

CONTROL TOWER OPERATOR (CTO)

STUDY GUIDE

TS-14-1

FEDERAL AVIATION ADMINISTRATION

Maintained by ATO Safety & Technical
Training (AJI) in collaboration with Air Traffic
Safety Oversight (AOV)
February 2021

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FOREWORD

Purpose: The Control Tower Operator (CTO) Study Guide aids in the completion of the CTO Airmen Written Test. It is approved by the Air Traffic Service for use in technical training. This publication does not replace, substitute for, or supersede official regulations or directives.

Cancellation: The Control Tower Operator (CTO) Study Guide, TS-14-1, dated November 2016 is canceled.

Review: The Federal Personnel Manual requires that training programs established under the Government Employees Training Act be based on actual needs. A review of these training needs must be conducted at least once every three years.

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PREFACE

This publication has been prepared by the Air Traffic Division and is designed to support the training requirements of the National Air Traffic Training Program.

Recommended changes and corrections to this publication should be forwarded to:

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INTRODUCTION

This study guide consists of seven individual areas of learning. Each area is listed in Title 14, Code of Federal Regulations (14 CFR), Section 65.35, and is presented in order of priority.

1. Airport traffic control procedures
2. Flight rules
3. Communications operating procedures
4. Flight assistance service
5. Aviation weather
6. Air navigation and aids to air navigation
7. En route traffic control procedures

Complete this study guide, using the reference material as directed. It is recommended that a short break be taken after each hour of continuous study.

A score of 70 percent or higher is required to pass the CTO Airmen Written Test.

NOTE: RETAIN THE COMPLETED CTO STUDY GUIDE AND REFERENCE MATERIALS AFTER COMPLETION OF THE CTO AIRMEN WRITTEN TEST FOR FUTURE REVIEW.

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DIRECTIONS

The following directions outline the methods to be used in completion of this study guide. Make a sincere effort to complete the study guide in accordance with these directions. Anything less will reduce the effectiveness of the study guide and decrease the possibility of attaining a passing score on the test.

1. Obtain the following reference material before you begin:
 - FAA Order JO 7110.10, Flight Services
 - FAA Order JO 7110.65, Air Traffic Control
 - FAA Order JO 7210.3, Facility Operation and Administration
 - FAA Order JO 7360.1, Aircraft Type Designators
 - FAA Order JO 7930.2, Notices to Airmen (NOTAMs)
 - FAA Order 7900.5, Surface Weather Observing
 - FAA-H-8083-15, Instrument Flying Handbook
 - Aeronautical Information Manual (AIM)
 - AC 00-45, Aviation Weather Services
 - Title 14, Code of Federal Regulations (14 CFR), Part 61 (Excerpts are located in Appendix A of this study guide.)
 - Title 14, Code of Federal Regulations (14 CFR), Part 65 (Excerpts are located in Appendix B of this study guide.)
 - Title 14, Code of Federal Regulations (14 CFR), Part 91 (Excerpts are located in Appendix C of this study guide.)
 - FAA-H-8083-25, Pilot's Handbook of Aeronautical Knowledge (Excerpts are located in Appendix D of this study guide.)
2. This study guide is divided into seven parts, one for each individual area of learning. Read the overview of each knowledge area first. Each overview contains a brief statement to guide you from subject to subject. It also refers you to reference material. Be sure to read the references in the order in which they are listed, though they may be out of sequence. When a reference is listed, read all associated notes, illustrations, tables, and examples.
3. Each part of the study guide consists of multiple-choice questions. Write your answers on a separate sheet of paper. **DO NOT WRITE IN THIS BOOKLET.**
4. The correct answers and their respective references are located at the end of each part. If you answer incorrectly, reread the appropriate reference and correct your answer.
5. If you have questions, consult your instructor or supervisor.

6. When you complete this study guide, notify your instructor or supervisor who will then make arrangements to administer the closed-book CTO Airmen Written Test.

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PART 1

AIRPORT TRAFFIC CONTROL PROCEDURES OVERVIEW

A complete understanding of basic airport traffic control is the first step toward becoming a good air traffic controller. Applying approved procedures in the correct order of duty priority will enable you to keep air traffic flowing smoothly without incident. This is the mark of a professional air traffic controller.

Study Chapter 8 of FAA Order JO 7110.10, Flight Services; Chapters 1 through 3, 5, 7, 9, and 10 and Appendix D of FAA Order JO 7110.65, Air Traffic Control. Also review page 192 of FAA-H-8083-15, Instrument Flying Handbook; Chapters 10 and 11 of FAA Order JO 7210.3, Facility Operation and Administration; Chapters 3 and 4 and the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM); and Title 14, Code of Federal Regulations (14 CFR), Parts 65 and 91. (Excerpts from 14 CFR, Parts 65 and 91, are located in Appendices B and C of this study guide respectively.)

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PART 1

AIRPORT TRAFFIC CONTROL PROCEDURES

1. Controllers who encounter situations that are **NOT** covered in JO 7110.65 are expected to _____.
 - A. exercise their best judgment
 - B. consult their supervisor
 - C. consult their training specialist
 - D. report the situations to FAA Headquarters
2. Procedural Letters of Agreement are _____ to JO 7110.65.
 - A. appended
 - B. added
 - C. supplemental
 - D. attached
3. Procedural Letters of Agreement require the concurrence of _____.
 - A. one facility
 - B. more than one facility
 - C. the Administrator
 - D. the Flight Standards District Office
4. The word "shall" means a procedure is _____.
 - A. recommended
 - B. advisable
 - C. mandatory
 - D. approved
5. The word that means a procedure is recommended is "_____."
 - A. shall
 - B. should
 - C. may
 - D. will
6. The word that means futurity, but does **NOT** imply that a procedure or action is required is "_____."
 - A. shall
 - B. should
 - C. may
 - D. will
7. The term "aircraft" includes both the _____.
 - A. operator and passengers
 - B. airframe and owner
 - C. aircraft and crew members
 - D. pilot and crew members
8. The word "altitude" refers to the indicated altitude expressed in mean sea level, _____, or both.
 - A. flight level
 - B. calibrated altitude
 - C. true altitude
 - D. above ground level
9. When used in conjunction with visibility, "miles" refers to _____ miles; otherwise, "miles" means _____ miles.
 - A. nautical; statute
 - B. partial; full
 - C. statute; nautical
 - D. full; partial

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

10. When time is used in the context of a clock reading, hours and minutes are expressed in _____.
- A. Coordinated Universal Time (UTC)
 - B. Mountain Standard Time (MST)
 - C. Greenwich Mean Time (GMT)
 - D. Eastern Standard Time (EST)
11. When reading the time, the change to the next minute is made at the minute plus _____ seconds.
- A. 15
 - B. 30
 - C. 45
 - D. 60
12. A time check is given to the nearest _____.
- A. half hour
 - B. quarter hour
 - C. whole minute
 - D. quarter minute
13. The first duty priority of an air traffic controller is to separate aircraft and issue _____.
- A. traffic alerts
 - B. safety alerts
 - C. flight plans
 - D. weather forecasts
14. When determining priority of duties, a controller should exercise _____.
- A. caution
 - B. common sense
 - C. authority
 - D. good judgment
15. Give first priority to _____ and issuing safety alerts
- A. separating aircraft
 - B. issuing traffic
 - C. marking strips
 - D. communicating with aircraft
16. When establishing priority of duties, you should consider the _____.
- A. agency directives
 - B. facility policy
 - C. situation at hand
 - D. consequences
17. When workload, communications, and equipment permit, _____ procedures are preferred.
- A. radar
 - B. nonradar
 - C. local
 - D. automation

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

18. The use of nonradar separation is preferred over radar separation when a(n) _____ will be gained.
- A. operational advantage
 - B. minute
 - C. edge
 - D. pilot advantage
19. A safety alert is issued when a controller recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or _____.
- A. adjacent airspace
 - B. other aircraft
 - C. airports
 - D. thunderstorms
20. Provide air traffic control service to aircraft on a(n) _____ basis as circumstances permit.
- A. aircraft capacity
 - B. "first come, first served"
 - C. traffic flow
 - D. workload
21. An aircraft in distress have the right-of-way over _____ air traffic..
- A. local
 - B. en route
 - C. touch and go
 - D. all other
22. Provide priority handling to AIR EVAC and HOSP flights when verbally requested by _____.
- A. the pilot
 - B. military authority
 - C. the supervisor
 - D. the airport manager
23. Provide priority handling to civil air ambulance flights when the pilot, in radio transmissions, verbally identifies the flight by stating _____ followed by the FAA authorized call sign
- A. sea rescue
 - B. doctor on board
 - C. MEDEVAC
 - D. military air ambulance flight
24. Provide priority handling, as required, to expedite _____ aircraft.
- A. air show
 - B. flight check
 - C. scheduled
 - D. commercial
25. Provide priority handling and _____ assistance to SAR aircraft performing a SAR mission.
- A. priority
 - B. minimum
 - C. maximum
 - D. no
26. IFR aircraft must have priority over _____ aircraft.
- A. MEDEVAC
 - B. SVFR
 - C. emergency
 - D. all other
27. USA/USN controllers must remind a military aircraft to check wheels down unless the pilot _____ for the approach.
- A. requests radio silence
 - B. requests negative gear check
 - C. has previously reported wheels down
 - D. is making a touch-and-go

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

28. When prompt compliance is required to avoid the development of an imminent situation, use the word _____.
- A. "HURRY"
 - B. "CLEARED"
 - C. "EXPEDITE"
 - D. "IMMEDIATELY"
29. When expeditious compliance is required to avoid an imminent situation, use the word _____.
- A. "HURRY"
 - B. "CLEARED"
 - C. "EXPEDITE"
 - D. "IMMEDIATELY"
30. What term do pilots use to inform ATC that they **CANNOT** accept undue delay at their destination because of low fuel?
- A. "Minimum fuel"
 - B. "Low fuel"
 - C. "Bingo"
 - D. "No delay"
31. A formation flight shall be controlled as a(n) _____.
- A. emergency
 - B. single aircraft
 - C. priority
 - D. special operation
32. Transfer control responsibility of an aircraft only after eliminating any potential _____.
- A. delays
 - B. conflicts
 - C. handoffs
 - D. coordination
33. Unless specifically coordinated, assume control of an aircraft only after _____.
- A. radar contact
 - B. you have acknowledged the handoff
 - C. communication transfer
 - D. it is in your area of jurisdiction
34. Before allowing an aircraft to enter airspace under another controller's jurisdiction, a controller must first _____ with the receiving controller.
- A. exchange frequencies
 - B. initiate handoff
 - C. exchange traffic
 - D. coordinate
35. When must transfer of radio communications for an en route aircraft be accomplished?
- A. Prior to handoff
 - B. Before entering the receiving controller's area
 - C. Upon request
 - D. After the aircraft is pointed out to adjoining sectors

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

36. Respond to another controller's operational request by restating the incomplete or abbreviated terms followed by the word _____.
- A. "CONTACT"
 - B. "OK"
 - C. "APPROVED"
 - D. "ROGER"
37. Air traffic control service is provided based only upon observed or _____ traffic.
- A. known
 - B. predicted
 - C. expected
 - D. routine
38. The operating position having primary responsibility for operations on the active runway is _____.
- A. local control
 - B. ground control
 - C. clearance delivery
 - D. flight data
39. When a local controller authorizes a vehicle or aircraft under another controller's jurisdiction to cross an active runway, the local controller must specify the runway preceded by the word(s) _____.
- A. "TAXI ACROSS"
 - B. "CROSS"
 - C. "PROCEED ACROSS"
 - D. "CLEARED ACROSS"
40. Known ground vehicles, equipment, and personnel must be clear of a runway before a departing aircraft starts takeoff or a landing aircraft crosses the _____.
- A. field boundary
 - B. runway numbers
 - C. approach lights
 - D. runway threshold
41. Vehicles on or near a movement area should be described in a manner that will assist pilots in _____.
- A. avoiding them
 - B. determining their intentions
 - C. contacting them
 - D. recognizing them
42. An aircraft's position may be determined visually by the controller or through use of _____.
- A. a display system
 - B. CEDAR
 - C. a light gun
 - D. an ATIS
43. Local controllers may use certified radar displays to provide a direction or suggested heading to a VFR aircraft as an advisory aid to _____.
- A. landing
 - B. navigation
 - C. final approach
 - D. radar approach

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

44. Pilots wishing to exceed the prescribed speed limit in Class C or Class D airspace must _____.
- A. advise ATC
 - B. be in a descent
 - C. request a waiver
 - D. receive ATC authorization
45. The minimum age requirement to be eligible for a CTO certificate is _____ years.
- A. 21
 - B. 20
 - C. 18
 - D. 17
46. Separation responsibility between aircraft within a formation during transition to individual control rests with the _____ and the pilots of other aircraft in the flight.
- A. controller
 - B. VFR pilots
 - C. flight leader
 - D. squadron commanding officer
47. A practical test on Notice to Airmen procedures is a prerequisite to act as an air traffic control operator at any _____.
- A. operating position
 - B. position
 - C. ATC facility
 - D. facility
48. A practical test on a surface area includes terrain features, visual checkpoints, and _____.
- A. control zones
 - B. obstructions
 - C. runway markings
 - D. construction areas
49. To operate at any operating position, a control tower operator must pass a(n) _____ test on weather reporting procedures and the use of reports.
- A. essay
 - B. oral
 - C. practical
 - D. multiple-choice
50. At least once during each seven consecutive work days, a controller must have _____ consecutive hours of relief.
- A. 24
 - B. 16
 - C. 12
 - D. 8
51. An air traffic controller is limited to _____ consecutive hours of duty.
- A. 12
 - B. 10
 - C. 8
 - D. 2

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

52. When performing duties as an air traffic controller, controllers shall have their CTO certificate _____.
- A. readily available
 - B. in personnel file
 - C. on file in the Facility Manager's office
 - D. in their training records
53. To meet currency requirements, air traffic control tower operators must have served for at least _____ of the preceding 6 months at the facility for which their facility rating applies.
- A. 4
 - B. 3
 - C. 2
 - D. 1
54. Applicants for a facility rating at any air traffic control tower must have satisfactorily served as an air traffic control tower operator at that control tower without a facility rating for at least _____ months.
- A. 2
 - B. 4
 - C. 6
 - D. 8
55. To meet the application requirements for a facility rating, a military applicant must have satisfactorily served as an air traffic control operator for at least _____ months.
- A. 2
 - B. 4
 - C. 6
 - D. 8
56. What airspace extends from the surface to 2,500 feet above the airport elevation surrounding those airports that have an operational control tower?
- A. Class A
 - B. Class B
 - C. Class C
 - D. Class D
57. 14 CFR, Part _____, specifies the required certificates and ratings or qualifications for air traffic control tower operations.
- A. 61
 - B. 65
 - C. 91
 - D. 95
58. When distances can be determined by suitable landmarks, the separation minima between a Category II aircraft departing behind a Category I departure is _____ feet.
- A. 2,500
 - B. 3,000
 - C. 4,500
 - D. 6,000
59. The minimum separation required for an aircraft taking off on the same runway behind a preceding heavy departure is _____ minute(s).
- A. 1
 - B. 2
 - C. 3
 - D. 5

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

60. The minimum separation for an aircraft departing behind a heavy on parallel runways separated by less than 2,500 feet is _____ minute(s).
- A. 1
 - B. 2
 - C. 3
 - D. 5
61. Intersection departures may be initiated or authorized by a controller if the _____.
- A. operation is covered under a Letter of Agreement
 - B. operation is covered under the facility Standard Operating Procedure
 - C. pilot requests
 - D. company requests
62. Controllers action required if an aircraft executing a touch and go to a closed runway is to _____.
- A. restrict the aircraft to a low approach
 - B. restrict the aircraft's speed
 - C. restate the landing runway
 - D. restate that the runway is closed
63. The approval or disapproval of a pilot request to remain in closed traffic is based on _____.
- A. local traffic conditions
 - B. controller ability
 - C. pilot ability
 - D. aircraft characteristics
64. An aircraft conducting an overhead maneuver is on VFR and the IFR flight plan is canceled when the aircraft reaches the _____ on the initial approach portion of the maneuver.
- A. landing threshold
 - B. initial point
 - C. break point
 - D. touchdown point
65. Restricted low approaches are **NOT** authorized over an aircraft in takeoff position or a _____.
- A. landing aircraft
 - B. parking ramp
 - C. terminal building
 - D. departing aircraft
66. Issue the position, altitude (if known), and _____ of a super/heavy/B757 when issuing wake turbulence cautionary advisories.
- A. speed
 - B. aircraft type
 - C. aircraft identification
 - D. direction of flight
67. Controllers may clear an arriving aircraft to land if they observe a preceding arrival's position and determine that the prescribed runway separation will exist when the succeeding aircraft crosses the _____.
- A. approach lights
 - B. landing threshold
 - C. field boundary
 - D. runway numbers

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

68. During daylight hours when distances can be determined by suitable landmarks, an arriving Category I aircraft must **NOT** cross the landing threshold until a departing Category I aircraft is airborne and at least _____ feet from the landing threshold.
- A. 1,000
 - B. 2,500
 - C. 3,000
 - D. 4,500
69. Issue wake turbulence cautionary advisories to aircraft landing behind a departing/arriving super or heavy on a parallel runway separated by less than _____ feet.
- A. 1,000
 - B. 1,500
 - C. 2,000
 - D. 2,500
70. Simultaneous takeoff and landing operations may be conducted on intersecting runways provided that they are approved by the facility manager, authorized by a facility directive, and conducted _____.
- A. in accordance with a Letter of Agreement
 - B. in accordance with a Standard Operating Procedure
 - C. in VFR conditions
 - D. at the request of the pilot
71. A large aircraft is departing on an 8,000-foot runway. A small aircraft is ready for takeoff from an intersection on the same runway. The earliest the controller may clear the small aircraft for takeoff is _____ minute(s) after the large aircraft has taken off.
- A. 1
 - B. 2
 - C. 3
 - D. 4
72. The minimum separation required when an arriving aircraft will fly through the airborne flight path of a departing heavy on a crossing runway is _____ minute(s).
- A. 1
 - B. 2
 - C. 3
 - D. 4
73. Specific traffic pattern information issued to an arriving aircraft may be omitted if a _____ traffic pattern is in use.
- A. left
 - B. right
 - C. north
 - D. south

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES (Continued)

74. Unless requested by the pilot, do **NOT** issue a downwind takeoff to helicopters if the tailwind exceeds _____ knots.
- A. 3
 - B. 5
 - C. 10
 - D. 15
75. During taxi and ground movement operations, larger and heavier helicopters show a significant increase in _____.
- A. downwash turbulence
 - B. drag resistance
 - C. lift forces
 - D. noise generation
76. When holding instructions are issued for more than one VFR aircraft at the same visual holding point, the controller must issue _____.
- A. the local time
 - B. an EFC
 - C. traffic information
 - D. direction of turns
77. Operations on the active runway are a primary responsibility of _____.
- A. airport management
 - B. approach control
 - C. Local Control
 - D. Ground Control
78. When cleared to air-taxi, a helicopter is expected to remain below _____ feet AGL unless otherwise requested or instructed.
- A. 100
 - B. 200
 - C. 300
 - D. 500
79. At locations that have a Letter of Agreement for Special VFR helicopter operations, the minimum separation between a Special VFR helicopter and an arriving or departing IFR aircraft 1 mile or more from the airport is _____ mile(s).
- A. $\frac{1}{2}$
 - B. 1
 - C. $1\frac{1}{2}$
 - D. 2
80. Authorize simultaneous helicopter landings and takeoffs if the landing/takeoff points are at least 200 feet apart and _____.
- A. the courses have approach lights
 - B. the pilots have each other in sight
 - C. the courses to be flown do not conflict
 - D. a Letter of Agreement exists
81. What phraseology will permit a pilot to make a touch-and-go, low approach, missed approach, or stop-and-go?
- A. "CLEARED FOR THE RUNWAY."
 - B. "CLEARED FOR ANY APPROACH."
 - C. "CLEARED FOR THE CHOICE."
 - D. "CLEARED FOR THE OPTION."

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

82. An aircraft cleared for a low approach is considered to be an arrival until the aircraft crosses the _____.
- A. approach lights
 - B. field boundary
 - C. landing threshold
 - D. runway numbers
83. To achieve proper spacing between helicopters, _____ may be more practical than course changes.
- A. holding
 - B. hovering
 - C. runway delays
 - D. speed adjustments
84. Simultaneous same direction aircraft operations on parallel runways are authorized only during VFR conditions unless _____ separation is applied.
- A. visual
 - B. lateral
 - C. runway
 - D. longitudinal
85. Simultaneous opposite direction aircraft operations on parallel runways between sunset and sunrise are **NOT** authorized unless runway centerlines are separated by a minimum of _____ feet.
- A. 500
 - B. 700
 - C. 1,400
 - D. 2,800
86. Before takeoff, inform departing IFR, SVFR, and VFR aircraft receiving radar service and TRSA VFR aircraft of the appropriate departure control frequency and _____.
- A. initial altitude
 - B. beacon code
 - C. initial heading
 - D. center frequency
87. A nonapproach control tower may be authorized to provide visual separation between two aircraft within a(n) _____ area.
- A. airport
 - B. approach control
 - C. surface
 - D. terminal
88. Nonapproach control towers may be authorized to provide visual separation between aircraft within a surface area provided that other separation is assured _____ the application of visual separation.
- A. just prior to
 - B. during
 - C. immediately following
 - D. before and after
89. Separation of IFR aircraft before and after the application of visual separation is a(n) _____ function.
- A. IFR control
 - B. nonapproach control tower
 - C. Local Control
 - D. Ground Control

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES (Continued)

90. Departing IFR civil aircraft should be instructed to contact departure control after takeoff about _____ mile(s) beyond the end of the runway.
- A. ½
 - B. 1
 - C. 1½
 - D. 2
91. The departure control frequency may be omitted from a departure clearance if the aircraft is assigned a standard instrument departure (SID) and the frequency is published on the _____.
- A. aircraft checklist
 - B. SID
 - C. airport signs
 - D. sectional chart
92. When radio communications **CANNOT** be employed, aircraft and movement of vehicles on the movement area are controlled by _____.
- A. flashing taxiway lights
 - B. light signals
 - C. flashing runway lights
 - D. rotating beacon
93. An aircraft receiving a flashing white signal light while holding short of an active runway should _____.
- A. return to the starting point
 - B. use caution and cross the runway
 - C. stop
 - D. depart without delay
94. A flashing green light to an aircraft in flight means "_____."
- A. cleared to land
 - B. return for landing (followed by a green light at the proper time)
 - C. exercise extreme caution
 - D. give way to other aircraft and continue circling
95. To obtain acknowledgement from an airborne fixed-wing aircraft equipped with receiver only between sunrise and sunset, request the aircraft to _____.
- A. flash the landing light
 - B. move the ailerons
 - C. rock the wings
 - D. move the rudder
96. Between sunset and sunrise, a helicopter equipped with receiver only should be requested to acknowledge instructions by flashing the landing light or _____.
- A. rocking the tip path plane
 - B. turning the helicopter toward the controlling facility
 - C. making a right 360-degree turn
 - D. flashing the search light
97. The appropriate light signal to use when aircraft are converging and a collision hazard exists is _____.
- A. alternating red and green
 - B. flashing red
 - C. flashing green
 - D. white

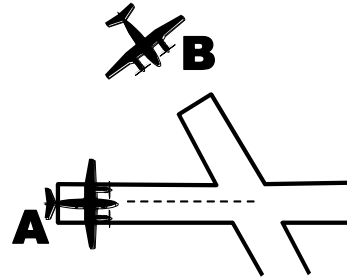
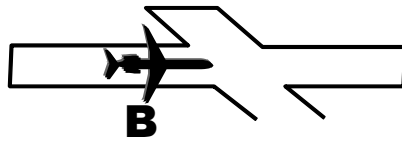
PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

98. Wake turbulence separation minima must continue to touchdown for all aircraft **NOT** making a visual approach or _____.
- A. maintaining visual separation
 - B. being laterally separated
 - C. instrument approach
 - D. VOR approach
99. Issue wake turbulence cautionary advisories to IFR aircraft that accept a visual approach or _____ when operating behind an aircraft that requires wake turbulence separation.
- A. visual separation
 - B. lateral separation
 - C. vertical separation
 - D. longitudinal separation
100. Provide preventive airport traffic control service only to aircraft operating in accordance with a _____.
- A. waiver from the FAA Administrator
 - B. waiver from the Flight Standards District Office
 - C. Departure Procedure
 - D. Letter of Agreement
101. When a low-level wind shear/microburst alert is received, issue the Airport Wind (direction and velocity) and the _____.
- A. speed loss or gain on approach
 - B. displayed field boundary wind
 - C. boundary wind at the site nearest the runway threshold
 - D. latest pilot report
102. LLWAS is designed to detect conditions only around the periphery of a(n) _____.
- A. runway threshold
 - B. departure corridor
 - C. airport
 - D. runway
103. When a low-level wind shear/microburst is reported by pilots or detected by LLWAS, the statement "LOW LEVEL WIND SHEAR ADVISORIES IN EFFECT" must be included on the ATIS broadcast for _____ minutes.
- A. 10
 - B. 15
 - C. 20
 - D. 30
104. Even though the Low Level Wind Shear Alert System (LLWAS) is **NOT** in alert status, issue specific field boundary wind information if _____.
- A. required in a Letter of Agreement
 - B. required in the facility Standard Operating Procedure
 - C. requested by the aircraft operator
 - D. requested by the pilot
105. If a low-level wind shear/microburst alert is received, issue the _____ and the displayed field boundary wind.
- A. Magnetic Wind
 - B. Airport Wind
 - C. speed loss or gain on approach
 - D. latest pilot report

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

106. The certificate issued by the FAA that authorizes the holder to act as an air traffic control tower operator is called a(n) _____ certificate.
- A. facility rating
 - B. ATCT
 - C. CTO
 - D. facility
107. An endorsement that an applicant has met the requirements to control air traffic at a facility is called a(n) _____.
- A. facility rating
 - B. area rating
 - C. CTO certificate
 - D. facility certificate
108. Before a CTO certificate can be issued, each applicant must pass a(n) _____ examination.
- A. oral
 - B. performance
 - C. written
 - D. medical
109. A person acting as an air traffic control tower operator involving civil aircraft, who does **NOT** hold a valid CTO certificate or facility rating at that location, must be under the supervision of a holder of a(n) _____ for that control tower.
- A. area rating
 - B. facility rating
 - C. medical certificate
 - D. facility certificate
110. General eligibility requirements for non-FAA employees and active duty military personnel to hold a CTO certificate include a minimum age of 18 years, good moral character, command of the English language, and possession of a(n) _____.
- A. valid driver's license
 - B. valid pilot's license
 - C. appropriate current medical certificate
 - D. appropriate facility rating
111. Skill requirements for operating positions in a control tower include the passing of a(n) _____ test.
- A. essay
 - B. practical
 - C. oral
 - D. multiple-choice
112. An air traffic control tower operator may **NOT** issue an IFR clearance without approval of the facility having _____ that location.
- A. area control at
 - B. VFR control at
 - C. IFR control at
 - D. communications with
113. **NO** person may perform the duties of an air traffic controller, even if holding a CTO certificate, unless that person holds a current _____.
- A. area rating
 - B. facility rating
 - C. pilot's license
 - D. medical certificate

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES (continued)

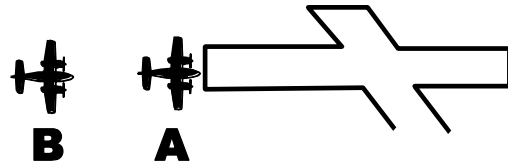
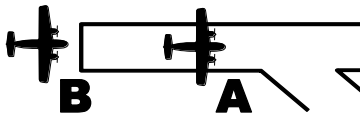


114. Aircraft A, a Category II, is on final approach. Aircraft B, a Category III, is departing on the same runway. The minimum distance required for separation between the two aircraft using suitable landmarks as a reference is _____ feet.

A. 2,500
B. 3,000
C. 4,500
D. 6,000

116. Aircraft A is departing Runway 10. Aircraft B is on final approach to Runway 16. Ensure that aircraft B does **NOT** cross the landing threshold until aircraft A has departed and passed the _____.

A. intersection
B. tower
C. 3000 foot remaining
D. VOR"



115. Aircraft A has landed and aircraft B is on final approach to the same runway. Both aircraft are Category III. Ensure that aircraft B does **NOT** cross the landing threshold until aircraft A has _____.

A. slowed to taxi speed
B. turned off the runway and is clear of the hold position marking
C. landed and is clear of the runway
D. started a turn off the runway

117. Aircraft A and aircraft B are on final approach to the same runway. When anticipating separation, landing clearance for aircraft B need **NOT** be withheld if aircraft A _____.

A. is faster than aircraft B
B. will be through the runway intersection
C. will clear the runway
D. is at taxi speed when aircraft B crosses the landing threshold

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

118. The reduced runway separation minimum between a Category III departure followed by a Category I arrival is _____ feet.
- A. 2,500
 - B. 3,000
 - C. 4,500
 - D. 6,000
119. Separate an arriving aircraft using one runway from another aircraft on an intersecting runway or a non-intersecting runway when the flight paths intersect by ensuring that the arriving aircraft does **NOT** cross the landing threshold or flight path until the preceding aircraft has _____.
- A. arrived or departed
 - B. departed and passed the intersection/flight path or is airborne and turning to avoid conflict
 - C. reached taxi speed
 - D. crossed the landing threshold or started takeoff roll
120. Land and Hold Short Operations must only be conducted _____.
- A. in VFR conditions
 - B. at nonapproach control towers
 - C. with the concurrence of the departure controller
 - D. in accordance with a Letter of Agreement
121. During Land and Hold Short Operations on intersecting runways, issue the measured distance from the landing threshold to the intersection, rounded down to the nearest _____ feet if requested by either aircraft.
- A. 10
 - B. 50
 - C. 100
 - D. 500
122. A condition for conducting Land and Hold Short Operations on intersecting runways is that both runways must be dry with **NO** braking action reports of less than _____.
- A. nil
 - B. poor
 - C. medium
 - D. good
123. A provision for conducting a simultaneous operation on intersecting runways is that both aircraft involved must be issued _____.
- A. a wind report
 - B. an altimeter setting
 - C. feet remaining
 - D. traffic information

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

124. The term "high key" relates to a(n) _____ approach.
- A. overhead
 - B. VOR
 - C. TACAN
 - D. simulated flameout
125. On an overhead approach, the initial approach is _____ nautical miles in length.
- A. 5 to 10
 - B. 5
 - C. 3 to 5
 - D. 3
126. Do **NOT** authorize an aircraft to line up and wait at an intersection at any time when the intersection is _____.
- A. not visible from the tower
 - B. less than 500 feet from the approach end
 - C. a high speed taxiway
 - D. not an authorized departure point
127. While conducting simultaneous landings on intersecting runways, the maximum allowable tailwind for a landing aircraft that has been instructed to hold short of an intersection is _____.
- A. no tailwind
 - B. 5 knots
 - C. 8 knots
 - D. 10 knots
128. What factor should be considered when determining which runways are to be designated as "active" runways?
- A. Traffic flow
 - B. Expected traffic
 - C. Severe weather activity
 - D. Request from the airport operator
129. ATC service is provided in accordance with procedures and minima contained in FAA Order JO 7110.65 except when pilots are required to abide by _____.
- A. company policy
 - B. "see and be seen" rules
 - C. ICAO documents or rules of the air
 - D. pilot policy
130. Reporting essential flight information includes any flight conditions that may have an adverse effect on _____.
- A. air safety
 - B. gate time
 - C. landing time
 - D. aircraft sequencing
131. "Coordinate with the appropriate _____ for transit authorization when you are providing radar traffic advisory service to an aircraft that will enter another facility's airspace."
- A. control tower
 - B. airport authority
 - C. Flight Standards District Office
 - D. Airport Advisory Service

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

132. After an aircraft has been issued a clearance to line up and wait on a runway, what is the phraseology used to prevent the aircraft from inadvertently taking off?
- A. "TAXI CLEAR OF THE RUNWAY."
 - B. "HOLD FOR LANDING TRAFFIC."
 - C. "HOLD IN POSITION."
 - D. "REMAIN IN POSITION."
133. A pilot encountering an distress condition should broadcast _____ preferably three times.
- A. "EMERGENCY"
 - B. "HELP"
 - C. "MAYDAY"
 - D. "PAN-PAN"
134. Inform an aircraft of any observed abnormal aircraft condition when requested by a pilot or _____.
- A. as traffic permits
 - B. as time permits
 - C. when requested by an observer
 - D. when you deem it necessary
135. When issuing traffic to radar-identified aircraft, state the azimuth and distance from the aircraft and the _____.
- A. altitude
 - B. speed
 - C. direction of flight
 - D. beacon code
136. Local controllers may use certified tower radar displays to determine an aircraft's exact location, spatial relationship to other aircraft, or _____.
- A. type
 - B. exact heading
 - C. company
 - D. identification
137. Identify a primary radar beacon target by observing the target make an identifying turn of _____ degrees or more.
- A. 10
 - B. 20
 - C. 30
 - D. 40
138. What term describes a physical or automated action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will **NOT** be transferred?
- A. Handoff
 - B. Point out
 - C. Radar contact
 - D. Quick look
139. Transfer radar identification from one controller to another to provide _____ radar service.
- A. terminal
 - B. continuous
 - C. sector
 - D. en route

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

140. What procedure permits one controller to transfer radar identification of an aircraft to another controller, request approval for an aircraft to enter another controller's airspace, and retain radio communications with the aircraft?
- A. Handoff
 - B. Radar contact
 - C. Point out
 - D. Quick look
141. Radar separation shall be applied between the _____ of beacon control slashes.
- A. lines
 - B. centers
 - C. axes
 - D. ends
142. Radar separation shall be applied between the _____ of beacon control slashes and the _____ of primary targets.
- A. ends, centers
 - B. ends, vertices
 - C. axes, vertices
 - D. axes, centers
143. What phraseology term is used to inform the controller initiating a handoff that the aircraft is identified and approval is granted for the aircraft to enter the receiving controller's airspace?
- A. "POINT OUT APPROVED"
 - B. "APPROVED"
 - C. "RADAR CONTACT"
 - D. "CONTACT"
144. The transferring controller must complete _____ prior to transferring control of an aircraft entering airspace delegated to the receiving controller.
- A. radar handoff
 - B. point out
 - C. stripmarking
 - D. strip transfer
145. Except where it is **NOT** operationally feasible, interfacility and intrafacility transfers of _____ must be accomplished in all areas of radar surveillance.
- A. radio communications
 - B. responsibility
 - C. radar identification
 - D. control
146. Do **NOT** approve a pilot's request to conduct aerobatic practice activities within surface areas of Class B, C, or D airspace unless operating in accordance with a _____.
- A. facility directive
 - B. Letter of Agreement
 - C. Memorandum of Agreement
 - D. Standard Operating Procedure
147. When Special VFR operations are being conducted, authorize an aircraft to climb to VFR upon request if the only weather limitation is _____.
- A. low clouds
 - B. restricted visibility
 - C. thunderstorms
 - D. heavy rain

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES (Continued)

148. Special VFR aircraft are **NOT** assigned fixed altitudes because of the _____.
- A. wake turbulence requirement
 - B. visibility requirements
 - C. clearance-from-clouds requirement
 - D. minimum separation requirements
149. Special VFR minimums are prescribed in Title 14, Code of Federal Regulations, Part _____.
- A. 95
 - B. 91
 - C. 65
 - D. 61
150. Local controllers must visually scan runways _____.
- A. every 3 minutes
 - B. every 90 seconds
 - C. only when there is traffic
 - D. to the maximum extent possible
151. Fixed-wing Special VFR flights may be approved only if arriving and departing IFR aircraft are **NOT** _____.
- A. delayed
 - B. en route
 - C. required to expedite
 - D. vectored
152. When ground visibility is officially reported at an airport as less than 1 mile, inform pilots of arriving fixed-wing aircraft that ground visibility is less than 1 mile and that a Special VFR clearance **CANNOT** be issued unless _____.
- A. a waiver is requested
 - B. the pilots are IFR-rated
 - C. the aircraft are IFR-equipped
 - D. an emergency exists
153. The minimum requirement for vertical separation between an IFR aircraft and a Special VFR aircraft is that the Special VFR aircraft be assigned an altitude at least _____ any conflicting IFR traffic.
- A. 1,000 feet above
 - B. 1,000 feet below
 - C. 500 feet above
 - D. 500 feet below
154. Special VFR operations may be authorized for aircraft transiting the surface area when the primary airport is reporting VFR but the pilot is unable to _____.
- A. maintain VFR
 - B. file an IFR flight plan
 - C. see the airport
 - D. contact approach control
155. The objective of gate hold procedures is to achieve departure delays of _____ minutes or less after engine start and taxi time.
- A. 5
 - B. 10
 - C. 15
 - D. 30

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

156. When gate hold procedures are in effect, advise departing aircraft of the time at which the pilot can expect to receive a(n) _____ time and/or taxi advisory.
- A. Expect Further Clearance
 - B. takeoff
 - C. engine start
 - D. pushback
157. The sequence for departure under gate hold procedures must be maintained in accordance with _____ unless modified by flow control restrictions.
- A. Standard Operating Procedures
 - B. a Letter of Agreement
 - C. traffic complexity
 - D. the initial call
158. Gate hold procedures shall be implemented whenever departure delays exceed or are expected to exceed _____ minutes.
- A. 5
 - B. 10
 - C. 15
 - D. 30
159. Describe the quality of braking action by using the terms "GOOD," "GOOD TO MEDIUM," "MEDIUM", "MEDIUM TO POOR," "POOR," _____, or a combination of these terms.
- A. "NEGATIVE"
 - B. "NONE"
 - C. "NIX"
 - D. "NIL"
160. Where available, _____ is used to provide advanced noncontrol airport/terminal area and meteorological information to aircraft.
- A. NOTAM
 - B. ATIS
 - C. FSS
 - D. CWA
161. The ceiling/sky condition, visibility, and obstructions to vision may be omitted if the ceiling is above 5,000 feet and the visibility is more than _____ miles.
- A. 3
 - B. 5
 - C. 10
 - D. 15
162. Unless required for message content, the duration of an ATIS message should **NOT** exceed _____ seconds.
- A. 20
 - B. 30
 - C. 45
 - D. 60
163. During the recording of an ATIS message, the speech rate should **NOT** be _____.
- A. more than 30 words per minute
 - B. more than 30 seconds
 - C. Excessive
 - D. less than 30 seconds

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

164. When runway braking action reports of "MEDIUM", "POOR" and "NIL" are received, what statement should be included on the ATIS broadcast?
- A. "BRAKING ACTION ALERT."
 - B. "BRAKING ACTION ADVISORIES ARE IN EFFECT."
 - C. "BRAKING ACTION ALERT IN EFFECT."
 - D. "BRAKING ACTION REPORTED POOR TO NIL."
165. The radar equipment used to augment visual observation of aircraft and/or vehicular movement on runways and taxiways is _____.
- A. ASDE
 - B. ASR
 - C. ARTS
 - D. AGCE
166. What system is used to augment visual observation of aircraft landing or departing as well as aircraft or vehicular movements on runways, taxiways, or other areas of the movement area?
- A. ASDE
 - B. ASR
 - C. ARTS
 - D. AGCE
167. The light system arranged to provide vertical visual approach slope guidance information during the approach to a runway is _____.
- A. VALS
 - B. VASI
 - C. VRAS
 - D. VSI
168. Who is responsible for operating airport lights during the hours when the tower is closed?
- A. Flight Service Station
 - B. approach control
 - C. Airport Advisory facility
 - D. airport management/operator
169. Approach lights shall be operated between sunrise and sunset when the ceiling is less than 1,000 feet or the prevailing visibility is _____ mile(s) or less and approaches are being made to a landing runway served by the lights.
- A. 1/2
 - B. 1
 - C. 2
 - D. 5
170. Sequenced Flashing Lights (SFL) shall be operated when the visibility is less than _____ mile(s) and instrument approaches are being made to the runway served by the associated ALS.
- A. 1
 - B. 2
 - C. 3
 - D. 4
171. The current touchdown RVR for the runway(s)-in-use shall be issued when prevailing visibility is _____ mile(s) or less, regardless of the value indicated.
- A. 1
 - B. 2
 - C. 3
 - D. 4

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

172. If controls are provided, turn rotating beacon on _____.
- A. between sunrise and sunset
 - B. when visibility is less than 3 miles
 - C. between sunset and sunrise
 - D. when ceiling is below 500 feet
173. Reportable values are _____ feet or less for RVR
- A. 3,000
 - B. 4,000
 - C. 5,000
 - D. 6,000
174. What is the phraseology used to issue RVR information?
- A. "RUNWAY TWO EIGHT LEFT RVR VISIBILITY SIX HUNDRED FEET."
 - B. "RVR ON RUNWAY TWO EIGHT SIX THOUSAND FEET."
 - C. "RUNWAY ONE FOUR RVR TWO THOUSAND FOUR HUNDRED."
 - D. "RVR RUNWAY THREE TWO THREE QUARTERS."
175. Issue current touchdown RVR/RVV for the runway(s)-in-use when RVR indicates a reportable value regardless of the _____.
- A. prevailing visibility
 - B. airport conditions
 - C. traffic complexity
 - D. runway(s)-in-use
176. Between sunrise and sunset, ceiling or visibility below basic VFR minima is indicated by turning on the _____.
- A. approach lighting system
 - B. rotating beacon
 - C. runway lights
 - D. taxiway lights
177. Except where a "runway use" program is in effect, use the "calm wind" runway when the wind is less than _____ knots.
- A. 3
 - B. 5
 - C. 10
 - D. 15
178. Determining which runways are to be designated as "active" is a primary responsibility of the _____.
- A. local controller
 - B. tower supervisor/CIC
 - C. airport manager
 - D. approach control supervisor/CIC
179. The types of radar services designed to enhance safety by providing air traffic services to VFR aircraft are basic radar, TRSA, Class B, and Class _____ services.
- A. A
 - B. C
 - C. D
 - D. E

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES (Continued)

180. The physical dimensions of Class C airspace will normally be a _____-NM radius capped at 4,000 feet above the primary airport.
- A. 5
 - B. 10
 - C. 15
 - D. 20
181. Class C airspace shall extend down to _____ feet above the surface, except that an inner core with a 5-NM radius shall extend down to the surface.
- A. 700
 - B. 1,000
 - C. 1,200
 - D. 1,500
182. " _____ airspace Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements."
- A. Class A
 - B. Class B
 - C. Class C
 - D. TRSA
183. What terminal radar service provides, in addition to basic radar service, sequencing of all IFR and participating VFR aircraft to the primary airport and separation between all participating VFR aircraft?
- A. Class A
 - B. Class B
 - C. Class C
 - D. TRSA
184. Pilot participation in the Terminal Radar Service Area is _____.
- A. mandatory
 - B. required
 - C. urged
 - D. suggested
185. The appropriate VFR altitude for direction of flight rules does **NOT** apply until the aircraft is above _____ feet AGL.
- A. 1,000
 - B. 2,000
 - C. 3,000
 - D. 4,000
186. Terminal Radar Service Areas (TRSAs) are solely established to define airspace within which _____ service will be provided.
- A. IFR
 - B. VFR
 - C. control
 - D. separation
187. What airspace extends from the surface to 2,500 feet above the airport elevation surrounding those airports that have an operational control tower?
- A. Class A
 - B. Class B
 - C. Class C
 - D. Class D

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

188. The size and shape of a TRSA/Class B airspace will vary depending upon _____.
- A. navigational aids
 - B. traffic volume
 - C. adjacent airports
 - D. operational requirements
189. Minimum vertical separation between VFR aircraft and IFR aircraft within Class C airspace is _____ feet.
- A. 500
 - B. 1,000
 - C. 1,500
 - D. 2,000
190. When applying basic radar services, the _____ ordinarily establishes the landing sequence.
- A. approach control
 - B. tower
 - C. center
 - D. supervisor
191. The radius of the outer area encompassing Class C airspace will normally be _____ NM, with some site-specific variations.
- A. 5
 - B. 10
 - C. 15
 - D. 20
192. In a TRSA when applying Stage III procedures, the _____ must specify the approach interval.
- A. Tower
 - B. TRSA
 - C. POFZ
 - D. restricted area
193. When basic radar service is being provided, an aircraft sighted by the local controller at the time of first radio contact may be positioned in the landing sequence after _____.
- A. radar contact
 - B. coordination with approach control
 - C. communication with the center
 - D. issuing landing clearance
194. The specialist being relieved and the relieving specialist must share equal responsibility for the completeness and _____ of the position relief briefing.
- A. accuracy
 - B. timeliness
 - C. explicitness
 - D. duration
195. The position relief briefing process involves _____ separate and distinct steps.
- A. 2
 - B. 3
 - C. 4
 - D. 5

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES (Continued)

196. "Assumption of position responsibility" is step number _____ of the position relief briefing process.
- A. 1
 - B. 2
 - C. 3
 - D. 4
197. The ordered listing of items to be covered during a position relief briefing is called the _____.
- A. checklist
 - B. relief list
 - C. position list
 - D. brief list
198. In position relief, the manual or automatic display of the current status of position-related equipment and operational conditions or procedures is the _____.
- A. position relief area
 - B. status information area
 - C. position relief board
 - D. status information board
199. FAA flight inspection aircraft are identified by the call sign _____.
- A. "FLIGHT CHECK"
 - B. "SAFE AIR 1"
 - C. "SAFI"
 - D. "INSPECTION"
200. Do **NOT** ask a flight check aircraft to deviate from the pilot's planned action except to preclude a(n) _____ situation.
- A. traffic
 - B. emergency
 - C. delay
 - D. priority
201. Issue radar advisories to flight inspection aircraft where adequate coverage exists and to the extent permitted by _____.
- A. facility orders
 - B. Letters of Agreement
 - C. workload
 - D. equipment
202. When issuing advisories on bird activity, include the position, species or size (if known), direction of flight, and _____.
- A. altitude
 - B. location where they were first spotted
 - C. type of aircraft that spotted them
 - D. flight service frequency for more information
203. Bird activity information advisories are issued for at least _____ minutes after receipt of such information.
- A. 10
 - B. 15
 - C. 20
 - D. 25

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

204. When appropriate procedural requirements are met, separation between aircraft may be reduced to _____ mile(s) within 10NM of the runway.
- A. 1
 - B. 1½
 - C. 2
 - D. 2½
205. A designated STOL runway may be assigned only when requested by the pilot or as specified in a _____.
- A. Letter of Agreement with the airport operator
 - B. Letter of Agreement with the aircraft operator
 - C. Memorandum of Understanding with the airport operator
 - D. Memorandum of Understanding with the aircraft operator
206. When requested by a pilot or when you deem it necessary, inform an aircraft of any observed abnormal aircraft condition by using the phraseology, "(Item) _____ (observed condition)."
- A. IS
 - B. SEEMS
 - C. APPEARS
 - D. LOOKS
207. Surface wind shall be described as "calm" when wind velocity is _____ knots.
- A. 3 or less
 - B. less than 3
 - C. 5 or less
 - D. less than 5
208. The _____ has the responsibility to determining whether or NOT conditions are adequate for the use of STARS data on the TDW
- A. Cab Coordinator
 - B. supervisor
 - C. local controller
 - D. facility manager
209. Which terminal controller is responsible for operations conducted on the active runways?
- A. Approach
 - B. Clearance Delivery
 - C. Ground
 - D. Local
210. A primary function of an ATCT is to provide _____.
- A. advisory service to VFR aircraft and control service to IFR aircraft
 - B. safe, orderly, and expeditious flow of traffic on and in the vicinity of an airport
 - C. control service to aircraft on an IFR flight plan operating outside of controlled airspace
 - D. weather information to aircraft before and after takeoff
211. Which position in the ATCT issues control instructions to aircraft and vehicles operating in the airport movement area?
- A. Ground Control
 - B. Local Control
 - C. Cab Coordinator
 - D. Departure Control

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*

212. Ground control must obtain approval from _____ before authorizing an aircraft or a vehicle to cross or use any portion of an active runway.
- A. local control
 - B. approach control
 - C. ground control
 - D. clearance delivery
213. The active runway is controlled by the _____ controller.
- A. Local
 - B. Ground
 - C. Departure
 - D. Approach
214. Ground control must obtain _____ from local control before authorizing an aircraft or vehicle to cross or use any portion of an active runway.
- A. approval
 - B. acknowledgment
 - C. a point out
 - D. control of the runway
215. The first duty priority of an air traffic controller is separating aircraft and _____.
- A. issuing safety alerts
 - B. relaying traffic alerts
 - C. expediting traffic flow
 - D. preventing delays
216. What term describes the position that is in direct communication with aircraft and ensures the separation of aircraft in the area of jurisdiction?
- A. Tower Position
 - B. Tower Associate Position
 - C. Tower Cab Position
 - D. Tower Cab Coordinator Position

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PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*
Answers and References

Ques.	Ans.	Reference	Ques.	Ans.	Reference
1	A	JO 7110.65, par. 1-1-1	45	C	14 CFR, Section 65.33
2	C	JO 7110.65, par. 1-1-10	46	C	JO 7110.65, par. 2-1-13
3	B	JO 7110.65, par. 1-1-10	47	A	14 CFR, Section 65.37
4	C	JO 7110.65, par. 1-2-1	48	B	14 CFR, Section 65.37
5	B	JO 7110.65, par. 1-2-1	49	C	14 CFR, Section 65.37
6	D	JO 7110.65, par. 1-2-1	50	A	14 CFR, Section 65.47
7	C	JO 7110.65, par. 1-2-1	51	B	14 CFR, Section 65.47
8	A	JO 7110.65, par. 1-2-1	52	A	14 CFR, Section 65.49
9	C	JO 7110.65, par. 1-2-1	53	B	14 CFR, Section 65.50
10	A	JO 7110.65, par. 1-2-1	54	C	14 CFR, Section 65.39
11	B	JO 7110.65, par. 1-2-1	55	C	14 CFR, Section 65.39
12	D	JO 7110.65, par. 1-2-1	56	D	AIM, Pilot/Controller Glossary
13	B	JO 7110.65, par. 2-1-2	57	B	14 CFR, Section 65.31
14	D	JO 7110.65, par. 2-1-2	58	C	JO 7110.65, par. 3-9-6
15	A	JO 7110.65, par. 2-1-2	59	B	JO 7110.65, par. 3-9-6
16	C	JO 7110.65, par. 2-1-2	60	B	JO 7110.65, par. 3-9-6
17	D	JO 7110.65, par. 2-1-3	61	C	JO 7110.65, par. 3-7-1
18	A	JO 7110.65, par. 2-1-3	62	D	JO 7110.65, par. 3-3-2
19	B	JO 7110.65, par. 2-1-6	63	A	JO 7110.65, par. 3-10-11
20	B	JO 7110.65, par. 2-1-4	64	B	JO 7110.65, par. 3-10-12
21	D	JO 7110.65, par. 2-1-4	65	D	JO 7110.65, par. 3-10-10
22	A	JO 7110.65, par. 2-1-4	66	D	JO 7110.65, par. 3-10-3
23	C	JO 7110.65, par. 2-1-4	67	B	JO 7110.65, par. 3-10-6
24	B	JO 7110.65, par. 2-1-4	68	C	JO 7110.65, par. 3-10-3
25	C	JO 7110.65, par. 2-1-4	69	D	JO 7110.65, par. 3-10-3
26	B	JO 7110.65, par. 2-1-4	70	C	JO 7110.65, par. 3-10-4
27	C	JO 7110.65, par. 2-1-25	71	C	JO 7110.65, par. 3-9-7
28	C	JO 7110.65, par. 2-1-5	72	B	JO 7110.65, par. 3-10-4
29	D	JO 7110.65, par. 2-1-5	73	A	JO 7110.65, par. 3-10-1
30	A	JO 7110.65, par. 2-1-8	74	B	JO 7110.65, par. 3-11-2
31	B	JO 7110.65, par. 2-1-13	75	A	JO 7110.65, par. 3-11-1
32	B	JO 7110.65, par. 2-1-15	76	C	JO 7110.65, par. 7-1-4
33	D	JO 7110.65, par. 2-1-15	77	C	JO 7110.65, par. 3-1-3
34	D	JO 7110.65, par. 2-1-14	78	A	JO 7110.65, par. 3-11-1
35	B	JO 7110.65, par. 2-1-17	79	B	JO 7110.65, par. 7-5-3
36	C	JO 7110.65, par. 2-1-18	80	C	JO 7110.65, par. 3-11-5
37	A	JO 7110.65, par. 3-1-1	81	D	JO 7110.65, par. 3-8-1
38	A	JO 7110.65, par. 3-1-3	82	C	JO 7110.65, par. 3-8-2
39	B	JO 7110.65, par. 3-1-3	83	D	JO 7110.65, par. 3-8-1
40	D	JO 7110.65, par. 3-1-5	84	A	JO 7110.65, par. 3-8-3
41	D	JO 7110.65, par. 3-1-6	85	D	JO 7110.65, par. 3-8-4, table 3- 8-2
42	A	JO 7110.65, par. 3-1-7	86	B	JO 7110.65, par. 3-9-3
43	B	JO 7110.65, par. 3-1-9	87	C	JO 7110.65, par. 7-2-1
44	D	14 CFR, Section 91.117	88	D	JO 7110.65, par. 7-2-1
			89	A	JO 7110.65, par. 7-2-1

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*
Answers and References *(Continued)*

Ques.	Ans.	Reference	Ques.	Ans.	Reference
90	A	JO 7110.65, par. 3-9-3	135	C	JO 7110.65, par. 2-1-21
91	B	JO 7110.65, par. 3-9-3	136	D	JO 7110.65, par. 3-1-9
92	B	JO 7110.65, par. 3-2-1	137	C	JO 7110.65, par. 5-3-2
93	A	14 CFR, Section 91.125	138	B	JO 7110.65, par. 5-4-2
94	B	14 CFR, Section 91.125	139	B	JO 7110.65, par. 5-4-1
95	C	JO 7110.65, par. 3-2-3	140	C	JO 7110.65, par. 5-4-2
96	D	JO 7110.65, par. 3-2-3	141	D	JO 7110.65, par. 5-5-2
97	A	14 CFR, Section 91.125	142	A	JO 7110.65, par. 5-5-2
98	A	JO 7110.65, par. 2-1-19	143	C	JO 7110.65, par. 5-4-2
99	A	JO 7110.65, par. 2-1-20	144	A	JO 7110.65, par. 5-4-5
100	D	JO 7110.65, par. 3-1-2	145	C	JO 7110.65, par. 5-4-1
101	B	JO 7110.65, par. 3-1-8	146	B	JO 7110.65, par. 3-1-11
102	C	JO 7110.65, par. 3-1-8	147	B	JO 7110.65, par. 7-5-6
103	C	JO 7110.65, par. 3-1-8	148	C	JO 7110.65, par. 7-5-4
104	D	JO 7110.65, par. 3-1-8	149	B	14 CFR, Section 91.157
105	B	JO 7110.65, par. 3-1-8	150	D	JO 7110.65, par. 3-1-12
106	C	14 CFR, Section 65.31	151	A	JO 7110.65, par. 7-5-2
107	A	14 CFR, Section 65.31	152	D	JO 7110.65, par. 7-5-7
108	C	14 CFR, Section 65.35	153	D	JO 7110.65, par. 7-5-4
109	B	14 CFR, Section 65.31	154	A	JO 7110.65, par. 7-5-1
110	C	14 CFR, Sections 65.33, 65.49	155	C	JO 7210.3, par. 10-4-3
111	B	14 CFR, Section 65.37	156	C	JO 7110.65, par. 3-9-2
112	C	14 CFR, Section 65.45	157	D	JO 7210.3, par. 10-4-3
113	D	14 CFR, Section 65.49	158	C	JO 7210.3, par. 10-4-3
114	D	JO 7110.65, par. 3-10-3	159	D	JO 7110.65, par. 3-3-4
115	C	JO 7110.65, par. 3-10-3	160	B	JO 7110.65, par. 2-9-1
116	A	JO 7110.65, par. 3-10-4	161	B	JO 7110.65, par. 2-9-3
117	C	JO 7110.65, par. 3-10-3	162	B	JO 7210.3, par. 10-4-1
118	D	JO 7110.65, par. 3-10-3	163	C	JO 7210.3, par. 10-4-1
119	B	JO 7110.65, par. 3-10-4	164	B	JO 7110.65, par. 3-3-5
120	A	JO 7110.65, par. 3-10-4	165	A	AIM, Pilot/Controller Glossary
121	B	JO 7110.65, par. 3-10-4	166	A	JO 7110.65, par. 3-6-1
122	D	JO 7110.65, par. 3-10-4	167	B	AIM, Pilot/Controller Glossary
123	D	JO 7110.65, par. 3-10-4	168	D	JO 7210.3, par. 10-6-1
124	D	JO 7110.65, par. 3-10-13	169	D	JO 7110.65, par. 3-4-5
125	C	JO 7110.65, par. 3-10-12	170	C	JO 7110.65, par. 3-4-7
126	A	JO 7110.65, par. 3-9-4	171	A	JO 7110.65, par. 2-8-2
127	A	JO 7110.65, par. 3-10-4	172	C	JO 7110.65, par. 3-4-18
128	C	JO 7210.3, par.10-1-6	173	D	JO 7110.65, par. 2-8-2
129	C	JO 7110.65, par. 2-1-1	174	C	JO 7110.65, par. 2-8-3
130	A	JO 7110.65, par. 2-1-9	175	A	JO 7110.65, par. 2-8-2
131	A	JO 7110.65, par.	176	B	JO 7110.65, par. 3-4-18
132	C	2-1-16b JO 7110.65,	177	B	JO 7110.65, par. 3-5-1
133	D	par. 3-9-4 JO 7110.65,	178	B	JO 7210.3, par. 10-1-6
134	D	par.10-1-1 JO 7110.65, par. 3-1-10	179	B	JO 7210.3, par. 12-1-1

PART 1
AIRPORT TRAFFIC CONTROL PROCEDURES *(Continued)*
Answers and References *(Continued)*

Ques.	Ans.	Reference
180	B	JO 7210.3, par. 12-1-4
181	C	AIM, par. 3-2-4
182	B	AIM, Pilot/Controller Glossary
183	D	AIM, Pilot/Controller Glossary
184	C	AIM, Pilot/Controller Glossary
185	C	14 CFR, Section 91.159
186	D	JO 7210.3, par. 12-1-3
187	D	AIM, Pilot/Controller Glossary
188	D	JO 7210.3, par. 12-1-3
189	A	JO 7110.65, par. 7-8-3
190	B	JO 7110.65, par. 7-6-6
191	D	JO 7210.3, par. 12-1-4
192	A	JO 7110.65, par. 12-1-3
193	B	JO 7110.65, par. 7-6-3
194	A	JO 7110.65, App. A
195	C	JO 7110.65, App. A
196	C	JO 7110.65, App. A
197	A	JO 7110.65, App. A
198	B	JO 7110.65, App. A
199	A	JO 7110.65, par. 9-1-2
200	B	JO 7110.65, par. 9-1-2
201	C	JO 7110.65, par. 9-1-2
202	A	JO 7110.65, par. 2-1-23
203	B	JO 7110.65, par. 2-1-23
204	D	JO 7210.3, par. 10-4-10
205	B	JO 7110.65, par. 3-5-2
206	C	JO 7110.65, par. 3-1-10
207	B	JO 7110.65, par. 2-6-3
208	C	JO 7110.65, par. 5-4-3
209	D	JO 7110.65, par. 3-1-3
210	B	AIM, par. 4-1-2
211	A	FAA-H-8083-15, p. 192
212	A	FAA-H-8083-15, p. 192
213	B	JO 7110.65, par. 3-1-3
214	A	JO 7110.65, par. 3-1-3
215	A	JO 7110.65, par. 2-1-2
216	A	JO 7110.65, par. 2-10-3

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PART 2

FLIGHT RULES OVERVIEW

The flight rules governing the operation of aircraft within the United States apply to air traffic controllers as well as to pilots. A complete understanding of the flight rules prescribed in Title 14, Code of Federal Regulations is an absolute requirement for the control of air traffic.

Study Chapter 7 of FAA Order JO 7110.65, Air Traffic Control, and Title 14, Code of Federal Regulations (14 CFR), Parts 61 and 91. (Excerpts from 14 CFR, Parts 61 and 91, are located in Appendices A and C of this study guide respectively.)

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PART 2 FLIGHT RULES

1. Unless a waiver is issued, **NO** person may operate an aircraft in such proximity as to create a(n) _____ hazard.
 - A. near miss
 - B. wake turbulence
 - C. collision
 - D. imminent
2. **NO** person may fly in formation if the aircraft is carrying _____.
 - A. hazardous material
 - B. commercial cargo
 - C. civilians
 - D. passengers for hire
3. An agreement between pilots-in-command of participating aircraft must be made before engaging in _____ flight.
 - A. formation
 - B. IFR
 - C. VFR
 - D. cross-country
4. Weather permitting, it is the responsibility of each person operating an aircraft to maintain vigilance in order to _____ other aircraft.
 - A. follow
 - B. observe
 - C. miss
 - D. see and avoid
5. An aircraft in distress has the right-of-way over _____.
 - A. all other aircraft
 - B. helicopters
 - C. airships
 - D. gliders
6. In converging situations involving aircraft of different categories, the right-of-way over all aircraft is given to _____.
 - A. fixed-wing aircraft
 - B. balloons
 - C. military aircraft
 - D. airships
7. While operating in airspace underlying Class B airspace, aircraft shall **NOT** exceed an indicated airspeed of _____ knots.
 - A. 200
 - B. 230
 - C. 250
 - D. 280
8. Unless otherwise authorized or required by ATC, the maximum indicated airspeed for reciprocating engine aircraft at or below 2,500 feet AGL within four nautical miles of the primary airport in Class C or Class D airspace is _____ knots.
 - A. 200
 - B. 230
 - C. 250
 - D. 280

PART 2
FLIGHT RULES (Continued)

9. Within Class B airspace, the maximum airspeed of turbine-powered aircraft is _____ knots.
- A. 200
 - B. 230
 - C. 250
 - D. 280
10. The maximum allowable airspeed for an aircraft below 10,000 feet is _____ knots.
- A. 200
 - B. 230
 - C. 250
 - D. 280
11. The maximum allowable airspeed for a jet in Class C or Class D airspace at or below 2,500 feet AGL within four nautical miles of the primary airport is _____ knots.
- A. 200
 - B. 230
 - C. 250
 - D. 280
12. Speed restrictions do **NOT** apply if the prescribed speed is lower than the _____ of an aircraft.
- A. operating speed
 - B. true airspeed
 - C. maximum safe speed
 - D. minimum safe speed
13. The maximum allowable airspeed of a VFR aircraft operating in the VFR corridor through Class B airspace is _____ knots.
- A. 200
 - B. 230
 - C. 250
 - D. 280
14. Aerobatic flight may **NOT** be conducted when flight visibility is less than _____ statute mile(s).
- A. 1
 - B. 3
 - C. 5
 - D. 7
15. Aerobatic flight may **NOT** be conducted below _____ feet AGL.
- A. 1,000
 - B. 1,500
 - C. 2,000
 - D. 2,500
16. Aerobatic flight may **NOT** be conducted within Class B, Class C, Class D, or Class E airspace or within 4 miles of the centerline of a(n) _____.
- A. active runway
 - B. ILS approach
 - C. VOR approach
 - D. federal airway

PART 2
FLIGHT RULES (Continued)

17. Position lights on aircraft must be lighted between _____.
- A. sunrise and sunset
 - B. sunset and sunrise
 - C. ½ hour before sunset and ½ hour after sunrise
 - D. 6 p.m. and 6 a.m.
18. During the hours of darkness, anticollision lights need **NOT** be lighted when the pilot-in-command determines that, because of _____ conditions, it would be in the interest of safety to turn the lights off.
- A. weather
 - B. operating
 - C. airport
 - D. runway
19. A pilot may cancel IFR if operating in VFR conditions and outside of Class _____ airspace.
- A. A
 - B. B
 - C. C
 - D. D
20. A pilot who deviates from an ATC instruction due to an emergency shall notify _____ as soon as possible.
- A. ATC
 - B. the Administrator
 - C. FSDO
 - D. other traffic
21. If requested, a pilot who is granted priority by ATC in an emergency shall submit to the ATC facility manager a detailed report of that emergency within _____ hours.
- A. 8
 - B. 24
 - C. 48
 - D. 72
22. A flashing green light signal to an aircraft on the ground means the aircraft is cleared to _____.
- A. take off
 - B. cross taxiway
 - C. cross runway
 - D. taxi
23. **NO** pilot may operate below minimum safe altitudes except when necessary for landing or _____.
- A. formation flight
 - B. takeoff
 - C. carrying passengers for hire
 - D. doing aerobatics
24. A flashing red light signal directed to an aircraft in the air means "_____."
- A. go around
 - B. airport unsafe; do not land
 - C. give way to other traffic
 - D. circle to the left

PART 2
FLIGHT RULES (Continued)

25. The minimum safe altitude over congested areas is 1,000 feet above the highest obstacle within a horizontal radius of _____ feet of the aircraft.
- A. 1,000
 - B. 1,500
 - C. 2,000
 - D. 2,500
26. In a sparsely populated area, an aircraft may **NOT** operate within _____ feet of a building.
- A. 500
 - B. 1,000
 - C. 1,500
 - D. 2,000
27. Helicopters may operate at less than the prescribed minimum safe altitude over a congested area if the operation is conducted without hazard to persons or _____ on the surface.
- A. other aircraft
 - B. property
 - C. buildings
 - D. animals
28. Routes or altitudes specifically for helicopters are prescribed by _____.
- A. the controlling agency
 - B. airport management
 - C. the FAA
 - D. a Letter of Agreement
29. Aircraft operating at or above 18,000 feet MSL shall set their altimeter to _____.
- A. 2.982
 - B. 2.992
 - C. 29.82
 - D. 29.92
30. Aircraft operating below 18,000 feet MSL shall set their altimeter to the current reported altimeter setting of a station along the route within _____ nautical miles of the aircraft.
- A. 20
 - B. 50
 - C. 100
 - D. 150
31. Arriving, departing, or through flight aircraft operating in Class D airspace must establish _____ with the ATCT facility providing air traffic service for that airspace.
- A. communications
 - B. radar contact
 - C. visual contact
 - D. a Letter of Agreement
32. Aircraft approaching to land should circle the airport to the _____.
- A. right
 - B. left
 - C. north
 - D. south

PART 2
FLIGHT RULES *(Continued)*

33. Normally, a large or turbine-powered aircraft will enter the airport traffic pattern at an altitude at least _____ feet AGL.
- A. 1,000
 - B. 1,500
 - C. 2,000
 - D. 2,500
34. Who is the final authority on the use of an assigned noise abatement runway?
- A. The Administrator
 - B. Pilot-in-command
 - C. Airport management
 - D. Aircraft operator
35. At controlled airports, a(n) _____ is required to taxi, take off, or land.
- A. ATC clearance
 - B. operational radio
 - C. pilot's license
 - D. valid medical certificate
36. When a flight plan is filed, the _____ is responsible for closing the flight plan.
- A. control tower
 - B. pilot
 - C. aircraft operator
 - D. Flight Service Station
37. Before entering Class C airspace, an aircraft must establish _____ with ATC.
- A. visual contact
 - B. two-way radio contact
 - C. the type of approach
 - D. radar
38. Helicopters approaching to land at an airport without a control tower must avoid the _____.
- A. runway
 - B. parking ramp
 - C. flow of fixed-wing aircraft
 - D. airport lighting
39. Unless otherwise indicated, aircraft approaching to land at airports without control towers must make all turns to the _____.
- A. left
 - B. right
 - C. east
 - D. west
40. In order for the pilot of a civil aircraft to land at or take off from an airport within Class B airspace, the pilot must hold at least a(n) _____ pilot's certificate.
- A. multi engine
 - B. commercial
 - C. instrument
 - D. private

PART 2
FLIGHT RULES (Continued)

41. When conditions require application of temporary flight restrictions in a particular area, the information is disseminated via a(n) _____.
- A. PIREP
 - B. LOA
 - C. NOTAM
 - D. AIRMET
42. An aircraft can only be flight-tested in areas of light air traffic over _____ or sparsely populated areas.
- A. the airport
 - B. the traffic pattern
 - C. open water
 - D. flat terrain
43. ATC may authorize deviations from the operating requirements within Class A airspace provided that a written request for such deviations is submitted at least _____ days before the proposed operation.
- A. 2
 - B. 4
 - C. 10
 - D. 30
44. **NO** pilot, except the pilot of a U.S. military aircraft, may land during a standard instrument approach when the _____ visibility is less than that prescribed for the approach.
- A. tower
 - B. flight
 - C. surface
 - D. prevailing
45. When the air traffic control system **CANNOT** be conducted safely and efficiently, the _____ issues a NOTAM in response to the emergency.
- A. Air Traffic Manager
 - B. supervisor
 - C. Administrator
 - D. Flight Service Station
46. **NO** person may operate an aircraft _____ or in the vicinity of an area to be visited by the President of the United States.
- A. near
 - B. next to
 - C. around
 - D. over
47. Helicopters may be operated _____ in an airport traffic pattern within 1/2 mile of the runway or helipad of intended landing if the flight visibility is not less than 1/2 mile
- A. 500 feet below clouds
 - B. 1,000 feet above clouds
 - C. clear of clouds
 - D. 2,000 feet horizontal
48. Except as provided in 14 CFR, Section 91.157, **NO** person may operate an aircraft VFR within Class C, D, or E airspace beneath a ceiling that is less than _____ feet.
- A. 500
 - B. 1,000
 - C. 1,500
 - D. 2,000

PART 2
FLIGHT RULES (Continued)

49. When operating Special VFR in Class B, C, D, or E airspace, all aircraft except _____ are required to meet the same visibility requirements.
- A. ultralights
 - B. airships
 - C. helicopters
 - D. balloons
50. When an aircraft is operating during the day in Class G airspace below 1,200 feet AGL, a minimum of _____ statute mile(s) flight visibility is required.
- A. 1
 - B. 2
 - C. 3
 - D. 4
51. When clouds are in the area, pilots operating Special VFR must remain _____.
- A. 500 feet below clouds
 - B. 1,000 feet above clouds
 - C. clear of clouds
 - D. in the traffic pattern
52. Except for helicopters, NO pilot may operate an aircraft on a Special VFR clearance between sunset and sunrise unless that person is _____.
- A. a private pilot
 - B. a commercial pilot
 - C. instrument-rated
 - D. military personnel
53. When weather is below basic VFR minimums, Special VFR allows VFR pilots to operate in Class _____ airspace.
- A. A, B, C, or D
 - B. A, B, D, or E
 - C. B, C, D, or E
 - D. B, C, D, or G
54. Appropriate altitudes for direction of flight in VFR conditions do **NOT** apply until the aircraft is more than _____ feet AGL.
- A. 500
 - B. 1,000
 - C. 2,000
 - D. 3,000
55. An aircraft under VFR, cruising above 3,000 feet AGL and below 18,000 feet MSL on a magnetic course of 196°, shall maintain an MSL altitude at any _____ thousand-foot interval plus 500 feet.
- A. one
 - B. two
 - C. odd
 - D. even
56. To operate in controlled airspace under IFR, a pilot must be _____ and receive ATC clearance.
- A. a private pilot
 - B. a commercial pilot
 - C. ready for departure
 - D. filed on an IFR flight plan

PART 2
FLIGHT RULES (Continued)

57. When it is necessary to use an instrument approach to a civil airport, each person operating an aircraft must use a standard instrument _____ procedure.
- A. approach
 - B. letdown
 - C. descent
 - D. arrival
58. When "NO PT" is specified on an approach chart, the pilot may **NOT** make a _____ turn unless ATC gives approval.
- A. precautionary
 - B. procedure
 - C. proper
 - D. partial
59. When both an MEA and a MOCA are prescribed for a route segment, the MOCA may be used within _____ nautical miles of the VOR involved.
- A. 2
 - B. 12
 - C. 22
 - D. 32
60. Except over mountainous areas, the minimum IFR altitude is _____ feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown.
- A. 500
 - B. 1,000
 - C. 1,500
 - D. 2,000
61. An appropriate IFR altitude for an aircraft in level flight operating below 18,000 feet MSL in uncontrolled airspace would be an MSL altitude at any _____ thousand-foot interval when flying a magnetic course of 095 degrees.
- A. one
 - B. two
 - C. odd
 - D. even
62. An IFR aircraft assigned "VFR conditions-on-top" must fly at _____ altitude(s).
- A. odd-numbered
 - B. even-numbered
 - C. an appropriate VFR
 - D. an appropriate IFR
63. When flying on a federal airway, IFR aircraft must navigate _____ of that airway.
- A. left
 - B. right
 - C. in the vicinity
 - D. along the centerline
64. Since a visual approach is **NOT** an instrument approach, it has _____.
- A. approach minimums
 - B. no missed approach segment
 - C. separation standards
 - D. an associated runway

PART 2
FLIGHT RULES (Continued)

65. In order to fly "VFR-on-top," an aircraft must be on a(n) _____ flight plan.
- A. SVFR
 - B. VFR
 - C. IFR
 - D. DVFR
66. Unless authorized by ATC, IFR aircraft operating along routes other than Federal Airways shall operate along the _____ between NAVAIDs or fixes defining that route.
- A. direct course
 - B. centerline
 - C. true course
 - D. magnetic course
67. Unless requested by ATC, IFR position reports are **NOT** required when the aircraft is under _____ control.
- A. center
 - B. approach
 - C. nonradar
 - D. radar
68. IFR aircraft are required to report information relating to flight safety and _____ encountered.
- A. other traffic
 - B. light chop
 - C. VFR conditions
 - D. unforecast weather
69. In the event of radio failure, an IFR aircraft operating in VFR conditions is expected to _____.
- A. divert to the alternate
 - B. squawk 7600 and proceed to the alternate
 - C. maintain VFR and land soon as practical
 - D. return to the departure airport
70. An IFR aircraft experiencing radio failure shall maintain the last assigned altitude or the _____, whichever is higher.
- A. MEA
 - B. MOCA
 - C. minimum VFR altitude
 - D. minimum IFR altitude
71. In the event of radio failure while being vectored off airways, the pilot should proceed directly to the point specified in the _____ clearance.
- A. IFR
 - B. vector
 - C. en route
 - D. initial
72. Pilots operating under IFR conditions must report any complete or partial loss of navigational or _____ capabilities.
- A. flight
 - B. communication
 - C. instrument
 - D. pilotage

PART 2
FLIGHT RULES *(Continued)*

73. What is the minimum vertical distance an aircraft must maintain above the clouds to comply with Special VFR minimums?
- A. 500 feet
 - B. 1,000 feet
 - C. 2,000 feet
 - D. Just stay clear of the clouds.
74. An appropriate VFR altitude for an aircraft on a magnetic course of 200 degrees is _____ feet.
- A. 5,500
 - B. 6,000
 - C. 6,500
 - D. 7,000
75. Student pilots may operate an aircraft on a solo flight in Class B airspace if the student has received both ground and flight training in that Class B airspace area, and the logbook of that student has been endorsed by the instructor within _____ days.
- A. 30
 - B. 60
 - C. 90
 - D. 120

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PART 2
FLIGHT RULES *(Continued)*
Answers and References

Ques.	Ans.	Reference	Ques.	Ans.	Reference
1	C	14 CFR, Section 91.111	46	D	14 CFR, Section 91.141
2	D	14 CFR, Section 91.111	47	C	14 CFR, Section 91.155
3	A	14 CFR, Section 91.111	48	B	14 CFR, Section 91.155
4	D	14 CFR, Section 91.113	49	C	14 CFR, Section 91.157
5	A	14 CFR, Section 91.113	50	A	14 CFR, Section 91.155
6	B	14 CFR, Section 91.113	51	C	14 CFR, Section 91.157
7	A	14 CFR, Section 91.117	52	C	14 CFR, Section 91.157
8	A	14 CFR, Section 91.117	53	C	JO 7110.65 Glossary
9	C	14 CFR, Section 91.117	54	D	CFR, Section 91.159 14
10	C	14 CFR, Section 91.117	55	D	CFR, Section 91.159 14
11	A	14 CFR, Section 91.117	56	D	CFR, Section 91.173 14
12	D	14 CFR, Section 91.117	57	A	CFR, Section 91.175 14
13	A	14 CFR, Section 91.117	58	B	CFR, Section 91.175 14
14	B	14 CFR, Section 91.303	59	C	CFR, Section 91.177 14
15	B	14 CFR, Section 91.303	60	B	CFR, Section 91.177 14
16	D	14 CFR, Section 91.303	61	C	CFR, Section 91.179 14
17	B	14 CFR, Section 91.209	62	C	CFR, Section 91.179 14
18	B	14 CFR, Section 91.209	63	D	CFR, Section 91.181
19	A	14 CFR, Section 91.123	64	B	JO 7110.65, par. 7-4-1
20	A	14 CFR, Section 91.123	65	C	JO 7110.65, par. 7-3-1
21	C	14 CFR, Section 91.123	66	A	14 CFR, Section 91.181
22	D	14 CFR, Section 91.125	67	D	14 CFR, Section 91.183
23	B	14 CFR, Section 91.119	68	D	14 CFR, Section 91.183
24	B	14 CFR, Section 91.125	69	C	14 CFR, Section 91.185
25	C	14 CFR, Section 91.119	70	D	14 CFR, Section 91.185
26	A	14 CFR, Section 91.119	71	B	14 CFR, Section 91.185
27	B	14 CFR, Section 91.119	72	B	14 CFR, Section 91.187
28	C	14 CFR, Section 91.119	73	D	14 CFR, Section 91.157
29	D	14 CFR, Section 91.121	74	C	14 CFR, Section 91.159
30	C	14 CFR, Section 91.121	75	C	14 CFR, Section 61.95
31	A	14 CFR, Section 91.129			
32	B	14 CFR, Section 91.126			
33	B	14 CFR, Section 91.129			
34	B	14 CFR, Section 91.129			
35	A	14 CFR, Section 91.129			
36	B	14 CFR, Section 91.153			
37	B	14 CFR, Section 91.130			
38	C	14 CFR, Section 91.126			
39	A	14 CFR, Section 91.126			
40	D	14 CFR, Section 91.131			
41	C	14 CFR, Section 91.137			
42	C	14 CFR, Section 91.305			
43	B	14 CFR, Section 91.135			
44	B	14 CFR, Section 91.175			
45	C	14 CFR, Section 91.139			

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PART 3

COMMUNICATIONS OPERATING PROCEDURES OVERVIEW

A complete understanding and knowledge of the use of radios and interphones, the messages transmitted and relayed, and the formats designed to prevent misunderstanding are essential to sound air traffic control. Your ability to apply procedures, rules, priorities, and formats that govern radio and interphone communications is directly related to how you are perceived as a professional.

Study Chapters 2, 4, and 5 of FAA Order JO 7110.65, Air Traffic Control, and the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM).

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PART 3

COMMUNICATIONS OPERATING PROCEDURES

1. When combining positions in the tower, do **NOT** use ground control frequency for _____ communications.
 - A. aircraft
 - B. vehicle
 - C. emergency
 - D. airborne
2. When local and ground control functions are being combined, it is recommended that they be combined on the _____ frequency.
 - A. ground control
 - B. flight data
 - C. clearance delivery
 - D. local control
3. Operating positions shall monitor assigned radio frequencies and _____ continuously.
 - A. transmitters
 - B. displays
 - C. intercoms
 - D. interphones
4. When issuing clearances or instructions, ensure _____ from pilots.
 - A. readback
 - B. compliance
 - C. acknowledgment
 - D. clearance
5. Pilots may acknowledge receipt of a radio message by stating _____.
 - A. "SAY AGAIN"
 - B. "REPEAT"
 - C. "WILCO"
 - D. "WORDS TWICE"
6. If a clearance is read back by a pilot, the controller shall ensure the readback is _____.
 - A. correct
 - B. acknowledged
 - C. received
 - D. accepted
7. Occasionally it may become necessary for controllers to authorize pilots to interrupt their communications _____.
 - A. sequence
 - B. time
 - C. guard
 - D. order
8. Transmit only those messages necessary for air traffic control or otherwise contributing to _____.
 - A. air traffic delays
 - B. air safety
 - C. aircraft movement
 - D. vehicular movement

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

9. If necessary, relay operational information to aircraft or aircraft _____.
- A. operators
 - B. owners
 - C. manufacturers
 - D. maintenance
10. When relaying operational information, relay the _____ of such information.
- A. history
 - B. priority
 - C. implications
 - D. source
11. Relay operational information to military aircraft who are operating or who will operate on a(n) _____.
- A. DVFR flight plan
 - B. air route
 - C. jet route
 - D. IR route
12. The FAA Administrator and Deputy Administrator may use the coded phrases _____ or _____ in air-to-ground communications.
- A. "EXECUTIVE ONE"; "EXECUTIVE TWO"
 - B. "SAFEAIR ONE"; "SAFEAIR TWO"
 - C. "FAA ONE"; "FAA TWO"
 - D. "AVIATION ONE"; "AVIATION TWO"
13. The format used when replying to an aircraft during initial call-up is the aircraft identification, _____, message, and "OVER" if required.
- A. ATC unit identification
 - B. aircraft type
 - C. aircraft call sign
 - D. sector identification
14. The first item stated during initial call-up to an aircraft is the _____.
- A. facility identification
 - B. aircraft type
 - C. aircraft identification
 - D. sector identification
15. On initial contact with an aircraft a controller will first state _____.
- A. ATC unit identification
 - B. aircraft type
 - C. aircraft identification
 - D. message
16. After initial call-up Omit the _____ after communications have been established.
- A. Facility identification
 - B. aircraft type
 - C. aircraft identification
 - D. message

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

17. After communications have been established, the controller may use the aircraft identification prefix and the _____.
- A. three-letter identifier
 - B. ICAO identifier
 - C. first three digits or letters of the aircraft identification
 - D. last three digits or letters of the aircraft identification
18. When the Vice President is onboard a USAF aircraft, the proper call sign for the aircraft is _____.
- A. "EXECUTIVE TWO"
 - B. "TRANSPORT TWO"
 - C. "AIR FORCE TWO"
 - D. "SAFEAIR TWO"
19. Do NOT abbreviate the call signs of aircraft with _____.
- A. similar sounding aircraft identification
 - B. personalized call signs
 - C. all-letter aircraft identification
 - D. military call signs
20. When the controller is communicating with an aircraft, the facility identification may be omitted after _____.
- A. the pilot concurs
 - B. communications have been established
 - C. radar contract has been established
 - D. the third transmission
21. If a message obviously requires a reply, the word _____ may be omitted.
- A. "ROGER"
 - B. "WILCO"
 - C. "OVER"
 - D. "OUT"
22. In prioritizing interphone messages, first priority shall be given to _____.
- A. ATC clearances
 - B. movement messages
 - C. emergencies
 - D. ATC instructions
23. Lower priority messages may be interrupted on the interphone system by using the words "EMERGENCY" or _____.
- A. "HANDOFF"
 - B. "BREAK"
 - C. "CLEAR LINE"
 - D. "CONTROL"
24. When initializing an interphone call, the caller first states the identification of the position being called, followed by the _____.
- A. controller identification
 - B. aircraft identification
 - C. position identification of the caller
 - D. interphone line identification

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

25. Priority is given to interphone messages as follows: emergency messages, clearance and control instructions, movement and control messages, and _____.
- A. administration messages on VFR aircraft
 - B. movement messages on VFR aircraft
 - C. time checks
 - D. point outs
26. Upon completion of an interphone message, the receiving facility states a response, if required, followed by _____.
- A. the receiver's operating initials
 - B. a time check
 - C. the position identification
 - D. an acknowledgment
27. Interphone messages should always be terminated by _____.
- A. operating initials
 - B. a time check
 - C. position identification
 - D. an acknowledgment
28. In inter/intrafacility communications for heavy/super aircraft identification and in communications with heavy/super aircraft, the word(s) _____ must be used.
- A. "HEAVY JET"
 - B. "JUMBO"
 - C. "HEAVY/SUPER"
 - D. "LARGE"
29. American 981 and United 981 are both on your frequency. To avoid a possible misunderstanding, _____ and restate the call sign after the flight number of the aircraft involved.
- A. speak slowly, enunciate carefully
 - B. speak loudly, enunciate carefully
 - C. notify both pilots of similar sounding identifications
 - D. notify the sector supervisor of similar sounding identifications
30. The ICAO phonetic word for the letter "A" is _____.
- A. "ALFA"
 - B. "ALFRED"
 - C. "ABLE"
 - D. "ALBERT"
31. The ICAO phonetic word for the letter "B" is _____.
- A. "BAKER"
 - B. "BREAKER"
 - C. "BROWN"
 - D. "BRAVO"
32. What phraseology is used to identify a B744 when issuing traffic?
- A. "HEAVY BOEING SEVEN FORTY-SEVEN"
 - B. "HEAVY BOEING SEVEN FORTY-FOUR"
 - C. "BOEING SEVEN FORTY-SEVEN"
 - D. "BOEING SEVEN FORTY-FOUR"

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

33. Serial numbers are stated _____.
- A. in group form
 - B. in block form
 - C. as separate digits
 - D. in number pairs
34. The proper phraseology for stating the serial number 11609 is _____.
- A. "ELEVEN SIX ZERO NINER"
 - B. "ONE ONE SIX ZERO NINER"
 - C. "ELEVEN SIX O NINE"
 - D. "ONE ONE SIX O NINER"
35. Which of the following are spoken by pronouncing each digit in the number of hundreds or thousands followed by the word "HUNDRED" or "THOUSAND" as appropriate?
- A. field elevation
 - B. flight levels
 - C. altimeter settings
 - D. altitudes
36. The phraseology for stating an altitude of 10,500 feet is _____.
- A. "TEN THOUSAND PLUS FIVE HUNDRED"
 - B. "ONE ZERO THOUSAND FIVE HUNDRED"
 - C. "TEN FIVE ZERO ZERO"
 - D. "ONE ZERO FIVE ZERO ZERO"
37. An altitude of 18,500 feet is stated as _____.
- A. "ONE EIGHT THOUSAND FIVE HUNDRED"
 - B. "EIGHTEEN THOUSAND FIVE HUNDRED"
 - C. "FLIGHT LEVEL ONE EIGHT FIVE"
 - D. "FLIGHT LEVEL EIGHTEEN FIVE"
38. The phraseology for stating an altitude of 10,000 feet is _____.
- A. "TEN'S OF THOUSAND"
 - B. "TEN THOUSAND ZERO HUNDRED"
 - C. "ONE ZERO THOUSAND"
 - D. "ONE ZERO THOUSAND ZERO HUNDRED"
39. General time information is given using the _____ separate digits of the hour and minutes based on the 24-hour clock in terms of Coordinated Universal Time (UTC).
- A. 2
 - B. 4
 - C. 6
 - D. 8
40. What is the phraseology used to issue a time check of 11:30:00?
- A. "TIME, ELEVEN THIRTY ON THE MINUTE."
 - B. "TIME, ONE ONE THREE ZERO ON THE MINUTE."
 - C. "TIME, ONE ONE THREE ZERO."
 - D. "TIME, ELEVEN THIRTY."

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

41. An altimeter setting of 30.32 is stated as _____.
- A. "ALTIMETER, THIRTY THIRTY-TWO"
 - B. "ALTIMETER, THREE ZERO THREE TWO"
 - C. "ALTIMETER, THIRTY POINT THIRTY-TWO"
 - D. "ALTIMETER, THREE ZERO POINT THREE TWO"
42. When issuing a time check, state the word "TIME" followed by the four separate digits of the hour and minutes and the nearest _____.
- A. ten seconds
 - B. minute
 - C. half minute
 - D. quarter minute
43. When issuing a time check, time would be stated _____.
- A. "ZERO ONE THREE ZERO"
 - B. "ZERO ONE THIRTY A.M."
 - C. "ONE THREE ZERO"
 - D. "ONE THIRTY A.M."
44. The phraseology for stating a true airspeed of 250 is _____.
- A. "TWO FIVE ZERO"
 - B. "TWO FIVE ZERO KNOTS"
 - C. "TWO HUNDRED FIFTY"
 - D. "TWO HUNDRED FIFTY KNOTS"
45. A wind of 350 degrees with a velocity of 20 knots should be stated as _____.
- A. "WIND THREE FIVE ZERO AT TWO ZERO"
 - B. "WIND THREE FIVE ZERO AT TWENTY"
 - C. "WIND THREE FIVE ZERO DEGREES AT TWO ZERO KNOTS"
 - D. "WIND THREE FIVE ZERO DEGREES AT TWENTY KNOTS"
46. When requested by a pilot, time information is given in Coordinated Universal Time followed by the _____ equivalent.
- A. Greenwich Mean Time
 - B. Zulu time
 - C. Daylight Saving Time
 - D. local standard time
47. What is the phraseology used to issue a field elevation of 2,160 feet?
- A. "FIELD ELEVATION, TWENTY-ONE SIXTY."
 - B. "FIELD ELEVATION, TWO ONE SIX ZERO."
 - C. "FIELD ELEVATION, TWENTY-ONE SIX ZERO."
 - D. "FIELD ELEVATION, TWO ONE SIXTY."
48. When issuing surface wind, state the indicated direction to the nearest _____ degrees.
- A. 3
 - B. 5
 - C. 10
 - D. 15

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

49. The phraseology used to assign an aircraft a heading of north is "HEADING _____."
- A. THREE SIX ZERO
 - B. THREE SIXTY
 - C. NORTH
 - D. ZERO ZERO ZERO
50. The phraseology used to identify runway 27R is _____.
- A. "RUNWAY TWENTY-SEVEN RIGHT"
 - B. "RUNWAY TWO SEVEN RIGHT"
 - C. "RUNWAY TWENTY-SEVEN ROMEO"
 - D. "RUNWAY TWO SEVEN ROMEO"
51. The phraseology used to state the frequency 121.5 MHz is _____.
- A. "ONE TWO ONE FIVE"
 - B. "ONE TWO ONE POINT FIVE"
 - C. "ONE TWENTY-ONE FIVE"
 - D. "ONE TWENTY-ONE POINT FIVE"
52. The term used to identify the control tower at Abilene, Texas, is "_____."
- A. Abilene Control Tower
 - B. Abilene Control
 - C. Abilene Tower
 - D. Abilene ATCT
53. To identify the ground control function at Honolulu Airport, the caller would state _____.
- A. "Honolulu Airport Ground Control"
 - B. "Honolulu Airport Ground"
 - C. "Honolulu Ground"
 - D. "Honolulu Control"
54. To identify a civil aircraft, use the aircraft type, model, _____ name, or the prefix "NOVEMBER."
- A. pilot's
 - B. operator's
 - C. manufacturer's
 - D. owner's
55. Two ways to properly state the identification of N23C, a DC-3, are "NOVEMBER TWO THREE CHARLIE" or _____.
- A. "NOVEMBER TWENTY-THREE CHARLIE"
 - B. "DOUGLAS TWO THREE CHARLIE"
 - C. "DC-3 TWENTY-THREE CHARLIE"
 - D. "TWO THREE CHARLIE"
56. Identify Air taxi and commercial operators not having FAA authorized call sign by stating _____ followed by the flight number in group form if used by the pilot.
- A. "NOVEMBER"
 - B. aircraft callsign
 - C. the aircraft type
 - D. "TANGO"

PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*

57. The word "TANGO" followed by the registration number indicates the flight is a(n) _____ aircraft.
- A. military
 - B. air carrier
 - C. civil
 - D. air taxi
58. Air Mobility Command aircraft are identified by the prefix _____.
- A. "MAC"
 - B. "MOBILE"
 - C. "ROAM"
 - D. "REACH"
59. Altitudes of 18,000 feet or more above mean sea level are expressed in _____.
- A. meters
 - B. miles
 - C. flight levels
 - D. feet
60. When issuing an IFR departure clearance, specify the _____ when practical as the clearance limit.
- A. the final approach fix serving the destination airport
 - B. a short-range fix
 - C. the point at which the aircraft leaves controlled airspace
 - D. the destination airport
61. An airport at which an aircraft may land if landing at the intended airport becomes inadvisable is called a(n) _____ airport.
- A. alternate
 - B. substitute
 - C. backup
 - D. secondary
62. What is the phraseology used to approve a point out?
- A. "POINT OUT OBSERVED."
 - B. "ROGER POINT OUT."
 - C. "POINT OUT APPROVED."
 - D. "POINT OUT RECEIVED."
63. What is the phraseology for issuing an altimeter setting of 30.02?
- A. "Altimeter, thirty point zero two."
 - B. "Altimeter, three zero point zero two."
 - C. "Altimeter, thirty zero two."
 - D. "Altimeter, three zero zero two."
64. The phraseology for stating a true airspeed of 160 knots is _____.
- A. "ONE SIX ZERO KNOTS"
 - B. "ONE HUNDRED SIXTY KNOTS"
 - C. "ONE-SIXTY"
 - D. "ONE HUNDRED SIXTY"
65. An altitude of 18,000 feet is stated as _____.
- A. "FLIGHT LEVEL ONE EIGHT ZERO"
 - B. "FLIGHT LEVEL ONE EIGHTEEN"
 - C. "ONE EIGHT THOUSAND FEET"
 - D. "EIGHTEEN THOUSAND FEET"

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PART 3
COMMUNICATIONS OPERATING PROCEDURES *(Continued)*
Answers and References

Ques.	Ans.	Reference	Ques.	Ans.	Reference
1	D	JO 7110.65, par. 2-4-1	46	D	JO 7110.65, par. 2-4-17
2	D	JO 7110.65, par. 2-4-1	47	B	JO 7110.65, par. 2-4-17
3	D	JO 7110.65, par. 2-4-2	48	C	JO 7110.65, par. 2-4-17
4	C	JO 7110.65, par. 2-4-3	49	A	JO 7110.65, par. 2-4-17
5	C	JO 7110.65, par. 2-4-3	50	B	JO 7110.65, par. 2-4-17
6	A	JO 7110.65, par. 2-4-3	51	B	JO 7110.65, par. 2-4-17
7	C	JO 7110.65, par. 2-4-4	52	C	JO 7110.65, par. 2-4-19
8	B	JO 7110.65, par. 2-4-5	53	C	JO 7110.65, par. 2-4-19
9	A	JO 7110.65, par. 2-4-7	54	C	JO 7110.65, par. 2-4-20
10	D	JO 7110.65, par. 2-4-7	55	B	JO 7110.65, par. 2-4-20
11	D	JO 7110.65, par. 2-4-7	56	D	JO 7110.65, par. 2-4-20
12	B	JO 7110.65, par. 2-4-7	57	D	JO 7110.65, par. 2-4-20
13	A	JO 7110.65, par. 2-4-8	58	D	JO 7110.65, par. 2-4-20
14	C	JO 7110.65, par. 2-4-8	59	C	JO 7110.65, par. 2-4-17
15	C	JO 7110.65, par. 2-4-8	60	D	JO 7110.65, par. 4-3-2
16	A	JO 7110.65, par. 2-4-8	61	A	AIM, Pilot/Controller Glossary
17	D	JO 7110.65, par. 2-4-9	62	C	JO 7110.65, par. 5-4-2
18	C	JO 7110.65, par. 2-4-20	63	D	JO 7110.65, par. 2-4-17
19	A	JO 7110.65, par. 2-4-9	64	A	JO 7110.65, par. 2-4-17
20	B	JO 7110.65, par. 2-4-9	65	A	JO 7110.65, par. 2-4-17
21	C	JO 7110.65, par. 2-4-9			
22	C	JO 7110.65, par. 2-4-10			
23	D	JO 7110.65, par. 2-4-11			
24	C	JO 7110.65, par. 2-4-12			
25	B	JO 7110.65, par. 2-4-10			
26	A	JO 7110.65, par. 2-4-12			
27	A	JO 7110.65, par. 2-4-13			
28	C	JO 7110.65, par. 2-4-14			
29	C	JO 7110.65, par. 2-4-15			
30	A	JO 7110.65, par. 2-4-16			
31	D	JO 7110.65, par. 2-4-16			
32	A	JO 7110.65, par. 2-4-21			
33	C	JO 7110.65, par. 2-4-17			
34	B	JO 7110.65, par. 2-4-17			
35	D	JO 7110.65, par. 2-4-17			
36	B	JO 7110.65, par. 2-4-17			
37	C	JO 7110.65, par. 2-4-17			
38	C	JO 7110.65, par. 2-4-17			
39	B	JO 7110.65, par. 2-4-17			
40	C	JO 7110.65, par. 2-4-17			
41	B	JO 7110.65, par. 2-4-17			
42	D	JO 7110.65, par. 2-4-17			
43	A	JO 7110.65, par. 2-4-17			
44	B	JO 7110.65, par. 2-4-17			
45	A	JO 7110.65, par. 2-4-17			

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PART 4

FLIGHT ASSISTANCE SERVICE OVERVIEW

Sound judgment and complete knowledge of the methods and procedures for handling unusual or unexpected situations are essential for providing appropriate flight assistance service. Your ability to react in a timely manner to any given situation relates directly to your professionalism.

Study Chapter 8 of FAA Order JO 7110.10, Flight Services; Chapters 2 and 10 of FAA Order JO 7110.65, Air Traffic Control; Chapter 2 of FAA Order JO 7210.3, Facility Operation and Administration; and the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM).

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PART 4 FLIGHT ASSISTANCE SERVICE

1. A condition of being threatened by serious and imminent danger requiring immediate assistance is classified as _____.
 - A. disaster
 - B. hazardous
 - C. distress
 - D. urgency

2. A potential distress condition of being concerned about safety and requiring timely but **NOT** immediate assistance is classified as a(n) _____.
 - A. hazard
 - B. caution
 - C. urgency
 - D. alert

3. If the words "MAYDAY" or "PAN-PAN" are **NOT** used and you are in doubt that a situation constitutes an emergency or potential emergency, handle it as though it were a(n) _____.
 - A. routine operation
 - B. emergency
 - C. suspect operation
 - D. suspicious activity

4. "Consider that an aircraft emergency exists and inform the RCC or ARTCC when an emergency is declared by either the pilot, facility personnel, or _____.
 - A. airport management
 - B. airport operator
 - C. aircraft mechanic
 - D. officials responsible for the operation of the aircraft

5. If a report indicates that a forced landing is about to occur, a(n) _____ exists.
 - A. emergency
 - B. situation
 - C. problem
 - D. incident

6. An emergency may be declared if an emergency situation is observed or the need for _____ appears likely.
 - A. progressive instructions
 - B. ground rescue
 - C. radar identification
 - D. additional services

7. The minimum required information for handling an inflight emergency is aircraft identification and type, nature of emergency, and _____.
 - A. amount of fuel remaining
 - B. emergency equipment on board
 - C. intended destination
 - D. pilot's desires

PART 4
FLIGHT ASSISTANCE SERVICE (*Continued*)

8. An emergency has been declared and the minimum information has been acquired. Other less pertinent information should be obtained after the _____.
- A. controller initiates action
 - B. pilot has regained control
 - C. operator has been contacted
 - D. aircraft is on the ground
9. Which of the following is **NOT** a recognized method of orientating lost aircraft?
- A. NAVAIDs
 - B. Pilotage
 - C. Radar
 - D. Sightings by persons on the ground
10. If an ELT is heard or reported by an aircraft, AFSS and terminal facilities should notify the _____.
- A. ARTCC
 - B. USAF
 - C. SAR
 - D. RCC
11. When you receive information about an aircraft in distress, forward detailed data to the _____ in whose area the emergency exists.
- A. ATCT
 - B. FSS
 - C. ARTCC
 - D. RCC
12. If you are in communication with an aircraft in distress and the pilot has **NOT** declared an emergency, you _____ the emergency.
- A. postpone
 - B. declare
 - C. ignore
 - D. transfer
13. Transfer the responsibility for handling an emergency to another facility only when better _____ will result.
- A. communications
 - B. radar resolution
 - C. frequency control
 - D. handling
14. Frequencies assigned specifically for aircraft in emergency conditions are 121.5 MHz and _____ MHz.
- A. 234.0
 - B. 234.5
 - C. 243.0
 - D. 243.5
15. If an emergency aircraft is on a frequency other than 121.5 MHz or 243.0 MHz, change frequencies _____.
- A. only when there is a valid reason
 - B. at your discretion
 - C. as soon as the emergency is acknowledged
 - D. when two-way radio contact is established

PART 4
FLIGHT ASSISTANCE SERVICE *(Continued)*

16. If communications with an emergency aircraft are difficult and weather conditions permit, the controller may ask the aircraft to _____ to improve reception.
- A. climb
 - B. descend
 - C. change frequencies
 - D. make a turn
17. Facilities that hear or receive a report of an ELT signal shall solicit assistance from _____.
- A. the nearest RCC
 - B. other aircraft in the area
 - C. local law enforcement
 - D. other positions in the facility
18. One of the factors to consider when recommending an emergency airport for an emergency aircraft is _____.
- A. available service
 - B. aircraft type
 - C. airport type
 - D. number of runways
19. When information is received from any source that a bomb has been placed on, in, or near an aircraft, notify your supervisor or _____.
- A. Air Traffic Manager
 - B. local law enforcement
 - C. airport operator
 - D. Flight Standards District Office
20. Actions such as the unauthorized use of aircraft, tampering with aircraft or other property around airports or FAA facilities, and placing packages or other objects in unusual locations are considered _____.
- A. unlawful acts
 - B. criminal behavior
 - C. suspicious activities
 - D. questionable conduct
21. Do **NOT** attempt to delay, detain, or question a person conducting suspicious activities, but keep the person or persons in sight until a(n) _____ representative arrives.
- A. airline
 - B. airport
 - C. FAA
 - D. law enforcement
22. Handle an aircraft targeted with a bomb threat as a(n) _____.
- A. routine operation
 - B. special operation
 - C. emergency
 - D. search and rescue
23. Once you have established which aircraft is the subject of a threat, notify the _____.
- A. airport management
 - B. Flight Standards District Office
 - C. pilot
 - D. aircraft operator

PART 4
FLIGHT ASSISTANCE SERVICE *(Continued)*

24. After having received a specific bomb threat, the pilot requests technical assistance. This may be obtained from a(n) _____.
- A. local police officer
 - B. airport security officer
 - C. area fire marshal
 - D. FAA aviation explosives expert
25. A bomb threat is received concerning an aircraft on the ground, and the pilot insists on departing. The controller should _____.
- A. have the aircraft taxi to a safe place on the airport
 - B. hold the aircraft for the explosives expert
 - C. issue or relay an ATC clearance if in your opinion the operation will not adversely affect other aircraft
 - D. advise the supervisor
26. If you receive notification of a bomb threat and the pilot elects to remain on the ground, advise other aircraft to remain at least _____ yards away from the bomb threat aircraft.
- A. 100
 - B. 200
 - C. 300
 - D. 400
27. If you receive a request for the location of the nearest explosive detection K-9 team, obtain the aircraft identification and position and notify _____.
- A. airport security
 - B. local police
 - C. your supervisor
 - D. the explosives center
28. If the location of the nearest explosive detection K-9 team has been relayed to the aircraft and the pilot wishes to divert to that location, the controller must obtain a(n) _____ from the pilot.
- A. waiver
 - B. flight plan
 - C. estimated time of arrival
 - D. concurrence
29. If an airborne aircraft receives a bomb threat, the controller may ask if the pilot wishes to climb or descend in order to _____.
- A. create positive "G" forces
 - B. equalize the cabin and outside air pressure
 - C. create negative "G" forces
 - D. equalize the dynamic pressure on the control surfaces
30. If a pilot requests clearance to climb or descend, issue the appropriate clearance, taking into consideration MEA, MOCA, MRA, and _____.
- A. MRO
 - B. terrain
 - C. weather
 - D. delay time
31. Before an aircraft that has received a bomb threat is moved from the service area, consider the _____ as a paramount factor.
- A. aircraft's proximity to other aircraft
 - B. crew's safety
 - C. deplaning of passengers
 - D. volatility of the bomb

PART 4
FLIGHT ASSISTANCE SERVICE *(Continued)*

32. When an ELT is heard or reported, coordination with the Rescue Coordination Center (RCC) is the responsibility of the _____.
- A. AFSS
 - B. ARTCC
 - C. ATCT
 - D. ARS
33. If you determine the location of the ELT signal, notify the _____.
- A. ARTCC
 - B. FSS
 - C. ATCT
 - D. RCC
34. Air traffic controllers must **NOT** leave their _____ to locate an ELT signal.
- A. required duty stations
 - B. current locations
 - C. assigned positions
 - D. designated areas
35. Methods and means of guiding an emergency aircraft to an airport include _____.
- A. dead reckoning
 - B. compass headings
 - C. satellite surveillance systems
 - D. compass rose vectors
36. One of the organizations to which accounts of suspicious activities must be reported is the _____.
- A. ARTCC
 - B. AFSS
 - C. FBI
 - D. CIA
37. When a pilot requests technical assistance during a bomb threat situation, a controller should obtain the aircraft type, series, and model; the _____; and other pertinent details.
- A. pilot's name
 - B. location and description of the bomb device, if known
 - C. hours on airframe since new
 - D. hours on engines since new or remanufactured
38. If a pilot states "minimum fuel," it means _____.
- A. immediate landing is required
 - B. a minimum amount of fuel will be required upon landing
 - C. any undue delay cannot be accepted upon reaching destination
 - D. there is enough fuel remaining to reach the alternate
39. The Rescue Coordination Center (RCC) is operated by the _____.
- A. FCC
 - B. ARTCC
 - C. USCG and USAF
 - D. ATCT

PART 4
FLIGHT ASSISTANCE SERVICE (Continued)

40. Who must be responsible for receiving and relaying all pertinent ELT signal information to the appropriate authorities?
- A. ARTCC
 - B. USAF
 - C. FSS
 - D. RCC
41. An aircraft on a VFR flight plan is considered overdue if it does **NOT** arrive at its destination and _____ minutes have passed since its ETA.
- A. 10
 - B. 20
 - C. 30
 - D. 40
42. An aircraft **NOT** on a flight plan fails to arrive at its destination, and a reliable source reports that the flight was due to arrive at 2000. This aircraft is considered overdue at _____.
- A. 2015
 - B. 2030
 - C. 2100
 - D. 2130
43. When an aircraft is considered to be in emergency status or an IFR aircraft is overdue, the _____ must alert the RCC.
- A. USAF
 - B. ARTCC
 - C. FSS
 - D. ATCT
44. A Piper Cherokee on an IFR flight plan is overdue at its clearance limit. The aircraft will be considered overdue _____ after its ETA.
- A. 30 minutes
 - B. 45 minutes
 - C. 1 hour
 - D. 2 hours
45. An aircraft on an IFR flight plan who estimated OKC VORTAC at 2015 failed to report. This aircraft is considered overdue at _____.
- A. 2030
 - B. 2045
 - C. 2100
 - D. 2115
46. The ALNOT search area is generally _____ miles on either side of the route of flight from the last reported position to the destination.
- A. 200
 - B. 150
 - C. 100
 - D. 50
47. If you have reason to believe that an aircraft is overdue prior to 30 minutes past its ETA, you should _____.
- A. take the appropriate action immediately
 - B. do nothing until at least 10 minutes after the ETA
 - C. take action 15 minutes after the ETA
 - D. take appropriate action 30 minutes after the ETA

PART 4
FLIGHT ASSISTANCE SERVICE *(Continued)*

48. An aircraft in imminent danger requiring immediate assistance is classified as a(n) _____ condition.

- A. urgency
- B. distress
- C. hazardous
- D. alert

49. During an emergency, the controller should keep the emergency aircraft on the initial contact frequency unless _____.

- A. there are other aircraft on the initial contact frequency
- B. there is a valid reason to change frequencies
- C. prior coordination is effected with the RCC
- D. UHF/VHF emergency frequencies are available for use

50. An aircraft emergency may be declared by the pilot, officials responsible for the operation of the aircraft, or _____.

- A. military personnel
- B. airport management
- C. facility personnel
- D. rescue coordinators

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PART 4
FLIGHT ASSISTANCE SERVICE *(Continued)*
Answers and References

Ques.	Ans.	Reference	Ques.	Ans.	Reference
1	C	AIM, Pilot/Controller Glossary	44	A	JO 7110.65, par. 10-3-1
2	C	AIM, Pilot/Controller Glossary	45	B	JO 7110.65, par. 10-3-1
3	B	JO 7110.65, par. 10-1-1	46	D	JO 7110.65, par. 10-3-4
4	D	JO 7110.65, par. 10-2-5	47	A	JO 7110.65, par. 10-3-1
5	A	JO 7110.65, par. 10-2-5	48	B	AIM, Pilot/Controller Glossary
6	B	JO 7110.65, par. 10-2-5	49	B	JO 7110.65, par. 10-2-2
7	D	JO 7110.65, par. 10-2-1	50	C	JO 7110.65, par. 10-2-5
8	A	JO 7110.65, par. 10-2-1			
9	D	JO 7110.65, par. 10-2-3			
10	A	JO 7110.65, par. 10-2-10			
11	C	JO 7110.65, par. 10-1-4			
12	B	JO 7110.65, par. 10-1-1			
13	D	JO 7110.65, par. 10-1-4			
14	C	JO 7110.65, par. 10-2-2			
15	A	JO 7110.65, par. 10-2-2			
16	A	JO 7110.65, par. 10-2-4			
17	B	JO 7110.65, par. 10-2-10			
18	B	JO 7110.65, par. 10-2-15			
19	A	JO 7110.65, par. 10-2-11			
20	C	JO 7210.3, par. 2-7-6			
21	D	JO 7210.3, par. 2-7-6			
22	C	JO 7110.65, par. 10-2-11			
23	C	JO 7110.65, par. 10-2-11			
24	D	JO 7110.65, par. 10-2-11			
25	C	JO 7110.65, par. 10-2-11			
26	A	JO 7110.65, par. 10-2-11			
27	C	JO 7110.65, par. 10-2-12			
28	C	JO 7110.65, par. 10-2-12			
29	B	JO 7110.65, par. 10-2-11			
30	C	JO 7110.65, par. 10-2-11			
31	C	JO 7110.65, par. 10-2-11			
32	B	JO 7110.65, par. 10-2-10			
33	A	JO 7110.65, par. 10-2-10			
34	A	JO 7110.65, par. 10-2-10			
35	B	JO 7110.65, par. 10-2-16			
36	C	JO 7210.3, par. 2-7-6			
37	B	JO 7110.65, par. 10-2-11			
38	C	JO 7110.65, par. 2-1-8			
39	C	AIM, Pilot/Controller Glossary			
40	A	JO 7110.65, par. 10-1-4			
41	C	JO 7110.65, par. 10-3-1			
42	C	JO 7110.10, par. 8-1-3			
43	B	JO 7110.65, par. 10-3-3			

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PART 5

AVIATION WEATHER OVERVIEW

The accurate and timely dissemination of aviation weather is one of the most important duties of the Air Traffic Control Specialist. Significant technological advances in ground-based weather reporting equipment, satellites, and airborne radar have greatly improved the controller's ability to keep pilots informed of weather conditions that may adversely affect flight safety. Regardless of these improvements, your ability to apply weather-related skills effectively is still the most important factor in helping pilots avoid hazardous flight conditions.

The information contained in this part of the study guide is not intended for meteorologists but for Air Traffic Control Specialists. It presents selected items of weather information necessary to perform their job.

Study AC 00-45, Aviation Weather Services; Chapters 4 and 7 and the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM); AC 00-6, Aviation Weather; and paragraph 9-3 of FAA Order 7900.5, Surface Weather Observing.

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PART 5 AVIATION WEATHER

1. A report of meteorological phenomena encountered by aircraft in flight is called a(n) _____.
 - A. METAR
 - B. PIREP
 - C. SIGMET
 - D. AIRMET
2. Urgent PIREPs contain information about tornadoes, hail, _____, and _____.
 - A. snowfall; rain
 - B. turbulence; thunderstorms
 - C. rainfall; light icing
 - D. severe icing; severe turbulence
3. When the ceiling is at or below 5,000 feet and the visibility is less than 5 miles, controllers are obligated to _____ PIREPs.
 - A. disseminate
 - B. record
 - C. observe
 - D. solicit
4. A decrease of temperature with an increase in height is called a(n) _____.
 - A. alto inversion
 - B. inversion
 - C. upper cold front
 - D. lapse rate
5. An altimeter depicts indicated altitude, which is altitude expressed as height above _____.
 - A. ground level
 - B. mean sea level
 - C. cruising altitude
 - D. 18,000 feet
6. The _____ barometer is the type commonly used by meteorologists and the aviation community.
 - A. mercurial
 - B. aneroid
 - C. digital
 - D. analog
7. In a METAR, temperature and dew point are shown in whole degrees _____.
 - A. Fahrenheit
 - B. Kelvin
 - C. Rankine
 - D. Celsius
8. Surface temperature and dew point spread is important in anticipating _____.
 - A. fog
 - B. hail
 - C. turbulence
 - D. thunderstorms

PART 5
AVIATION WEATHER *(Continued)*

9. An increase in temperature of the atmosphere with an increase of altitude height defines a(n) _____.
- A. lapse rate
 - B. inversion
 - C. upper cold front
 - D. alto inversion
10. Weather advisories issued to amend an area forecast regarding weather phenomena that are of operational interest to all aircraft and potentially hazardous to aircraft are classified as _____.
- A. AIRMETs
 - B. SIGMETs
 - C. GENOTs
 - D. INREQs
11. Weather advisories issued for extreme turbulence and severe icing are classified as _____.
- A. INREQs
 - B. AIRMETs
 - C. GENOTs
 - D. SIGMETs
12. Advisories for existing and forecast weather involving tornadoes, embedded thunderstorms are classified as _____.
- A. AIRMETs
 - B. Convective SIGMETs
 - C. SIGMETs
 - D. METARs
13. In the troposphere, the lapse rate is approximately _____°F per one thousand feet.
- A. 1
 - B. 3.57
 - C. 3
 - D. 4
14. Convective currents are the result of _____.
- A. ocean currents
 - B. cooling of the earth's surface
 - C. uneven heating of the earth
 - D. tectonic movement
15. Air is deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere due to _____.
- A. convection
 - B. friction
 - C. pressure gradient force
 - D. Coriolis force
16. In the Northern Hemisphere, air movement around a low pressure center flows in a(n) _____ direction.
- A. clockwise
 - B. counterclockwise
 - C. outward
 - D. downward

PART 5
AVIATION WEATHER *(Continued)*

17. The uneven heating of adjacent bodies of air causing warm air to be drawn upward and more dense air downward defines _____.
- A. inversions
 - B. convection currents
 - C. jet stream
 - D. air mass settling
18. A narrow, high-speed, meandering band of air moving at a high altitude is called a _____.
- A. microburst
 - B. jet blast
 - C. jet stream
 - D. downdraft
19. The four basic cloud forms are cirriform, nimbus, _____ and _____.
- A. cumuliform and cirrus
 - B. stratiform and alto
 - C. alto and cirrus
 - D. cumuliform and stratiform
20. Clouds formed by vertical currents of unstable air are called _____ clouds.
- A. cirrus
 - B. nimbus
 - C. stratus
 - D. cumulus
21. Clouds formed by the cooling of stable air are called _____ clouds.
- A. convective
 - B. stratus
 - C. cumulonimbus mamma
 - D. alto cumulus
22. Lines drawn on a weather map around pressure areas to connect the points of equal pressure are called _____.
- A. isopleth
 - B. isotherms
 - C. isolines
 - D. isobars
23. When a mass of cold air replaces warm air, a _____ front occurs.
- A. warm
 - B. cold
 - C. gust
 - D. wind
24. A squall line is a narrow band of _____.
- A. dense fog
 - B. high-speed wind
 - C. thunderstorms
 - D. severe icing

PART 5
AVIATION WEATHER *(Continued)*

25. Warm air slides over a wedge of colder air when a _____ front progresses forward.
- A. wind
 - B. gust
 - C. cold
 - D. warm
26. Cold fronts typically move _____ than warm fronts.
- A. slower
 - B. faster
 - C. at the same speed
 - D. more Eastern
27. The weather phenomenon particularly hazardous to aviation is _____.
- A. haze
 - B. thunderstorm
 - C. inversion
 - D. rain
28. The three principle types of fronts are cold, warm, and _____.
- A. stationary
 - B. inactive
 - C. active
 - D. fast-moving
29. One of the most common and persistent weather hazards encountered in aviation is _____.
- A. haze
 - B. dust
 - C. rain
 - D. fog
30. Clear ice is considered dangerous to aircraft in flight because it is _____.
- A. difficult to remove
 - B. difficult to see
 - C. greatly effects airflow
 - D. all of the above
31. The precipitation types are: _____, _____, _____, snow grains, ice pellets, hail, and small hail and/or snow pellets.
- A. snow; drizzle; rain
 - B. fog; drizzle; rain
 - C. hail; snow; snow thunder
 - D. hail; snow; fog
32. Rain rarely reduces surface visibility to less than _____ mile(s).
- A. 1
 - B. 2
 - C. 3
 - D. 4
33. Three types of structural icing are clear, _____, and mixed.
- A. pitot
 - B. carburetor
 - C. rime
 - D. induction
34. When accumulation of aircraft icing is such that ice protection systems fail to remove or reduce it, the icing intensity is reported as _____.
- A. trace
 - B. moderate
 - C. heavy
 - D. severe

PART 5
AVIATION WEATHER *(Continued)*

35. _____ is a visible aggregate of minute water droplets or ice crystals suspended in the atmosphere that reduces visibility to less than 7 statute miles.
A. Mist
B. Fog
C. Ice
D. Rain
36. Small, dangerous downdrafts of wind extending horizontally 2.5 miles or less with wind speeds of up to 150 knots are called _____.
A. microbursts
B. dust devils
C. wind shear
D. downdrafts
37. Clear Air Turbulence (CAT) most generally occurs at high altitude and in the vicinity of _____.
A. clouds
B. thunderstorm tops
C. the jet stream
D. the equator
38. The initial stage of a thunderstorm occurs in a _____ cloud.
A. stratiform
B. stratus
C. cluster
D. cumulus
39. The mature stage of a thunderstorm is reached when _____ begins.
A. precipitation
B. lightning
C. thunder
D. virga
40. Airports equipped with LLWAS-Network Expansion (LLWAS systems integrated with TDWR and TDWR systems) provide the capability of detecting wind shear alerts and _____.
A. incoming rain
B. wake turbulence
C. microburst alerts
D. tornadic activity
41. Two thunderstorm hazards to aircraft are hail and _____.
A. rain
B. thunder
C. turbulence
D. low ceiling
42. A violently rotating column of air in contact with the ground and associated with a thunderstorm is called a _____.
A. tornado
B. dust devil
C. hurricane
D. funnel cloud

PART 5
AVIATION WEATHER *(Continued)*

43. Pressure, temperature, and humidity are used to determine _____ altitude.
- A. pressure
 - B. density
 - C. indicated
 - D. true
44. What type of Aviation Routine Weather Report would be generated when a wind shift occurs?
- A. METAR
 - B. TAF
 - C. SPECI
 - D. SIGMET
45. An Aviation Routine Weather Report taken after an aircraft mishap is called a _____ observation.
- A. METAR
 - B. TAF
 - C. SPECI
 - D. SIGMET
46. A change in wind speed and/or direction in a short distance is called a _____.
- A. wind shear
 - B. microburst
 - C. downdraft
 - D. jet stream
47. In a METAR report, the height of a cloud base is reported in _____ of feet mean sea level (MSL).
- A. tens
 - B. hundreds
 - C. thousands
 - D. ten thousands
48. Broken sky cover means that _____ to 7/8 of the sky is obscured by clouds.
- A. 3/8
 - B. 4/8
 - C. 5/8
 - D. 6/8
49. Station identifiers for all weather reporting stations in the continental United States will begin with the letter _____.
- A. A
 - B. C
 - C. K
 - D. P
50. The greatest distance that can be seen throughout at least half the horizon circle describes _____ visibility.
- A. prevailing
 - B. sector
 - C. variable
 - D. operational

PART 5
AVIATION WEATHER *(Continued)*

51. "+TSRAGR" encoded in a METAR indicates a _____.
- A. heavy thunderstorm, rain, and snow grains
 - B. thunderstorm, rain showers, and heavy hail
 - C. severe thunderstorm, rain, and hail
 - D. thunderstorm, heavy rain, and hail
52. Wind direction is determined by the direction _____ the wind is blowing.
- A. to which
 - B. at which
 - C. from which
 - D. in which
53. Wind speed is the average speed given in _____.
- A. meters
 - B. miles
 - C. kilometers
 - D. knots
54. The standard pressure at sea level is _____ inches of mercury.
- A. 29.92
 - B. 29.93
 - C. 30.02
 - D. 30.03
55. The METAR entry "SCT020 BKN250" is decoded as "_____."
- A. scattered layer at two thousand feet and a broken ceiling at two five thousand feet
 - B. scattered clouds at two hundred feet and a broken layer at two thousand five hundred feet
 - C. two thousand scattered, ceiling two five thousand broken
 - D. two hundred scattered, twenty-five hundred broken
56. The METAR entry "FEW025TCU SCT040" is decoded as "_____."
- A. few towering cumulonimbus at two thousand five hundred feet and ceiling four thousand feet scattered
 - B. few towering cumulus clouds at twenty-five hundred feet and a scattered layer at four thousand feet
 - C. few clouds at twenty-five hundred, towering cumulonimbus, ceiling four thousand scattered
 - D. few clouds at two thousand five hundred, towering cumulus, four thousand scattered

PART 5
AVIATION WEATHER *(Continued)*

57. "CIG 005V008" in the remarks section of a METAR indicates "_____."
- A. ceiling variable between five hundred and eight hundred
 - B. ceiling variable at five hundred and at eight hundred
 - C. ceiling visible between five hundred and eight hundred
 - D. ceiling visible at five hundred and at eight hundred
58. In a METAR report, the altimeter element follows the _____ group.
- A. temperature/dew point
 - B. visibility
 - C. sky condition
 - D. present weather
59. A very small downward gust of air (2.5 miles or less in diameter) is called a _____.
- A. tornado funnel
 - B. convection current
 - C. macroburst
 - D. microburst
60. Tower personnel shall take prevailing visibility observations when prevailing visibility at the usual point of observation or at tower level is less than _____ mile(s).
- A. 1
 - B. 2
 - C. 3
 - D. 4
61. A SPECI will be taken when _____.
- A. there is a significant change in weather
 - B. thunderstorms are expected in the area
 - C. an aircraft accident has occurred
 - D. the ceiling or visibility changes

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PART 5
AVIATION WEATHER *(Continued)*
Answers and References

Ques.	Ans.	Reference	Ques.	Ans.	Reference
1	B	AIM, Pilot/Controller Glossary	47	B	AC 00-45, par. 3.2.1.6
2	D	AC 00-45 par. 3.2.1.1	48	C	AC 00-45, table 3.3
3	D	JO 7110.65 par. 2-6-3	49	C	AC 00-45, par. 3.1.5.2
4	D	AC 00-6, par. 2.8	50	A	AC 00-45, par. 3.1.5.6
5	B	AC 00-6, par. 5.4.1	51	D	AC 00-45, par. 3.2.1.7
6	B	AC 00-6, par. 5.2.1	52	C	AC 00-45, par. 3.1.5.5
7	D	AC 00-45, par. 3.1.5.10	53	D	AC 00-45, par. 3.1.5.5
8	A	AC 00-6, par. 3.6	54	A	AC 00-6, par. 5.5
9	B	AC 00-6, par. 17.2.3.1	55	C	AC 00-45, par. 3.1.5.9
10	A	AIM, Pilot/Controller Glossary	56	D	AC 00-45, par. 3.1.5.9
11	D	AIM, Pilot/Controller Glossary	57	A	AC 00-45, par. 3.1.5.13.16
12	B	AIM, Pilot/Controller Glossary	58	A	AC 00-45, par. 3.1.1
13	B	AC 00-6, par. 1.6	59	D	AIM, Pilot/Controller Glossary
14	C	AC 00-6, par. 17.2.1	60	D	7900.5, par. 6.7
15	D	AC 00-6, par. 7.3.2	61	C	AC 00-45, table 3-1
16	B	AC 00-6, par. 7.5			
17	B	AC 00-6, par. 17.2.1			
18	C	AC 00-6, par. 8.3.1			
19	D	AC 00-6, table 13-1			
20	D	AC 00-6, par. 13.4.3			
21	B	AC 00-6, par. 13.4.3.3			
22	D	AC 00-6, par. 5.2.5.1			
23	B	AC 00-6, par. 10.2			
24	C	AC 00-6, par. 19.4			
25	D	AC 00-6, par. 10.2			
26	B	AC 00-6, par. 10.2			
27	B	AC 00-6, par. 19.1			
28	A	AC 00-6, figure 10-4			
29	D	AC 00-6, par. 16.1.1			
30	D	AC 00-6, par. 18.3.2			
31	A	AC 00-6, par. 14.1			
32	A	AC 00-6, par. 16.1.5			
33	C	AC 00-6, par. 18.3			
34	D	AIM, par. 7-1-20			
35	A	AC 00-6, par 16.1.2			
36	A	AIM, Pilot/Controller Glossary			
37	C	AC 00-6, par. 17.2.3.2			
38	D	AC 00-6, par. 19.3			
39	A	AC 00-6, par. 19.3			
40	C	AIM, par. 4-3-7			
41	C	AC 00-6, par. 19.6			
42	A	AC 00-6, par. 19.6.9			
43	B	AC 00-6, par. 5.5			
44	C	AC 00-45, table 3-1			
45	C	AC 00-45, table 3-1			
46	A	AIM, Pilot/Controller Glossary			

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PART 6

AIR NAVIGATION AND AIDS TO NAVIGATION OVERVIEW

A basic knowledge of navigational principles and electronic aids to navigation will enable the controller to better relate to the pilot regarding aircraft navigation and its relationship to air traffic control.

Comprehension of how pilots navigate, as well as a basic knowledge of the instruments and methods used in air navigation, are required in order to function as a full performance level controller.

Study Chapters 1, 4, and 5 of FAA Order JO 7930.2, Notices to Airmen (NOTAMs); Chapters 1 and 5 and the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM); and AC 61-23, Pilot's Handbook of Aeronautical Knowledge. (Excerpts from AC 61-23 are located in Appendix D of this study guide.)

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PART 6
AIR NAVIGATION AND AIDS TO NAVIGATION

1. A Nondirectional Radio Beacon (NDB) transmits nondirectional signals whereby the pilot of a properly equipped aircraft can determine the aircraft's _____ from the station.
 - A. heading
 - B. bearing
 - C. radial
 - D. distance
2. Nondirectional Radio Beacons (NDBs) are subject to disturbances from lightning and precipitation static, which may result in erroneous _____ information.
 - A. distance
 - B. heading
 - C. radial
 - D. bearing
3. Nondirectional Radio Beacons operate in what frequency band?
 - A. 108.0 to 117.95 MHz
 - B. 108.0 to 117.95 kHz
 - C. 190 to 1750 MHz
 - D. 190 to 1750 kHz
4. A ground-based electronic navigational aid transmitting very high frequency navigational signals 360 degrees in azimuth, orientated from magnetic north is called _____.
 - A. DME
 - B. NDB
 - C. ILS
 - D. VOR
5. Which of the following is used as the basis for navigation within the National Airspace System?
 - A. DME
 - B. NDB
 - C. ILS
 - D. VOR
6. VORs operate in what frequency band?
 - A. 108.0 to 117.95 MHz
 - B. 108.0 to 117.95 kHz
 - C. 190 to 535 MHz
 - D. 190 to 535 kHz
7. How many magnetic radials are available from a VOR?
 - A. 90
 - B. 180
 - C. 270
 - D. 360
8. The VOR antenna transmission pattern is _____.
 - A. omnidirectional
 - B. a narrow beam
 - C. nondirectional
 - D. oriented to true north

PART 6
AIR NAVIGATION AND AIDS TO NAVIGATION *(Continued)*

9. A basic restriction regarding the use of VOR navigational aids is that its signal _____.
- A. depends on antenna size
 - B. is line-of-sight
 - C. follows the curvature of the earth
 - D. is oriented to true north
10. Specific geographical positions on the earth's surface are described by the terms "_____" and "_____."
- A. polar; equatorial
 - B. prime meridian; international date line
 - C. latitude; longitude
 - D. variation; deviation
11. The three aeronautical charts used by VFR pilots are VFR Terminal Area Charts, World Aeronautical Charts, and _____ Charts.
- A. Radio Navigation
 - B. Sectional
 - C. Standard Arrival
 - D. Standard Departure
12. The angular difference between true north and magnetic north is known as magnetic _____.
- A. compensation
 - B. deviation
 - C. variation
 - D. difference
13. Two basic methods of air navigation are radio and _____.
- A. Long Range Navigation (LORAN-C)
 - B. Flight Management System (FMS)
 - C. pilotage
 - D. Area Navigation
14. A satellite-based navigation system that provides highly accurate position and speed information is called _____.
- A. ILS
 - B. GPS
 - C. TACAN
 - D. VOR
15. An ultra high-frequency electronic air navigation aid that provides suitably equipped aircraft with a continuous indication of bearing and distance to the station is called _____.
- A. ILS
 - B. DME
 - C. TACAN
 - D. VOR
16. TACANs are specifically designed for use by _____ aircraft.
- A. presidential
 - B. general aviation
 - C. air carrier
 - D. military

PART 6
AIR NAVIGATION AND AIDS TO NAVIGATION *(Continued)*

17. DMEs operate in what frequency band?
- A. 335 to 1105 kHz
 - B. 335 to 1105 MHz
 - C. 960 to 1215 kHz
 - D. 960 to 1215 MHz
18. The distance information received from DME equipment is _____.
- A. slant range distance
 - B. horizontal distance
 - C. vertical distance
 - D. distance in radar miles
19. A navigational aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment at one site is called a _____.
- A. DME TACAN
 - B. Terminal VOR
 - C. VORTAC
 - D. VOR/DME
20. Which approach uses a localizer and glideslope?
- A. NDB
 - B. VOR/DME
 - C. VOR
 - D. ILS
21. An ILS approach is classified as a _____ approach.
- A. radar
 - B. precision
 - C. guided
 - D. vectored
22. A precision approach is an instrument approach that provides _____ information.
- A. electronic glideslope/glidepath
 - B. monitored distance and azimuth
 - C. digital bearing and altitude
 - D. heading and distance
23. If the glideslope portion of an ILS is out of service, the approach procedure reverts to a nonprecision _____ approach.
- A. localizer
 - B. VOR
 - C. NDB
 - D. restricted ILS
24. A NAVAID used to identify a position on an ILS approach, while also providing range information along the final approach path, is called a _____.
- A. localizer
 - B. VOR
 - C. marker beacon
 - D. glideslope

PART 6
AIR NAVIGATION AND AIDS TO NAVIGATION (*Continued*)

25. The ILS component that provides course guidance to the runway centerline is called the _____.
- A. localizer
 - B. glideslope
 - C. outer marker
 - D. compass locator
26. A NOTAM D is given what type of handling?
- A. Local dissemination
 - B. Distant dissemination
 - C. Modified dissemination
 - D. Universal dissemination
27. Who is responsible for the origination of Notice to Airmen concerning NAVAIDs (NOTAM Ds) for which they are responsible?
- A. Technical Operations personnel
 - B. The flight service station in whose area the outage occurs
 - C. The center in whose area the outage occurs
 - D. The terminal nearest the area where the outage occurs
28. All NOTAMs will be processed, stored, and distributed by the _____.
- A. ARTCC
 - B. NS
 - C. ATCT
 - D. NFDC
29. Who is responsible for monitoring the United States Notice to Airmen System?
- A. ARTCC
 - B. FSS
 - C. NFDC
 - D. USNOF
30. What does the acronym "NAS" mean?
- A. National Altitude System
 - B. National Airspace System
 - C. National Aircraft System
 - D. National Approach System
31. The purpose of an Approach Light System associated with ILS is to provide _____ information.
- A. visual
 - B. range
 - C. glideslope
 - D. azimuth

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PART 6
AIR NAVIGATION AND AIDS TO NAVIGATION *(Continued)*
Answers and References

Ques.	Ans.	Reference
1	B	AIM, par. 1-1-2
2	D	AIM, par. 1-1-2
3	D	AIM, par. 1-1-2
4	D	AIM, Pilot/Controller Glossary
5	D	AIM, Pilot/Controller Glossary
6	A	AIM, par. 1-1-3
7	D	FAA-H-8083-25, p. 16-22
8	A	FAA-H-8083-25, p. 16-22
9	B	AIM, par. 1-1-3
10	C	FAA-H-8083-25, p.16-3
11	B	FAA-H-8083-25, p.16-2
12	C	FAA-H-8083-25 p.16-6
13	C	FAA-H-8083-25, p. 16-1
14	B	AIM, Pilot/Controller Glossary
15	C	AIM, Pilot/Controller Glossary
16	D	AIM, par. 1-1-5
17	D	AIM, par. 1-1-7
18	A	AIM, par. 1-1-7
19	C	AIM, Pilot/Controller Glossary
20	D	AIM, Pilot/Controller Glossary
21	B	AIM, Pilot/Controller Glossary
22	A	AIM, Pilot/Controller Glossary
23	A	AIM, par. 1-1-9
24	C	AIM, par. 1-1-9
25	A	AIM, par. 1-1-9
26	B	AIM, Glossary
27	A	JO 7930.2, par. 5-3-1
28	B	JO 7930.2, par. 1-2-1
29	D	JO 7930.2, par. 4-1-1
30	B	AIM, Pilot/Controller Glossary
31	A	AIM, Pilot/Controller Glossary

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PART 7

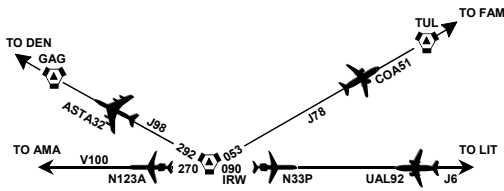
EN ROUTE TRAFFIC CONTROL PROCEDURES OVERVIEW

A controller must be able to recognize and apply the rules for assigning proper altitudes for flight direction, issuing current altimeter settings in a timely manner, and ensuring minimum separation when applying longitudinal, lateral, or vertical separation.

Study Chapters 2, 4, 6, 9, and 11 of FAA Order JO 7110.65, Air Traffic Control. Also review Chapter 3 and the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM) and Title 14, Code of Federal Regulations (14 CFR), Section 91.179.

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PART 7 CONTROL PROCEDURES



REFER TO THE ABOVE DIAGRAM TO ANSWER ITEMS 1 THROUGH 5.

1. UAL92, en route LIT J6 AMA, will be cleared to descend from FL200 to 12,000. UAL92 shall be advised of the altimeter setting for _____.
 - A. LIT
 - B. AMA
 - C. the weather reporting station nearest the point the aircraft will descend below the lowest usable flight level
 - D. the weather reporting station nearest to the facility

2. Appropriate IFR altitudes at or below FL290 and above 15,000 for ASTA32, en route IRW GAG DEN, begin at _____ with intervals of _____ feet ascending.
 - A. 17,500; 4,000
 - B. 16,000; 2,000
 - C. 16,500; 2,000
 - D. 16,000; 4,000

3. An appropriate VFR altitude for N33P, en route IRW J6 LIT, would be any altitude if operating below _____ feet AGL.
 - A. 3,000
 - B. 6,000
 - C. 9,000
 - D. 12,000

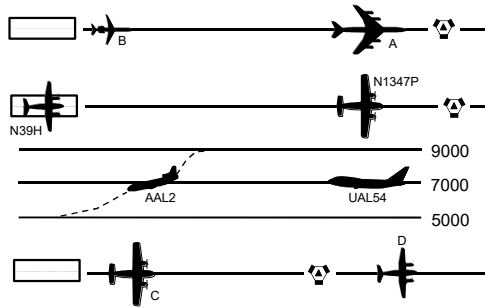
4. COA51, en route IRW J78 TUL FAM, is climbing to its assigned altitude of FL190 and has requested a higher altitude. An altitude that would **NOT** be appropriate for the direction of flight is _____.
 - A. FL210
 - B. FL270
 - C. FL300
 - D. FL330

5. N123A's proposed route of flight is IRW V100 AMA. An appropriate IFR altitude for N123A is _____ feet.
 - A. 5,500
 - B. 6,000
 - C. 6,500
 - D. 7,000

6. The vertical separation minimum for IFR, RVSM-equipped aircraft up to and including FL410 is _____ feet.
 - A. 1,000
 - B. 2,000
 - C. 3,000
 - D. 4,000

PART 7

EN ROUTE TRAFFIC CONTROL PROCEDURES *(Continued)*

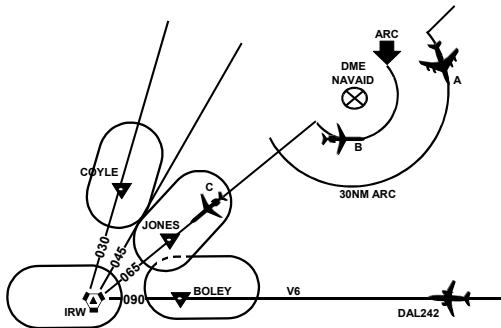


REFER TO THE ABOVE DIAGRAM TO ANSWER ITEMS 7 THROUGH 10.

7. Aircraft A, a B737/A, TAS 450, en route OKC V210 MLC, is level at 13,000. Aircraft B, a C500/A, TAS 410, filed OKC V210 MLC, is ready for departure requesting 13,000. Using DME, the minimum longitudinal separation is _____ miles.
- A. 5
B. 10
C. 15
D. 20
8. N39H, a C310/T, TAS 165, is requesting clearance via OKC V14 TUL. N1347P, a BE9L/U, TAS 220, has been cleared OKC V14 TUL and departed at 1303 UTC. What minimum longitudinal separation must be established between these two aircraft?
- A. 5 miles
B. 10 miles
C. 3 minutes
D. 5 minutes
9. AAL2 and UAL54 are en route ATL V278 DFW at 10,000 and 8,000 feet respectively. Both aircraft are the same speed using DME. AAL2 must be _____ miles in front of UAL54 to receive a descent clearance to 10,000.
- A. 5
B. 10
C. 15
D. 20
10. Aircraft C is using DME. Aircraft D is **NOT** DME-equipped. Aircraft C is deriving distance information from the same NAVAID that aircraft D has reported passing and aircraft D is within 15 minutes of the NAVAID. The minimum usable longitudinal separation between these two aircraft is _____ miles.
- A. 10
B. 20
C. 30
D. 40
11. Two DME-equipped aircraft are on the same course and both pilots are in direct radio communication with each other. If both pilots concur, the controller may authorize the following pilot to maintain longitudinal separation of 10 minutes or _____ miles.
- A. 10
B. 20
C. 30
D. 40

PART 7

EN ROUTE TRAFFIC CONTROL PROCEDURES *(Continued)*



REFER TO THE ABOVE DIAGRAM TO ANSWER ITEMS 12 THROUGH 14.

12. Simultaneous holding at the same altitude may **NOT** be accomplished at _____ and _____.

- A. Coyle; Boley
- B. Coyle; Jones
- C. Boley; Jones
- D. IRW; Boley

13. The minimum lateral DME separation between aircraft A and aircraft B is _____ miles.

- A. 5
- B. 10
- C. 15
- D. 20

14. The minimum lateral separation between aircraft A and the protected airspace for aircraft C is _____ miles.

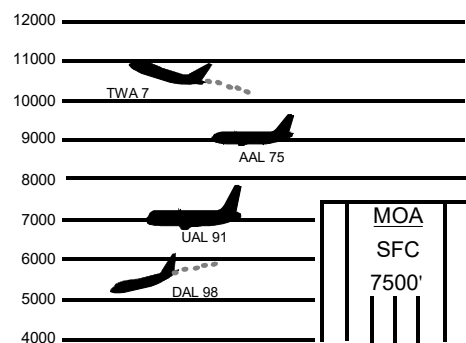
- A. 3
- B. 5
- C. 10
- D. 20

15. Aircraft may be cleared to hold over different fixes at the same altitude if the holding pattern airspace areas _____.

- A. do not overlap
- B. overlap by 3NM or less
- C. are located within the same sector
- D. are at or below 18,000 feet

16. Geographical locations may be used as visual reporting points or holding fixes if an aircraft is assigned an altitude below _____.

- A. 24,000
- B. 18,000
- C. 12,000
- D. 6,000"



REFER TO THE ABOVE DIAGRAM TO ANSWER ITEMS 17 THROUGH 20.

17. TWA7 has been cleared to climb to 12,000 and has reported leaving 10,000. AAL75 has requested to climb to 10,000. Severe turbulence has been reported between 9,000 and 14,000. AAL75 may be assigned 10,000 when _____.

- A. TWA7 reports leaving 10,000
- B. TWA7 reports leaving 11,000
- C. TWA7 reports level at 12,000
- D. severe turbulence no longer exists

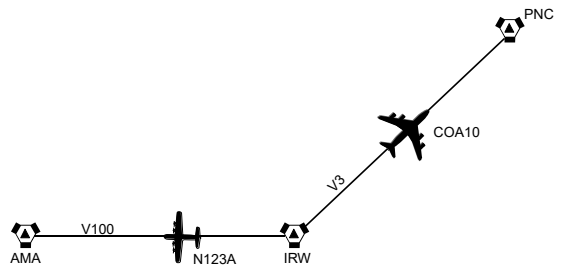
PART 7
EN ROUTE TRAFFIC CONTROL PROCEDURES *(Continued)*

18. AAL75 is westbound en route V6 to OKC. The lowest altitude AAL75 may be assigned to cross the depicted MOA is _____ feet.
- A. 9,000
 - B. 8,500
 - C. 8,000
 - D. 7,500
19. What type of clearance authorizes DAL98 to descend to minimum IFR altitude, climb/descend within an assigned altitude block at the pilot's discretion, and proceed to and make an approach at the destination airport?
- A. block altitude clearance
 - B. visual approach clearance
 - C. approach clearance
 - D. cruise clearance
20. DAL98, cleared to cruise 6,000, has reported leaving 6,000. UAL91 may be assigned 6,000 when DAL98 reports _____.
- A. on the ground
 - B. level at 4,000
 - C. leaving 5,000
 - D. leaving 6,000
21. The minimum vertical separation required for RVSM aircraft up to and including FL 410 _____ feet.
- A. 500
 - B. 1,000
 - C. 2,000
 - D. 4,000
22. The minimum vertical separation required for non-RVSM aircraft above FL290 through FL600 is _____ feet.
- A. 1,000
 - B. 2,000
 - C. 3,000
 - D. 4,000
23. The minimum vertical separation for IFR flight at and below FL290 is _____ feet.
- A. 4,000
 - B. 2,000
 - C. 1,000
 - D. 500
24. Two thousand feet of vertical separation is required for non-RVSM IFR flight above _____ up to and including FL600.
- A. FL290
 - B. FL280
 - C. FL190
 - D. FL180
25. Separation of all air traffic within designated airspace by ATC is called _____.
- A. separation control
 - B. controlled separation
 - C. positive separation
 - D. positive control

PART 7

EN ROUTE TRAFFIC CONTROL PROCEDURES *(Continued)*

26. The program whose mission is to balance air traffic demand with system capacity is _____.
- Traffic Management
 - Keep 'Em High
 - Altitude Reservation
 - En Route SWAP



REFER TO THE ABOVE DIAGRAM TO ANSWER ITEMS 30 AND 31.

27. Holding aircraft at the same altitude may be accomplished over different fixes if the _____.
- holding pattern airspace does not overlap
 - controller suggests it and the pilot concurs
 - fixes are on established routes
 - pilot requests it

30. COA10, en route IRW V3 PNC, is climbing to an assigned altitude of 3,000 feet and has reported heavy turbulence and icing. The pilot has requested an altitude assignment of 6,000 feet. You may approve this altitude _____.

- only if you obtain prior approval from all affected positions or sectors
- upon request, as 6,000 feet is an appropriate altitude for direction of flight
- if the altimeter setting is 29.92 or higher
- only until the aircraft exits your airspace

28. The standard minimum longitudinal separation between aircraft is _____ minutes.
- 5
 - 10
 - 15
 - 20

31. N123A's proposed route of flight is IRW V100 AMA. An appropriate IFR altitude for N123A is _____ feet.

- 5,500
- 6,000
- 6,500
- 7,000

29. The standard minimum longitudinal separation between aircraft is _____ miles.

- 5
- 10
- 15
- 20

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PART 7
EN ROUTE TRAFFIC CONTROL PROCEDURES *(Continued)*
Answers and References

Ques.	Ans.	Reference
1	C	JO 7110.65, par. 2-7-2
2	B	14 CFR, Section 91.179
3	A	AIM, par. 3-1-5
4	C	14 CFR, Section 91.179
5	B	JO 7110.65, par. 4-5-2
6	A	JO 7110.65, par. 4-5-1
7	B	JO 7110.65, par. 6-4-2
8	C	JO 7110.65, par. 6-4-2
9	B	JO 7110.65, par. 6-4-2
10	C	JO 7110.65, par. 6-4-2
11	B	JO 7110.65, par. 6-4-4
12	C	JO 7110.65, par. 6-5-1
13	B	JO 7110.65, par. 6-5-3
14	B	JO 7110.65, par. 6-5-3
15	A	JO 7110.65, par. 6-5-1
16	B	JO 7110.65, par. 6-5-1
17	B	JO 7110.65, par. 6-6-2
18	C	JO 7110.65, par. 9-3-2
19	D	JO 7110.65 par. 6-6-2
20	C	JO 7110.65, par.6-6-2
21	B	JO 7110.65, par. 4-5-1
22	B	JO 7110.65, par. 4-5-1
23	C	JO 7110.65, par. 4-5-1
24	A	JO 7110.65, par. 4-5-1
25	D	AIM, Pilot/Controller Glossary
26	A	JO 7110.65, par. 11-1-1
27	A	JO 7110.65, par. 6-5-1
28	B	JO 7110.65, par. 6-4-2
29	D	JO 7110.65, par. 6-4-2
30	A	JO 7110.65, par. 4-5-3
31	B	JO 7110.65, par. 4-5-2

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APPENDIX A
TITLE 14, CODE OF FEDERAL REGULATIONS (EXCERPTS)
FOR TRAINING PURPOSES ONLY

CHAPTER 1, PART 61

Subpart C – Student Pilots

61.95 Operations in Class B airspace and at airports located within Class B airspace.

- (a) A student pilot may not operate an aircraft on a solo flight in Class B airspace unless:
 - (1) The student pilot has received both ground and flight training from an authorized instructor on that Class B airspace area, and the flight training was received in the specific Class B airspace area for which solo flight is authorized;
 - (2) The logbook of that student pilot has been endorsed by the authorized instructor who gave the student pilot flight training, and the endorsement is dated within the 90-day period preceding the date of the flight in that Class B airspace area; and
 - (3) The logbook endorsement specifies that the student pilot has received the required ground and flight training, and has been found proficient to conduct solo flight in that specific Class B airspace area.

- (b) A student pilot may not operate an aircraft on a solo flight to, from, or at an airport located within Class B airspace pursuant to Section 91.131(b) of this chapter unless:
 - (1) The student pilot has received both ground and flight training from an instructor authorized to provide training to operate at that airport, and the flight and ground training has been received at the specific airport for which the solo flight is authorized;
 - (2) The logbook of that student pilot has been endorsed by an authorized instructor who gave the student pilot flight training, and the endorsement is dated within the 90-day period preceding the date of the flight at that airport; and
 - (3) The logbook endorsement specifies that the student pilot has received the required ground and flight training, and has been found proficient to conduct solo flight operations at that specific airport.

- (c) This section does not apply to a student pilot seeking a sport pilot certificate or a recreational pilot certificate.

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APPENDIX B
TITLE 14, CODE OF FEDERAL REGULATIONS (EXCERPTS)

FOR TRAINING PURPOSES ONLY

CHAPTER 1, PART 65

Subpart B – Air Traffic Control Tower Operators

65.31 Required credentials, certificates, and rating or qualification.

No person may act as an air traffic control tower operator at an air traffic control tower in connection with civil aircraft unless he or she –

- (a) Holds an FAA Credential with a tower rating or an air traffic control tower operator certificate issued under this subpart:
- (b) Holds a facility rating for that control tower issued under this subpart, or has qualified for the operating position at which he or she acts and is under the supervision of the holder of a facility rating for that control tower; and
- (c) Except for a person employed by the FAA or employed by, or on active duty with, the Department of the Air Force, Army, or Navy or the Coast Guard, holds at least a second-class medical certificate issued under Part 67 of this chapter.

65.33 Eligibility requirements: General.

To be eligible for an air traffic control tower operator certificate a person must –

- (a) Be at least 18 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 radio conversation;
- (d) Except for a person employed by the FAA or employed by, or on active duty with, the Department of the Air Force, Army, or Navy or the Coast Guard, hold at least a second-class medical certificate issued under Part 67 of this chapter within the 12 months before the date application is made; and
- (e) Comply with Section 65.35.

65.35 Knowledge requirements.

Each applicant for an air traffic control tower operator certificate must pass a written test on –

- (a) The flight rules in Part 91 of this chapter:
- (b) Airport traffic control procedures, and this subpart:
- (c) En route traffic control procedures;
- (d) Communications operating procedures;
- (e) Flight assistance service;
- (f) Air navigation, and aids to air navigation; and
- (g) Aviation weather.

65.37 Skill requirements: Operating positions.

No person may act as an air traffic control tower operator at any operating position unless he has passed a practical test on –

- (a) Control tower equipment and its use;
- (b) Weather reporting procedures and use of reports;
- (c) Notices to Airmen, and use of the Aeronautical Information Manual;
- (d) Use of operational forms;
- (e) Performance of noncontrol operational duties; and
- (f) Each of the following procedures that is applicable to that operating position and is required by the person performing the examination:
 - (1) The airport, including rules, equipment, runways, taxiways, and obstructions.
 - (2) The terrain features, visual checkpoints, and obstructions within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for the airport.
 - (3) Traffic patterns and associated procedures for use of preferential runways and noise abatement.
 - (4) Operational agreements.

- (5) The center, alternate airports, and those airways, routes, reporting points, and air navigation aids used for terminal air traffic control.
- (6) Search and rescue procedures.
- (7) Terminal air traffic control procedures and phraseology.
- (8) Holding procedures, prescribed instrument approach, and departure procedures.
- (9) Radar alignment and technical operation.
- (10) The application of the prescribed radar and nonradar separation standard, as appropriate.

65.39 Practical experience requirements: Facility rating.

Each applicant for a facility rating at any air traffic control tower must have satisfactorily served –

- (a) As an air traffic control tower operator at that control tower without a facility rating for at least 6 months; or
- (b) As an air traffic control tower operator with a facility rating at a different control tower for at least 6 months before the date he applies for the rating.

However, an applicant who is a member of an Armed Force of the United States meets the requirements of this section if he has satisfactorily served as an air traffic control tower operator for at least 6 months.

65.41 Skill requirements: Facility ratings.

Each applicant for a facility rating at an air traffic control tower must have passed a practical test on each item listed in Section 65.37 of this part that is applicable to each operating position at the control tower at which the rating is sought.

65.45 Performance of duties.

- (a) An air traffic control tower operator shall perform his duties in accordance with the limitations on his certificate and the procedures and practices prescribed in air traffic control manuals of the FAA, to provide for the safe, orderly, and expeditious flow of air traffic.
- (b) An operator with a facility rating may control traffic at any operating position at the control tower at which he holds a facility rating. However, he may not issue an air traffic clearance for IFR flight without authorization from the appropriate facility exercising IFR control at that location.
- (c) An operator who does not hold a facility rating for a particular control tower may act at each operating position for which he has qualified, under the supervision of an operator holding a facility rating for that control tower.

65.47 Maximum hours.

Except in an emergency, a certificated air traffic control tower operator must be relieved of all duties for at least 24 consecutive hours at least once during each 7 consecutive days. Such an operator may not serve or be required to serve –

- (a) For more than 10 consecutive hours; or
- (b) For more than 10 hours during a period of 24 consecutive hours, unless he has had a rest period of at least 8 hours at or before the end of the 10 hours of duty.

65.49 General operating rules.

- (a) Except for a person employed by the FAA or employed by, or on active duty with, the Department of the Air Force, Army, or Navy, or the Coast Guard, no person may act as an air traffic control tower operator under a certificate issued to him or her under this part unless he or she has in his or her personal possession an appropriate current medical certificate issued under Part 67 of this chapter.
- (b) Each person holding an air traffic control tower operator certificate shall keep it readily available when performing duties in an air traffic control tower, and shall present that certificate or his medical certificate or both for inspection upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

- (c) A certificated air traffic control tower operator who does not hold a facility rating for a particular control tower may not act at any operating position at the control tower concerned unless there is maintained at that control tower, readily available to persons named in paragraph (b) of this section, a current record of the operating positions at which he has qualified.
- (d) An air traffic control tower operator may not perform duties under his certificate during any period of known physical deficiency that would make him unable to meet the physical requirements for his current medical certificate. However, if the deficiency is temporary, he may perform duties that are not affected by it whenever another certificated and qualified operator is present and on duty.
- (e) A certificated air traffic control tower operator may not control air traffic with equipment that the Administrator has found to be inadequate.
- (f) The holder of an air traffic control tower operator certificate, or an applicant for one, shall, upon the reasonable request of the Administrator, cooperate fully in any test that is made of him.

65.50 Currency requirements.

The holder of an air traffic control tower operator certificate may not perform any duties under that certificate unless –

- (a) He has served for at least three of the preceding 6 months as an air traffic control tower operator at the control tower to which his facility rating applies, or at the operating positions for which he has qualified; or
- (b) He has shown that he meets the requirements for his certificate and facility rating at the control tower concerned, or for operating at positions for which he has previously qualified.

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APPENDIX C
TITLE 14, CODE OF FEDERAL REGULATIONS (EXCERPTS)
FOR TRAINING PURPOSES ONLY

CHAPTER 1, PART 91

Subpart A – General

91.1 Applicability.

- (a) Except as provided in paragraphs (b), (c), (e), (f) of this section and Sections 91.701 and 91.703, this part prescribes rules governing the operation of aircraft within the United States, including the waters within 3 nautical miles of the U.S. coast.
- (b) Each person operating an aircraft in the airspace overlying the waters between 3 and 12 nautical miles from the coast of the United States must comply with § 91.1 through 91.21; §§91.101 through 91.143; §§91.151 through 91.159; § 91.167 through 91.193; §91.203; §91.205; §§91.209 through 91.217; §91.221, § 91.225; §§91.303 through 91.319; §§91.323 through 91.327; §91.605; §91.609; § 91.703 through 91.715; and §91.903.
- (c) This part applies to each person on board an aircraft being operated under this part, unless otherwise specified.
- (d) This part also establishes requirements for operators to take actions to support the continued airworthiness of each airplane.
- (e) This part does not apply to any aircraft or vehicle governed by part 103 of this chapter, or subparts B, C, or D of part 101 of this chapter.
- (f) Except as provided in §§107.13, 107.27, 107.47, 107.57, and 107.59 of this chapter, this part does not apply to any aircraft governed by part 107 of this chapter.

Subpart B – Flight Rules

GENERAL

91.111 Operating near other aircraft.

- (a) No person may operate an aircraft so close to another aircraft as to create a collision hazard.
- (b) No person may operate an aircraft in formation flight except by arrangement with the pilot in command of each aircraft in the formation.
- (c) No person may operate an aircraft, carrying passengers for hire, in formation flight.

91.113 Right-of-way rules: Except water operations.

- (a) Inapplicability. This section does not apply to the operation of an aircraft on water.
- (b) General. When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft. When a rule of this section gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it unless well clear.
- (c) In distress. An aircraft in distress has the right-of-way over all other air traffic.
- (d) Converging. When aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so), the aircraft to the other's right has the right-of-way. If the aircraft are of different categories –
 - (1) A balloon has the right-of-way over any other category of aircraft;
 - (2) A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.
 - (3) An airship has the right-of-way over a powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.
However, an aircraft towing or refueling other aircraft has the right-of-way over all other engine-driven aircraft.
- (e) Approaching head-on. When aircraft are approaching each other head-on, or nearly so, each pilot of each aircraft shall alter course to the right.
- (f) Overtaking. Each aircraft that is being overtaken has the right-of-way and each pilot of an overtaking aircraft shall alter course to the right to pass well clear.
- (g) Landing. Aircraft, while on final approach to land or while landing, have the right-of-way over other aircraft in flight or operating on the surface, except that they shall not take advantage of this rule to force an aircraft off the runway surface which has already landed and is attempting to make way for an aircraft on final approach. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land or to overtake that aircraft.

91.115 Right-of-way rules: Water operations.

- (a) General. Each person operating an aircraft on the water shall, insofar as possible, keep clear of all vessels and avoid impeding their navigation, and shall give way to any vessel or other aircraft that is given the right-of-way by any rule of this section.
- (b) Crossing. When aircraft, or an aircraft and a vessel, are on crossing courses, the aircraft or vessel to the other's right has the right-of-way.

- (c) Approaching head-on. When aircraft, or an aircraft and a vessel, are approaching head-on, or nearly so, each shall alter its course to the right to keep well clear.
- (d) Overtaking. Each aircraft or vessel that is being overtaken has the right-of-way, and the one overtaking shall alter course to keep well clear.
- (e) Special circumstances. When aircraft, or an aircraft and a vessel, approach so as to involve risk of collision, each aircraft or vessel shall proceed with careful regard to existing circumstances, including the limitations of the respective craft.

91.117 Aircraft speed.

- (a) Unless otherwise authorized by the Administrator, no person may operate an aircraft below 10,000 feet MSL at an indicated airspeed of more than 250 knots (288 m.p.h.).
- (b) Unless otherwise authorized or required by ATC, no person may operate an aircraft at or below 2,500 feet above the surface within 4 nautical miles of the primary airport of a Class C or Class D airspace area at an indicated airspeed of more than 200 knots (230 mph). This paragraph (b) does not apply to any operations within a Class B airspace area. Such operations shall comply with paragraph (a) of this section.
- (c) No person may operate an aircraft in the airspace underlying a Class B airspace area designated for an airport or in a VFR corridor designated through such a Class B airspace area, at an indicated airspeed of more than 200 knots (230 mph).
- (d) If the minimum safe airspeed for any particular operation is greater than the maximum speed prescribed in this section, the aircraft may be operated at that minimum speed.

91.119 Minimum safe altitudes: General.

Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

- (a) Anywhere. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
- (b) Over congested areas. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.
- (c) Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

- (d) Helicopters, powered parachutes, and weight-shift-control aircraft. If the operation is conducted without hazard to persons or property on the surface—

(1) A helicopter may be operated at less than the minimums prescribed in paragraph (b) or (c) of this section, provided each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA; and

(2) A powered parachute or weight-shift-control aircraft may be operated at less than the minimums prescribed in paragraph (c) of this section

91.121 Altimeter settings.

- (a) Each person operating an aircraft shall maintain the cruising altitude or flight level of that aircraft, as the case may be, by reference to an altimeter that is set, when operating –

(1) Below 18,000 feet MSL, to –

- (i) The current reported altimeter setting of a station along the route and within 100 nautical miles of the aircraft;

- (ii) If there is no station within the area prescribed in paragraph (a)(1)(i) of this section, the current reported altimeter setting of an appropriate available station; or

- (iii) In the case of an aircraft not equipped with a radio, the elevation of the departure airport or an appropriate altimeter setting available before departure; or

(2) At or above 18,000 feet MSL, to 29.92" Hg.

- (b) The lowest usable flight level is determined by the atmospheric pressure in the area of operation as shown in the following table:

Current altimeter setting	Lowest usable flight level
29.92 (or higher).....	180
29.91 through 29.42.....	185
29.41 through 28.92.....	190
28.91 through 28.42.....	195
28.41 through 27.92.....	200
27.91 through 27.42.....	205
27.41 through 26.92.....	210

- (c) To convert minimum altitude prescribed under Sections 91.119 and 91.177 to the minimum flight level, the pilot shall take the flight level equivalent of the minimum altitude in feet and add the appropriate number of feet specified below, according to the current reported altimeter setting:

Current altimeter setting	Adjustment factor
29.92 (or higher).....	None
29.91 through 29.42.....	500
29.41 through 28.92.....	1,000
28.91 through 28.42.....	1,500
28.41 through 27.92.....	2,000
27.91 through 27.42.....	2,500
27.41 through 26.92.....	3,000

91.123 Compliance with ATC clearances and instructions.

- (a) When an ATC clearance has been obtained, no pilot in command may deviate from that clearance unless an amended clearance is obtained, an emergency exists, or the deviation is in response to a traffic alert and collision avoidance system resolution advisory. However, except in Class A airspace, a pilot may cancel an IFR flight plan if the operation is being conducted in VFR weather conditions. When a pilot is uncertain of an ATC clearance, that pilot shall immediately request clarification from ATC.
- (b) Except in an emergency, no person may operate an aircraft contrary to an ATC instruction in an area in which air traffic control is exercised.
- (c) Each pilot in command who, in an emergency, or in response to a traffic alert and collision avoidance system resolution advisory, deviates from an ATC clearance or instruction shall notify ATC of that deviation as soon as possible.
- (d) Each pilot in command who (though not deviating from a rule of this subpart) is given priority by ATC in an emergency, shall submit a detailed report of that emergency within 48 hours to the manager of that ATC facility, if requested by ATC.
- (e) Unless otherwise authorized by ATC, no person operating an aircraft may operate that aircraft according to any clearance or instruction that has been issued to the pilot of another aircraft for radar air traffic control purposes.

(Approved by the Office of Management and Budget under control number 2120-0005)

91.125 ATC light signals.

ATC light signals have the meaning shown in the following table:

Color and type of signal	Meaning with respect to aircraft on the surface	Meaning with respect to aircraft in flight
Steady green.....	Cleared for takeoff.	Cleared to land.
Flashing green.....	Cleared to taxi.	Return for landing (to be followed by steady green at proper time).
Steady red.....	Stop.	Give way to other aircraft and continue circling.
Flashing red.....	Taxi clear of runway in use.	Airport unsafe – do not land.
Flashing white.....	Return to starting point on airport.	Not applicable.
Alternating red and green.....	Exercise extreme caution.	Exercise extreme caution.

91.126 Operating on or in the vicinity of an airport in Class G airspace.

- (a) General. Unless otherwise authorized or required, each person operating an aircraft on or in the vicinity of an airport in a Class G airspace area must comply with the requirements of this section.
- (b) Direction of turns. When approaching to land at an airport without an operating control tower in Class G airspace –
 - (1) Each pilot of an airplane must make all turns of that airplane to the left unless the airport displays approved light signals or visual markings indicating that turns should be made to the right, in which case the pilot must make all turns to the right; and
 - (2) Each pilot of a helicopter or a powered parachute must avoid the flow of fixed-wing aircraft.
- (c) Flap settings. Except when necessary for training or certification, the pilot in command of a civil turbojet-powered aircraft must use, as a final flap setting, the minimum certificated landing flap setting set forth in the approved performance information in the Airplane Flight Manual for the applicable conditions. However, each pilot in command has the final authority and responsibility for the safe operation of the pilot's airplane, and may use a different flap setting for that airplane if the pilot determines that it is necessary in the interest of safety.

- (d) Communications with control towers. Unless otherwise authorized or required by ATC, no person may operate an aircraft to, from, through, or on an airport having an operational control tower unless two-way radio communications are maintained between that aircraft and the control tower. Communications must be established prior to 4 nautical miles from the airport, up to and including 2,500 feet AGL. However, if the aircraft radio fails in flight, the pilot in command may operate that aircraft and land if weather conditions are at or above basic VFR weather minimums, visual contact with the tower is maintained, and a clearance to land is received. If the aircraft radio fails while in flight under IFR, the pilot must comply with Section 91.185.

91.127 Operating on or in the vicinity of an airport in Class E airspace.

- (a) Unless otherwise required by Part 93 of this chapter or unless otherwise authorized or required by the ATC facility having jurisdiction over the Class E airspace area, each person operating an aircraft on or in the vicinity of an airport in a Class E airspace area must comply with the requirements of Section 91.126.
- (b) Departures. Each pilot of an aircraft must comply with any traffic patterns established for that airport in Part 93 of this chapter.
- (c) Communications with control towers. Unless otherwise authorized or required by ATC, no person may operate an aircraft to, from, through, or on an airport having an operational control tower unless two-way radio communications are maintained between that aircraft and the control tower. Communications must be established prior to 4 nautical miles from the airport, up to and including 2,500 feet AGL. However, if the aircraft radio fails in flight, the pilot in command may operate that aircraft and land if weather conditions are at or above basic VFR weather minimums, visual contact with the tower is maintained, and a clearance to land is received. If the aircraft radio fails while in flight under IFR, the pilot must comply with Section 91.185.

91.129 Operations in Class D airspace.

- (a) General. Unless otherwise authorized or required by the ATC facility having jurisdiction over the Class D airspace area, each person operating an aircraft in Class D airspace must comply with the applicable provisions of this section. In addition, each person must comply with Sections 91.126 and 91.127. For the purpose of this section, the primary airport is the airport for which the Class D airspace area is designated. A satellite airport is any other airport within the Class D airspace area.
- (b) Deviations. An operator may deviate from any provision of this section under the provisions of an ATC authorization issued by the ATC facility having jurisdiction over the airspace concerned. ATC may authorize a deviation on a continuing basis or for an individual flight, as appropriate.
- (c) Communications. Each person operating an aircraft in Class D airspace must meet the following two-way radio communications requirements:

- (1) Arrival or through flight. Each person must establish two-way radio communications with the ATC facility (including foreign ATC in the case of foreign airspace designated in the United States) providing air traffic services prior to entering that airspace and thereafter maintain those communications while within that airspace.
 - (2) Departing flight. Each person –
 - (i) From the primary airport or satellite airport with an operating control tower must establish and maintain two-way radio communications with the control tower, and thereafter as instructed by ATC while operating in the Class D airspace area; or
 - (ii) From a satellite airport without an operating control tower, must establish and maintain two-way radio communications with the ATC facility having jurisdiction over the Class D airspace area as soon as practicable after departing.
- (d) Communications failure. Each person who operates an aircraft in a Class D airspace area must maintain two-way radio communications with the ATC facility having jurisdiction over that area.
- (1) If the aircraft radio fails in flight under IFR, the pilot must comply with Section 91.185 of the part.
 - (2) If the aircraft radio fails in flight under VFR, the pilot in command may operate that aircraft and land if –
 - (i) Weather conditions are at or above basic VFR weather minimums;
 - (ii) Visual contact with the tower is maintained; and
 - (iii) A clearance to land is received.
- (e) Minimum altitudes when operating to an airport in Class D airspace.
- (1) Unless required by the applicable distance-from-cloud criteria, each pilot operating a large or turbine-powered airplane must enter the traffic pattern at an altitude of at least 1,500 feet above the elevation of the airport and maintain at least 1,500 feet until further descent is required for a safe landing.
 - (2) Each pilot operating a large or turbine-powered airplane approaching to land on a runway served by an instrument approach procedure with vertical guidance, if the airplane is so equipped, must:
 - (i) Operate that airplane at an altitude at or above the glide path between the published final approach fix and the decision altitude (DA), or decision height (DH), as applicable; or
 - (ii) If compliance with the applicable distance-from-cloud criteria requires glide path interception closer in, operate that airplane at or above the glide path, between the point of interception of glide path and the DA or the DH.

- (3) Each pilot operating an airplane approaching to land on a runway served by a visual approach slope indicator must maintain an altitude at or above the glide path until a lower altitude is necessary for a safe landing.
- (4) Paragraphs (e)(2) and (e)(3) of this section do not prohibit normal bracketing maneuvers above or below the glide path that are conducted for the purpose of remaining on the glide path.
- (f) Approaches. Except when conducting a circling approach under Part 97 of this chapter or unless otherwise required by ATC, each pilot must –
 - (1) Circle the airport to the left, if operating an airplane; or
 - (2) Avoid the flow of fixed-wing aircraft, if operating a helicopter.
- (g) Departures. No person may operate an aircraft departing from an airport except in compliance with the following:
 - (1) Each pilot must comply with any departure procedures established for that airport by the FAA.
 - (2) Unless otherwise required by the prescribed departure procedure for that airport or the applicable distance from clouds criteria, each pilot of a turbine-powered airplane and each pilot of a large airplane must climb to an altitude of 1,500 feet above the surface as rapidly as practicable.
- (h) Noise abatement. Where a formal runway use program has been established by the FAA, each pilot of a large or turbine-powered airplane assigned a noise abatement runway by ATC must use that runway. However, consistent with the final authority of the pilot in command concerning the safe operation of the aircraft as prescribed in Section 91.3(a), ATC may assign a different runway if requested by the pilot in the interest of safety.
- (i) Takeoff, landing, taxi clearance. No person may, at any airport with an operating control tower, operate an aircraft on a runway or taxiway, or take off or land an aircraft, unless an appropriate clearance is received from ATC.

91.130 Operations in Class C airspace.

- (a) General. Unless otherwise authorized by ATC, each aircraft operation in Class C airspace must be conducted in compliance with this section and Section 91.129. For the purpose of this section, the primary airport is the airport for which the Class C airspace area is designated. A satellite airport is any other airport within the Class C airspace area.
- (b) Traffic patterns. No person may take off or land an aircraft at a satellite airport within a Class C airspace area except in compliance with FAA arrival and departure traffic patterns.
- (c) Communications. Each person operating an aircraft in Class C airspace must meet the following two-way radio communications requirements:

- (1) Arrival or through flight. Each person must establish two-way radio communications with the ATC facility (including foreign ATC in the case of foreign airspace designated in the United States) providing air traffic services prior to entering that airspace and thereafter maintain those communications while within that airspace.
- (2) Departing flight. Each person –
 - (i) From the primary airport or satellite airport with an operating control tower must establish and maintain two-way radio communications with the control tower, and thereafter as instructed by ATC while operating in the Class C airspace area; or
 - (ii) From a satellite airport without an operating control tower, must establish and maintain two-way radio communications with the ATC facility having jurisdiction over the Class C airspace area as soon as practicable after departing.
- (d) Equipment requirements. Unless otherwise authorized by the ATC having jurisdiction over the Class C airspace area, no person may operate an aircraft within a Class C airspace area designated for an airport unless that aircraft is equipped with the applicable equipment specified in §91.215, and after January 1, 2020, §91.225.
- (e) Deviations. An operator may deviate from any provision of this section under the provisions of an ATC authorization issued by the ATC facility having jurisdiction over the airspace concerned. ATC may authorize a deviation on a continuing basis or for an individual flight, as appropriate.

91.131 Operations in Class B airspace.

- (a) Operating rules. No person may operate an aircraft within a Class B airspace area except in compliance with Section 91.129 and the following rules:
 - (1) The operator must receive an ATC clearance from the ATC facility having jurisdiction for that area before operating an aircraft in that area.
 - (2) Unless otherwise authorized by ATC, each person operating a large turbine engine-powered airplane to or from a primary airport for which a Class B airspace area is designated must operate at or above the designated floors of the Class B airspace area while within the lateral limits of that area.
 - (3) Any person conducting pilot training operations at an airport within a Class B airspace area must comply with any procedures established by ATC for such operations in that area.
- (b) Pilot requirements.
 - (1) No person may take off or land a civil aircraft at an airport within a Class B airspace area or operate a civil aircraft within a Class B airspace area unless—

- (i) The pilot in command holds at least a private pilot certificate;
 - (ii) The pilot in command holds a recreational pilot certificate and has met—
 - (A) The requirements of §61.101(d) of this chapter; or
 - (B) The requirements for a student pilot seeking a recreational pilot certificate in §61.94 of this chapter;
 - (iii) The pilot in command holds a sport pilot certificate and has met—
 - (A) The requirements of §61.325 of this chapter; or
 - (B) The requirements for a student pilot seeking a recreational pilot certificate in §61.94 of this chapter; or
 - (iv) The aircraft is operated by a student pilot who has met the requirements of §61.94 or §61.95 of this chapter, as applicable.
- (2) Notwithstanding the provisions of paragraphs (b)(1)(ii), (b)(1)(iii) and (b)(1)(iv) of this section, no person may take off or land a civil aircraft at those airports listed in section 4 of appendix D to this part unless the pilot in command holds at least a private pilot certificate.
- (c) Communications and navigation equipment requirements. Unless otherwise authorized by ATC, no person may operate an aircraft within a Class B airspace area unless that aircraft is equipped with –
- (1) For IFR operation. An operable VOR or TACAN receiver or an operable and suitable RNAV system; and
 - (2) For all operations. An operable two-way radio capable of communications with ATC on appropriate frequencies for that Class B airspace area.
- (d) Other equipment requirements. No person may operate an aircraft in a Class B airspace area unless the aircraft is equipped with –
- (1) The applicable operating transponder and automatic altitude reporting equipment specified in §91.215(a), except as provided in §91.215(e), and
 - (2) After January 1, 2020, the applicable Automatic Dependent Surveillance-Broadcast Out equipment specified in §91.225

91.133 Restricted and prohibited areas.

- (a) No person may operate an aircraft within a restricted area (designated in Part 73) contrary to the restrictions imposed, or within a prohibited area, unless that person has the permission of the using or controlling agency, as appropriate.
- (b) Each person conducting, within a restricted area, an aircraft operation (approved by the using agency) that creates the same hazards at the operations for which the restricted area was designated may deviate from the rules of the subpart that are not compatible with the operation of the aircraft.

91.135 Operations in Class A airspace.

Except as provided in paragraph (d) of this section, each person operating an aircraft in Class A airspace must conduct that operation under instrument flight rules (IFR) and in compliance with the following:

- (a) Clearance. Operations may be conducted only under an ATC clearance received prior to entering the airspace.
- (b) Communications. Unless otherwise authorized by ATC, each aircraft operating in Class A airspace must be equipped with a two-way radio capable of communicating with ATC on a frequency assigned by ATC. Each pilot must maintain two-way radio communications with ATC while operating in Class A airspace.
- (c) Equipment requirements. Unless otherwise authorized by ATC, no person may operate an aircraft within Class A airspace unless that aircraft is equipped with the applicable equipment specified in §91.215, and after January 1, 2020, §91.225
- (d) ATC authorizations. An operator may deviate from any provision of this section under the provisions of an ATC authorization issued by the ATC facility having jurisdiction of the airspace concerned. In the case of an inoperative transponder, ATC may immediately approve an operation within a Class A airspace area allowing flight to continue, if desired, to the airport of ultimate destination, including any intermediate stops, or to proceed to a place where suitable repairs can be made, or both. Requests for deviation from any provision of this section must be submitted in writing, at least 4 days before the proposed operation. ATC may authorize a deviation on a continuing basis or for an individual flight.

91.137 Temporary flight restrictions in the vicinity of disaster/hazard areas.

- (a) The Administrator will issue a Notice to Airmen (NOTAM) designating an area within which temporary flight restrictions apply and specifying the hazard or condition requiring their imposition, whenever he determines it is necessary in order to –
 - (1) Protect persons and property on the surface or in the air from a hazard associated with an incident on the surface;
 - (2) Provide a safe environment for the operation of disaster relief aircraft; or
 - (3) Prevent an unsafe congestion of sightseeing and other aircraft above an incident or event which may generate a high degree of public interest.

The Notice to Airmen will specify the hazard or condition that requires the imposition of temporary flight restrictions.

- (b) When a NOTAM has been issued under paragraph (a)(1) of this section, no person may operate an aircraft within the designated area unless that aircraft is participating in the hazard relief activities and is being operated under the direction of the official in charge of on-scene emergency response activities.

- (c) When a NOTAM has been issued under paragraph (a)(2) of this section, no person may operate an aircraft within the designated area unless at least one of the following conditions are met:
 - (1) The aircraft is participating in hazard relief activities and is being operated under the direction of the official in charge of on-scene emergency response activities.
 - (2) The aircraft is carrying law enforcement officials.
 - (3) The aircraft is operating under the ATC approved IFR flight plan.
 - (4) The operation is conducted directly to or from an airport within the area, or is necessitated by the impracticability of VFR flight above or around the area due to weather, or terrain; notification is given to the Flight Service Station (FSS) or ATC facility specified in the NOTAM to receive advisories concerning disaster relief aircraft operations; and the operation does not hamper or endanger relief activities and is not conducted for the purpose of observing the disaster.
 - (5) The aircraft is carrying properly accredited news representatives, and, prior to entering the area, a flight plan is filed with the appropriate FAA or ATC facility specified in the Notice to Airmen and the operation is conducted above the altitude used by the disaster relief aircraft, unless otherwise authorized by the official in charge of on-scene emergency response activities.

- (d) When a NOTAM has been issued under paragraph (a)(3) of this section, no person may operate an aircraft within the designated area unless at least one of the following conditions is met:
 - (1) The operation is conducted directly to or from an airport within the area, or is necessitated by the impracticability of VFR flight above or around the area due to weather or terrain, and the operation is not conducted for the purpose of observing the incident or event.
 - (2) The aircraft is operating under an ATC approved IFR flight plan.
 - (3) The aircraft is carrying incident or event personnel, or law enforcement officials.
 - (4) The aircraft is carrying properly accredited news representatives and, prior to entering that area, a flight plan is filed with the appropriate FSS or ATC facility specified in the NOTAM.

- (e) Flight plans filed and notifications made with an FSS or ATC facility under this section shall include the following information:
 - (1) Aircraft identification, type, and color.
 - (2) Radio communications frequencies to be used.
 - (3) Proposed times of entry of, and exit from, the designated area.

- (4) Name of news media or organization and purpose of flight.
- (5) Any other information requested by ATC.

91.139 Emergency air traffic rules.

- (a) This section prescribes a process for utilizing Notices to Airmen (NOTAMs) to advise of the issuance and operations under emergency air traffic rules and regulations and designates the official who is authorized to issue NOTAMs on behalf of the Administrator in certain matters under this section.
- (b) Whenever the Administrator determines that an emergency condition exists, or will exist, relating to the FAA's ability to operate the air traffic control system and during which normal flight operations under this chapter cannot be conducted consistent with the required levels of safety and efficiency –
 - (1) The Administrator issues an immediately effective air traffic rule or regulation in response to that emergency condition; and
 - (2) The Administrator or the Associate Administrator for Air Traffic may utilize the NOTAM system to provide notification of the issuance of the rule or regulation.

Those NOTAMs communicate information concerning the rules and regulations that govern flight operations, the use of navigation facilities, and designation of that airspace in which the rules and regulations apply.

- (c) When a NOTAM has been issued under this section, no person may operate an aircraft, or other device governed by the regulation concerned, within the designated airspace except in accordance with the authorizations, terms, and conditions prescribed in the regulation covered by the NOTAM.

91.141 Flight restrictions in the proximity of the Presidential and other parties.

No person may operate an aircraft over or in the vicinity of any area to be visited or traveled by the President, the Vice President, or other public figures contrary to the restrictions established by the Administrator and published in a Notice to Airmen (NOTAM).

91.143 Flight limitation in the proximity of space flight operations.

When a Notice to Airmen (NOTAM) is issued in accordance with this section, no person may operate any aircraft of U.S. registry, or pilot any aircraft under the authority of an airman certificate issued by the Federal Aviation Administration, within areas designated in a NOTAM for space flight operation except when authorized by ATC.

91.144 Temporary restriction on flight operations during abnormally high barometric pressure conditions.

- (a) Special flight restrictions. When any information indicates that barometric pressure on the route of flight currently exceeds or will exceed 31 inches of mercury, no person may operate an aircraft or initiate a flight contrary to the requirements established by the Administrator and published in a Notice to Airmen issued under this section.
- (b) Waivers. The Administrator is authorized to waive any restriction issued under paragraph (a) of this section to permit emergency supply, transport, or medical services to be delivered to isolated communities, where the operation can be conducted with an acceptable level of safety.

VISUAL FLIGHT RULES

91.153 VFR flight plan: Information required.

- (a) Information required. Unless otherwise authorized by ATC, each person filing a VFR flight plan shall include in it the following information:
 - (1) The aircraft identification number and, if necessary, its radio call sign.
 - (2) The type of the aircraft or, in the case of a formation flight, the type of each aircraft and the number of aircraft in the formation.
 - (3) The full name and address of the pilot in command or, in the case of a formation flight, the formation commander.
 - (4) The point and proposed time of departure.
 - (5) The proposed route, cruising altitude (or flight level), and true airspeed at that altitude.
 - (6) The point of first intended landing and the estimated elapsed time until over that point.
 - (7) The amount of fuel on board (in hours).
 - (8) The number of persons in the aircraft, except where that information is otherwise readily available to the FAA.
 - (9) Any other information the pilot in command or ATC believes is necessary for ATC purposes.
- (b) Cancellation. When a flight plan has been activated, the pilot in command, upon canceling or completing the flight under the flight plan, shall notify an FAA Flight Service Station or ATC facility.

91.155 Basic VFR weather minimums.

- (a) Except as provided in paragraph (b) of this section and §91.157, no person may operate an aircraft under VFR when the flight visibility is less, or at a distance from clouds that is less, than that prescribed for the corresponding altitude and class of airspace in the following table:

Airspace	Flight visibility	Distance from clouds
Class A.....	Not Applicable.	Not Applicable.
Class B.....	3 statute miles.	Clear of clouds.
Class C.....	3 statute miles.	500 feet below. 1,000 feet above. 2,000 feet horizontal.
Class D.....	3 statute miles.	500 feet below. 1,000 feet above. 2,000 feet horizontal.
Class E: Less than 10,000 feet MSL.....	3 statute miles.	500 feet below. 1,000 feet above. 2,000 feet horizontal.
At or above 10,000 feet MSL..	5 statute miles.	1,000 feet below. 1,000 feet above. 1 statute mile horizontal.
Class G: 1,200 feet or less above the surface (regardless of MSL altitude). Day, except as provided in Section 91.155 (b).....	1 statute mile.	Clear of clouds.
Night, except as provided in Section 91.155 (b).....	3 statute miles.	500 feet below. 1,000 feet above. 2,000 feet horizontal.
More than 1,200 feet above the surface but less than 10,000 feet MSL. Day.....	1 statute mile.	500 feet below. 1,000 feet above. 2,000 feet horizontal.
Night.....	3 statute miles.	500 feet below. 1,000 feet above. 2,000 feet horizontal.
More than 1,200 feet above the surface and at or above 10,000 feet MSL.	5 statute miles.	1,000 feet below. 1,000 feet above. 1 statute mile horizontal.

- (b) Class G Airspace. Notwithstanding the provisions of paragraph (a) of this section, the following operations may be conducted in Class G airspace below 1,200 feet above the surface:
 - (1) Helicopter. A helicopter may be operated clear of clouds in an airport traffic pattern within 1/2 mile of the runway or helipad of intended landing if the flight visibility is not less than 1/2 statute mile.
 - (2) Airplane, powered parachute, or weight-shift-control aircraft. If the visibility is less than 3 statute miles but not less than 1 statute mile during night hours and you are operating in an airport traffic pattern within 1/2 mile of the runway, you may operate an airplane, powered parachute, or weight-shift-control aircraft clear of clouds.
- (c) Except as provided in §91.157, no person may operate an aircraft beneath the ceiling under VFR within the lateral boundaries of controlled airspace designated to the surface for an airport when the ceiling is less than 1,000 feet.
- (d) Except as provided in §91.157 of this part, no person may take off or land an aircraft, or enter the traffic pattern of an airport, under VFR, within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport –
 - (1) Unless ground visibility at that airport is at least 3 statute miles; or
 - (2) If ground visibility is not reported at that airport, unless flight visibility during landing or takeoff, or while operating in the traffic pattern is at least 3 statute miles.
- (e) For the purpose of this section, an aircraft operating at the base altitude of a Class E airspace area is considered to be within the airspace directly below that area.

91.157 Special VFR weather minimums.

- (a) Except as provided in Appendix D, Section 3, of this part, special VFR operations may be conducted under the weather minimums and requirements of this section, instead of those contained in §91.155, below 10,000 feet MSL within the airspace contained by the upward extension of the lateral boundaries of the controlled airspace designated to the surface for an airport.
- (b) Special VFR operations may only be conducted –
 - (1) With an ATC clearance;
 - (2) Clear of clouds;
 - (3) Except for helicopters, when flight visibility is at least 1 statute mile; and
 - (4) Except for helicopters, between sunrise and sunset (or in Alaska, when the sun is 6 degrees or more below the horizon) unless –

- (i) The person being granted the ATC clearance meets the applicable requirements for instrument flight under Part 61 of this chapter; and
 - (ii) The aircraft is equipped as required in §91.205(d).
- (c) No person may take off or land an aircraft (other than a helicopter) under special VFR –
 - (1) Unless ground visibility is at least 1 statute mile; or
 - (2) If ground visibility is not reported, unless flight visibility is at least 1 statute mile. For the purposes of this paragraph, the term flight visibility includes the visibility from the cockpit of an aircraft in takeoff position if:
 - (i) The flight is conducted under this Part 91; and
 - (ii) The airport at which the aircraft is located is a satellite airport that does not have weather reporting capabilities.
- (d) The determination of visibility by a pilot in accordance with paragraph (c)(2) of this section is not an official weather report or an official ground visibility report.

91.159 VFR cruising altitude or flight level.

Except while holding in a holding pattern of 2 minutes or less, or while turning, each person operating an aircraft under VFR in level cruising flight more than 3,000 feet above the surface shall maintain the appropriate altitude or flight level prescribed below, unless otherwise authorized by ATC:

- (a) When operating below 18,000 feet MSL and –
 - (1) On a magnetic course of zero degrees through 179 degrees, any odd thousand foot MSL altitude +500 feet (such as 3,500, 5,500, or 7,500); or
 - (2) On a magnetic course of 180 degrees through 359 degrees, any even thousand foot MSL altitude +500 feet (such as 4,500, 6,500, or 8,500).
- (b) When operating above 18,000 feet MSL, maintain the altitude or flight level assigned by ATC.

INSTRUMENT FLIGHT RULES

91.169 IFR flight plan: Information required.

- (a) Information required. Unless otherwise authorized by ATC, each person filing an IFR flight plan must include in it the following information:
 - (1) Information required under §91.153(a) of this part;
 - (2) Except as provided in paragraph (b) of this section, an alternate airport.
- (b) Paragraph (a)(2) of this section does not apply if:
 - (1) Part 97 of this chapter prescribes a standard instrument approach procedure to, or a special instrument approach procedure has been issued by the Administrator to the operator for, the first airport of intended landing; and
 - (2) Appropriate weather reports or weather forecasts, or a combination of them, indicate the following:
 - (i) For aircraft other than helicopters. For at least 1 hour before and for 1 hour after the estimated time of arrival, the ceiling will be at least 2,000 feet above the airport elevation and the visibility will be at least 3 statute miles.
 - (ii) For helicopters. At the estimated time of arrival and for 1 hour after the estimated time of arrival, the ceiling will be at least 1,000 feet above the airport elevation, or at least 400 feet above the lowest applicable approach minima, whichever is higher, and the visibility will be at least 2 statute miles.
- (c) IFR alternate airport weather minima. Unless otherwise authorized by the Administrator, no person may include an alternate airport in an IFR flight plan unless appropriate weather reports or weather forecasts, or a combination of them, indicate that, at the estimated time of arrival at the alternate airport, the ceiling and visibility at that airport will be at or above the following weather minima:
 - (1) If an instrument approach procedure has been published in Part 97 of this chapter, or a special instrument approach procedure has been issued by the Administrator to the operator, for that airport, the following minima:
 - (i) For aircraft other than helicopters: The alternate airport minima specified in that procedure, or if none are specified the following standard approach minima:
 - (A) For a precision approach procedure. Ceiling 600 feet and visibility 2 statute miles.

- (B) For a nonprecision approach procedure. Ceiling 800 feet and visibility 2 statute miles.
- (ii) For helicopters. Ceiling 200 feet above the minimum for the approach to be flown, and visibility at least 1 statute mile but never less than the minimum visibility for the approach to be flown, and
- (2) If no instrument approach procedure has been published in Part 97 of this chapter and no special instrument approach procedure has been issued by the Administrator to the operator, for the alternate airport, the ceiling and visibility minima are those allowing descent from the MEA, approach, and landing under basic VFR.
- (d) Cancellation. When a flight plan has been activated, the pilot in command, upon canceling or completing the flight under the flight plan, shall notify an FAA Flight Service Station or ATC facility.

91.173 ATC clearance and flight plan required.

No person may operate an aircraft in controlled airspace under IFR unless that person has –

- (a) Filed an IFR flight plan; and
- (b) Received an appropriate ATC clearance.

91.175 Takeoff and landing under IFR.

- (a) Instrument approaches to civil airports. Unless otherwise authorized by the FAA, when it is necessary to use an instrument approach to a civil airport, each person operating an aircraft must use a standard instrument approach procedure prescribed in part 97 of this chapter for that airport. This paragraph does not apply to United States military aircraft.
- (b) Authorized DA/DH or MDA. For the purpose of this section, when the approach procedure being used provides for and requires the use of a DA/DH or MDA, the authorized DA/DH or MDA is the highest of the following:
 - (1) The DA/DH or MDA prescribed by the approach procedure.
 - (2) The DA/DH or MDA prescribed for the pilot in command.
 - (3) The DA/DH or MDA appropriate for the aircraft equipment available and used during the approach.
- (c) Operation below DA/DH or MDA. Except as provided in §91.176 of this chapter, where a DA/DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, below the authorized MDA or continue an approach below the authorized DA/DH unless –

- (1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and for operations conducted under Part 121 or Part 135 unless that descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;
 - (2) The flight visibility is not less than the visibility prescribed in the standard instrument approach being used; and
 - (3) Except for a Category II or Category III approach where any necessary visual reference requirements are specified by the Administrator, at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:
 - (i) The approach light system, except that the pilot may not descend below 100 feet above the touchdown zone elevation using the approach lights as a reference unless the red terminating bars or the red side row bars are also distinctly visible and identifiable.
 - (ii) The threshold.
 - (iii) The threshold markings.
 - (iv) The threshold lights.
 - (v) The runway end identifier lights.
 - (vi) The visual glide slope indicator.
 - (vii) The touchdown zone or touchdown zone markings.
 - (viii) The touchdown zone lights.
 - (ix) The runway or runway markings.
 - (x) The runway lights.
- (d) Landing. No pilot operating an aircraft, except a military aircraft of the United States, may land that aircraft when—
- (1) For operations conducted under §91.176 of this part, the requirements of paragraphs (a)(3)(iii) or (b)(3)(iii), as applicable, of that section are not met; or
 - (2) For all other operations under this part and parts 121, 125, 129, and 135, the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used.
- (e) Missed approach procedures. Each pilot operating an aircraft, except a military aircraft of the United States, shall immediately execute an appropriate missed approach procedure when either of the following conditions exist:

- (1) Whenever operating an aircraft pursuant to paragraph (c) of this section or §91.176 of this part and the requirements of that paragraph are not met at either of the following times:
 - (i) When the aircraft is being operated below MDA; or
 - (ii) Upon arrival at the missed approach point, including a DA/DH where a DA/DH is specified and its use is required, and at any time after that until touchdown.
 - (2) Whenever an identifiable part of the airport is not distinctly visible to the pilot during a circling maneuver at or above MDA, unless the inability to see an identifiable part of the airport results only from a normal bank of the aircraft during the circling approach.
- (f) Civil airport takeoff minimums. This paragraph applies to persons operating an aircraft under Part 121, 125, 129, or 135 of this chapter.
- (1) Unless otherwise authorized by the FAA, no pilot may takeoff from a civil airport under IFR unless the weather conditions at time of takeoff are at or above the weather minimums for IFR takeoff prescribed for that airport under Part 97 of this chapter.
 - (2) If takeoff weather minimums are not prescribed under Part 97 of this chapter for a particular airport, the following weather minimums apply to takeoffs under IFR:
 - (i) For aircraft, other than helicopters, having two engines or less—1 statute mile visibility.
 - (ii) For aircraft having more than two engines—1/2 statute mile visibility.
 - (iii) For helicopters—1/2 statute mile visibility.
 - (3) Except as provided in paragraph (f)(4) of this section, no pilot may takeoff under IFR from a civil airport having published obstacle departure procedures (ODPs) under Part 97 of this chapter for the takeoff runway to be used, unless the pilot uses such ODPs or an alternative procedure or route assigned by air traffic control.
 - (4) Notwithstanding the requirements of paragraph (f)(3) of this section, no pilot may takeoff from an airport under IFR unless:
 - (i) For Part 121 and Part 135 operators, the pilot uses a takeoff obstacle clearance or avoidance procedure that ensures compliance with the applicable airplane performance operating limitations requirements under Part 121, subpart I or part 135, subpart I for takeoff at that airport; or
 - (i) For Part 129 operators, the pilot uses a takeoff obstacle clearance or avoidance procedure that ensures compliance with the airplane

performance operating limitations prescribed by the State of the operator for takeoff at that airport.

- (g) Military airports. Unless otherwise prescribed by the Administrator, each person operating a civil aircraft under IFR into or out of a military airport shall comply with the instrument approach procedures and the takeoff and landing minimum prescribed by the military authority having jurisdiction of that airport.
- (h) Comparable values of RVR and ground visibility.
 - (1) Except for Category II or Category III minimums, if RVR minimums for takeoff or landing are prescribed in an instrument approach procedure, but RVR is not reported for the runway of intended operation, the RVR minimum shall be converted to ground visibility in accordance with the table in paragraph (h)(2) of this section and shall be the visibility minimum for takeoff or landing on that runway.

(2)

RVR (feet)	Visibility (statute miles)
1,600	1/4
2,400	1/2
3,200	5/8
4,000	3/4
4,500	7/8
5,000	1
6,000	1 1/4

- (i) Operations on unpublished routes and use of radar in instrument approach procedures. When radar is approved at certain locations for ATC purposes, it may be used not only for surveillance and precision radar approaches, as applicable, but also may be used in conjunction with instrument approach procedures predicated on other types of radio navigational aids. Radar vectors may be authorized to provide course guidance through the segments of an approach to the final course or fix. When operating on an unpublished route or while being radar vectored, the pilot, when an approach clearance is received, shall, in addition to complying with §91.177, maintain the last altitude assigned to that pilot until the aircraft is established on a segment of a published route or instrument approach procedure unless a different altitude is assigned by ATC. After the aircraft is so established, published altitudes apply to descent within each succeeding route or approach segment unless a different altitude is assigned by ATC. Upon reaching the final approach course or fix, the pilot may either complete the instrument approach in accordance with a procedure approved for the facility or continue a surveillance or precision radar approach to a landing.
- (j) Limitation on procedure turns. In the case of a radar vector to a final approach course or fix, a timed approach from a holding fix, or an approach for which the procedure specifies “No PT,” no pilot may make a procedure turn unless cleared to do so by ATC.

- (k) ILS components. The basic components of an ILS are the localizer, glide slope, and outer marker, and, when installed for use with Category II or Category III instrument approach procedures, an inner marker. The following means may be used to substitute for the outer marker: Compass locator; precision approach radar (PAR) or airport surveillance radar (ASR); DME, VOR, or nondirectional beacon fixes authorized in the standard instrument approach procedure; or a suitable RNAV system in conjunction with a fix identified in the standard instrument approach procedure. Applicability of, and substitution for, the inner marker for a Category II or III approach is determined by the appropriate 14 CFR Part 97 approach procedure, letter of authorization, or operations specifications issued to an operator.
- (l) Approach to straight-in landing operations below DH, or MDA using an enhanced flight vision system (EFVS). For straight-in instrument approach procedures other than Category II or Category III, no pilot operating under this section or §§121.651, 125.381, and 135.225 of this chapter may operate an aircraft at any airport below the authorized MDA or continue an approach below the authorized DH and land unless—
- (1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and, for operations conducted under Part 121 or Part 135 of this chapter, the descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;
 - (2) The pilot determines that the enhanced flight visibility observed by use of a certified enhanced flight vision system is not less than the visibility prescribed in the standard instrument approach procedure being used;
 - (3) The following visual references for the intended runway are distinctly visible and identifiable to the pilot using the enhanced flight vision system:
 - (i) The approach light system (if installed); or
 - (ii) The following visual references in both paragraphs (l)(3)(ii)(A) and (B) of this section:
 - (A) The runway threshold, identified by at least one of the following:
 - (1) The beginning of the runway landing surface;
 - (2) The threshold lights; or
 - (3) The runway end identifier lights.
 - (B) The touchdown zone, identified by at least one of the following:
 - (1) The runway touchdown zone landing surface;
 - (2) The touchdown zone lights;

- (3) The touchdown zone markings; or
 - (4) The runway lights.
- (4) At 100 feet above the touchdown zone elevation of the runway of Intended landing and below that altitude, the flight visibility must be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the enhanced flight vision system to continue to a landing:
- (i) The lights or markings of the threshold; or
 - (ii) The lights or markings of the touchdown zone;
- (5) The pilot(s) is qualified to use an EFVS as follows—
- (i) For Parts 119 and 125 certificate holders, the applicable training, testing and qualification provisions of Parts 121, 125, and 135 of this chapter;
 - (ii) For foreign persons, in accordance with the requirements of the civil aviation authority of the State of the operator; or
 - (iii) For persons conducting any other operation, in accordance with The applicable currency and proficiency requirements of Part 61 of this chapter;
- (6) For Parts 119 and 125 certificate holders, and Part 129 operations specifications holders, their operations specifications authorize use of EFVS; and
- (7) The aircraft is equipped with, and the pilot uses, an enhanced flight vision system, the display of which is suitable for maneuvering the aircraft and has either an FAA type design approval or, for a foreign-registered aircraft, the EFVS complies with all of the EFVS requirements of this chapter.
- (m) For purposes of this section, “enhanced flight vision system” (EFVS) is an installed airborne system comprised of the following features and characteristics:
- (1) An electronic means to provide a display of the forward external scene topography (the natural or manmade features of a place or region especially in a way to show their relative positions and elevation) through the use of imaging sensors, such as a forward-looking infrared, millimeter wave radiometry, millimeter wave radar, and low-light level image intensifying;
 - (2) The EFVS sensor imagery and aircraft flight symbology (*i.e.*, at least airspeed, vertical speed, aircraft attitude, heading, altitude, command guidance as appropriate for the approach to be flown, path deviation indications, and flight path vector, and flight path angle reference cue) are presented on a head-up display, or an equivalent display, so that they are clearly visible to the pilot flying in his or her normal position and line of vision and looking forward along the flight path, to include:

- (i) The displayed EFVS imagery, attitude symbology, flight path vector, and flight path angle reference cue, and other cues, which are referenced to this imagery and external scene topography, must be presented so that they are aligned with and scaled to the external view; and
- (ii) The flight path angle reference cue must be displayed with the pitch scale, selectable by the pilot to the desired descent angle for the approach, and suitable for monitoring the vertical flight path of the aircraft on approaches without vertical guidance; and
- (iii) The displayed imagery and aircraft flight symbology do not adversely obscure the pilot's outside view or field of view through the cockpit window;
- (3) The EFVS includes the display element, sensors, computers and power supplies, indications, and controls. It may receive inputs from an airborne navigation system or flight guidance system; and
- (4) The display characteristics and dynamics are suitable for manual control of the aircraft.

91.177 Minimum altitudes for IFR operations.

- (a) Operation of aircraft at minimum altitudes. Except when necessary for takeoff or landing, or unless otherwise authorized by the FAA, no person may operate an aircraft under IFR below –
 - (1) The applicable minimum altitudes prescribed in Parts 95 and 97 of this chapter; However, if both a MEA and a MOCA are prescribed for a particular route or route segment, a person may operate an aircraft below the MEA down to, but not below, the MOCA, provided the applicable navigation signals are available. For aircraft using VOR for navigation, this applies only when the aircraft is within 22 nautical miles of that VOR (based on the reasonable estimate by the pilot operating the aircraft of that distance); or
 - (2) If no applicable minimum altitude is prescribed in parts 95 and 97 of this chapter, then –
 - (i) In the case of operations over an area designated as a mountainous area in part 95 of this chapter, an altitude of 2,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown; or
 - (ii) In any other case, an altitude of 1,000 feet above the highest obstacle within a horizontal distance of 4 nautical miles from the course to be flown. .
- (b) Climb. Climb to a higher minimum IFR altitude shall begin immediately after passing the point beyond which that minimum altitude applies, except that when ground obstructions intervene, the point beyond which the higher minimum altitude applies shall be crossed at or above the applicable MCA.

91.179 IFR cruising altitude or flight level.

Unless otherwise authorized by ATC, the following rules apply—

- (a) In controlled airspace. Each person operating an aircraft under IFR in level cruising flight in controlled airspace shall maintain the altitude or flight level assigned that aircraft by ATC. However, if the ATC clearance assigns “VFR conditions on-top,” that person shall maintain an altitude or flight level as prescribed by §91.159.
- (b) In uncontrolled airspace. Except while in a holding pattern of 2 minutes or less or while turning, each person operating an aircraft under IFR in level cruising flight in uncontrolled airspace shall maintain an appropriate altitude as follows:
 - (1) When operating below 18,000 feet MSL and –
 - (i) On a magnetic course of zero degrees through 179 degrees, any odd thousand foot MSL altitude (such as 3,000, 5,000, or 7,000); or
 - (ii) On a magnetic course of 180 degrees through 359 degrees, any even thousand foot MSL altitude (such as 2,000, 4,000, or 6,000).
 - (2) When operating at or above 18,000 feet MSL but below flight level 290, and –
 - (i) On a magnetic course of zero degrees through 179 degrees, any odd flight level (such as 190, 210, or 230); or
 - (ii) On a magnetic course of 180 degrees through 359 degrees, any even flight level (such as 180, 200, or 220).
 - (3) When operating at flight level 290 and above in non-RVSM airspace, and—
 - (i) On a magnetic course of zero degrees through 179 degrees, any flight level, at 4,000-foot intervals, beginning at and including flight level 290 (such as flight level 290, 330, or 370); or
 - (ii) On a magnetic course of 180 degrees through 359 degrees, any flight level, at 4,000-foot intervals, beginning at and including flight level 310 (such as flight level 310, 350, or 390).
 - (4) When operating at flight level 290 and above in airspace designated as Reduced Vertical Separation Minimum (RVSM) airspace and—
 - (i) On a magnetic course of zero degrees through 179 degrees, any odd flight level, at 2,000-foot intervals beginning at and including flight level 290 (such as flight level 290, 310, 330, 350, 370, 390, 410); or
 - (ii) On a magnetic course of 180 degrees through 359 degrees, any even flight level, at 2000-foot intervals beginning at and including flight level 300 (such as 300, 320, 340, 360, 380, 400).

91.181 Course to be flown.

Unless otherwise authorized by ATC, no person may operate an aircraft within controlled airspace under IFR except as follows:

- (a) On an ATS route, along the centerline of that airway.
- (b) On any other route, along the direct course between the navigational aids or fixes defining that route. However, this section does not prohibit maneuvering the aircraft to pass well clear of other air traffic or the maneuvering of the aircraft in VFR conditions to clear the intended flight path both before and during climb or descent.

91.183 IFR radio communications.

Unless otherwise authorized by ATC, the pilot in command of each aircraft operated under IFR in controlled airspace must ensure that a continuous watch is maintained on the appropriate frequency and must report the following as soon as possible—

- (a) The time and altitude of passing each designated reporting point, or the reporting points specified by ATC, except that while the aircraft is under radar control, only the passing of those reporting points specifically requested by ATC need be reported;
- (b) Any unforecast weather conditions encountered; and
- (c) Any other information relating to the safety of flight.

91.185 IFR operations: Two-way radio communications failure.

- (a) General. Unless otherwise authorized by ATC, each pilot who has two-way radio communications failure when operating under IFR shall comply with the rules of this section.
- (b) VFR conditions. If the failure occurs in VFR conditions, or if VFR conditions are encountered after the failure, each pilot shall continue the flight under VFR and land as soon as practicable.
- (c) IFR conditions. If the failure occurs in IFR conditions, or if paragraph (b) of this section cannot be complied with, each pilot shall continue the flight according to the following:
 - (1) Route.
 - (i) By the route assigned in the last ATC clearance received;
 - (ii) If being radar vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;
 - (iii) In the absence of an assigned route, by the route that ATC has advised may be expected in a further clearance; or

- (iv) In the absence of an assigned route or a route that ATC has advised may be expected in a further clearance, by the route filed in the flight plan.
- (2) Altitude. At the highest of the following altitudes or flight levels for the route segment being flown:
- (i) The altitude or flight level assigned in the last ATC clearance received;
 - (ii) The minimum altitude (converted, if appropriate, to minimum flight level as prescribed in §91.121(c)) for IFR operations; or
 - (iii) The altitude or flight level ATC has advised may be expected in a further clearance.
- (3) Leave clearance limit.
- (i) When the clearance limit is a fix from which an approach begins, commence descent or descent and approach as close as possible to the expect-further-clearance time if one has been received, or if one has not been received, as close as possible to the estimated time of arrival as calculated from the filed or amended (with ATC) estimated time en route.
 - (ii) If the clearance limit is not a fix from which an approach begins, leave the clearance limit at the expect-further-clearance time if one has been received, or if none has been received, upon arrival over the clearance limit, and proceed to a fix from which an approach begins and commence descent or descent and approach as close as possible to the estimated time of arrival as calculated from the filed or amended (with ATC) estimated time en route.

91.187 Operation under IFR in controlled airspace; Malfunction reports.

- (a) The pilot in command of each aircraft operated in controlled airspace under IFR shall report as soon as practical to ATC any malfunctions of navigational, approach, or communication equipment occurring in flight.
- (b) In each report required by paragraph (a) of this section, the pilot in command shall include the –
 - (1) Aircraft identification;
 - (2) Equipment affected;
 - (3) Degree to which the capability of the pilot to operate under IFR in the ATC system is impaired; and
 - (4) Nature and extent of assistance desired from ATC.

SUBPART C – EQUIPMENT, INSTRUMENT, AND CERTIFICATE REQUIREMENTS

91.209 Aircraft lights.

No person may:

- (a) During the period from sunset to sunrise (or, in Alaska, during the period a prominent unlighted object cannot be seen from a distance of 3 statute miles or the sun is more than 6 degrees below the horizon) –
 - (1) Operate an aircraft unless it has lighted position lights;
 - (2) Park or move an aircraft in, or in dangerous proximity to, a night flight operations area of an airport unless the aircraft –
 - (i) Is clearly illuminated;
 - (ii) Has lighted position lights; or
 - (iii) Is in an area that is marked by obstruction lights;
 - (3) Anchor an aircraft unless the aircraft –
 - (i) Has lighted anchor lights; or
 - (ii) Is in an area where anchor lights are not required on vessels; or
- (b) Operate an aircraft that is equipped with an anticollision light system, unless it has lighted anticollision lights. However, the anticollision lights need not be lighted when the pilot-in-command determines that, because of operating conditions, it would be in the interest of safety to turn the light off.

SUBPART D – SPECIAL FLIGHT OPERATIONS

91.303 Aerobatic flight.

No person may operate an aircraft in aerobatic flight –

- (a) Over any congested area of a city, town, or settlement;
- (b) Over an open air assembly of persons;
- (c) Within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport;
- (d) Within 4 nautical miles of the center line of any Federal airway;

- (e) Below an altitude of 1,500 feet above the surface; or
- (f) When flight visibility is less than 3 statute miles.

For the purposes of this section, aerobatic flight means an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight.

91.305 Flight test areas.

No person may flight test an aircraft except over open water, or sparsely populated areas, having light air traffic.

SUBPART H – FOREIGN AIRCRAFT OPERATIONS AND OPERATIONS OF U.S.-REGISTERED CIVIL AIRCRAFT OUTSIDE OF THE UNITED STATES; AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

91.707 Flights between Mexico or Canada and the United States.

Unless otherwise authorized by ATC, no person may operate a civil aircraft between Mexico or Canada and the United States without filing an IFR or VFR flight plan, as appropriate.

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APPENDIX D PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE, FAA-H-8083-25 (EXCERPTS)

FOR TRAINING PURPOSES ONLY

CHAPTER 15 – NAVIGATION

Aeronautical Charts

An aeronautical chart is the road map for a pilot flying under VFR. The chart provides information which allows pilots to track their position and provides available information which enhances safety. The three aeronautical charts used by VFR pilots are:

- Sectional
- VFR Terminal Area
- World Aeronautical

A free catalog listing aeronautical charts and related publications including prices and instructions for ordering is available at the National Aeronautical Charting Group (NACG) web site: www.naco.faa.gov.

Sectional Charts

Sectional charts are the most common charts used by pilots today. The charts have a scale of 1:500,000 (1 inch = 6.86 nautical miles (NM) or approximately 8 statute miles (SM)) which allows for more detailed information to be included on the chart.

The charts provide an abundance of information, including airport data, navigational aids, airspace, and topography. Figure 16-1 is an excerpt from the legend of a sectional chart. By referring to the chart legend, a pilot can interpret most of the information on the chart. A pilot should also check the chart for other legend information, which includes air traffic control (ATC) frequencies and information on airspace. These charts are revised semiannually except for some areas outside the conterminous United States where they are revised annually.

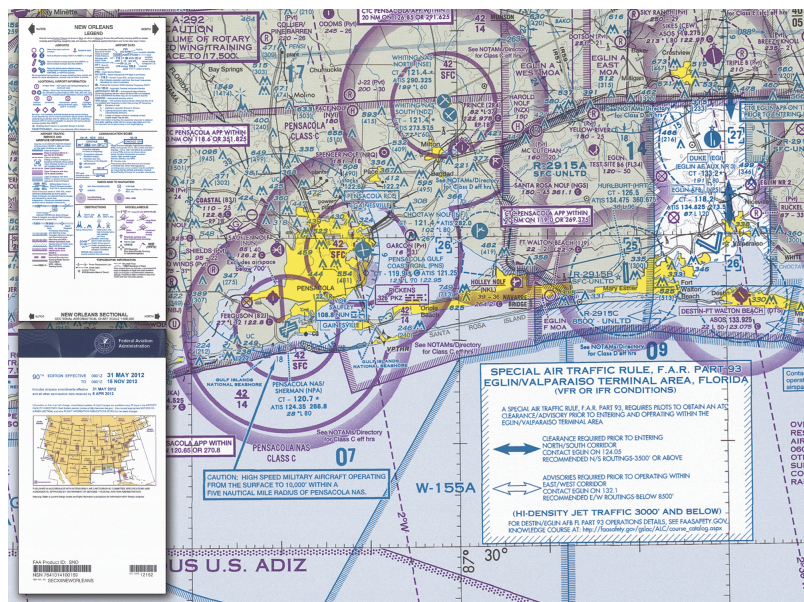


Figure 16-1. Sectional chart and legend.

VFR Terminal Area Charts

VFR terminal area charts are helpful when flying in or near Class B airspace. They have a scale of 1:250,000 (1 inch = 3.43 NM or approximately 4 SM). These charts provide a more detailed display of topographical information and are revised semiannually, except for several Alaskan and Caribbean charts. [Figure 16-2]

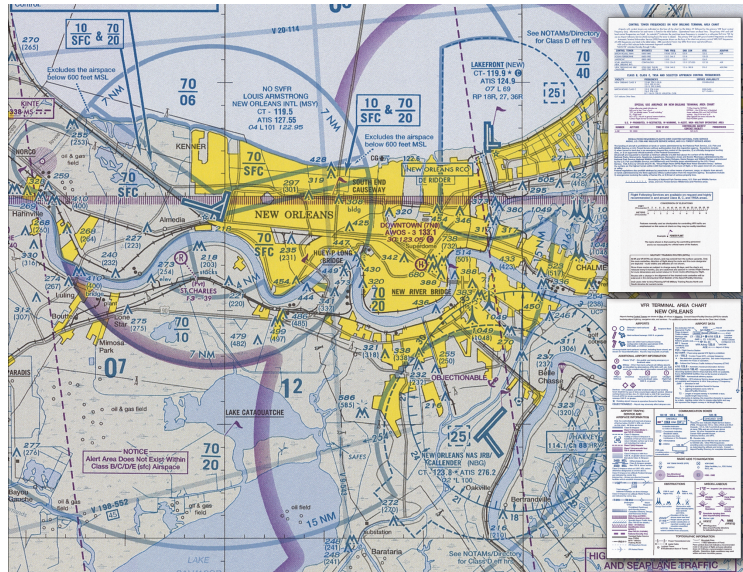


Figure 16-2. VFR Terminal Area Chart and legend.

World Aeronautical Charts

World aeronautical charts are designed to provide a standard series of aeronautical charts, covering land areas of the world, at a size and scale convenient for navigation by moderate speed aircraft. They are produced at a scale of 1:1,000,000 (1 inch = 13.7 NM or approximately 16 SM). These charts are similar to sectional charts and the symbols are the same except there is less detail due to the smaller scale. [Figure 16-3]

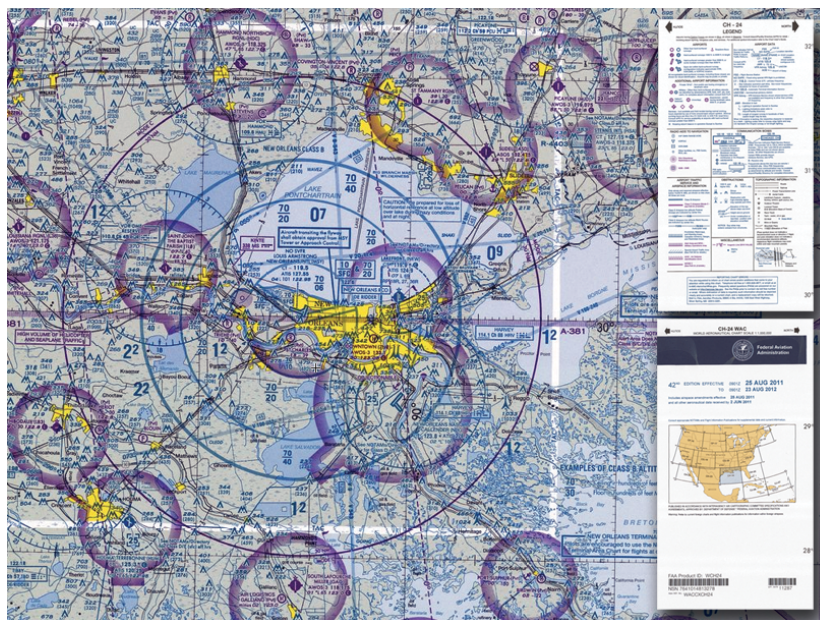


Figure 16-3. World aeronautical chart.

These charts are revised annually except several Alaskan charts and the Mexican/Caribbean charts which are revised every 2 years.

Latitude and Longitude (Meridians and Parallels)

The equator is an imaginary circle equidistant from the poles of the Earth. Circles parallel to the equator (lines running east and west) are parallels of latitude. They are used to measure degrees of latitude north (N) or south (S) of the equator. The angular distance from the equator to the pole is one-fourth of a circle or 90° . The 48 conterminous states of the United States are located between 25° and 49° N latitude. The arrows in *Figure 16-4* labeled "Latitude" point to lines of latitude.

Meridians of longitude are drawn from the North Pole to the South Pole and are at right angles to the Equator. The "Prime Meridian" which passes through Greenwich, England, is used as the zero line from which measurements are made in degrees east (E) and west (W) to 180° . The 48 conterminous states of the United States are between 67° and 125° W longitude. The arrows in *Figure 16-4* labeled "Longitude" point to lines of longitude. Any specific geographical point can be located by reference to its longitude and latitude. Washington, D.C., for example, is approximately 39° N latitude, 77° W longitude. Chicago is approximately 42° N latitude, 88° W longitude.



Figure 16-4. Meridians and parallels - the basis of measuring time, distance, and direction.

Variation

Variation is the angle between true north and magnetic north. It is expressed as east variation or west variation depending upon whether magnetic north (MN) is to the east or west of true north (TN).

The north magnetic pole is located close to 71° N latitude, 96° W longitude and is about 1,300 miles from the geographic or true north pole *as indicated in figure 16-8*. If the Earth were uniformly magnetized, the compass needle would point toward the magnetic pole, in which case the variation between true north (as shown by the geographical meridians) and magnetic north (as shown by the magnetic meridians) could be measured at any intersection of the meridians.

Actually, the Earth is not uniformly magnetized. In the United States, the needle usually points in the general direction of the magnetic pole, but it may vary in certain geographical localities by many degrees. Consequently, the exact amount of variation at thousands of selected locations in the United States has been carefully determined. The amount and direction of variation, which change slightly from time to time, are shown on most aeronautical charts as broken magenta lines, called isogonic lines, which connect points of equal magnetic variation. (The line connecting points at which there is no variation between north and magnetic north is the agonic line.) An isogonic chart is shown in *Figure 16-9*. Minor bends and turns in the isogonic and agonic lines are caused by unusual geological conditions affecting magnetic forces in these areas.

On the west coast of the United States, the compass needle points to the east of true north; on the east coast, the compass needle points to the west of true north.

Zero degree variation exists on the agonic line, where magnetic north and true north coincide. This line runs roughly west of the Great Lakes, south through Wisconsin, Illinois, western Tennessee, and along the border of Mississippi and Alabama.

Because courses are measured in reference to geographical meridians which point toward true north, and these courses are maintained by reference to the compass which points along a magnetic meridian in the general direction of magnetic north, the true direction must be converted into magnetic direction for the purpose of flight. This conversion is made by adding or subtracting the variation which is indicated by the nearest isogonic line on the chart.

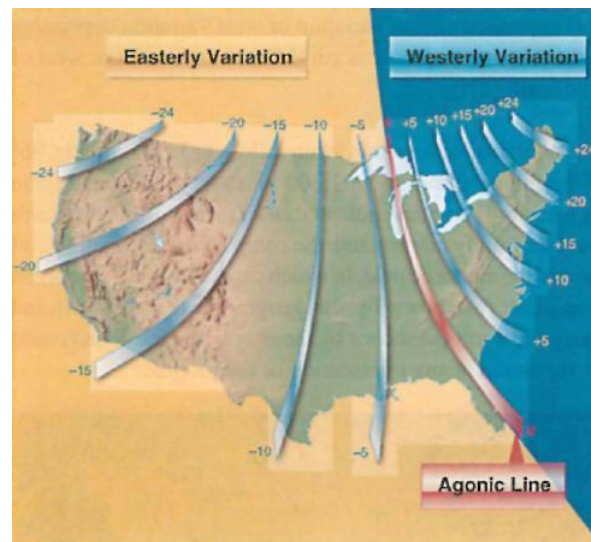


Figure 16-9. Note the agonic line where magnetic variation is zero

Very High Frequency (VHF) Omnidirectional Range (VOR)

The VOR system is present in three slightly different navigation aids (NAVAIDs): VOR, VOR/DME, and VORTAC. By itself it is known as a VOR, and it provides magnetic bearing information to and from the station. When DME is also installed with a VOR, the NAVAID is referred to as a VOR/DME. When military tactical air navigation (TACAN) equipment is installed with a VOR, the NAVAID is known as a VORTAC. DME is always an integral part of a VORTAC. Regardless of the type of NAVAID utilized (VOR, VOR/DME or VORTAC), the VOR indicator behaves the same. Unless otherwise noted, in this section, VOR, VOR/ DME and VORTAC NAVAIDs are all referred to hereafter as VORs.

The prefix "omni-" means all, and an omnidirectional range is a VHF radio transmitting ground station that projects straight line courses (radials) from the station in all directions. From a top view, it can be visualized as being similar to the spokes from the hub of a wheel. The distance VOR radials are projected depends upon the power output of the transmitter.

The course or radials projected from the station are referenced to magnetic north. Therefore, a radial is defined as a line of magnetic bearing extending outward from the VOR station. Radials are identified by numbers beginning with 001, which is 1 ° east of magnetic north, and progress in sequence through all the degrees of a circle until reaching 360. To aid in orientation, a compass rose reference to magnetic north is superimposed on aeronautical charts at the station location.

VOR ground stations transmit within a VHF frequency band of 108.0-117.95 MHz. Because the equipment is VHF, the signals transmitted are subject to line-of-sight restrictions. Therefore, its range varies in direct proportion to the altitude of receiving equipment. Generally, the reception range of the signals at an altitude of 1,000 feet above ground level (AGL) is about 40 to 45 miles. This distance increases with altitude. [Figure 16-28]

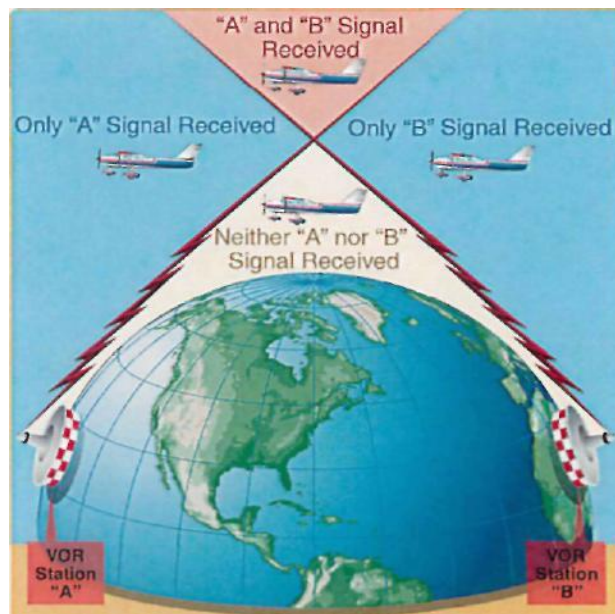


Figure 16-28. VHF transmissions follow a line-of-sight course

VORs and VORTACs are classed according to operational use. There are three classes:

- T (Terminal)
- L (Low altitude)
- H (High altitude)

The normal useful range for the various classes is shown in the following table:

VOR/VORTAC NAVAIDS

Normal Usable Altitudes and Radius Distances

Class	Altitudes	Distance (Miles)
T	12,000' and below	25
L	Below 18,000'	40
H	Below 14,500'	40
H	Within the conterminous 48 states only, between 14,500 and 17,999'	100
H	18,000'—FL 450	130
H	60,000'—FL 450	100

The useful range of certain facilities may be less than 50 miles. For further information concerning these restrictions, refer to the Communication/NAVAID Remarks in the A/FD.

NOTE: [“A/FD – Airport Facility Directory” is now referred to as “Chart Supplement U.S.”](#)

The accuracy of course alignment of VOR radials is considered to be excellent. It is generally within plus or minus 1°. However, certain parts of the VOR receiver equipment deteriorate, and this affects its accuracy. This is particularly true at great distances from the VOR station. The best assurance of maintaining an accurate VOR receiver is periodic checks and calibrations. VOR accuracy checks are not a regulatory requirement for VFR flight. However, to assure accuracy of the equipment, these checks should be accomplished quite frequently and a complete calibration each year. The following means are provided for pilots to check VOR accuracy:

- FAA VOR test facility (VOT)
- Certified airborne checkpoints
- Certified ground checkpoints located on airport surfaces

If an aircraft has two VOR receivers installed, a dual VOR receiver check can be made. To accomplish the dual receiver check, a pilot tunes both VOR receivers to the same VOR ground facility. The maximum permissible variation between the two indicated bearings is 4 degrees. A list of the airborne and ground checkpoints is published in the Chart Supplement U.S. (formerly referred to as A/FD).

Basically, these checks consist of verifying that the VOR radials the aircraft equipment receives are aligned with the radials the station transmits. There are not specific tolerances in VOR checks required for VFR flight. But as a guide to assure acceptable accuracy, the required IFR tolerances can be used — $\pm 4^\circ$ for ground checks and $\pm 6^\circ$ for airborne checks. These checks can be performed by the pilot.

The VOR transmitting station can be positively identified by its Morse code identification or by a recorded voice identification which states the name of the station followed by "VOR." Many FSS transmit voice messages on the same frequency that the VOR operates. Voice transmissions should not be relied upon to identify stations, because many FSS remotely transmit over several omniranges, which have names different from that of the transmitting FSS. If the VOR is out of service for maintenance, the coded identification is removed and not transmitted. This serves to alert pilots that this station should not be used for navigation. VOR receivers are designed with an alarm flag to indicate when signal strength is inadequate to operate the navigational equipment. This happens if the aircraft is too far from the VOR or the aircraft is too low and, therefore, is out of the line of sight of the transmitting signals.