

PRACTICE EXAM 10: FINAL MASTERY SIMULATION — 105 QUESTIONS

1. What is the minimum class of medical certificate required to exercise commercial pilot privileges for hire?
 - A. Third-class medical
 - B. First-class medical
 - C. Second-class medical

2. A leg of 108 nautical miles is flown at a groundspeed of 144 knots. What is the leg time?
 - A. 30 minutes
 - B. 45 minutes
 - C. 60 minutes

3. A wing stalls when it exceeds what value, regardless of airspeed?
 - A. The critical angle of attack
 - B. The never-exceed speed
 - C. The maximum gross weight

4. A non-instrument-rated commercial pilot may not carry passengers for hire on cross-countries of more than what distance?
 - A. 50 nautical miles
 - B. 25 nautical miles
 - C. 100 nautical miles

5. An airplane covers 96 nautical miles in 32 minutes. What is its groundspeed?

- A. 150 knots
- B. 180 knots
- C. 200 knots

6. Which type of drag is greatest at low airspeed and high angle of attack?

- A. Parasite drag
- B. Interference drag
- C. Induced drag

7. Within how many days must a written report be filed after an aircraft accident?

- A. 5 days
- B. 10 days
- C. 30 days

8. Which V-speed provides the most altitude gained over the shortest horizontal distance?

- A. VX, best angle of climb
- B. VY, best rate of climb
- C. VA, maneuvering speed

9. On a constant-speed propeller airplane, which control sets the RPM?

- A. The throttle
- B. The propeller control

C. The mixture control

10. An airplane burns 10 gallons per hour for 3 hours. How much fuel is used?

A. 20 gallons

B. 25 gallons

C. 30 gallons

11. Which transponder code indicates lost two-way radio communication?

A. 7700

B. 7500

C. 7600

12. In a level turn, as the bank angle increases, what happens to load factor and stall speed?

A. Both increase

B. Both decrease

C. Both remain unchanged

13. Which document must be displayed and visible to the occupants of the aircraft?

A. The registration certificate

B. The weight and balance data

C. The airworthiness certificate

14. An airplane has 40 gallons usable and burns 8 gallons per hour. What is its endurance?

- A. 4 hours
- B. 5 hours
- C. 6 hours

15. What primarily causes the wingtip vortices of wake turbulence?

- A. The engine exhaust
- B. The propeller rotation
- C. The production of lift

16. A pilot flies within one wingspan of the surface and experiences reduced induced drag. What is this called?

- A. Ground effect
- B. Wind shear
- C. Adverse yaw

17. Which cloud type is associated with stable air?

- A. Stratiform clouds
- B. Cumuliform clouds
- C. Towering cumulus

18. A pilot computes the moment of a 250-pound load at an arm of 84 inches. What is it?

- A. 3,340 lb-in
- B. 21,000 lb-in
- C. 334 lb-in

19. What is the maximum speed at which the landing gear may be extended or retracted called?

- A. VLO, landing gear operating speed
- B. VLE, landing gear extended speed
- C. VNO, normal operating speed

20. An aircraft operated for hire requires which inspection in addition to the annual?

- A. A transponder inspection every 12 months
- B. A pitot-static inspection every 12 months
- C. A 100-hour inspection

21. Which hazardous attitude is countered by "Taking chances is foolish"?

- A. Macho
- B. Resignation
- C. Impulsivity

22. A field is at 5,000 feet pressure altitude with a temperature of 25°C (standard 5°C). What is the approximate density altitude using 120 feet per degree?

- A. 6,000 feet
- B. 7,400 feet
- C. 5,000 feet

23. Air circulates in which manner around a low-pressure system in the Northern Hemisphere?

- A. Clockwise and outward
- B. Counterclockwise and inward

C. Clockwise and inward

24. What is the primary purpose of the dual magneto ignition system?

A. To power the aircraft's radios

B. To increase fuel efficiency only

C. To provide redundancy and a more complete burn

25. Which front typically produces a narrow band of violent weather that passes quickly?

A. A cold front

B. A warm front

C. A stationary front

26. A pilot computes a 30° crosswind from a 22-knot wind. What is the approximate crosswind component?

A. 19 knots

B. 22 knots

C. 11 knots

27. What does RAIM provide in a GPS system?

A. Conversion of true course to magnetic heading

B. Verification of the integrity of the GPS position signal

C. Permanent flight-plan storage

28. How does maneuvering speed (V_A) change as weight decreases?

- A. It increases
- B. It remains constant
- C. It decreases

29. What is the minimum fuel reserve for a VFR flight during the day?

- A. Destination plus 30 minutes
- B. Destination plus 45 minutes
- C. Destination plus 60 minutes

30. A winds-aloft group reads "2150." What does it represent?

- A. Wind from 021° at 50 knots
- B. Light and variable winds
- C. Wind from 210° at 50 knots

31. Which airspace requires an explicit ATC clearance before a VFR aircraft may enter?

- A. Class C airspace
- B. Class B airspace
- C. Class D airspace

32. A spin requires a stalled wing and which additional condition?

- A. High airspeed
- B. Yaw
- C. A forward CG

33. A pilot computes a CG shift of 70 pounds moved 40 inches in a 2,800-pound airplane. How far does the CG move?

- A. 1.0 inch
- B. 2.0 inches
- C. 0.5 inch

34. Which type of fog forms on clear, calm nights as the ground cools?

- A. Advection fog
- B. Radiation fog
- C. Steam fog

35. What is the standard atmospheric pressure at sea level?

- A. 30.00 in. Hg
- B. 28.92 in. Hg
- C. 29.92 in. Hg

36. Which describes the danger of a microburst on approach?

- A. A steady, predictable headwind
- B. A constant crosswind only
- C. A shift from headwind to severe downdraft and tailwind

37. A winds-aloft group reads "7340." What does it represent?

- A. Wind from 230° at 140 knots
- B. Wind from 073° at 40 knots

C. Light and variable winds

38. Which checklist assesses a pilot's personal fitness to fly?

A. PAVE

B. IMSAFE

C. DECIDE

39. When the temperature is above standard, density altitude is what relative to pressure altitude?

A. Higher than pressure altitude

B. Lower than pressure altitude

C. Equal to pressure altitude

40. What color are the position lights on the right wingtip and the tail, respectively?

A. Red and white

B. White and green

C. Green and white

41. A pilot computes the standard temperature at 5,000 feet. What is it?

A. +5°C

B. +7°C

C. +3°C

42. A VOR used for IFR navigation must be checked within how many days?

- A. 90 days
- B. 30 days
- C. 12 calendar months

43. A 60° bank level turn produces a 2 G load factor. By approximately what percentage does the stall speed increase?

- A. 100%
- B. 41%
- C. 20%

44. Which describes a Convective SIGMET?

- A. Moderate turbulence affecting only light aircraft
- B. IFR ceilings and mountain obscuration
- C. Thunderstorm hazards affecting all aircraft

45. A pilot computes a leg time for 96 nautical miles at a groundspeed of 192 knots. How long?

- A. 30 minutes
- B. 45 minutes
- C. 20 minutes

46. What is the recommended minimum distance to remain from a severe thunderstorm?

- A. 5 nautical miles
- B. 10 nautical miles
- C. 20 nautical miles

47. A runway is aligned to a magnetic heading of 318°. What is its runway number?

- A. Runway 31
- B. Runway 32
- C. Runway 3

48. A complete electrical failure occurs in flight. What happens to the engine?

- A. It stops immediately
- B. It loses half its power
- C. It continues running on the magnetos

49. Which describes how to avoid wake turbulence when landing behind a larger aircraft?

- A. Stay at or above its flight path and land beyond its touchdown point
- B. Stay below its path and land before its touchdown point
- C. Match its exact glidepath and touchdown point

50. A pilot computes that a constant-speed propeller separates power from RPM. Which control sets manifold pressure?

- A. The throttle
- B. The propeller control
- C. The mixture control

51. Which describes the effect of a forward CG?

- A. Decreased stability and lower stall speed
- B. Increased stability and higher stall speed

C. No effect on handling

52. What action counteracts adverse yaw during a coordinated turn?

A. Rudder in the direction of the turn

B. Opposite aileron

C. Reduced power

53. A pilot computes the time to climb 6,000 feet at 750 feet per minute. How long?

A. 6 minutes

B. 10 minutes

C. 8 minutes

54. Which AIRMET covers moderate icing and freezing levels?

A. AIRMET Sierra

B. AIRMET Tango

C. AIRMET Zulu

55. What is the minimum fuel reserve for an IFR flight to a destination requiring an alternate?

A. 30 minutes beyond the destination only

B. Destination, then the alternate, plus 45 minutes

C. 45 minutes beyond the destination with no alternate fuel

56. A pilot computes the moment of a 200-pound load at an arm of 73 inches. What is it?

- A. 14,600 lb-in
- B. 273 lb-in
- C. 3,650 lb-in

57. Which describes the standard traffic pattern direction unless otherwise indicated?

- A. Right turns
- B. Left turns
- C. Straight-in only

58. A blocked pitot tube (with the drain blocked) during a climb causes the airspeed indicator to do what?

- A. Read zero immediately
- B. Behave like an altimeter, reading higher
- C. Read a constant accurate value

59. Which describes structural icing requirements?

- A. Visible moisture only
- B. A temperature above 10°C
- C. Visible moisture and a temperature of 0°C or colder

60. A pilot computes that an airplane covers 2 nautical miles per minute. What is the groundspeed?

- A. 120 knots
- B. 60 knots
- C. 100 knots

61. What is the purpose of leaning the mixture as altitude increases?

- A. To increase manifold pressure
- B. To cool the cylinders rapidly
- C. To restore the proper fuel-air ratio in thinner air

62. Which describes the right-of-way rule when two aircraft approach head-on?

- A. The aircraft on the left has the right of way
- B. Each pilot alters course to the right
- C. Both maintain heading

63. A pilot computes weight and balance: 1,700 lb empty at 39.0 in, 360 lb at 37.0 in, 200 lb at 73.0 in. What is the approximate CG?

- A. 39.0 inches
- B. 41.69 inches
- C. 45.0 inches

64. Which instrument is gyroscopic?

- A. The attitude indicator
- B. The altimeter
- C. The vertical speed indicator

65. What is required to operate in Class A airspace?

- A. An IFR clearance, since VFR is not permitted
- B. A Mode C transponder only

C. A special VFR clearance

66. Which describes the danger of an aft CG beyond the limit?

- A. It increases stall speed dramatically
- B. It makes the airplane impossible to taxi
- C. It makes stall and spin recovery more difficult

67. A pilot must determine the oxygen requirement above 14,000 feet cabin altitude. Which is correct?

- A. No oxygen is required
- B. The crew must use oxygen the entire time
- C. Oxygen is required only above 15,000 feet

68. Which describes the mature stage of a thunderstorm?

- A. Only building cumulus
- B. Predominantly downdrafts as it weakens
- C. Both updrafts and downdrafts, the most hazardous stage

69. A pilot computes the headwind component for a 22-knot wind at 30° off the runway. What is it?

- A. 19 knots
- B. 11 knots
- C. 22 knots

70. Which describes the privilege limitation for a non-instrument-rated commercial pilot?

- A. No passenger-for-hire beyond 50 NM or at night
- B. No passenger carriage at any time
- C. No restriction with a second-class medical

71. What is the conversion order from true course to compass heading?

- A. Compass → magnetic → true heading → true course
- B. True course → true heading → magnetic heading → compass heading
- C. True course → magnetic heading → true heading → compass heading

72. Which describes the effect of a tailwind on takeoff distance?

- A. It decreases the distance
- B. It has no effect
- C. It increases the distance

73. A pilot must determine the document not required for a domestic flight. Which is it?

- A. The airworthiness certificate
- B. The radio station license
- C. The operating limitations

74. Which describes the best glide speed after an engine failure?

- A. Near L/D_{max} , giving maximum gliding distance
- B. The never-exceed speed
- C. The stalling speed in the landing configuration

75. A pilot computes the cloud base from a temperature/dewpoint of 18°C/8°C using the spread divided by 2.5, times 1,000. What is it?

- A. 2,000 feet AGL
- B. 4,000 feet AGL
- C. 6,000 feet AGL

76. Which transponder code declares an emergency?

- A. 7600
- B. 7500
- C. 7700

77. What does the maximum elevation figure (MEF) on a sectional represent?

- A. The floor of the overlying controlled airspace
- B. The minimum en route IFR altitude
- C. The highest terrain or obstacle within a charted quadrangle

78. A pilot must determine the VFR weather minimums in Class B airspace. Which is correct?

- A. 3 SM visibility and clear of clouds
- B. 5 SM visibility and 1,000/1,000/1 SM
- C. 1 SM visibility and clear of clouds

79. Which describes the function of carburetor heat?

- A. To melt or prevent carburetor ice by warming induction air
- B. To enrich the mixture at altitude

C. To increase manifold pressure for takeoff

80. A pilot recognizes that VLO and VLE govern different gear operations. Which is correct?

A. They are identical speeds

B. VLE governs operating the gear; VLO governs flying with it extended

C. VLO governs operating the gear; VLE governs flying with it extended

81. Which describes the first lost-procedure step?

A. Confess to ATC

B. Climb to improve reception, range, and visibility

C. Comply with all instructions

82. A pilot must determine the required inspections for an aircraft used for flight instruction for hire. Which is correct?

A. Only an annual inspection

B. Both an annual and a 100-hour inspection

C. Only a 100-hour inspection

83. Which describes the effect of high humidity on density altitude?

A. It lowers density altitude

B. It has no effect

C. It raises density altitude because humid air is less dense

84. A pilot recognizes that holding out to the public for hire confirms common carriage. What is required?

- A. An air carrier certificate under Part 119
- B. Only a commercial certificate
- C. Nothing if the flight is under 50 NM

85. Which describes a special flight permit (ferry permit)?

- A. Authorization to fly an unairworthy-but-safe airplane for a specific purpose
- B. Authorization for a private pilot to fly for hire
- C. An exemption from carrying required documents

86. A pilot must determine the cloud clearance in Class C airspace. Which is correct?

- A. Clear of clouds
- B. 500 below, 1,000 above, 2,000 horizontal
- C. 1,000 below, 1,000 above, 1 SM horizontal

87. Which describes the heading indicator?

- A. It senses the magnetic field directly and never drifts
- B. It is a pitot-static instrument
- C. It is gyroscopic and precesses, requiring resetting to the compass

88. A pilot must determine the minimum age and total time for a commercial airplane certificate under the standard path. Which is correct?

- A. 16 years and 150 hours
- B. 21 years and 300 hours
- C. 18 years and 250 hours

89. Which describes the effect of exceeding the critical angle of attack at high airspeed in a steep turn?

- A. The wing cannot stall because airspeed is high
- B. The wing can stall above the published stall speed
- C. The airplane gains lift indefinitely

90. A pilot must determine the right of way of a glider relative to an airplane. Which is correct?

- A. The glider has the right of way
- B. The airplane has priority
- C. They share equal priority

91. Which describes when an outlook weather briefing is appropriate?

- A. When departure is six or more hours away
- B. When departing within the hour
- C. When updating prior information

92. A pilot must determine the effect of a blocked static port on the altimeter during a climb. Which is correct?

- A. It reads increasing altitude normally
- B. It reads decreasing altitude
- C. It freezes at the altitude where the blockage occurred

93. Which describes the danger of relying solely on the airspeed indicator to avoid a stall?

- A. The indicator is always inaccurate in turns

- B. The wing can stall at any airspeed if the critical angle is exceeded
- C. Stall speed never changes

94. A pilot must determine the maximum time the 100-hour inspection may be exceeded to reach maintenance, and how the excess is treated. Which is correct?

- A. Up to 25 hours, forgiven
- B. Up to 10 hours, interval restarts at zero
- C. Up to 10 hours, excess included in the next interval

95. Which describes the required crew oxygen between 12,500 and 14,000 feet cabin altitude?

- A. Required for the time exceeding 30 minutes
- B. Required the entire time
- C. Not required at any point

96. A pilot must determine the right of way of a balloon relative to an airplane. Which is correct?

- A. The balloon, being least maneuverable, has the right of way
- B. The airplane has priority
- C. They share equal priority

97. Which describes the standard traffic pattern altitude on the downwind leg?

- A. 500 feet AGL
- B. 1,000 feet AGL
- C. 2,500 feet AGL

98. A pilot must determine the correct climb speed and propeller setting to clear an obstacle. Which is correct?

- A. VY with low RPM
- B. VX with high RPM/low blade angle
- C. Maneuvering speed with high manifold pressure

99. Which describes the purpose of the GUMPS check on approach?

- A. To set cruise power for the descent
- B. To complete the engine run-up
- C. To verify gas, undercarriage, mixture, propeller, and switches before landing

100. A pilot must determine the right action for an inoperative item not required for the flight under §91.213(d). Which is correct?

- A. Repair it before any flight
- B. Report it to the NTSB
- C. Remove or deactivate and placard it "Inoperative"

101. Which describes the four forces in straight-and-level unaccelerated flight?

- A. Lift equals weight and thrust equals drag
- B. Thrust exceeds drag and lift exceeds weight
- C. Weight exceeds lift while thrust equals drag

102. A pilot must determine the VFR weather minimums in Class E at or above 10,000 feet MSL. Which is correct?

- A. 3 SM visibility with 500/1,000/2,000
- B. 5 SM visibility with 1,000/1,000/1 SM
- C. Clear of clouds with 1 SM visibility

103. Which describes the behavior of the magnetic compass when turning to a northerly heading?

- A. It overshoots, so roll out late
- B. It lags, so undershoot and roll out early
- C. It remains accurate during the turn

104. A pilot must determine which agency receives immediate notification of an aircraft accident. Which is correct?

- A. The local control tower
- B. The FAA Flight Standards District Office
- C. The National Transportation Safety Board

105. A pilot reviewing simulation scores wants to confirm readiness for the CAX. Which standard applies?

- A. Consistently scoring 85% or higher indicates readiness with headroom above the 70% pass line
- B. A 70% score guarantees a short checkride
- C. Any passing score signals full readiness

Exam 10 Answer Key with Full Answer Explanations

1. C — Exercising commercial pilot privileges for hire requires at least a second-class medical certificate. Third class supports only private privileges, and first class is the ATP standard. Second class is the commercial minimum.

2. B — Time equals distance divided by groundspeed: $108 \div 144 = 0.75$ hour = 45 minutes. At 144 knots the airplane covers 108 NM in 45 minutes. The relationship gives the leg time.
3. A — A wing stalls when it exceeds the critical angle of attack, regardless of airspeed or attitude. The published stall speed is merely the speed at which that angle is reached. This is why a stall can occur at any airspeed.
4. A — A non-instrument-rated commercial pilot may not carry passengers for hire on cross-countries of more than 50 nautical miles, nor at night. The limitation exists because instrument skills are deemed essential for those operations. Only the instrument rating lifts it.
5. B — Groundspeed equals distance divided by time: $96 \div (32 \div 60) = 96 \div 0.533 = 180$ knots. The relationship solves for speed. It is the inverse of the time computation.
6. C — Induced drag, the byproduct of lift, is greatest at low airspeed and high angle of attack, decreasing as airspeed increases. Parasite drag behaves oppositely. The two cross at L/D_{max} .
7. B — A written accident report must be filed within 10 days of an accident under Part 830. A still-missing overdue aircraft requires it within 7 days. These timelines are frequently tested.
8. A — VX, best angle of climb, provides the most altitude over the shortest horizontal distance, making it the obstacle-clearance speed. VY climbs fastest in time. Confusing the two has real consequences.
9. B — On a constant-speed propeller airplane, the propeller control sets the RPM via the governor, while the throttle sets manifold pressure. The mixture controls fuel-air ratio. The two power controls define the complex airplane.
10. C — Fuel equals rate times time: $10 \times 3 = 30$ gallons. This is the basic fuel-burn relationship. It underlies fuel planning.
11. C — Squawk 7600 indicates lost two-way radio communication. 7500 is hijacking and 7700 is emergency. "Seven-six, radio's nix" aids recall.

12. A — As bank angle increases in a level turn, load factor increases, which raises stall speed. The wing must produce more lift at a higher angle of attack. Steep turns demand airspeed attention.

13. C — The airworthiness certificate must be displayed and visible to the occupants, unlike the other ARROW documents. The registration and weight-and-balance data need only be aboard. The display requirement is unique to the airworthiness certificate.

14. B — Endurance equals usable fuel divided by burn rate: $40 \div 8 = 5$ hours. This is the basic endurance relationship. It determines flight duration.

15. C — Wingtip vortices are a direct byproduct of the wing producing lift. They are strongest behind a heavy, clean, slow aircraft. They are not caused by exhaust or the propeller.

16. A — Ground effect occurs within about one wingspan of the surface, reducing induced drag. It causes float on landing and can let an airplane lift off below safe climb speed. It is a reduction in induced drag.

17. A — Stable air produces stratiform (layered) clouds, smooth air, and poor visibility. Unstable air produces cumuliform clouds and turbulence. Matching cloud form to stability is a recurring theme.

18. B — Moment equals weight times arm: $250 \times 84 = 21,000$ lb-in. The moment is the turning tendency about the datum. It feeds the CG computation.

19. A — VLO, landing gear operating speed, is the maximum speed at which the gear may be extended or retracted. VLE governs flying with the gear already extended. The two are distinct and often confused.

20. C — An aircraft operated for hire requires a 100-hour inspection in addition to the annual. A privately flown aircraft needs only the annual. The for-hire use triggers the 100-hour.

21. A — The macho attitude is countered by "Taking chances is foolish." Recognizing the attitude allows applying the antidote. The exam pairs the five attitudes with their antidotes.

22. B — Density altitude equals pressure altitude plus the deviation times 120 feet: $5,000 + (25 - 5) \times 120 = 5,000 + 2,400 = 7,400$ feet. The 20°C above standard adds 2,400 feet. High temperature raises density altitude.

23. B — Air circulates counterclockwise and inward around a low-pressure system in the Northern Hemisphere, with rising air producing clouds and precipitation. Highs circulate clockwise and outward. The circulation is predictable.

24. C — The dual magneto system provides redundancy and a more complete burn by firing two spark plugs per cylinder. It is independent of the electrical system. The independence keeps the engine running during electrical failure.

25. A — A cold front produces a narrow band of often violent weather that passes quickly. A warm front produces widespread, steady weather. Their hazard profiles differ markedly.

26. C — The crosswind component equals wind speed times the sine of the angle: $22 \times \sin(30^{\circ}) = 22 \times 0.5 = 11$ knots. The headwind component would be about 19 knots. The crosswind is 11 knots.

27. B — RAIM (Receiver Autonomous Integrity Monitoring) verifies the integrity of the GPS position signal using redundant satellite information. It does not convert headings or store flight plans. Loss of RAIM means the position is no longer guaranteed accurate.

28. C — Maneuvering speed (V_A) decreases as weight decreases, because a lighter airplane reaches its limit load factor at a lower speed. This means a light airplane should slow more in turbulence. It is a reliable test point.

29. A — VFR day fuel reserve requires enough to reach the first point of intended landing plus 30 minutes at normal cruise. Night VFR requires 45 minutes. These are minimums.

30. C — "2150" decodes to wind from 210° at 50 knots; the direction ($21 \rightarrow 210^{\circ}$) is under 37 and the speed under 100, so no special encoding applies. The decode reads directly. It gives 210° at 50 knots.

31. B — Class B airspace requires an explicit ATC clearance before entry. Class C and D require only established two-way communication. This distinction is heavily tested.

32. B — A spin requires both a stalled wing and yaw, producing autorotation. High airspeed or a forward CG is not the requirement. Without yaw, a stall does not become a spin.

33. A — CG change equals $(\text{weight} \times \text{distance}) \div \text{total weight}$: $(70 \times 40) \div 2,800 = 2,800 \div 2,800 = 1.0$ inch. This is the standard weight-shift relationship. It gives the CG movement.

34. B — Radiation fog forms on clear, calm nights as the ground cools by radiation, common in low-lying areas at dawn. It burns off with daytime heating. Advection fog requires wind.

35. C — Standard sea-level atmospheric pressure is 29.92 in. Hg. This is used to set the altimeter for pressure altitude. It anchors the standard atmosphere.

36. C — A microburst produces a shift from an initial headwind to a severe downdraft and tailwind near the ground. It is not a steady headwind or a crosswind only. The shifting wind is the deadly trap.

37. A — Because the coded direction "73" exceeds 36, the special encoding applies: subtract 50 ($73 - 50 = 23 \rightarrow 230^\circ$) and add 100 to speed ($40 + 100 = 140$ knots). The result is 230° at 140 knots. This signals winds over 100 knots.

38. B — The IMSAFE checklist (Illness, Medication, Stress, Alcohol, Fatigue, Emotion) assesses the pilot's personal fitness to fly. PAVE assesses broader risk, and DECIDE structures the decision process. IMSAFE is the pilot self-assessment.

39. A — When temperature is above standard, density altitude is higher than pressure altitude, because warm air is less dense. The airplane then performs as though higher. This is why hot days degrade performance.

40. C — The right wingtip carries a green light and the tail a white light; the left wingtip is red. These colors reveal another aircraft's direction at night. They must be on from sunset to sunrise.

41. A — Standard temperature at 5,000 feet is $15 - (2 \times 5) = 15 - 10 = +5^{\circ}\text{C}$. The standard lapse rate is the basis. It is used to judge nonstandard deviations.

42. B — A VOR used for IFR navigation must be checked within the preceding 30 days. The permissible error varies by check type. The 30-day requirement is a reliable test point.

43. B — Stall speed increases with the square root of the load factor; at 2 Gs that is $\sqrt{2} \approx 1.41$, about a 41% increase. The 60°/2G/41% relationship is a classic figure. Steeper banks raise stall speed sharply.

44. C — A Convective SIGMET warns of thunderstorm hazards affecting all aircraft. It implies severe turbulence, severe icing, and low-level wind shear. It is the most serious in-flight advisory.

45. A — Time equals distance divided by groundspeed: $96 \div 192 = 0.5$ hour = 30 minutes. At 192 knots the airplane covers 96 NM in 30 minutes. The relationship gives the leg time.

46. C — Pilots should remain at least 20 nautical miles from a severe thunderstorm. Hail and turbulence can extend far from the visible storm. Never fly under, through, or near a thunderstorm.

47. B — A runway heading of 318° rounds to 320° ; dropping the last digit gives Runway 32. The designator is the magnetic heading rounded to the nearest 10 degrees. This is a standard chart-reading skill.

48. C — A complete electrical failure does not stop the engine, because the magnetos are independent and self-energizing. Radios, electric instruments, and lights are lost, but the engine runs. This independence is a key safety feature.

49. A — Landing behind a larger aircraft, stay at or above its flight path and land beyond its touchdown point to avoid the sinking vortices. Staying below or landing before its point enters the wake. Staying above is the avoidance principle.

50. A — On a constant-speed propeller airplane, the throttle sets manifold pressure (power), while the propeller control sets RPM. The mixture controls fuel-air ratio. Separating power from RPM is the constant-speed propeller's feature.

51. B — A forward CG increases stability and raises stall speed, because more tail-down force is needed. It also makes the airplane harder to flare. Forward CG is more stable but less efficient.

52. A — Adverse yaw is counteracted by applying rudder in the direction of the turn, producing coordinated flight. It is caused by aileron-induced drag, not the engine. Coordinated rudder corrects it.

53. C — Time to climb equals altitude gain divided by climb rate: $6,000 \div 750 = 8$ minutes. The relationship gives the climb time. It is a simple division.

54. C — AIRMET Zulu covers moderate icing and freezing levels. Sierra covers IFR/mountain obscuration, and Tango covers turbulence and wind. Matching the letter to its hazard is an easy point.

55. B — IFR fuel requires enough to reach the destination, then the alternate, plus a 45-minute reserve. A 30-minute reserve or destination-only fuel is insufficient. The IFR reserve includes the alternate plus 45 minutes.

56. A — Moment equals weight times arm: $200 \times 73 = 14,600$ lb-in. The moment is the turning tendency about the datum. It feeds the CG computation.

57. B — The standard traffic pattern uses left turns unless otherwise indicated. Right-hand patterns are used where noise, terrain, or airspace requires them. Left turns are the default.

58. B — A blocked pitot tube (with the drain blocked) during a climb causes the airspeed indicator to behave like an altimeter, reading higher. It does not read zero or stay accurate. Knowing the blockage behavior is a classic scenario.

59. C — Structural icing requires both visible moisture and a temperature of 0°C or colder, present simultaneously. Visible moisture alone, or temperatures above 10°C , do not produce structural ice. Both conditions must be met.

60. A — Two nautical miles per minute equals 120 knots (2×60). This relationship supports quick navigation estimates. It is a handy rule.

61. C — Leaning the mixture as altitude increases restores the proper fuel-air ratio in the thinner air, which would otherwise make the mixture too rich. It improves efficiency and prevents fouling. The mixture must be enriched again on descent.

62. B — When two aircraft approach head-on, each pilot alters course to the right. The left-aircraft rule applies to converging, not head-on, situations. "Turn right" ensures separation head-on.

63. B — CG equals total moment divided by total weight: $[(1,700 \times 39) + (360 \times 37) + (200 \times 73)] \div (1,700 + 360 + 200) = 94,220 \div 2,260 \approx 41.69$ inches. This is the core weight-and-balance computation. The CG is then checked against the envelope.

64. A — The attitude indicator is gyroscopic, as are the heading indicator and turn coordinator. The altimeter and VSI are pitot-static. Gyroscopic instruments require vacuum or electrical power.

65. A — Class A airspace requires an IFR clearance, since VFR is not permitted above 18,000 feet MSL. A transponder alone or a special VFR clearance does not suffice. Class A is IFR-only.

66. C — An aft CG beyond the limit makes stall and spin recovery more difficult by degrading the airplane's natural recovery tendency. It does not increase stall speed or prevent taxiing. The aft-CG recovery hazard is the danger.

67. B — Above 14,000 feet cabin altitude, the required minimum flight crew must use oxygen the entire time. Oxygen is required there, not only above 15,000 feet. The entire-time rule applies above 14,000 feet.

68. C — The mature stage has both updrafts and downdrafts and is the most hazardous, with heavy precipitation and the greatest turbulence. The cumulus stage is building, and the dissipating stage is weakening. The mature stage carries the greatest hazards.

69. A — The headwind component equals wind speed times the cosine of the angle: $22 \times \cos(30^\circ) = 22 \times 0.866 \approx 19$ knots. The crosswind component would be 11 knots. The headwind is about 19 knots.

70. A — A non-instrument-rated commercial pilot may not carry passengers for hire beyond 50 NM or at night. Some for-hire carriage within those limits remains permissible. A second-class medical does not remove the limitation.

71. B — The conversion runs true course → true heading (wind correction) → magnetic heading (variation) → compass heading (deviation). "True Virgins Make Dull Company" aids recall. The order must not be reversed.

72. C — A tailwind increases takeoff distance because the airplane must accelerate to a higher groundspeed to reach liftoff airspeed. A headwind decreases it. Downwind operations require more runway.

73. B — The radio station license is not required for domestic flight; it is needed only for international operations. The airworthiness certificate and operating limitations are required domestically. The radio license is the excluded item.

74. A — Best glide speed, near L/D_{max} , gives the maximum gliding distance after an engine failure. It is not the never-exceed or stall speed. Best glide maximizes the reachable landing sites.

75. B — Cloud base equals the spread divided by 2.5, times 1,000: $(18 - 8) \div 2.5 \times 1,000 = 4 \times 1,000 = 4,000$ feet AGL. The convective cloud base rises with the spread. This estimate aids planning.

76. C — Squawk 7700 declares an emergency. 7600 is lost comms and 7500 is hijacking. "Seven-seven, going to heaven" aids recall.

77. C — The maximum elevation figure (MEF) shows the highest terrain or obstacle within a charted quadrangle, in thousands and hundreds of feet MSL. It is not an airspace floor or IFR altitude. Pilots use it for safe altitude planning.

78. A — VFR flight in Class B airspace requires 3 statute miles visibility and clear of clouds. ATC separates traffic in Class B, so the cloud-clearance requirement is relaxed. The 3 SM/clear-of-clouds combination is the easy one.

79. A — Carburetor heat melts or prevents carburetor ice by warming the induction air. It does not enrich the mixture or increase manifold pressure for takeoff. It is the remedy for carburetor icing.

80. C — VLO governs operating (extending/retracting) the gear, and VLE governs flying with it extended. They are not identical or reversed. The two speeds govern different gear situations.

81. B — The first lost-procedure step is to climb to improve reception, range, and visibility. Confessing and complying follow. Climbing extends the airplane's reach.

82. B — An aircraft used for flight instruction for hire requires both an annual (every 12 months) and a 100-hour inspection. The annual alone or the 100-hour alone is insufficient. Both inspections apply.

83. C — High humidity raises density altitude because humid air is less dense than dry air. It does not lower density altitude or have no effect. Humidity worsens density altitude, though the effect is secondary.

84. A — A flight that holds out to the public for hire requires an air carrier certificate under Part 119. A commercial certificate alone is insufficient, and there is no under-50-NM exemption. Holding out triggers the certificate requirement.

85. A — A special flight permit (ferry permit) authorizes flying an unairworthy-but-safe airplane for a specific purpose, such as reaching maintenance. It does not grant commercial privileges or waive required documents. It addresses a narrow need.

86. B — Class C airspace VFR cloud clearance is 500 below, 1,000 above, 2,000 horizontal. Clear of clouds applies to Class B, and 1,000/1,000/1 SM applies above 10,000 in Class E. Class C uses the standard 152 clearance.

87. C — The heading indicator is gyroscopic and precesses, requiring periodic resetting to the magnetic compass. It does not sense the field directly or depend on altitude. Precession requires resetting.

88. C — A commercial airplane certificate under the standard path requires being at least 18 years old with a minimum of 250 hours total time. The 16/150 and 21/300 figures are incorrect. The 18-year/250-hour benchmark governs.

89. B — Exceeding the critical angle of attack in a high-speed steep turn can stall the wing above the published stall speed, because the increased load factor raises the actual stall speed. High airspeed does not prevent a stall. Angle of attack governs the stall.

90. A — A glider has the right of way over an airplane, because the priority order favors less maneuverable aircraft. The airplane does not have priority, and they do not share equal priority. The glider outranks the airplane.

91. A — An outlook briefing is appropriate when departure is six or more hours away. A standard briefing covers an imminent flight, and an abbreviated briefing updates prior information. The six-hour threshold is the trigger.

92. C — A blocked static port freezes the altimeter at the altitude where the blockage occurred, because it can no longer sense the changing static pressure. It does not read increasing or decreasing altitude. The static blockage freezes the altimeter.

93. B — Relying solely on the airspeed indicator is dangerous because the wing can stall at any airspeed if the critical angle is exceeded. The indicator is not always inaccurate, and stall speed does change with bank. Angle of attack governs the stall.

94. C — The 100-hour inspection may be exceeded by up to 10 hours to reach maintenance, with the excess included in the next interval. It is not 25 hours forgiven or a fresh restart. The 10-hour allowance with carryover applies.

95. A — Between 12,500 and 14,000 feet cabin altitude, the crew must use oxygen for the time exceeding 30 minutes. Oxygen is not required the entire time at those altitudes, nor is it never required. The 30-minute trigger governs.

96. A — A balloon, being the least maneuverable, has the right of way over an airplane. The airplane does not have priority, and they do not share equal priority. Less maneuverable aircraft have priority.

97. B — The downwind leg of the standard traffic pattern is typically flown at 1,000 feet AGL. This standard altitude promotes predictable traffic flow. Pilots announce the downwind on the CTAF at non-towered fields.

98. B — To clear an obstacle, set high RPM/low blade angle and climb at VX, which gives the most altitude over the shortest distance. VY with low RPM or maneuvering speed is wrong. VX and the takeoff propeller setting combine.

99. C — The GUMPS check (Gas, Undercarriage, Mixture, Propeller, Switches/Seatbelts) is run on approach to verify critical items, especially the gear down. It is not a cruise-power or run-up procedure. It guards against gear-up landings.

100. C — An inoperative item not required for the flight must be removed or deactivated and placarded "Inoperative" under §91.213(d). It need not be repaired before flight or reported to the NTSB. Placarding governs.

101. A — In straight-and-level unaccelerated flight, the four forces are in equilibrium: lift equals weight and thrust equals drag. Neither opposing pair is unequal in steady flight. A force imbalance produces a change.

102. B — Class E airspace at or above 10,000 feet MSL requires 5 SM visibility with 1,000/1,000/1-SM cloud clearance. The 3 SM/152 set applies below 10,000. The higher speeds at altitude demand the larger margins.

103. B — Turning to a northerly heading, the magnetic compass lags, so the pilot must undershoot and roll out early (UNOS — Undershoot North). It does not overshoot or stay accurate. This dip error is routinely tested.

104. C — Immediate notification of an aircraft accident goes to the National Transportation Safety Board under Part 830, not the FAA or the tower. While the FAA writes operating rules, accident reporting is an NTSB function. Confusing the agencies is a frequent error.

105. A — Consistently scoring 85% or higher indicates readiness with headroom above the 70% pass line and a shorter checkride oral. A 70% score does not guarantee a short checkride, and not every passing score signals full readiness. The 85% benchmark is the readiness standard.