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Air Force Services Center

Aero Club Program

Annual Instrument Exam

(Required Passing Score 80%)

1 FEBRUARY 2024

Exam Instructions:

1. Provide your answers on AF Form 1584C (Knowledge Exam Record)

2. References for this test include:

***Federal Aviation Regulations (FAR) 14 CFR Parts 61 and 91
Aeronautical Information Manual (AIM)
DAFMAN 34-152 dated 26 Dec 2023
Aero Club Instructor Standardization Guide
FAA-H-8083-16B Instrument Procedures Handbook
FAA-H-8083-15B Instrument Flying Handbook
FAA-H-8083-28 Aviation Weather Handbook
AC 90-107***

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Questions 1-20 Reference FAR/AIM

1. When executing a parallel procedure for a holding pattern, after crossing the fix, the pilot would turn to a heading parallel the holding course outbound on the: **(AIM 5-3-8 j.3.(a))**
 - a. Holding side of the holding pattern.
 - b. Non-holding side of the holding pattern for one minute.
 - c. Non-holding side of the holding pattern for 4 NM.

2. When filing an IFR flight plan an alternate is required except for when the destination airport has an instrument approach procedure and: **(14 CFR 91.169 b.2.i)**
 - a. The ceiling must be 600 feet and visibility must be 3 nautical miles, for an airport with a non-precision approach.
 - b. The ceiling must be 800 feet and visibility must be 2 nautical miles, for an airport with a precision approach.
 - c. The ceiling will be at least 2,000 feet above the airport elevation and the visibility will be at least 3 statute miles for at least 1 hour before and for 1 hour after the estimated time of arrival.

3. ADS-B equipment is required for flight except for: **(14 CFR 91.225 (d) 4)**
 - a. Airspace at and below 2500 above the surface.
 - b. In Class B and C Airspace.
 - c. Airspace above 10,000 Feet MSL.

4. In order to operate a civil aircraft under IFR using the VOR system of radio navigation the VOR equipment of that aircraft must be maintained, checked, and inspected under an approved procedure or been operationally checked within the previous 30 days using a(n) **(14 CFR 91.171 b. 1-3)**
 - a. Approved test signal with maximum bearing error of $\pm 4^\circ$.
 - b. Point on the airport surface designated as a VOR system checkpoint with maximum bearing error of $\pm 4^\circ$.
 - c. Airborne checkpoint with the maximum bearing error of $\pm 4^\circ$.
 - d. A or B.
 - e. All of the above.

5. When operating under IFR and experiencing two-way radio failure in VFR conditions or if VFR conditions are encountered after the failure pilots shall **(14 CFR 91.185 b)**
 - a. Immediately land
 - b. Continue the flight at assigned altitude and route, start approach at your ETA, or, if late, start approach upon arrival.
 - c. Continue the flight under VFR and land as soon as practicable.

6. An aircraft operating under 14 CFR part 91 IFR (Instrument Flight Rules) is required to have all of the following equipment except **(14 CFR 91.205 d)**
 - a. Slip-Skid Indicator
 - b. Gyroscopic pitch and bank indicator
 - c. Radar altimeter
 - d. Gyroscopic direction indicator

7. Before beginning any flight under IFR, the pilot in command must become familiar with all available information concerning that flight to include: **(14 CFR 91.103 a & b)**
 - a. Weather reports and Forecasts
 - b. Fuel requirements
 - c. Runway lengths at airports of intended use
 - d. All of the above

8. Can a Pilot make a straight in landing using an IAP with only circling minimums published (no straight-in minimums published)? **(AIM 5-4-20 c)**
 - a. Yes, if the pilot has the active runway in sight, have sufficient time to make a normal approach to landing, and when ATC has cleared them to land on that runway.
 - b. Yes, if the pilot lands on the active runway and has been cleared to do so by ATC.
 - c. No, the pilot must use the circling minimums.

9. Which is required to be reported to ATC without a specific request at all times?
(AIM 5-3-3 a. 1.(c))
- a. When leaving final approach fix inbound on final approach
 - b. A corrected ETA anytime a previous ETA is in error in excess of 2 minutes
 - c. When unable to climb or descend at a rate of at least 500 ft/min
 - d. All of the above
10. What is the floor of Class E airspace (shown as a magenta vignette on a sectional charts) when designated in conjunction with an airport which has an approved IAP? **(AIM 3-2-6 3.(a))**
- a. 500 feet AGL
 - b. 700 feet AGL
 - c. 1,200 feet AGL
11. What are the minimum qualifications for a person who occupies the other seat as a safety pilot during simulated instrument flight? **(14 CFR 91.109 (c) (1) (i))**
- a. Private pilot certificate with appropriate category and class ratings for the aircraft being flown.
 - b. Student pilot certificate with appropriate category and class rating for aircraft being flown
 - c. Private pilot certificate with an instrument rating
12. When being radar vectored for an ILS approach, at what point may you start a descent from your last assigned altitude to a lower minimum altitude if cleared for the approach? **(AIM 5-4-6 e. 1.)**
- a. Immediately to published glideslope intercept altitude
 - b. When within 5 miles of the FAF
 - c. When established on a published segment of a transition route, approach procedure segment, or other published route.

13. What does the CDI sensitivity transition to when flying a GPS approach within 2 NM of the Final Approach Waypoint with the approach mode armed? (**AIM 1-1-17 a 5.(e) (5)**)

- a. ± 1 NM
- b. ± 5 NM
- c. ± 0.5 NM
- d. ± 0.3 NM

14. If the GPS approach mode is not armed by 2 NM prior to the FAWP, the approach mode will not become active at 2 NM prior to the FAWP, and the equipment will flag. In these conditions, the RAIM and CDI sensitivity will not ramp down, and the pilot should: (**AIM 1-1-17, a 5. (e) (7)**)

- a. Fly to the MAWP and execute the missed approach
- b. Do not descend to the MDA
- c. Both A and B

15. Instrument departure procedures (DP's) provide obstruction clearance from the terminal area to the appropriate enroute structure. Which of the following are DP's? (**AIM 5-2-9 a.**)

- a. Obstacle Departure Procedure (ODP)
- b. Diverse Vector Areas (DVA)
- c. Standard Instrument Departure (SID)
- d. Both A and C

16. For IFR operations off of established airways below 18,000 feet MSL, VOR, VORTAC or TACAN navigational aids used to describe the "route of flight" should not exceed (**AIM 5-1-6 c. 3. (c)**)

- a. 260 NM
- b. 80 NM
- c. 40 NM
- d. 22 NM

17. Which flight time may be logged as instrument time when on an IFR flight plan?
(14 CFR 61.51 (g) 1)

- a. Only the time when you operate the aircraft solely by reference to instruments under actual or simulated instrument flight conditions.
- b. All of the time operating under an IFR flight plan.
- c. When the ceiling is forecast to be broken or overcast.
- d. When there is no visible horizon.

18. In order to act as pilot in command under IFR or weather conditions less than minimums prescribed for VFR you must have completed within the previous 6 months. (14 CFR 61.57 (c) (1) (i-iii))

- a. Six instrument approaches, emergency operations, holding procedures and tasks.
- b. Instrument approach procedures, emergency procedures, flight by reference to instruments.
- c. Six instrument approaches, holding procedures and tasks, intercepting and tracking courses through use of navigational electronic systems.
- d. Flight by reference to instruments, holding procedures and tasks, intercepting and tracking courses through use of navigational electronic systems.

19. True or False? Manual entry of waypoints using latitude/longitude or place/nearing is permitted for approach procedures using a GPS database. (AIM 1-1-17 2. (6) (b) (3))

- a. True
- b. False

20. Which of the following are acceptable visual references to continue below DH/DA while flying and ILS approach? (14 CFR 91.175 (c) (3) i-x)

- a. The threshold lights, the runway or runway markings, or taxi lighting.
- b. Red terminating bars, the threshold lights, or the visual glideslope indicator
- c. Airport beacon, the visual glideslope indicator, or the threshold.

Questions 21-25 reference AFMAN 34-152 & Instructor Standardization Guide

21. For pilots with less than 100 hours actual instrument time logged the weather minimums for IFR takeoffs must be no lower than _____ at the departure airport or the takeoff minimums listed in the terminal flight information publication for the airport, whichever is greater. (**DAFMAN 34-152 para 6.13.2**)
- The lowest compatible circling minimums, visibility only.
 - The lowest compatible approach minimums.
 - The lowest compatible circling minimums, both ceiling and visibility.
22. How long are instrument knowledge exams valid for? (**DAFMAN 34-152 para 6.11.9**)
- 6 Calendar Months
 - 18 Calendar Months
 - 24 Calendar Months
 - 12 Calendar Months
23. What items are mandatory to be accomplished during an initial or annual instrument flight check? (**Instructor Standardization Guide Pg.11**)
- Completed Instrument Exam, one precision and two non-precision approaches (VOR, GPS, ILS), Instrument & Equipment Failure.
 - One precision and two non-precision approaches (VOR, GPS, ILS), Holding procedures, Instrument & Equipment Failure.
 - One precision and two non-precision approaches (VOR, GPS, ILS), Holding procedures, Missed Approach Procedures.
24. True or False? The instrument checkout may be credited as an FAA Instrument Proficiency Check with prior instructor coordination and ensuring all FAA guidelines/requirements are met. (**Instructor Standardization Guide Pg.4**)
- True
 - False

25. Simulated night instrument practice in the local area requires: (**DAFMAN 34-152 para 6.14.10**)
- A second pilot on board.
 - A second pilot on board, with night currency in the aircraft being flown, and access to the flight controls.
 - An instrument rated instructor pilot.

Questions 26-35 reference FAA-H-8083-16B Instrument Procedures Handbook & FAA-H-8083-15B Instrument Flying Handbook

26. Departure design criterion begins with the assumption of an initial climb of _____ after crossing the departure end of the runway (DER) at a height of at least _____. (**FAA-H-8083-16B Instrument Procedures Handbook pg 1-16 Design Criteria**)
- 200 ft/NM; 0 feet
 - 400 ft/NM; 35 feet
 - 200 ft/NM; 35 feet
 - 400 ft/NM; 0 feet
27. Pilots should file IFR flight plans at least _____ prior to estimated departure to preclude possible delay in receiving a departure clearance from ATC. (**FAA-H-8083-15B Instrument Flying Handbook pg 10-2**)
- 30 minutes
 - 15 minutes
 - 60 minutes
 - 45 minutes
28. If visual reference is lost while circling-to-land from an instrument approach, what should you do? (**FAA-H-8083-15B Instrument Flying Handbook pg 10-21**)
- Execute the MAP by flying in the direction indicated on the IAP chart.
 - A circle-to-land procedure should not be conducted unless landing can be assured.
 - Execute the MAP making the initial climbing turn toward the landing runway and then maneuver to intercept and fly the missed approach course.

29. What temperature range will clear ice form? (**FAA-H-8083-15B Instrument Flying Handbook pg 10-24 Fig. 10-15**)

- a. 0°C to -10°C
- b. -10° to -15°C
- c. -15° to -20°C

30. Which of the following is not a Performance Instrument? (**FAA-H-8083-15B Instrument Flying Handbook pg 6-2**)


- a. Altimeter
- b. Attitude indicator
- c. Airspeed indicator
- d. Vertical speed indicator

31. What is the First fundamental skill in attitude instrument training? (**FAA-H-8083-15B Instrument Flying Handbook pg 6-10**)

- a. Power control
- b. Aircraft Control
- c. Instrument interpretation
- d. Cross-checking

32. True or False? The TO/FROM indicator determines if the aircraft is heading to or from the station. (**FAA-H-8083-15B Instrument Flying Handbook pg 9-11**)

- a. True
- b. False

33. What does the  symbol indicate on an approach chart? (**FAA-H-8083-15B Instrument Flying Handbook pg. 1-16**)

- a. Airport does not qualify for use as an alternate.
- b. Alternate takeoff procedures.
- c. The listing of alternate minimums should be consulted.

34. Low Altitude RNAV only routes are identified by the letter ___ prefix and are depicted in aeronautical _____. (**FAA-H-8083-16B Instrument Procedures Handbook pg 2-14**)

- a. V; Black
- b. Q; Blue
- c. T; Blue
- d. J; Black

35. Normal limits of localizer coverage allow for reliable coverage within ___ degrees of course centerline to ___ NM. (**FAA-H-8083-15B Instrument Flying Handbook pg 9-37 figure 9-34**)

- a. 35; 10
- b. 35; 18
- c. 10; 18
- d. Both A and C.

Questions 36-45 Reference FAA-H-8083-28 Aviation Weather Handbook and AC 90-107

36. The Automated Surface Observation System (ASOS) and Automated Weather Observing System (AWOS) broadcast area is defined as the area within _____ NM of the ASOS/AWOS station. (**FAA-H-8083-28 Aviation Weather Handbook 3.3.4.2.**)

- a. 25
- b. 80
- c. 150
- d. 100

37. A Terminal Aerodrome Forecast (TAF) is a concise statement of the... (**FAA-H-8083-28 Aviation Weather Handbook 27.3**)

- a. Current meteorological conditions significant to aviation for a specified time period within 5 sm of the center of the airports runway complex (terminal).
- b. Current meteorological conditions significant to aviation for a specified time period within 5 NM of the center of the airports runway complex (terminal).

- c. Expected meteorological conditions significant to aviation for a specified time period within 5 sm of the center of the airports runway complex (terminal).
 - d. Expected meteorological conditions significant to aviation for a specified time period within 5 NM of the center of the airports runway complex (terminal).
38. Convective Outlooks (AC) depict areas of general thunderstorms (**TSTMS**) in graphical and text formats on (**FAA-H-8083-28 Aviation Weather Handbook 27.16.1**)
- a. Day 1 through Day 3
 - b. Day 1 through Day 8
 - c. Day 1 only.
39. True or False? An indefinite ceiling is more hazardous than an equal ceiling caused by a layer aloft. (**FAA-H-8083-28 Aviation Weather Handbook 24.4.3.9 Fig 24-3**)
- a. True
 - b. False
40. What does “+TSRA GR” depict in a TAF or METAR? (**FAA-H-8083-28 Aviation Weather Handbook 24.4.3.8**)
- a. (Heavy) thunderstorm
 - b. Rain and Hail
 - c. (Heavy) thunderstorm, rain, and hail
 - d. Thunderstorm, rain and hail
41. The pressure altitude at a given location is indicated on the altimeter after the altimeter is set to: (**FAA-H-8083-28 Aviation Weather Handbook Appendix C**)
- a. Altimeter setting reported by ATIS
 - b. Field elevation
 - c. 29.92 inches of Mercury

42. Fog seldom forms when the temperature-dewpoint spread is greater than: (**FAA-H-8083-28 Aviation Weather Handbook 18.1.1**)


- a. 2°C
- b. 4°C
- c. 2° F

43. Pilots can select an alternate airport during their flight planning using an RNAV(GPS) approach to LNAV minimums, but must use IFR alternate airport weather minima guidance for _____. (**AC 90-107 8.a.**)

- a. Precision approach procedures
- b. Non-precision approach procedures
- c. Circling approach procedures
- d. Visual approach procedures

44. True or False? Upon Arrival at an alternate airport if the WASS navigation system indicated availability of LP, or LPV service the pilot may use that level of service to complete the instrument approach. (**AC 90-107 8.a.**)

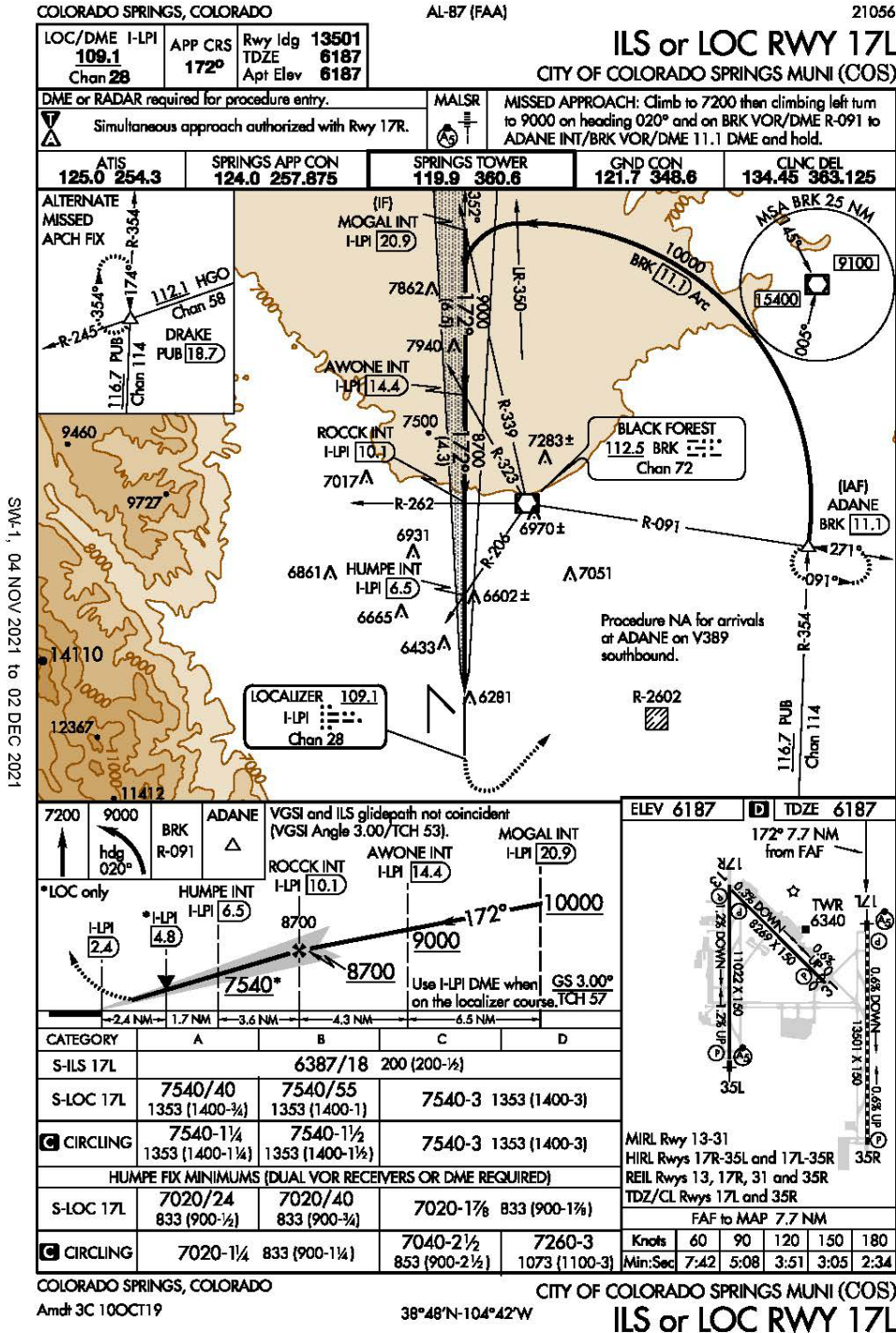
- a. True
- b. False

45. What does the  symbol indicate on RNAV (GPS) instrument approach charts? (**AC 90-107 8.c.**)

- a. A WAAS capable receiver is required to execute this approach.
- b. Operators must use LPV minima for flight planning to these airports.
- c. Operators must use LNAV minima for flight planning to these airports.
- d. NOTAMS or air traffic advisories are available for WAAS outages.

Reference the below Instrument Approach Plate for question 46-50

FOR TRAINING USE ONLY



46. You are cleared for the straight in localizer approach to 17L at Colorado Springs. Your airplane is equipped with a single VOR and DME both tuned to I-LPA. When can you descend below the MDA? (**AIM 5-4-5 (h)**)
- At HUMPE
 - At 7540'
 - At 7020'
 - At 4.8 DME
47. You are cleared for the straight in localizer approach to 17L at Colorado Springs. Your airplane is equipped with two VOR's, no DME, and is fully capable of IFR flight. One VOR is tuned to I-LPI and the other is tuned to BRK. You established on the localizer between MOGAL and AWONE at 9000' MSL. When can descend below 9000' MSL?
- This approach can't be flown due to not having DME on the aircraft
 - At R-323 off of BRK
 - At ROCCK
 - Glideslope intercept
48. You are cleared for the straight in localizer approach to 17L at Colorado Springs. Your airplane is equipped with two VOR's, no DME, and is fully capable of IFR flight. One VOR is tuned to I-LPI and the other is tuned to BRK. You just began your descent from ROCCK to the runway at 75 KIAS. How do you determine when to go missed approach?
- Once reaching HUMPE fix localizer minimums of 7020' MSL.
 - 2.4 DME
 - Timing of 7:42
 - Timing of 6:25
 - Timing of 5:08
49. What is the Circling Radius (NM) for the circling approach 17L at Colorado Springs for a CAT B approach category? (**AIM 5-4-20 Figure 5-4-28**)
- 1.5
 - 1.7
 - 1.9
 - 2.0

50. What are the weather minimums for a localizer approach 17L at Colorado Springs for a CAT A aircraft without dual VOR receivers or DME?

- a. $1400 - \frac{3}{4}$
- b. $1400 - 1 \frac{1}{4}$
- c. $900 - \frac{1}{2}$
- d. 1400-1