


FIGURE 54

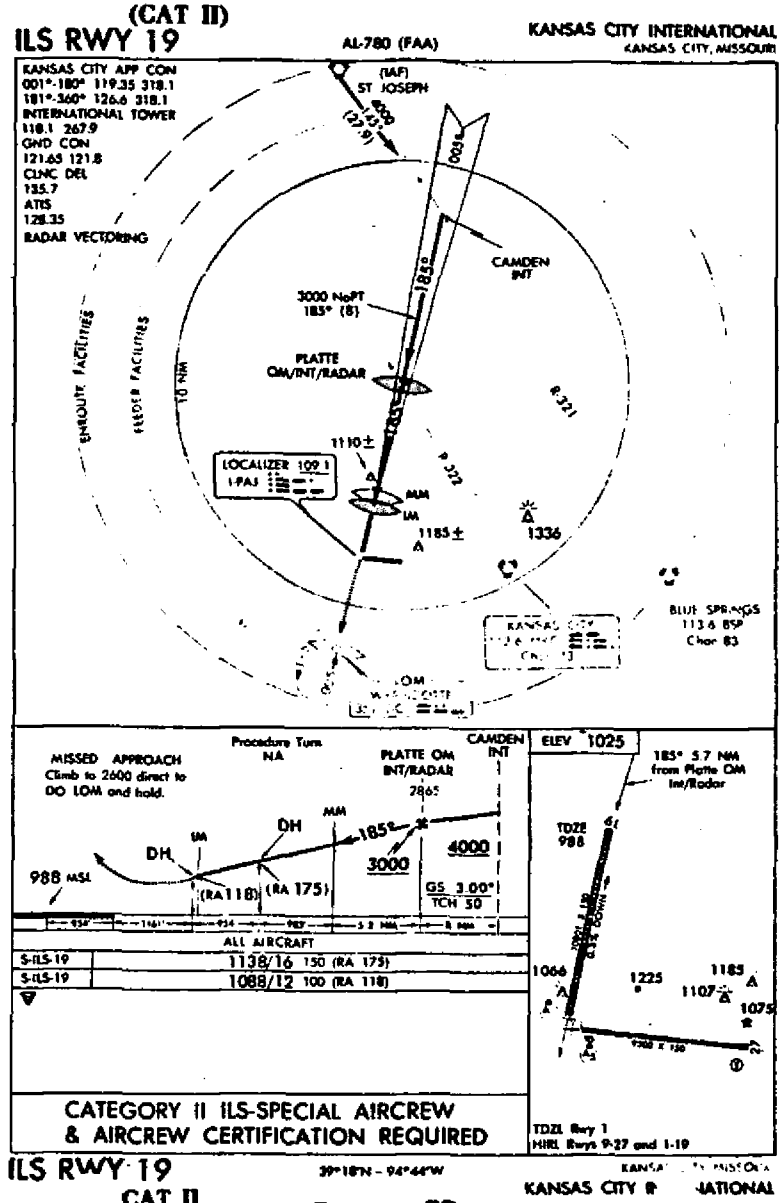


FIGURE 55

617 *Q40* Which condition indicates that you are at the MAP for the localizer-only approach to Runway 5R in an approach Category D airplane? (Fig. 54, page 115)

V_{REF} on final approach ---- 135 KIAS
Average headwind component ---------- 15 knots
ATIS reported wind ------ 070°/20 knots
HIRL ---------- Inoperative

1—1,210 feet MSL and when 2:40 has elapsed.

2—1,160 feet MSL or when 2:57 has elapsed, whichever occurs last.

3—1,360 feet MSL and when 2:57 has elapsed.

4—1,160 feet MSL or when 2:57 has elapsed, whichever occurs first.

618 *Q40* What are the landing minimums for a side-step maneuver in an approach Category C airplane? (Fig. 54, page 115)

1—1160-1½

2—1260-1½

3—975/18

4—1160/24

619 *Q40* With an operative radio altimeter, to which DH are you authorized to descend for a Category II ILS to RWY 19 if the Inner Marker is NOTAMed OTS? (Fig. 55, page 115)

1—1,138 feet MSL

2—1,088 feet MSL

3— 175 feet AGL

4— 118 feet AGL

620 *Q40* The RA DH (118) shown at the IM location for the ILS RWY 19 (CAT II) is also the (Fig. 55, page 115)

1—height of the glide path above the highest elevation in the touchdown zone.

2—minimum descent altitude for an ILS approach to Runway 19 at night.

3—absolute minimum altitude to which descent can be made for an ILS approach to Runway 19.

4—height of the main wheels of an aircraft above the terrain assuming the aircraft is on the glide slope.

621 *Q40* What are the landing minimums for a side-step maneuver in an approach Category D airplane? (Fig. 54, page 115)

1—1160/40

2— 975/20

3—1160-2

4—1360-2

622 *I78* Which air carriers shall keep records of its radio contacts with their pilots?

1—Domestic and Commercial.

2—Flag and Domestic.

3—Supplemental and Commercial.

4—Flag and Supplemental.

623 *Z16* What type of hydroplaning occurs when water is changed into steam and supports the airplane tire off the runway?

1—Dynamic hydroplaning.

2—Reverted rubber hydroplaning.

3—Thermal hydroplaning.

4—Viscous hydroplaning.

624 *R25* When landing at night on a Category II runway, the high intensity runway edge lights will be white until the last

1—1,500 feet.

2—2,000 feet.

3—1,000 feet.

4—1,200 feet.

625 *Z16* As compared to dynamic hydroplaning, at what speed can viscous hydroplaning occur when landing on a wet runway which has a smooth surface?

1—At approximately 1.2 times the speed dynamic hydroplaning can be expected to occur.

2—At approximately 1.4 times the speed dynamic hydroplaning can be expected to occur.

3—At the same speed.

4—At a lower speed.

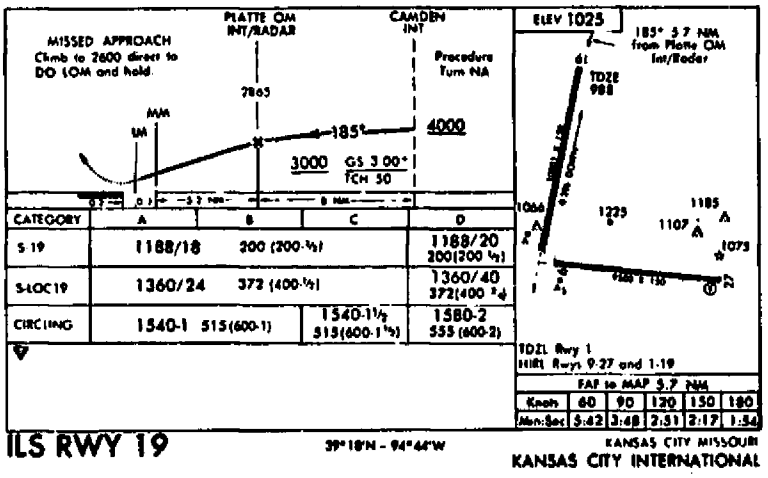


FIGURE 56

626 *V12* You enter holding at 1700Z and receive an EAC time of 1714Z. At 1702Z, you experience complete two-way communications failure. (The holding fix is not the same as the approach fix.) Which procedure should you follow to execute the approach to a landing?

1—Depart the holding fix to arrive at the approach fix as close as possible to the EAC time and complete the approach.

2—Depart the holding fix at the EAC time, and complete the approach.

3—Proceed to the approach fix, hold until EAC, and complete the approach.

4—Depart the holding fix on the flight planned ETA (as amended with ATC); proceed to the approach fix for the procedure in use.

627 *Q40* Which condition indicates that you are at the MAP for the localizer-only approach to Runway 19 in an approach Category C airplane? (Fig. 56)

Airspeed on final approach 135 knots
Average headwind component ---------- 15 knots
ATIS reported wind ----- 160°/12 knots

1—1,360 feet MSL or when 2:51 has elapsed, whichever occurs last.

2—1,540 feet MSL and when 2:08 has elapsed.

3—1,360 feet MSL or when 2:08 has elapsed, whichever occurs first.

4—1,580 feet MSL and when 2:51 has elapsed.

628 *I78* The record of each enroute radio contact between a domestic air carrier and its pilots shall be kept for at least

1—45 days.

2—60 days.

3—10 days.

4—30 days.

629 *V37* Which incident shall be reported by the most expeditious means available to the National Transportation Safety Board?

1—False engine fire warning during flight.

2—A near midair collision, the result of which required violent evasive action.

3—Flight control system malfunction.

4—An engine fire during ground start.

630 *I78* For which minimum time period must a record be kept of each enroute radio contact between a domestic air carrier and its pilots?

1—30 days

2—10 days

3—60 days

4—45 days

631 For what minimum period of time shall a
I74 domestic and flag air carrier keep copies of load manifests, dispatch releases, and flight plans?

1—6 months

2—45 days

3—3 months

4—30 days

632 For what period of time shall a supple-
I76 mental air carrier keep records of dispatch releases and load manifests at its operational base?

1—3 months

2—6 months

3—30 days

4—60 days

633 Flag air carriers must keep records of en-
I78 route radio contacts with their flights for what minimum time period?

1—10 days.

2—30 days.

3—25 hours of recorder time.

4—At least 45 minutes after the flight has terminated.

634 For what minimum period of time shall a
I76 supplemental air carrier and commercial operator retain copies of the load manifest, flight release, and flight plans?

1—2 months

2—30 days

3—6 months

4—3 months

635 After which minimum period of time may
I76 a supplemental air carrier operator destroy copies of the load manifest or airworthiness release?

1—60 days

2—30 days

3—6 months

4—3 months

636 An Initial Approach Fix may be identified
Q40 on an Instrument Approach Procedure Chart as

1—any of the fixes illustrated between the 10-mile ring and the enroute facilities ring.

2—the procedure turn and the fixes labeled IAF where there is no procedure turn authorized.

3—the procedure turn and the fixes on the feeder facility ring.

4—any fix that is within the 10-mile ring other than the final approach or intermediate approach fixes.

637 For which time period shall a supple-
I76 mental air carrier operator keep a copy of the airworthiness release, pilot route certification, and flight plans at its operations base?

1—30 days

2—60 days

3—3 months

4—6 months

638 For what minimum period of time shall a
I74 domestic air carrier keep copies of the load manifest, dispatch release, and flight plans?

1—6 months

2—45 days

3—3 months

4—30 days

639 The National Transportation Safety Board,
V37 Safety Investigation Regulations, Part 830, requires an immediate report by the most expeditious means available in event an aircraft accident or certain incidents occur. Which of the following would require this report?

1—Turbine engine failure due to loss of compressor blades.

2—When the copilot is too ill in flight to perform his duties on a two-pilot crew.

3—Propeller reversal in flight.

4—A near-miss that requires violent evasive action to avoid collision.

640 *V37* Which incident shall be reported immediately to the nearest Bureau of Aviation Safety Field Office of the National Transportation Safety Board?

1—An inflight fire.

2—A hard landing which results in structural damage.

3—A near midair collision, if violent evasive action has occurred.

4—An inflight generator failure.

641 *V37* Which incident requires an immediate report by the most expeditious means available to the nearest Bureau of Aviation Safety Field Office of the National Transportation Safety Board?

1—A near midair collision, if violent evasive action was required as a result.

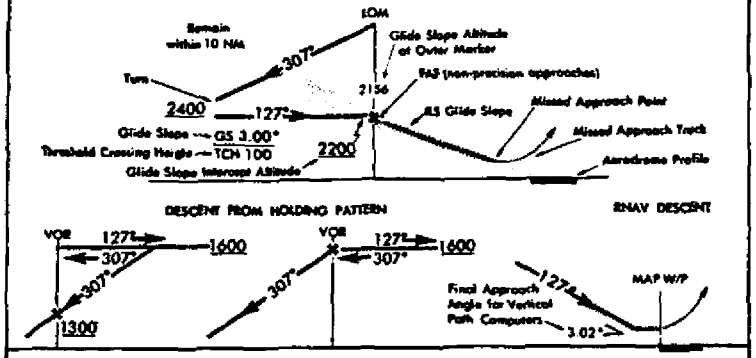
2—False engine fire warning during flight.

3—The inability of a required flight crewmember to perform normal flight duties due to illness.

4—An engine fire during a ground start.

LEGEND
INSTRUMENT APPROACH PROCEDURES (CHARTS)

PROFILE



FACILITIES/FIXES

	2
	Fan
NDB (Rbn)	
RNG	
VOR	
VORTAC	
TACAN	
WAYPOINT	
FIX	
INT	

ALTITUDES

3500 Mandatory Altitude — 2300 Minimum Altitude — 4800 Maximum Altitude — 2200 Recommended Altitude

Altitudes precede fix or are arrowed to show where they apply.

Glide Slope intercept altitude is the same as the minimum altitude over LOM for localizer only approach, except as otherwise noted.

Final Approach Fix (FAF) (for non-precision approaches)

Glide Slope Intercept

Visual Flight Path

AERODROME SKETCH

Runways

Hard Surface — Other Than Hard Surface — Hardstands/Taxiways

Closed Runways and Taxiways — Under Construction — Metal Surface

Over-run — Displaced Threshold

Arresting Gear

uni-directional — bi-directional — Jet Barrier

Control Tower
When Control Tower and Rotating Beacon are co-located, Beacon symbol will be used and further identified as TWR.

Rotating Aerodrome Beacon.

U.S. Navy Optical Landing System (OLS) "OLS" location is shown because of its height of approximately 7 feet and proximity to edge of runway may create an obstruction for some types of aircraft.

Helicopter Alighting Areas

Negative Symbols used to identify Copter Procedure landing point.

Note: The prop type symbol is being phased out.

Elev 123 — Runway TDZ elevation

0.8% – up — Total Runway Gradient (shown when runway gradient exceeds 0.3%)

MINIMA DATA

Indicates other than standard Alternate Minimums apply for U.S. Army and Civil, refer to tabulation.

NA Indicates IFR minimums are Not Authorized for alternate use due to unmonitored facility or absence of weather reporting service.

Indicates other than standard Take-off Minimums or departure procedures apply for Civil users. DOD users refer to Service Directives.

Night minimums shown in negative form being phased out.
Charts converted to TERPs criteria will show night minimum when different than day by an asterisk and note.

LEGEND
INSTRUMENT APPROACH PROCEDURES (CHARTS)

PLANVIEW SYMBOLS

Procedural Track

165° — 345° Procedure Turn (45° off course bearing for select users—degree and point of turn is left to discretion of pilot)

Missed Approach — Visual Flight Path

HOLDING PATTERNS

270° — 090° In lieu of Procedure Turn

270° — 090° Arrival Holding Pattern

Missed Approach Holding

Limits will only be specified when they deviate from the standard. DME fixes may be shown.

Helicopter Alighting Area

(IAF) 20 DME — 6 DME — Name

TACAN Fix — TACAN/DME Fix — RNAV Fix

TERMINAL ROUTINGS

2000 Minimum Altitude

155° (15.1) Mileage

Penetrates Special Use Airspace

3100 NoPT 5.6 NM to GS Intcpt

045° (14.2 to LOM)

R-198 Radial line and value

1400 Minimum Sector Altitude within 25 NM (Emergency Use Only)

(Arrows on distance circle identify Sectors)

International Boundary

Distance not to scale

VOR Changeover Point

OBSTRUCTIONS

• Spot Elevation — ● Highest Spot Elevation

Unlighted — Lighted — Group Unlighted

Group Lighted — Highest Obstruction

± Doubtful Accuracy

SPECIAL USE AIRSPACE

R-Restricted
P-Prohibited
W-Warning

RADIO AIDS TO NAVIGATION

110.1 Underline indicates No Voice transmitted on this frequency

VOR — TACAN — VORTAC

WAYPOINT (RNAV)

RANGE (Simultaneous Broadcast)

RANGE (Non-Simultaneous Broadcast)

NDB (Non-directional Radio Beacon)

LOM (Compass Locator)

Marker Beacon

Localizer Course

Localizer Transmitter
(shown when localizer installation is offset from its normal position off the end of the runway)

SDF Course

Range Course
Solid Line indicates "N" Quadrant

Reporting Point — Name (Compulsory) — Name (Non-Compulsory)

Fix or Intersection

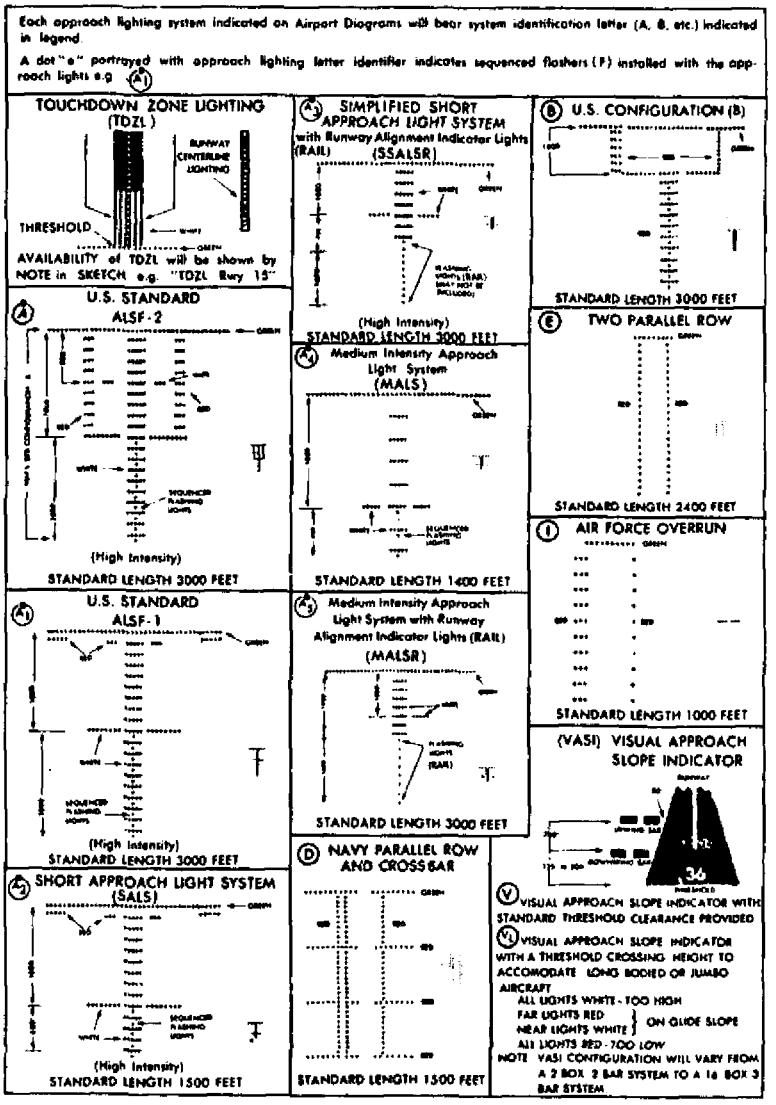
LEGEND

INSTR· T APPROACH PROCED CHARTS)

APPROAC.. .IGHTING SYSTEMS – ..TED STATES

Each approach lighting system indicated on Airport Diagrams will bear system identification letter (A, B, etc.) indicated in legend.

A dot "●" portrayed with approach lighting letter identifier indicates sequenced flashers (F) installed with the approach lights e.g. (A1)



PUBLISHED BY NOS, NOAA TO NACC SPECIFICATIONS

LEGEND

STANDARD TERMINAL ARRIVAL ROUTE (STAR) CHARTS

RADIO AIDS TO NAVIGATION

- VOR
- TACAN
- VORTAC
- WAYPOINT (RNAV)
- RANGE (Simultaneous Broadcast)
- NDB (Non-directional Radio Beacon)
- LOM (Compass Locator)
- Marker Beacons
- Localizer Course
- SDF Course
- NAME 000.0 NAM 00 — DME or TACAN Channel
- Underline indicates no voice transmitted on this frequency
- R-275 — Radial line and value
- Reporting Point — Non-Compulsory / Compulsory
- DME Fix
- DME Mileage (when not obvious)
- VOR Changeover Point

ROUTES

- 6500 MEA / *3500 MOCA / 270° / (65) Mileage — Arrival Route
- Transition Route
- MCA (Minimum Crossing Altitude)
- x Mileage Breakdown
- Altitude change at other than Radio Aids
- (65) Mileage between Radio Aids, Reporting Points and Route Breaks
- V12 J60 Airway/Route Identification
- Holding Pattern

SPECIAL USE AIRSPACE

R-352 — R-Restricted, P-Prohibited, W-Warning, A-Alert

AERODROMES

- Civil
- Joint Civil-Military
- Military
- Heliport

Entry facility/fix identified by name and symbol only.
All radials/bearings are magnetic
All mileages are nautical
All altitudes in feet-MSL
MEA – Minimum Enroute Altitude
MOCA – Minimum Obstruction Clearance Altitude

LEGEND

STANDARD INSTRUMENT DEPARTURE (SID) CHARTS

RADIO AIDS TO NAVIGATION

- VOR
- TACAN
- VORTAC
- WAYPOINT (RNAV)
- NDB (Non-directional Radio Beacon)
- RANGE (Simultaneous Voice)
- RANGE (Non-Simultaneous Voice)
- LOM (Compass Locator)
- MARKER BEACONS
- LOCALIZER COURSE

AERODROMES

- Heliport

RUNWAYS

- Hard surface
- Metal Surface
- Closed
- Under Construction
- Other Than Hard Surface
- Over-run / Hardstands / Taxiways

ROUTES

- Departure Route
- Transition Route

SPECIAL USE AIRSPACE

R-5 — R-Restricted, P-Prohibited, W-Warning, A-Alert

MISCELLANEOUS SYMBOLS

- Intersections
- Compulsory Reporting Point
- DME Fix
- R-160 — Radial line and value
- Distance Not To Scale
- Arresting Gear
- Jet Barrier
- Displaced Threshold
- Control Tower
- 0.5% DOWN — Take Off Gradient
- Changeover Point
- V105 Airway Identification

Outer Marker (OM)-continuous dashes
Middle Marker (MM)-alternate dots and dashes.
117.6-frequency underlined indicates no voice capability.
All radials/bearings are magnetic.
All mileages are nautical.
Runway dimensions in feet.
Elevation in feet-MSL.

AIRCRAFT APPROACH CATEGORIES

Minimums are specified for the various aircraft speed/weight combinations. Speeds are based upon a value 1.3 times the stalling speed of the aircraft in the landing configuration at maximum certificated gross landing weight. Thus they are COMPUTED values. See FAR 97.3 (b). An aircraft can fit into only one category, that being the highest category in which it meets either specification. For example, a 30,000 pound aircraft landing weight combined with a computed approach speed of 130 knots would place the aircraft in Category C. If it is necessary, however, to maneuver at speeds in excess of the upper limit of the speed range for each category, the minimum for the next higher approach category should be used. For example, a B-727-100 which falls in Category C, but is circling to land at a speed in excess of 140 knots, should use the approach category "D" minimum when circling to land. See following category limits.

Approach Category	Speed/Weight

A : Speed less than 91 knots; weight less than 30,001 pounds.

B : Speed 91 knots or more but less than 121 knots; weight 30,001 pounds or more but less than 60,001 pounds.

C : Speed 121 knots or more but less than 141 knots; weight 60,001 pounds or more but less than 150,001 pounds.

D : Speed 141 knots or more but less than 166 knots; weight 150,001 pounds or more.

E : Speed 166 knots or more; any weight.

RVR/Meteorological Visibility Comparable Values

The following table shall be used for converting RVR to meteorological visibility when RVR is inoperative.

RVR (feet)	Visibility (statute miles)
1600	1/4
2400	1/2
3200	5/8
4000	3/4
4500	7/8
5000	1
6000	1 1/4

Landing minimums published on instrument approach procedure charts are based upon full operation of all components and visual aids associated with the particular instrument approach procedure being used. Higher minimums are required with inoperative components or visual aids as indicated below, except where a note specifies that the table does not apply. If more than one component is inoperative, each minimum is raised to the highest minimum required by any single component that is inoperative. Adjustment of minimums for an inoperative OM is not required if an authorized substitution can be made. Authorized substitutions are: published fixes or ASR. ILS glide slope inoperative minimums are published on instrument approach charts as localizer minimums.

(1) ILS and PAR.

Inoperative Component or Aid	Increase DH	Increase Visibility	Approach Category
OM* MM*	50 feet	None	ABC
OM* MM*	50 feet	1/4 mile	D
ALS, SSALSR, MALSR	50 feet	1/4 mile	ABCD

*Not applicable to PAR

(2) ILS with visibility minimum of 1,800 or 2,000 feet RVR.

Inoperative Component or Aid	Increase DH	Increase Visibility	Approach Category
OM MM	50 feet	To 1/2 mile	ABC
OM MM	50 feet	To 3/4 mile	D
ALS	50 feet	To 3/4 mile	ABCD
HIRL, TDZL, RCLS	None	To 1/2 mile	ABCD
RVR	None	To 1/2 mile	ABCD

(3) VOR, VOR/DME, VORTAC, VOR (TAC), LOC, LOC/DME, LDA, LDA/DME, SDF, SDF/DME, RNAV, and ASR.

Inoperative Visual Aid	Increase MDA	Increase Visibility	Approach Category
ALS, SSALSR, MALSR	None	1/2 mile	ABC
HIRL, SALS, MALS	None	1/4 mile	ABC

(4) LOC CAT D only.

Inoperative Component or Aid	Increase MDA	Increase Visibility	Approach Category
ALS, MM	None	1/4 mile	D

(5) NDB and RNG.

Inoperative Visual Aid	Increase MDA	Increase Visibility	Approach Category
ALS, SSALSR, MALSR	None	1/4 mile	ABC

ENROUTE HIGH ALTITUDE - U.S.

For use at and above 18,000' MSL

L E G E N D

AERODROMES

Aerodromes shown have a minimum of 5000' hard surfaced runway and have an approved Instrument Approach Procedure published. The DOD FLIP Terminal High Altitude contains only those shown in DARK BLUE.

Civil
Joint Civil Military
Military

Parentheses around aerodrome name indicates military landing rights not available

Aerodrome symbol may be displaced for enroute navigational aids

AIR TRAFFIC SERVICES AND AIRSPACE INFORMATION

ROUTE DATA

VHF/UHF Data is depicted in BLUE. LF/MF Data is depicted in BROWN

Jet Route
Oceanic Route
Substitute Route Structure

(Via or by-passing temporarily shutdown navigational aids) See NOTAMS or appropriate publications for specific information

Unusable Route Segment
Military IFR Route
Flight Planning Route
J7 — Jet Route Identification
J6 — Preferred Single Direction Jet Route
HL500 — Canadian High Level Airway Identification
A15 ROUTE — Oceanic Route Identification
115.9 NAM — Facility Locator used with Radial Line in the formation of a Reporting point
257 ANM — Facility Locator used with Bearing Line in the formation of a Reporting Point
092 — Radial Outbound from a VHF/UHF Navigational Aid
279 — Bearing Inbound to a LF/MF Navigational Aid
123 / 148 — Total Mileage between Compulsory Reporting Points and/or Radio Aids
23 / 45 — Mileage between other Reporting Points, Radio Aids, and/or Mileage Breakdown
42 / 26 — VOR Changeover Point Giving mileage to Radio Aids (Not shown when less than 5 NM from the mid point in either direction

Mileage Breakdown
Denotes DME fix. (Distance same as route mileage)
19 — Denotes DME fix (Encircled mileage shown when not otherwise obvious)
MAA-40000 — MAA (Maximum Authorized Altitude) Shown along Routes when other than 45,000'
MEA-20000 — MEA (Minimum Enroute Altitude) Shown along Routes when other than 18,000'
MEA and/or MAA Change at other than Radio Aids to Navigation
MRA (Minimum Reception Altitude)

REPORTING POINTS

Compulsory Reporting Point
Non Compulsory Reporting Point
Offset Arrows Indicate Facility Forming a Reporting Point Toward LF/MF Away From VHF/UHF Radio Aid
Radar Jet Advisory Service Area FL 240 to FL 410 inclusive
Radar Jet Advisory Service Area with Variable Flight Levels Flight Levels indicated by NOTE

ALL ALTITUDES ARE MSL UNLESS OTHERWISE STATED

BOUNDARIES

Air Route Traffic Control Center (ARTCC)
Air Defense Identification Zone (ADIZ)
Flight Information Region (FIR)
Upper Information Region (UIR)
Adjoining ADIZ
Combined FIR and UIR
Oceanic Control Area (CTA)
International Boundary (Not shown when coincident with ARTC or FIR)
Official Time Zone

AIRSPACE INFORMATION

Ocean area (white) indicates controlled airspace
Shaded area (brown) indicates uncontrolled airspace

Continental Control Area
That airspace within the conterminous United States excluding certain special use airspace areas.

Continental Positive Control Area
That airspace within the continental control area from 18,000 ft MSL to and including FL 600 within the conterminous United States excluding the Santa Barbara Island, Farallon Island and the portion south of Lat 25°04'00" N.

Air Traffic Service Sample

CTA FIR
MIAM. OCEANIC
KZMA

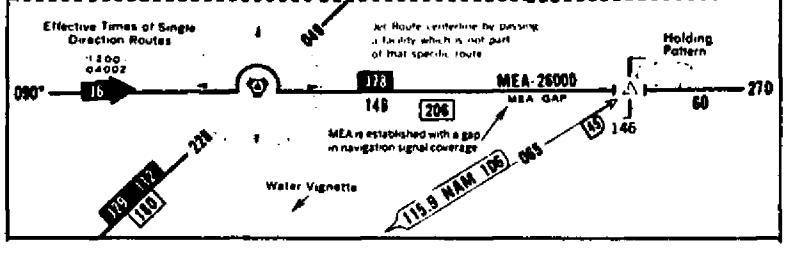
Additional Control Area Limit

MISCELLANEOUS

Registration marks Refer to Index on Title Panel
1970 Isogonic Line and Value shown each 4°

ALL MILEAGES ARE NAUTICAL EXCEPT AS NOTED
ALL RADIALS AND BEARINGS ARE MAGNETIC
ALL TIME IS GREENWICH MEAN (STANDARD) TIME (GMT)
DAYS ARE LOCAL
(DURING PERIODS OF DAYLIGHT SAVING TIME (DT) EFFECTIVE HOURS WILL BE ONE HOUR EARLIER THAN SHOWN
ALL CONTERMINOUS STATES ON DT EXCEPT ARIZONA AND THAT PORTION OF INDIANA IN THE EASTERN TIME ZONE

EXAMPLE OF GROUPING



RADIO AIDS TO NAVIGATION

RADIO AIDS TO NAVIGATION

VHF/UHF Aids are depicted in BLUE
LF/MF Aids are depicted in BROWN

COMPASS ROSE Oriented to Magnetic North

VOR TACAN VORTAC

LF/MF Range with simultaneous Voice Signal Capability (Solid tip in "H" Quadrant)

LF/MF Range without simultaneous Voice Signal Capability

LF/MF Range Course Feathered side indicates "A" Quadrant

LF/MF Non-directional Radiobeacon or Marine Radiobeacon

UHF Non-directional Radiobeacon

Consolan Station

Name Weather Radio — U S Weather Station with Voice Communication

IDENTIFICATION BOXES

Abnormal Status Undergrint for Affected Data, e.g. TO BE CMSN, SHUT DOWN, MAY BE CMSN, etc

DME SHUT DOWN
DME 00
NAME
000.0 MAN

VOR with TACAN compatible DME

NAME •257 ANM — LF/MF Radio Aid Identification and Frequency

Operates less than continuous or On Request

Enroute Flight Advisory Service Frequency 122.0 Voice Call e.g. "Los Angeles Flight Watch."

NAME
115.9 (L) NAM 100 (L)
300 NM

Underline indicates No Voice on this frequency. TACAN Channels are without Voice but are not underlined.

Heavy line box indicates FSS and radio aid same name

(FSS freqs available are 255.4, 122.2, selected discrete freqs. and emerg. 243.0 and 121.5)

In Canada a heavy line box indicates stations with standard group freq 126.7, 122.2, 122.1R

(L) Frequency Protection
Usable range at 18,000'–40 NM
"L" category radio aids located off Jet routes are depicted in screen blue.
Radio Aids to Navigation Without Classification are "H" Category

SPECIAL USE AIRSPACE

P-56
W-123
A-66
R-1234
TO 10000
0600-1800Z
MON-FRI
IFR
ZMA/ARTCC

P - Prohibited Area
R - Restricted Area
W - Warning Area
D - Danger Area (Canada)
A - Alert Area

SPECIAL USE AIRSPACE WILL INCLUDE

① Area Identification. In Canada area ident is preceded by the letters CY (CANADA) followed by a number (PROVINCE)

② Effective Altitude when ceiling is not unlimited or floor is 18,000 feet MSL and above

③ Operating Time. When continuous no time is shown
Days: Sunrise to Sunset
Nights: Sunset to Sunrise
Hours: Given in GMT, e.g. 0600-1300Z

Mon-Fri indicates area does not exist on Sat. or Sun.
1 Mar-15 June: Indicates area in use only through dates given. By NOTAM Area activated by NOTAM
Days are Local

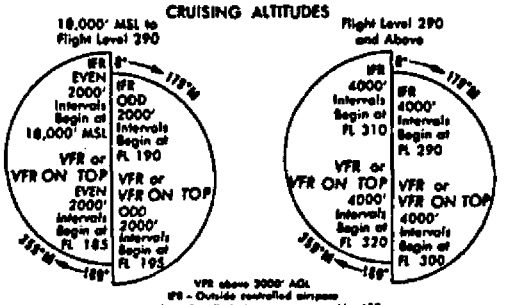
④ Weather Conditions during which the area is in operation. When continuous no weather is shown. VFR: Used only when VFR Flight can be maintained. IFR: Used only during IFR Conditions

⑤ Voice Call of Controlling Authority for enroute clearance through area. No A/G unless indicated

‡ Indicates complete information in tabulation on front panel

A	·–	F	··–·	K	–·–	P	·––·	U	··–	1	·————	6	–····
B	–···	G	––·	L	·–··	Q	––·–	V	···–	2	··———	7	––···
C	–·–·	H	····	M	––	R	·–·	W	·––	3	···——	8	–––··
D	–··	I	··	N	–·	S	···	X	–··–	4	····–	9	––––·
E	·	J	·–––	O	–––	T	–	Y	–·––	5	·····	0	–––––
								Z	––··				

CRUISING ALTITUDES



VFR above 3000' AGL
IFR – Outside controlled airspace
IFR within controlled airspace as assigned by ATC
All courses are magnetic

NO VFR FLIGHTS WITHIN POSITIVE CONTROL AREA

ENROUTE LOW ALTITUDE – U. S.

For use up to but not including 18,000' MSL

L E G E N D

AERODROMES

Aerodromes/Seadromes shown in BLUE have an approved Low Altitude Instrument Approach Procedure published. Those shown in DARK BLUE have an approved DOD Low Altitude Instrument Approach Procedure and/or approved DOD RADAR MINIMA published in DOD FLIPS. Aerodromes/Seadromes shown in BROWN do not have a published Instrument Approach Procedure.

LAND — SEA

Civil

Joint Civil-Military

Military

Heliport

RELATED FACILITIES

Pilot to Metro Service (PMSV)

Continuous Operation

Less Than Continuous

Weather Radar (WXR)

PMSV and WXR Combined

Published ILS and/or Localizer Procedure available

Published SDF Procedure available

1. Parentheses around aerodrome name indicate military landing rights not available
2. Aerodrome elevation given in feet above or below mean sea level.
3. Length of longest runway given to nearest 100 feet with 70 feet as the dividing point (Add 00).
4. Aerodrome symbol may be off set for enroute navigation aids.
5. Pvt Private use, not available to general public.

Night Landing Capability
Asterisk indicates lighting on request or operating part of night only

Aerodrome Elev

Name
349 '180
NASB/PAR
ATIS 108.5

Radar Service Availability
Star indicates prior request only

Longest Landing Runway Length

Automatic Terminal Information Service and Frequency

Star indicates operation less than continuous or part time

(Name)
185 — 35

No Runway Lighting Capability

Indicates Soft Surface

RADIO AIDS TO NAVIGATION AND COMMUNICATION BOXES

RADIO AIDS TO NAVIGATION

VHF/UHF Aids are depicted in BLUE
LF/MF Aids are depicted in BROWN

COMPASS ROSE
Oriented to Magnetic North
Size of Compass Roses have no significance. Smaller sizes are used in congested areas

VOR — TACAN — VORTAC

LF/MF Range with omnidirectional Voice Signal Capability (Solid dip in "N" Quadrant)

LF/MF Ranges without simultaneous Voice Signal Capability

LF/MF Range Courses
Feathered side indicates "A" Quadrant

LF/MF Non-directional Radiobeacon or Marine Radiobeacon with magnetic north indicator

UHF Non-directional Radiobeacon

Compass Locator Beacon

Consolan Station

Marker Beacon
Fan (FM) — Bone (BM)

ILS Localizer Course with ATC Function. Feathered side indicates Blue Sector

RADIO AIDS TO NAVIGATION DATA BOXES

Abnormal Status Underscored for Affected Data, e.g., TO BE CMSN, SHUT DOWN, MAY BE CMSN, etc.

DME SHUT DOWN

DME Chan 00
NAME
NAM 000.0 (T)
MN 000

VOR with TACAN compatible DME

(T) Frequency protection
Usable range at 12,000'-25 NM

NAME
NAM *000

* Operates less than continuous or On Request

Underline indicates No Voice Transmitted on this frequency

TACAN channels are without voice but are not underlined

Marfa Weather Radio

U.S. Weather Station with Voice Communication

(DENT 000

Commercial Broadcast Station

AIR/GROUND COMMUNICATION BOXES

HEAVY LINE BOXES indicate Flight Service Station (FSS). Frequencies 255.4, 122.2, and emerg 243.0 and 121.5 are normally available at all FSS's and are not shown above boxes. All other freqs available at FSS's are shown. Frequencies transmit and receive except those followed by R or T
R - receive only T - transmit only

123.6 122.6
122.1R

Triangle in corner of box indicates Enroute Flight Advisory Service Frequency 122.0 Voice Call e.g. Los Angeles Flight Watch.

Frequencies positioned above thin line NAVAID boxes are remoted to the NAVAID site. Other frequencies at the controlling FSS named are available, however, altitude and terrain may determine their reception

FAYETTEVILLE FYV

Name and identifier for FSS not associated with NAVAID

122.1R

WASHINGTON

Controlling FSS Name

Thin line box, without frequencies and Controlling FSS name indicates no FSS frequencies available

Flight Service Station (FSS)
Remote Communications Outlet (RCO)
Limited Remote Communications Outlet (LRCO)

In Canada a heavy line box indicates Aeradio. All available frequencies are shown

AIR TRAFFIC SERVICES AND AIRSPACE INFORMATION

AIRWAY AND ROUTE DATA

VHF/UHF Data is depicted in BLUE. LF/MF depicted in BROWN

VOR Airway and Identification

Airway and Identification

Uncontrolled Airway

Bahama Route and Identification

Bermuda Route and Identification

Atlantic Route Identification

Oceanic Route and Identification

Military IFR Route

Flight Planning Route

Substitute Route Structure (See NOTAMS for facility outages)

Unusable or closed segment

Preferred Single Direction Airway

Facility Locator used with Radial Line in the formation of a Reporting Point

Facility Locator used with Bearing Line in the formation of a Reporting Point

—036— Radial Outbound from a VHF/UHF Radio Aid

- -036- - Bearing inbound to a LF/MF Radio Aid

123 / 123 Total Mileage between Compulsory Reporting Points and/or Radio Aids

23 / 23 Mileage between other Reporting Points, Radio Aids, and/or Mileage Breakdown

42 / 26 VOR Changeover Point Giving mileage to Radio Aids (Not shown at mid-point locations)

Mileage breakdown

Denotes DME fix (Distance same as route mileage)

15 Denotes DME fix (Encircled mileage shown when not otherwise obvious)

MAA-15500 MAA (Maximum Authorized Altitude)

3500 / 3500 MEA (Minimum Enroute Altitude)

*3000 / *3000 MOCA (Minimum Obstruction Clearance Altitude)

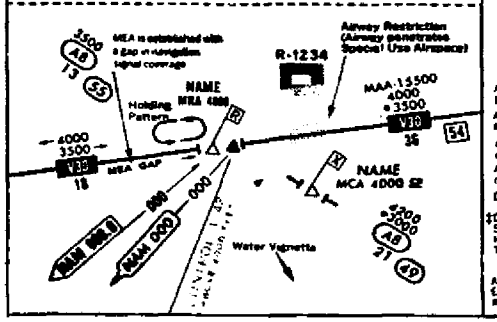
EVEN Canada only-Direction of Flight indicator (Shown when exception to Cruising Alt Diagram.

MEA, MAA and/or MOCA Change at other than Radio Aids to Navigation

MRA (Minimum Reception Altitude)

MCA (Minimum Crossing Altitude)

EXAMPLE OF GROUPING



REPORTING POINTS

Compulsory Reporting Point

Non Compulsory Reporting Point

Offset Arrows indicate Facility Forming a Reporting Point Toward LF/MF Away from VHF/UHF

BOUNDARIES

Altimeter Setting Change

Altimeter Setting Change when not otherwise defined

Air Route Traffic Control Center (ARTCC)

NAME ARTCC Remoted Sites with Discrete VHF and UHF Freqs

Flight Information Region (FIR)

Air Defense Identification Zone (ADIZ)

Combined FIR and ADIZ

Control Area (CTA)

Control Zone

Canadian Positive Control Zone

Control Zones within which flight using special VFR flight is prohibited

Intl Boundary (Omitted when coincident with ARTCC or FIR)

Area of Enlargement (Contains only data for through flights) See Area Charts for complete data

Official Time Zone

AIRSPACE INFORMATION

Open area (white) indicates controlled airspace.
Shaded area (brown) indicates uncontrolled airspace up to 14,500'. THE BASE OF THE CONTINENTAL CONTROL AREA IS 14,500 FT MSL EXCLUDING THE AIRSPACE LESS THAN 1,500 FT ABOVE THE TERRAIN AND CERTAIN SPECIAL USE AIRSPACE AREAS

MISCELLANEOUS

1975 Isogonic Line and Value

ALL MILEAGES ARE NAUTICAL EXCEPT AS NOTED

ALL RADIALS AND BEARINGS ARE MAGNETIC

ALL ALTITUDES ARE MSL UNLESS OTHERWISE STATED

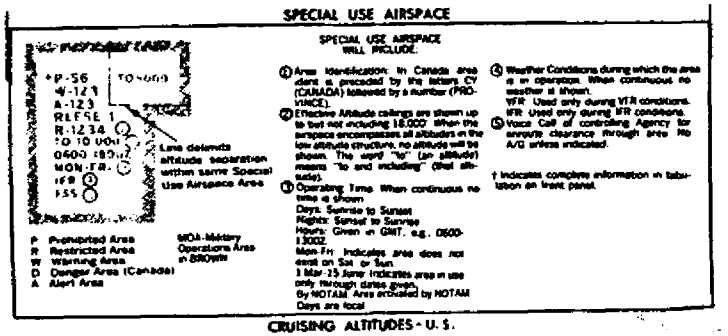
ALL TIME IS GREENWICH MEAN (STANDARD) TIME (GMT)

DAYS ARE LOCAL

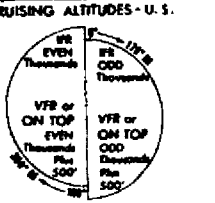
‡DURING PERIODS OF DAYLIGHT SAVING TIME (DT) EFFECTIVE HOURS WILL BE ONE HOUR EARLIER THAN SHOWN

ALL CONTERMINOUS STATES ON DT EXCEPT ARIZONA AND THAT PORTION OF INDIANA IN THE EASTERN TIME ZONE

SPECIAL USE AIRSPACE



CRUISING ALTITUDES - U. S.



VFR above 3000' AGL
IFR -- Outside controlled airspace
IFR within controlled airspace as assigned by ATC
All courses are magnetic

ENROUTE LOW ALTITUDE – U. S.

For use up to but not including 18,000' MSL

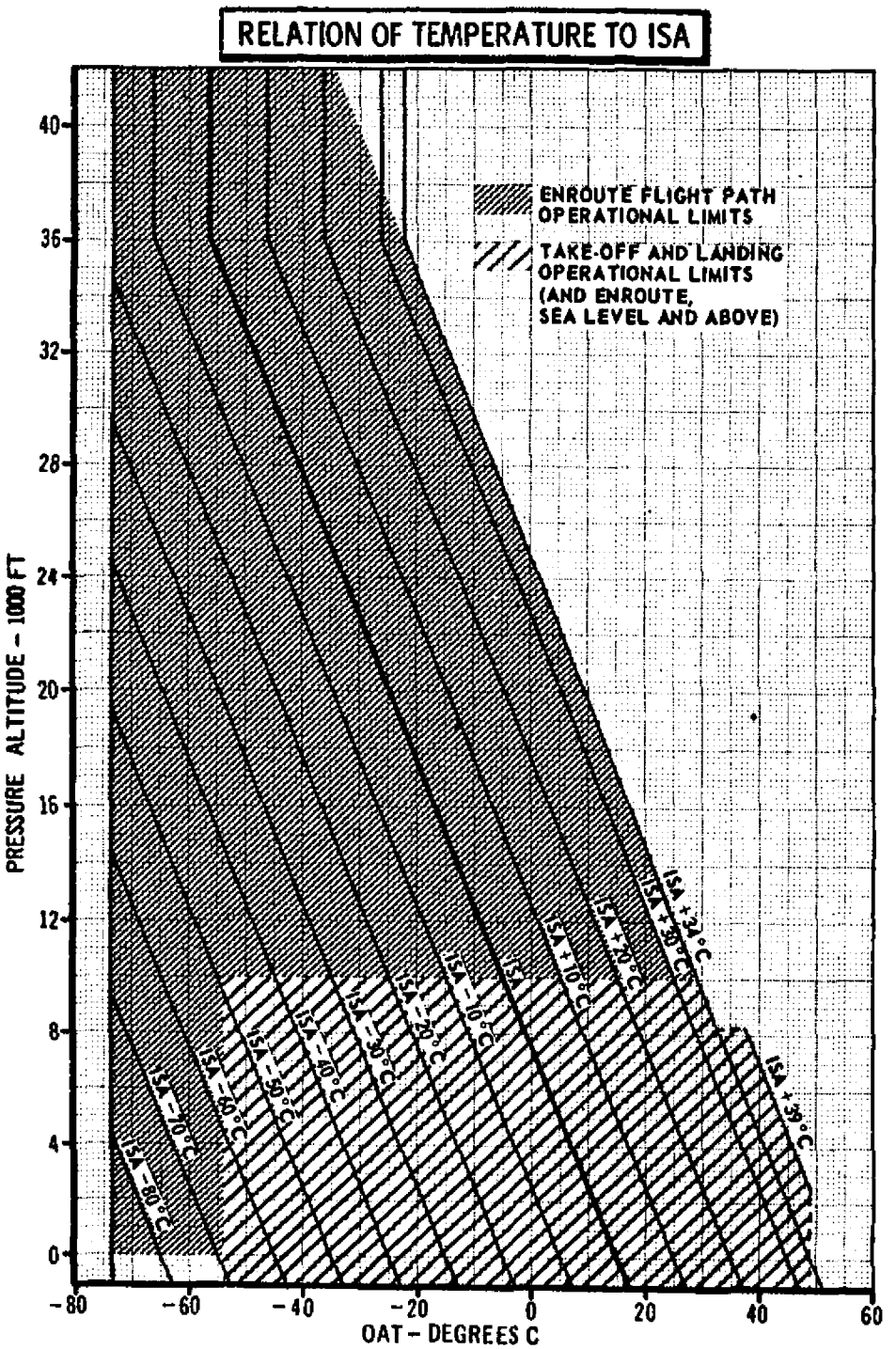
A/G VOICE COMMUNICATIONS

Civil airports with terminal A/G communications are listed below, alphabetically by airport name. Airports with proper names are listed by last name. Airports located within the limits of the Area Charts are listed on the Area Chart. Frequencies transmit and receive unless otherwise noted. An asterisk (*) follows the part-time tower freq remoted to the collocated full-time FSS for use as RAS during hours the tower is closed. Radials defining sectors are outbound from facility. Chart panel identification letter is shown to right of listing. For additional communications data, refer to AIM.

AKRON, N.Y. A
Buffalo App Con—123.8 Buffalo [illegible]

MINUTE MAN Boston App Con—124.6 133.0 D
Boston [illegible] Con—124.6

Twr—118.1
[illegible] Con—11[illegible]


RELATION OF TEMPERATURE TO ISA
ENROUTE FLIGHT PATH OPERATIONAL LIMITS
TAKE-OFF AND LANDING OPERATIONAL LIMITS (AND ENROUTE, SEA LEVEL AND ABOVE)
PRESSURE ALTITUDE – 1000 FT
OAT – DEGREES C
ISA – 80°C
ISA – 70°C
ISA – 60°C
ISA – 50°C
ISA – 40°C
ISA – 30°C
ISA – 20°C
ISA – 10°C
ISA
ISA + 10°C
ISA + 20°C
ISA + 30°C
ISA + 34°C
ISA + 39°C

PHYSIOLOGICAL TRAINING

The following articles concerning Hypoxia and Hyperventilation are excerpted from the Physiological Training Manual of the Civil Aeromedical Institute (CAMI). If further information is desired, write the Chief, Physiological Operations and Training Section, AAC–143, Civil Aeromedical Institute, FAA Aeronautical Center, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

Hypoxia

"Hypoxia is probably our most important physiological problem. It can be the most dangerous physical flying problem due to its insidious onset. Hypoxia, therefore, is one of the basic and most vital problems to the aviator. He must completely understand its causes, effects, prevention, and treatment.

Hypoxia can be defined as a lack of sufficient oxygen available to the body cells. The degree of hypoxia depends upon the reduction of the partial pressure of oxygen in the air sacs. *This reduction of oxygen pressure becomes apparent in the Physiological* Deficient Zone which extends from about 12,000 feet to 50,000 feet. Interference with the supply of oxygen to the cells of the body affects normal processes. The amount of oxygen in the cells may become inadequate due to various conditions.

The most important single characteristic of hypoxia at altitude is that if the aircrew member is engrossed in his duties, he may not notice the effect that hypoxia is having on his body. Each person will experience his individual symptoms of hypoxia; *therefore, in order to detect hypoxia, you must know your reactions. Some of the* common symptoms to look for are:

1. An increased breathing rate.
2. Light-headed or dizzy sensations.
3. Tingling or warm sensations.
4. Sweating.
5. Loss of vision or reduced vision; sleepiness.
6. Cyanosis (blue coloring of skin, fingernails, and lips).
7. Behavior changes.

Time of Useful Consciousness (T.U.C.) is the time from the onset of hypoxia until deterioration of the individual's effective performance. At altitudes below 30,000 feet this time may differ considerably from the time of total consciousness (the time it takes to "pass out"). Above 35,000 feet the times become closer and eventually coincide for all practical purposes. Various factors will determine T.U.C., some of which are:

1. Altitude. T.U.C. decreases with increasing altitude.
2. Rate of Ascent. In general, the faster the rate, the shorter the T.U.C.
3. Physical Activity. Exercise decreases T.U.C. considerably.
4. Day-to-Day Factors. Physical fitness or ability to tolerate hypoxia will change from day to day; therefore, changing your T.U.C.

The following T.U.C.'s given for various altitudes represent *average* times without supplemental oxygen:

15–18,000 feet	30 minutes or more
22,000 feet	5 to 10 minutes
25,000 feet	3 to 5 minutes
28,000 feet	2½ to 3 minutes
30,000 feet	1 to 2 minutes
35,000 feet	30 to 60 seconds

An immediate realization of your hypoxia symptoms and the obtaining of a proper amount of supplemental oxygen by emergency oxygen equipment procedures are necessary to combat hypoxia.

If oxygen is administered within a matter of 3 to 5 minutes to a person who is unconscious from hypoxia, recovery is usually rapid and complete. However, a hypoxic reaction may be followed by a state of shock during which there is a weak pulse, sweating, low blood pressure, and pooling of blood in dilated capillaries. This condition will require the usual treatment for shock."

Hyperventilation

"The respiratory center of the brain reacts to the amount of carbon dioxide found in the blood stream. When you are in a physically relaxed state, the amount of carbon dioxide in your blood stimulates the respiratory center and your breathing rate is stabilized at about 12 to 16 breaths a minute. When physical activity occurs, the body cells use more oxygen and more carbon dioxide is produced. Excessive carbon dioxide enters the blood and consequently the respiratory center responds to this excess. Breathing increases in depth and rate to remove the excess carbon dioxide. When the excess is removed, the respiratory center changes the breathing back to normal.

The same process is involved when a maximum effort is made to hold the breath. While the breath is being held, the body cells continue to manufacture carbon dioxide which enters the blood. The amount in the blood finally becomes so great that in spite of conscious efforts, the respiratory center overrides it and breathing is resumed.

Hyperventilation, or overbreathing, is a disturbance of respiration that may occur in individuals as a result of physical exertion, emotional tension, or anxiety. It is a condition in which the respiratory rate and depth are abnormally increased. This results in an excessive loss of carbon dioxide from the lungs, lowering the normal carbon dioxide tension of 40 mm. Hg. The most common symptoms are dizziness, hot and cold sensations, tingling of the hands, legs, and feet, tetany, nausea, sleepiness, and, finally, unconsciousness. After becoming unconscious, the breathing rate will be exceedingly low until enough carbon dioxide is produced to stimulate the respiratory center. Hyperventilation is a normal response to hypoxia. However, the excessive breathing does little good. Hyperventilation combined with hypoxia is very serious.

Should symptoms occur which you cannot definitely identify as either hypoxia or hyperventilation, the following steps should be taken:

Check your oxygen equipment immediately and put the regulator on 100% oxygen.

After three or four deep breaths of oxygen, the symptoms should improve markedly, if the condition experienced was hypoxia. (Recovery from hypoxia is extremely rapid.)

If the symptoms persist, you should consciously slow your breathing rate to an abnormally slow rate for 30 to 45 seconds, and then resume your breathing at a normal rate."

DEFINITIONS

Speed of sound—the speed at which sound waves travel through a medium, which is solely a function of temperature.

Mach number—the ratio of the true airspeed to the speed of sound.

$$\text{Mach No. (M)} = \frac{\text{True Airspeed (TAS)}}{\text{Speed of Sound}}$$

Speed of Sound = Mach 1.00

Subsonic—less than the speed of sound.

Transonic—airflow on aircraft components may be partly subsonic and partly supersonic. Mach numbers from 0.75 to 1.20.

Supersonic—definite supersonic airflow on all parts of the aircraft. Mach numbers from 1.20 to 5.00.

Critical Mach number—*the highest flight speed possible without supersonic* flow over any part of the aircraft.

Mean Aerodynamic Chord (MAC)—is the mean chord of the wing which is established by the manufacturer for engineering design and weight and balance purposes.

Specific range—is the nautical miles of flying distance per pound of fuel. The specific range can be defined by the following relationships:

$$\text{specific range} = \frac{\text{nautical air miles}}{\text{lbs. of fuel}} \quad \text{or} \quad \frac{\text{nautical air miles/hr.}}{\text{lbs. of fuel/hr.}}$$

$$\text{thus, specific range} = \frac{\text{TAS, knots}}{\text{fuel flow, lbs./hr.}}$$

Because of high fuel flow in jet aircraft, specific range is usually expressed as nautical *air* miles per 1,000 lbs. of fuel. (NAM/1,000 lbs.)

Clearway—expressed in terms of a clearway plane, extending from the end of the runway with an upward slope not exceeding 1.25 percent, above which no object nor any terrain protrudes.

Stopway—*an area beyond the runway, not less in width than the runway, for* use in decelerating the airplane during an aborted takeoff. A stopway can be used for increasing the accelerate-stop distance.

Takeoff Distance—(turbine engine powered airplanes)—The greater of:

1. The horizontal distance from the point of brake release to a point where the airplane attains a height of 35 feet above the takeoff surface, assuming an engine failure at the V_1 speed, or

2. 1.15 times the horizontal distance from the point of brake release to the point where the airplane attains a height of 35 feet above the takeoff surface with all engines operating.

The takeoff distance available, used in entering the chart, is the sum of the runway length plus the actual or maximum allowable clearway length. The length of the clearway used must not be greater than one-half the length of the runway.

Takeoff Run—(turbine engine powered airplanes)—The greater of:

1. The horizontal distance from the point of brake release to a point equidistant between the lift-off point and the point where the airplane attains a height of 35 feet above the takeoff surface, assuming an engine failure at V_1 speed, or

2. 1.15 times the horizontal distance from the point of brake release to a point equidistant between the lift-off point and the point where the airplane attains a height of 35 feet above the takeoff surface with all engines operating.

The takeoff run, used in entering the chart, must not exceed the length of the runway.

Accelerate-Stop Distance—The horizontal distance to accelerate from a standing start to the V_1 speed and thereafter, assuming an engine failure at this speed, to bring the airplane to a full stop. The accelerate-stop distance, used in entering the chart, must not exceed the length of the runway plus the length of the stopway.

Balanced Field Length—The condition where the takeoff distance is equal to the accelerate-stop distance. This distance must not exceed the length of the runway.

Unbalanced Field Length—The condition where the takeoff distance and accelerate-stop distance are not equal.

DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION

QUESTION SELECTION SHEET

TITLE	SELECTION NO.
AIRLINE TRANSPORT PILOT – AIRPLANE	

NAME _____

NOTE: (1) IT IS PERMISSIBLE TO MARK ON THIS SHEET

(2) LEGEND MATERIAL IS IN QUESTION BOOK APPENDIX, PAGES 115 THROUGH 123

On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number	On Answer Sheet For Item No.	Answer Question Number
1	003	21	295	41	451	61	555
2	010	22	305	42	457	62	558
3	031	23	311	43	468	63	563
4	063	24	317	44	478	64	564
5	069	25	323	45	473	65	571
6	080	26	325	46	480	66	578
7	109	27	338	47	486	67	579
8	119	28	340	48	492	68	584
9	128	29	357	49	501	69	585
10	157	30	364	50	502	70	590
11	171	31	372	51	503	71	597
12	187	32	386	52	517	72	599
13	208	33	391	53	525	73	602
14	220	34	400	54	527	74	606
15	244	35	407	55	532	75	614
16	250	36	418	56	534	76	617
17	253	37	421	57	545	77	624
18	274	38	426	58	546	78	626
19	280	39	435	59	550	79	629
20	290	40	446	60	552	80	637

THIS IS A SAMPLE TEST. IT IS NOT A DUPLICATE OF AN OFFICIAL TEST YOU MIGHT RECEIVE AT THE TESTING CENTER.

APPLICANT'S NAME

DATE OF TEST

INSTRUCTIONS FOR MARKING THE ANSWER SHEET

Make your marks with a black lead pencil furnished by the examiner. *Make only ONE mark to answer one question. In making corrections,* open answer sheet so erasure marks will not show up on page 2. Then, erase incorrect response on this sheet. On page 2 (copy) mark the incorrect selection with a slash (/). The questions are arranged in HORIZONTAL sequence as indicated by the arrows.

EXAMPLE: 1. 1 2 3 4 → 2. 1 2 3 4

DO NOT WRITE IN THIS BLOCK

0 1 2 3 4 5 6 7 8 9

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1 1 2 3 4	→ 2 1 2 3 4	→ 3 1 2 3 4	→ 4 1 2 3 4
5 1 2 3 4	6 1 2 3 4	7 1 2 3 4	8 1 2 3 4
9 1 2 3 4	10 1 2 3 4	11 1 2 3 4	12 1 2 3 4
13 1 2 3 4	14 1 2 3 4	15 1 2 3 4	16 1 2 3 4
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145 1 2 3 4	146 1 2 3 4	147 1 2 3 4	148 1 2 3 4
149 1 2 3 4	150 1 2 3 4	151 1 2 3 4	152 1 2 3 4
153 1 2 3 4	154 1 2 3 4	Page 155 1 2 3 4	156 1 2 3 4
157 1 2 3 4	158 1 2 3 4	4 159 1 2 3 4	160 1 2 3 4

FLIGHT TIME ANALYSIS

CHECK POINTS		ROUTE	MACH NO.	WIND FACTOR	SPEED-KNOTS		DIST	TIME		FUEL CONSUMPTION (POUNDS)		MISC
FROM	TO	ALTITUDE FLT/LEVEL		TEMPERATURE.	TAS	GRND SPEED	N.M.	LEG	TOTAL	LEG	TOTAL	

ALTERNATE AIRPORT DATA

FLIGHT SUMMARY

TIME	FUEL	
		ENROUTE
		ALTERNATE
		RESERVE
		MISSED APPROACH
		TOTAL

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